

# Instructions for Use

## TDL-Single Link/ TDL-Dual Link

DVI Transmission Link

### **Important**

Please read the safety information and all information delivered with the product carefully to familiarize yourself with safe and effective usage.



## Legal information

### Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 <b>DANGER</b>
indicates that death or severe personal injury <b>will</b> result if proper precautions are not taken.
 <b>WARNING</b>
indicates that death or severe personal injury <b>may</b> result if proper precautions are not taken.
 <b>CAUTION</b>
indicates that minor personal injury can result if proper precautions are not taken.
<b>NOTICE</b>
indicates that material damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

### Qualified personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

### Use of EIZO products

 <b>WARNING</b>
EIZO products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by EIZO. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

### Trademarks

All names identified by ® are registered trademarks of their respective owners. Please refer to the trademarks listed in the appendix. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

### Disclaimer of liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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# Introduction

## 1.1 Contents of this document

This document describes the functionality and appropriate use of the DVI transmission links. TDL Single Link and TDL Dual Link.

The contents of this document are neither part of a previous or existing agreement, commitment or legal relationship, nor does it modify such.

## 1.2 Further documentation

Please also observe the information in the documentation of the connected monitor, the used PC, and the used graphics card.

## Safety notes

### Guaranteeing perfect operation

Please note that the TDL Single Link and TDL Dual Link DVI transmission links do not have a zero error rate and that the transmission parameters can change as time passes.

Ensure that all necessary steps are taken to avoid violations or incorrect diagnoses. Regular maintenance and calibration of the complete system are recommended.

Flawless, safe and reliable operation of the DVI transmission links requires proper transportation, storage, mounting and installation as well as careful operator control and service. The unit must only be used for applications in which a DVI transmission link is normally used. The technical specifications of the product must be observed.

## 2.1 General safety notes

Flawless, safe and reliable operation of the equipment assumes that it has been professionally transported, stored, mounted and installed as well as careful operator control and service. The units may only be used for applications for which monitors are normally used.

For safety reasons, the following precautions must be observed:

 <b>DANGER</b>
<p><b>Please observe all warning information present on the device and in the Instruction Manual</b></p> <p>There is a danger to life if warnings are not obeyed. Severe personal injury or damage to property may occur.</p> <p><b>Observe the safety requirements of EN 60601-1 (IEC 60601-1)</b></p> <p>To prevent injury to patients and users, connect the electrical system in accordance with the safety requirements of EN 60601-1 (IEC 60601-1) for "Safety requirements for medical electrical systems".</p> <p><b>Connecting the protective earth conductor</b></p> <p>If the device is connected to the supply mains, the device must be connected to a protective earth conductor. Only in this manner is it guaranteed that the touch leakage current in the first fault event does not exceed 500 <math>\mu</math>A.</p> <p>The protective earth conductor of the device is considered as a first fault event.</p> <p>Use the following measures to ensure that the leakage currents remain below the specified limits:</p> <ul style="list-style-type: none"><li>• Separators for signal input or signal output unit</li><li>• Use of a safety isolating transformer</li><li>• Use of the additional protective earth terminal</li></ul> <p>Monitor support: The arm of the monitor support must have its own protective earth conductor. This protective earth conductor guarantees, together with the protective earth conductor of the monitor, that the housing leakage current always remains less than 500 <math>\mu</math>A, even in the first fault event.</p> <p><b>No unauthorized opening of the device / no unauthorized service or maintenance work</b></p> <p>The device may only be opened by qualified personnel. Likewise, service or maintenance work may only be carried out by qualified personnel. There is a risk of electric shock.</p> <p>No liability is accepted for death and injury to persons or damage to property resulting from work carried out by non-qualified personnel.</p> <p><b>Do not touch components in the device</b></p> <p>If the device is connected to the supply mains, components in the device are subjected to high voltages. Touching the components may be fatal.</p> <p><b>No contact between device and patients</b></p> <p>The device is not suitable for direct contact with patients. Device and patient must never be touched simultaneously. Otherwise there is a danger to life and limb.</p>

 **DANGER**

**Please observe all warning information present on the device and in the Instruction Manual**

There is a danger to life if warnings are not obeyed. Severe personal injury or damage to property may occur.

**Never use defective power cables**

If a damaged or unsuitable power cable is used, it could result in a fire or electric shock. Only use power cables with PE contacts approved by the manufacturer.

**Disconnect the power cable correctly**

When disconnecting the power cable, always do so by holding the plug. Ensure that your hands are dry. There is a risk of electric shock.

**Do not insert any objects into the housing**

Objects inserted into the housing may result in an electric shock or damage to the device.

**Do not place any objects on top of the device**

If you place objects on top of the device, this can lead to overheating and fire.

**Avoid penetration of liquid**

If liquid penetrates the device, this may result in an electric shock or failure of the device.

 **CAUTION****Extensive damage to property may result if the device is not connected correctly**

That is why you should observe the warning information:

**Connection must be carried out by specialists**

Please ensure that all steps are taken to avoid injuries or incorrect diagnoses.

- Only use the video cables specified by the manufacturer for the connection.
- Only use power cables with PE contacts.
- Only use power outlets with PE contacts.
- Do not connect too many devices to a power outlet or extension cable.
- Observe the information provided by the respective manufacturer.
- If required by the application or local regulations, QA software must be used for quality control and documentation.

**Connection in the USA and Canada**

Molded power supply plugs must comply with the requirements for "hospital grade attachments" CSA Std. C22.2 No. 21 and UL 498.

**Connection in China**

Only use power cables approved for China. These power cables are identified by the labels "CCC" or "CQC".

**Observe the country-specific regulations**

Observe all regulations of the country in which the device is used.

**NOTICE**

**Extensive damage to property may result if the device is not connected correctly**

That is why you should observe the warning information:

- Desktop installation:  
Place the device on a solid and level surface. The attached stand, as well as the installation surface, must be suitable for the weight of the device.
- For mounting in a wall or ceiling support:  
The support must be suitable for the weight of the device.
- For installation in a mounting frame:  
Observe the installation sequence, and provide ventilation for the device.

**Provide adequate air circulation**

When installing the device, ensure that there is adequate air circulation for operation. The permissible ambient temperature range must not be violated. Otherwise the device could be destroyed by overheating.

**Avoid sources of heat**

Do not install the device in the vicinity of sources of heat, e.g. radiators, heating appliances or other devices which can generate or emit heat.

**Do not subject the device to jolting or shocks**

The device contains sensitive electronic components which could be damaged by jolting or shocks.

**Only switch on a cold device following adaptation to room temperature**

If the device is brought into a room with a higher or rising temperature, condensed water is formed in and on the device. Do not switch on the device until the condensed water has evaporated. Otherwise the device could be damaged.

**NOTICE****Extensive damage to property may result if the device is not connected correctly**

That is why you should observe the warning information:

**Transportation only in original packaging**

Use the original packaging for transportation, and transport in the correct shipping position. Be sure to particularly protect the LCD module of monitors from shocks.

**Care of device / cleaning agents**

- Remove water drops immediately; extended contact with water discolors the surface.
- Only clean the surfaces using the cleaning agents referred to in the Instruction Manual.
- Monitor: The screen is extremely sensitive to mechanical damage. Absolutely avoid scratches, shocks, etc.

**What to do if the device is faulty**

If the following conditions exist, the device must be disconnected from the supply mains and checked by qualified personnel:

- Damage to the plug or power cable.
- Following the entry of liquid into the device.
- If the device has been exposed to moisture.
- If the device does not function or if a fault cannot be eliminated using the Instruction Manual.
- If the device has been dropped and/or the housing damaged.
- If the device smells of burning or makes peculiar noises.

**Be aware of the aging of monitors**

Note that monitors can fail as a result of aging, and that image properties such as brightness, contrast or color value can change.

**Do not touch the monitor screen**

Due to mechanical pressure or electrostatic discharging, touching the screen can result in brief disturbances to the image.

## 2.2 Product-specific safety notes

 <b>DANGER</b>
<p><b>There is a danger to life if the warnings are not obeyed. Severe personal injury or damage to property may occur</b></p> <ul style="list-style-type: none"><li>• Do not open the devices yourself.</li><li>• Only use approved transmission cables. Cables not corresponding to the specification could lead to image faults or failures. Therefore only use the supplied cable or one specified by EIZO.</li></ul> <p><b>Connecting</b></p> <p>There must be no contact to a patient when handling the connection cables.</p>

<b>CAUTION</b>
<p><b>Failure to observe the warnings may result in substantial damage to property.</b></p> <p>Do not subject device to excessive shocks.</p> <p>Take care when transporting! Use the original packaging!</p>

## Description

### 3.1 Scope of delivery

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#### Note

EIZO recommends that you keep the packaging material for subsequent transport of the monitor.

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Observe the information in the documentation of the connected monitor, the used PC, and the used graphics card.

#### Single-link versions

Product	Order number	Description
TDL0000-T	6GF6010-9DA01	DVI single-link transmitter unit for connection to the DVI output of a graphics card.
TDL0000-R0	6GF6010-9DA02	DVI single-link receiver unit for connection to the DVI socket of a monitor, entry for cable and power supply at back (0°).
TDL0000-R9	6GF6010-9DA03	DVI single-link receiver unit for connection to the DVI socket of a monitor, entry for cable and power supply at side (90°).
TDL0000-C13	6GF6010-9DA13	13 m cable with RJ 45 connector and ferrites
TDL0000-C30	6GF6010-9DA30	<ul style="list-style-type: none"> <li>• 30 m cable with RJ 45 connector</li> <li>• 4 ferrites</li> </ul>
TDL3600-SL	6GF6010-0DA36	<ul style="list-style-type: none"> <li>• DVI single-link transmitter unit for connection to the DVI output of a graphics card.</li> <li>• DVI single-link receiver unit for connection to the DVI socket of a monitor, entry for cable and power supply at side (90°).               <ul style="list-style-type: none"> <li>– 36 m cable with RJ 45 connector</li> <li>– 4 ferrites</li> </ul> </li> </ul>

## Description

### 3.1 Scope of delivery

Product	Order number	Description
TDL3600-SL	6GF6010-1DA36	<ul style="list-style-type: none"><li>• DVI single-link transmitter unit for connection to the DVI output of a graphics card.</li><li>• DVI single-link receiver unit for connection to the DVI socket of a monitor, entry for cable and power supply at side (90°).<ul style="list-style-type: none"><li>– 36 m cable with RJ 45 connector</li><li>– 4 ferrites</li><li>– Power supply unit for the receiver</li></ul></li></ul>
TDL2300-SL	6GF6010-1DA23	<ul style="list-style-type: none"><li>• DVI single-link transmitter unit for connection to the DVI output of a graphics card.</li><li>• DVI single-link receiver unit for connection to the DVI socket of a monitor, entry for cable and power supply at side (90°).<ul style="list-style-type: none"><li>– 23 m cable with RJ 45 connector</li><li>– 4 ferrites</li><li>– Power supply unit for the receiver</li></ul></li></ul>

### Dual-link versions

Product	Order number	Description
TDL3600-DL	6GF6010-2DB00	<ul style="list-style-type: none"><li>• DVI dual-link transmitter unit for connection to the dual-link DVI socket of a graphics card, outputs for the cables at the back (0°).</li><li>• DVI dual-link receiver unit for connection to the dual-link DVI socket of a monitor, entry for cables at back (0°), power supply input at the side (90°).</li></ul>
TDL3600-DL	6GF6010-2DB36	<ul style="list-style-type: none"><li>• 1 x DVI dual-link transmitter units for connection to the dual-link DVI output of a graphics card, outputs for the cables at the back (0°).</li><li>• 1 x DVI dual-link receiver unit for connection to the dual-link DVI socket of a monitor, entry for the cables at back (0°), power supply input at the side (90°).</li><li>• 2x 36 m cable with RJ 45 connector.</li></ul>
TDL3600-QL	6GF6010-4DB36	<ul style="list-style-type: none"><li>• 2 x DVI dual-link transmitter units for connection to the dual-link DVI output of a graphics card, outputs for the cables at the back (0°).</li><li>• 2 x DVI dual-link receiver unit for connection to the dual-link DVI socket of a monitor, entry for the cables at back (0°), power supply input at the side (90°).</li><li>• 4 x 36 m cable with RJ 45 connectors</li><li>• Fixing materials for installation of the receiver module in the EIZO RadiForce® LS580W monitor.</li></ul>

## 3.2 Applications

The TDL transmission links serve as the connection between DVI graphics cards and monitor, for both single-link and dual-link connections. The TDL transmission links allow the maximum standard distance to be exceeded for image transmissions when using conventional cables. The maximum distance for conventional connecting cables is 5 m between PC and monitor.

### Approved and tested monitors

The TDL transmission link is always compatible with all EIZO monitors. You need only observe that you require a single-link, dual-link or quad-link version.

You can request additional information using the e-mail contact address.

### Further applications

#### **TDL0000-SL versions with power supply unit (Order Nos.: 6F6010-1DA36, 6F6010-1DA23)**

With these versions it is also possible to operate monitors that have not been released by EIZO. No guarantee of function can be accepted, however, as not all monitors on the market can be tested by EIZO.

### **3.3 Important features**

The DVI transmission link has the following features which permit a wide range of applications:

#### **Covering of long distances between picture source and monitor**

With the TDL transmission links you obtain error-free transmission of picture data at a distance of up to 36 m between the PC and monitor. This makes it possible to route DVI to ceiling-mounted monitors.

#### **Compact design**

Low weight and small dimensions are features of the transmitter and receiver modules. The modules are simply screwed onto the DVI interfaces.

The small RJ 45 connectors on the cable mean that it is possible to insert it through small tubes and openings.

#### **DVI compatibility**

The TDL transmission links allow transmission of image signals according to the DVI standard. The monitor-specific characteristic data (EDID) is also transferred over the link.

#### **Screen resolution**

The TDL transmission links can be used to transmit digital image signals with a resolution of up to 1920 x 1200 at a image refresh rate of 60 Hz. Higher resolutions are also possible at a reduced refresh rate.

## Application planning

### Ensure unimpeded access to power supply unit and connections

<b>CAUTION</b>
<b>Power supply unit and connections must be accessible at all times</b>
When assembling or installing the device, ensure that the power supply unit and the connections are accessible at all times.

### Observe the permissible ambient temperature range

The unit must not be operated outside the permissible ambient temperature range.

### Change of environment

If the unit is brought into a warm environment from a cold one, condensation may form in the unit. The device may therefore be damaged if it is switched on.

- Wait until the condensed water has evaporated, including that inside the device, before you switch it on again. The warming-up process may possibly take several hours.

## 4.1 Cable routing

### Only use supplied cable

The cable properties have a major influence on the transmission quality. Therefore only the supplied cable or a specified cable may be used.

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#### Note

#### Observe the enclosed documentation

Please observe any documentation provided with the cable.

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### Observation of minimum bending radii

- To retain the special transmission properties, the cable must not be kinked.
- The bending radius must not be less than five times the outer diameter of the cable.

### Routing the cable

- Signal cables have to be routed separately from power supply cables to avoid mutual influencing. This particularly applies to the routing of cables used to transmit picture signals.
- Avoid potential differences between PC and monitor as well as ground loops.

### Do not concatenate cables

Concatenating several cables results in deterioration of picture quality: Interferences and artifacts occur in the pictures.

### Do not cascade TDL transmission links

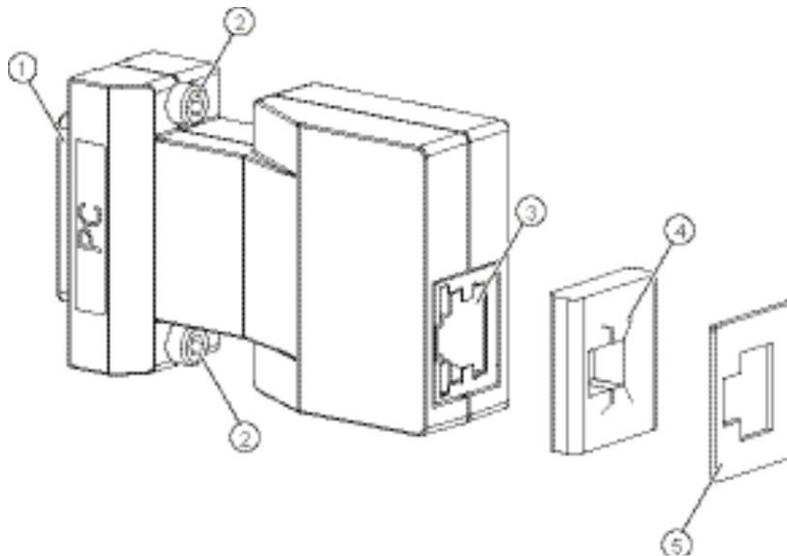
The cascading of several TDL transmission links results in deterioration of picture quality: Interferences and artifacts occur in the pictures.

## Assembly

### 5.1 Mounting of unit

#### Attachment to a PC

1. Plug the transmitter module directly onto the DVI socket of the graphics card.
2. Tighten hexagon socket screws.

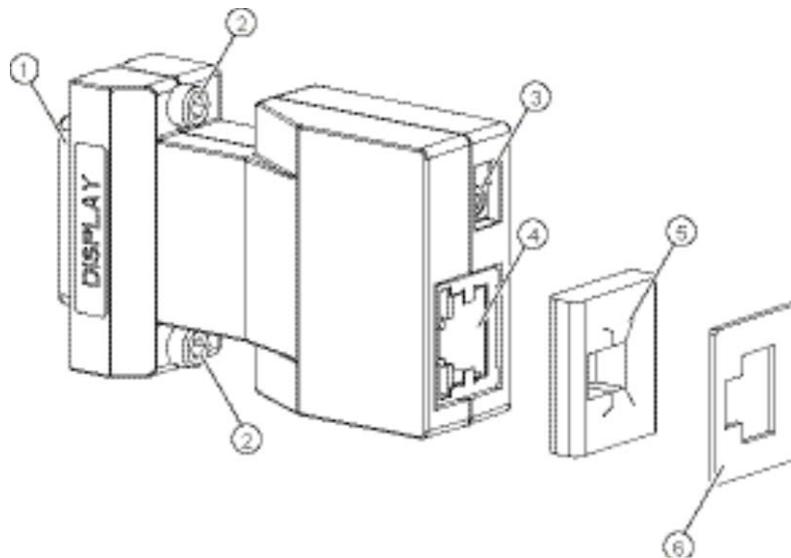


- ① DVI connector to PC
- ② Hexagon socket screws
- ③ RJ 45 socket for connection of the data cable
- ④ EMC-cushion
- ⑤ EMC holder

Attachment to a monitor

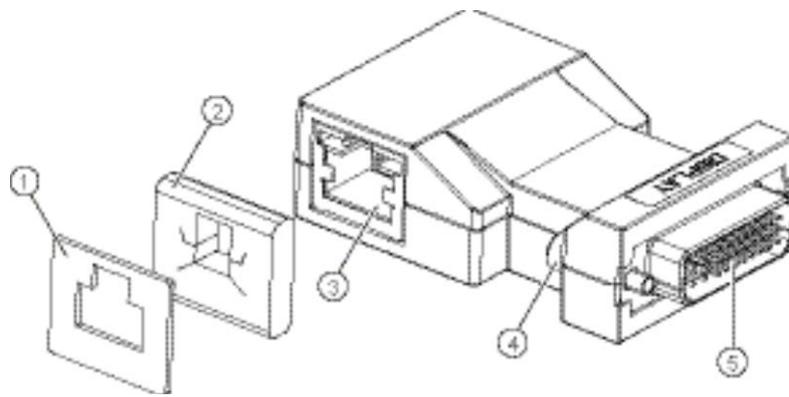
<b>CAUTION</b>
<b>Avoiding EMC faults</b>
The EMC cushion must be placed on a conducting surface of the monitor to avoid electromagnetic interference.

1. Plug the receiver module onto the DVI socket of the monitor.
2. Tighten hexagon socket screws.  
If necessary use a small screwdriver.



- ① DVI connector to monitor
- ② Hexagon socket screws
- ③ 5 V connection
- ④ RJ 45 socket for connection of the data cable
- ⑤ EMC-cushion
- ⑥ EMC holder

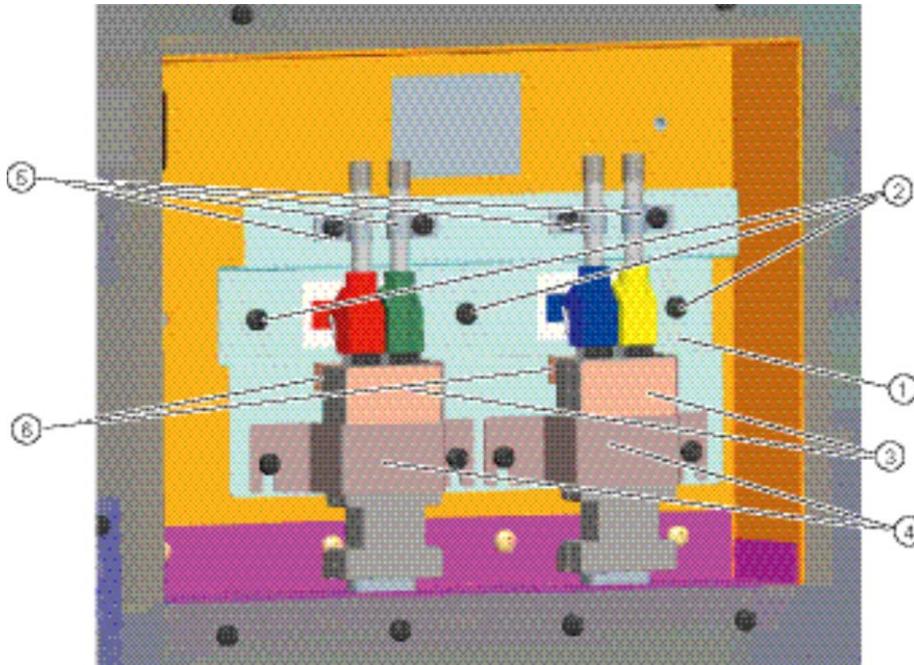
Figure 5-1 Receiver module with straight input socket



- ① EMC holder
- ② EMC-cushion
- ③ RJ 45 socket for connection of the data cable
- ④ Hexagon socket screw
- ⑤ DVI connector to monitor

Figure 5-2 Receiver module with lateral input socket

### Attachment of TDL3600-QL to RadiForce LS580W



- ① Mounting bracket
- ② 3 screws for attaching the mounting bracket
- ③ Receiver modules
- ④ Holding plates
- ⑤ Cable clips
- ⑥ EMC-cushion

In order to achieve an optimum attachment to the RadiForce LS580W monitor, a special mounting kit has been designed.

1. First attach the mounting bracket ① in the connection recess of the monitor using the three screws ②.
2. Stick the EMC cushions ⑥ on the top edge of the receiver module as shown in the drawing.
3. Then insert the receiver modules ③ in the DVI sockets and screw down the holding plates ④.
4. Then connect the cables according to the color coding and secure with the cable clips ⑤.

### Attachment of TDL3600-DL to a Large Monitor Manager

- Attaching the TDL3600-DL to the LMM56800 corresponds to mounting the DP modules to the LMM56800  
Please observe the information in the LMM56800's Instructions for Use.
- For attaching the TDL3600-DL to the LMM0802 an optional holder is available.  
Please contact the local sales representative.

## Connecting

### 6.1 General connection information

 <b>CAUTION</b>
All information and warnings related to this product must be observed to ensure danger-free operation.

<b>CAUTION</b>
<b>Changes to device</b>
<ul style="list-style-type: none"> <li>• Device settings may only be adjusted by trained service personnel; otherwise, the warranty is void.</li> <li>• Do not make any changes to the device without prior approval from the manufacturer.</li> </ul>

The unit does not have its own power supply, it is powered from the monitor or PC.

<b>CAUTION</b>
<b>Observe shielding measures</b>
Please observe all local EMC guidelines pertaining to shielding. If these requirements are not observed, interference signals could penetrate the monitor.
<b>To guarantee perfect image reproduction, the following instructions should be observed:</b>
<ul style="list-style-type: none"> <li>• Only shielded cables are permitted for all signal connections.</li> <li>• Screw tight or lock all plug-in connections.</li> <li>• Signal and power cables must not be routed through the same duct.</li> <li>• The display must not share a power supply with motors or valves (interference peaks!).</li> </ul>

<b>CAUTION</b>
<b>Completely disconnect device from the supply mains</b>
To completely disconnect the device from the supply mains, you must disconnect the power supply unit from the supply mains.
<ul style="list-style-type: none"> <li>• Remove the plug of the power supply unit from the socket.</li> <li>• Switch off the monitor and signal source.</li> </ul>
The device is now switched off and disconnected from the supply mains.

## 6.2 Connecting the signal cables

 <b>DANGER</b>
<b>Only connect device to a supply mains with a PE conductor</b>
WARNING: To avoid risk of electric shock, this equipment must only be connected to a supply mains with protective earth.

 <b>CAUTION</b>
<b>Ensure that routed cables do not result in tripping hazards</b>
When routing the cable, make sure that it cannot be tripped over.

<b>CAUTION</b>
<b>Mechanically relieve cable strain on the PC and monitor</b>
At the PC end, make sure that the cable on the PC and monitor is not subject to any mechanical strain. There should be no tension on the RJ 45 sockets or on the power supply sockets.

<b>CAUTION</b>
<b>Power supply unit with approval for medical applications required</b>
In the case of monitors not obtained from EIZO, a power supply unit is required with approval for medical applications in order to power the receiver module. The power supply unit is only included in the TDL versions TDL3600-SL (Order No. 6F6010-1DA36) and TDL2300-SL (Order No. 6F6010-1DA23).

- Insert the cable at the PC and monitor ends into the RJ45 socket of the transmitter or receiver module.

The attached detent lug prevents the cable from working loose. To improve the cable routing, the RJ45 socket on the receiver end is secured either at the side or rear.

### Connecting the external power supply unit

If you connect an external power supply unit, all requirements for a medical electrical system (ME system) must be observed.

# Commissioning

## 7.1 Switching on the device

- The TDL modules do not have their own power switch and are switched on together with the PC or monitor.

## 8.1 Note for users

The TDL modules do not have any operator controls. Manual settings are not required. All parameters required for operation are optimized automatically. All relevant signals are transmitted without operator intervention.

## Service and maintenance

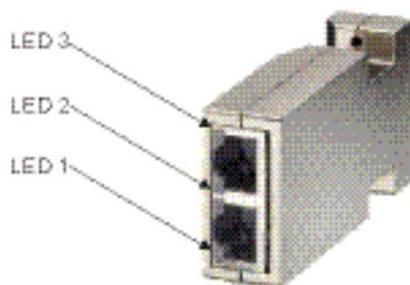
The TDL modules and cables require no service or maintenance.

<b>CAUTION</b>
<b>In the event of a fault, also refer to the documentation for the monitor</b>
Whenever a fault occurs, also refer to the monitor's instruction manual since important information on operating states can be found there.

<b>Fault</b>	<b>Cause</b>	<b>Remedy</b>
No picture appears on the monitor, operation LED off	Monitor not switched on. Power cable is not plugged in or incorrectly plugged in.	Switch on monitor or plug in power cable.
No picture appears on the monitor, operation LED on	No picture signal.	Check correct seating of transmitter and receiver modules. Check that the cable is inserted correctly at both ends.
	Picture source not supplying a signal.	Check picture source.
	Picture source is sending a signal which cannot be output on the monitor.	Set the picture source correctly.
	Older unit from EIZO Display Technologies; receiver module is not powered.	Obtain power supply cable between monitor and receiver module from servicing department.
	Not an EIZO Display Technologies unit.	Obtain power supply unit from servicing department.

Operating state for 6F6010-2DB00 (transmitter)

Fault	Cause	Remedy
All LEDs off	Normal state	No problem
LED 2 flashing	Data traffic DDC	No problem
LED 3 lit	Single-link mode	No problem
	Cable to Link 2 defective or not connected	Check cable, replace if necessary
LED 1 and 3 are lit	Receiver not connected	Connect receiver



## Technical specifications

### 11.1 General data

	<b>TDL0000-SL</b>	<b>TDL000-DL</b>
Type	DVI Single Link transmission link	DVI Dual Link transmission link
DVI signal	TMDS signal, regenerated at receiver end	TMDS signal, regenerated at receiver end
DDC transfer	<ul style="list-style-type: none"> <li>• DDC CI</li> <li>• EDID (even if the monitor is switched off)</li> </ul>	<ul style="list-style-type: none"> <li>• DDC CI</li> <li>• EDID (even if the monitor is switched off)</li> </ul>
Maximum distance between transmitter and receiver modules	36 m	36 m
Maximum DVI clock frequency	Up to 36 m long cable at 165 MHz, only for approved cable	Up to 36 m long cable at 165 MHz, only for approved cable
Screen resolutions	<p>Up to 1920 x 1200 pixels at 60 Hz</p> <p>Higher resolutions are also possible at a reduced refresh rate</p>	<p>Up to 2560 x 1600 or 2160 x 1920 at 60 Hz</p> <p>Higher resolutions are also possible at a reduced refresh rate</p>
Approved transmission cable	Only use transmission cables included in the scope of delivery or other approved for use by EIZO. Additional cables and/or adapters may not be used within the transmission link.	

## 11.2 Power supply

<b>CAUTION</b>
External power supply units for the TDL receiver modules must be approved according to IEC 60601, and comply with the country-specific directives. The power and current of this power supply unit must not exceed 25 VA or 5 A respectively.

### Single-link versions

#### Transmitter module

5 V DC	Via DVI interface, max. 50 mA
--------	-------------------------------

#### Receiver module

5 V DC	Via DVI interface, max. 200 mA
5 V DC	Via external power supply
Assignment 	5 V DC $\pm 5\%$

### Dual-link versions

#### Transmitter module

5 V DC	Via DVI interface, max. 20 mA
--------	-------------------------------

#### Receiver module

5 V DC	Via DVI interface, max. 400 mA
5 V DC	Via external power supply or supplementary cable from monitor
Assignment 	5 V DC $\pm 5\%$

#### Optional power supply unit

Input	
• Voltage	100 ... 240 V AC, -10 %, +10 %
• Frequency	47 ... 63 Hz
• Max. current	0.35 A with 90 V AC input voltage
DC output	
• Voltage	5 V $\pm 1\%$
• Max. current	2 A
Approvals	CULus2601, IEC 60601-1

## 11.3 Inputs/outputs, connection elements

### Transmitter module

<b>Single-link versions</b>	
DVI-D input	DVI-D plug (analog pins are not assigned)
RJ 45 output	<ul style="list-style-type: none"><li>• DVI picture signal (single link)</li><li>• DDC signal</li><li>• Hotplug detect</li></ul>

<b>Dual-link versions</b>	
DVI-D input	DVI-D plug dual-link (analog pins are not assigned)
RJ 45 output, primary	<ul style="list-style-type: none"><li>• DVI picture signal (channel 1 ... 3)</li><li>• DDC signal</li><li>• Hotplug detect</li></ul>
RJ 45 output, secondary	DVI picture signal (channel 4 ... 6)

### Receiver module

<b>Single-link versions</b>	
RJ 45 input	<ul style="list-style-type: none"><li>• DVI picture signal (single link)</li><li>• DDC signal</li><li>• Hotplug detect</li></ul>
DVI-D output	Restored DVI signal via DVI-D plug (analog pins are not assigned)

<b>Dual-link versions</b>	
RJ 45 input, primary	<ul style="list-style-type: none"><li>• DVI picture signal (channel 1 ... 3)</li><li>• DDC signal</li><li>• Hotplug detect</li></ul>
RJ 45 output, secondary	DVI picture signal (channel 4 ... 6)
DVI-D output	Restored dual-link DVI signal via DVI-D plug (analog pins are not assigned)

## 11.4 Mechanical design

Housing components	ABS metallized, TPE
Degree of protection	IP20 acc. to DIN 40050
Weight	Approx. 0.1 kg (without cable)
Dimensions (W x H x D) in mm	
• TDL SL transmitter (without cable)	65 x 40 x 18
• TDL SL receiver, versions with cable connection at side and cable connection at rear (without cable)	65 x 40 x 18
• TDL DL transmitter (without cable)	83 x 40 x 18
• TDL DL receiver (without cable)	83 x 40 x 18

## 11.5 Climatic conditions

### During operation

Temperature range	5 °C to 50 °C ambient temperature
Temperature gradient	Max. 5 °C/h, no condensation
Humidity	Max. 85 %, relative
Atmospheric pressure	1060 to 600 hPa

### Transport and storage (packed)

Temperature range	-20 °C ... +60 °C ambient temperature
Temperature gradient	Max. 5 °C/h, no condensation
Humidity	Max. 95 %, relative
Atmospheric pressure	1060 to 600 hPa

## 11.6 Safety specifications



This product has been assigned a CE marking in compliance with the stipulations of directives 2014/30/EU, 2014/35/EU and 2011/65/EU.

---

Safety standards

- IEC/EN 60601-1
- CAN/CSA - C 22.2 No.60601-1
- ANSI/AAMI ES60601-1

---

Degree of protection according to DIN 40050

IP20

---

## 11.7 Electromagnetic compatibility

DVI transmission links were designed to distribute video, audio and control signals in real time.

### CAUTION

Special EMC provisions are required for use of the DVI transmission links. Installation, assembly, and use must take place in compliance with the following instructions.

- Only use the cables included in the scope of delivery or recommended by the manufacturer. The use of other cables can result in increased electromagnetic radiation and reduced electromagnetic interference immunity of the device, as well as improper use.
- When using a portable RF communications device, maintain a distance of at least 30 cm from all parts of the device. Otherwise, problem-free function of the device cannot be guaranteed.

<b>Electromagnetic interference immunity</b>			
<p>DVI transmission links were tested with the following compliance levels in accordance with the test requirements for professional healthcare facilities, as established in IEC/EN 60610-1-2. Customers and users of the DVI transmission links have to ensure that the device is used in such an environment.</p>			
<b>Interference immunity test</b>	<b>Measurement level</b>	<b>Compliance level</b>	<b>Information regarding the electromagnetic environment</b>
Electrostatic discharge (ESD) IEC/EN 61000-4-2	±8 kV contact ±15 kV air	±8 kV contact ±15 kV air	It is recommended to use the device on wood, concrete, or ceramic floors. If the floor is made of synthetic material, the relative humidity should be at least 30%.
Fast transient electric disturbances (bursts) IEC/EN 61000-4-4	±2 kV power lines ±1 kV input / output lines	±2 kV power lines ±1 kV input / output lines	The power supply quality has to correspond to that of typical industrial environments or hospitals.
Surge voltage IEC/EN 61000-4-5	±1 kV line against line ±2 kV line against ground	±1 kV line against line ±2 kV line against ground	The power supply quality has to correspond to that of typical industrial environments or hospitals.
Voltage dips, brief interruptions, and fluctuations of power supply lines IEC/EN 61000-4-11	0 % VT for 0.5 periods and 1 period 70 % VT for 25 / 30 periods at 50 / 60 Hz 0 % VT for 250 / 300 periods at 50 / 60Hz	0 % VT for 0.5 periods and 1 period 70 % VT for 25 periods at 50 Hz 0 % VT for 250 periods at 50 Hz	The power supply quality has to correspond to that of typical industrial environments or hospitals. If the monitor has to continue operation even if the power supply is interrupted, it is recommended to connect the device to an uninterruptible power supply or battery.
Magnetic fields with energy technology frequencies IEC/EN 61000-4-8	30 A/m (50 / 60 Hz)	30 A/m (50 Hz)	The magnetic fields with energy technology frequencies must be in an area that is representative of a typical location in a typical industrial environment or hospitals. The device should be used at least 15 cm away from the source of magnetic fields with energy technology frequencies.
<p><b>Note:</b> VT is the alternating current voltage before application of the measurement level.</p>			

Electromagnetic interference immunity			
<p>DVI transmission links were tested with the following compliance levels in accordance with the test requirements for professional healthcare facilities, as established in IEC/EN 60601-1-2. Customers and users of the monitor have to ensure that the device is used in such an environment.</p>			
Interference immunity test	Measurement level	Compliance level	Information regarding the electromagnetic environment
Line-based disturbances caused by RF fields IEC/EN 61000-4-6	3 V <sub>rms</sub> 150 kHz to 80 MHz	3 V <sub>rms</sub>	<p>Portable and mobile RF communications devices may only be operated in the vicinity of the monitor and its components (including cables) when in compliance with the recommended minimum distance. It is determined using the formula for calculating the frequency of the transmitter. Recommended minimum distance  <math>d = 3.5/3 \sqrt{P} = 1.2 \sqrt{P}</math>, 150 kHz to 80 MHz  <math>d = 2 \sqrt{P}</math>, ISM bands between 150 kHz and 80 MHz  <math>d = 3.5/3 \sqrt{P} = 1.2 \sqrt{P}</math>, 80 MHz to 800 MHz  <math>d = 7/3 \sqrt{P} = 2.3 \sqrt{P}</math>, 800 MHz to 2.7 GHz</p> <p>In this case, "P" stands for the measured maximum nominal output power in watts (W) of the transmitter recommended by the transmitter manufacturer, and "d" for the recommended minimum distance in meters (m).</p> <p>The field strengths of fixed transmitters according to electromagnetic location measurement<sup>a)</sup> have to be less than the compliance level in each individual frequency range. Interference can occur when used in the vicinity of devices identified with the following symbol.</p> 
	6 V <sub>rms</sub> ISM bands between 150 kHz and 80 MHz	6 V <sub>rms</sub>	
Electromagnetic RF fields IEC/EN 61000-4-3	3 V/m 80 MHz to 2.7 GHz	3 V/m	
<p><b>Note:</b> The higher frequency range applies at 80 MHz and 800 MHz.</p> <p><b>Note:</b> Guidelines with respect to line-based interference due to RF fields or electromagnetic RF fields may not apply in all situations. Absorption and reflection by structures, objects, and people impact the propagation of electromagnetic waves. .</p>			
<p><sup>a)</sup> The field strengths of fixed transmitters, for example the base station for cordless and mobile telephones, radio, land mobile radio, ham radio, and television cannot be determined precisely in advance. To evaluate the electromagnetic environment using fixed transmitters, an electromagnetic location measurement should be included. If the measured field strength in the environment where the device is used exceeds the applicable RF compliance level, observe the monitor to ensure its proper operation. If improper operation is observed, in some circumstances additional measures may be necessary, such as reorienting or repositioning the device.</p>			

Recommended minimum distance between portable or mobile RF communications devices and the DVI transmission links			
DVI transmission links are intended for use in an electromagnetic environment in which interference due to electromagnetic radiation is controlled. For other portable and mobile RF communication devices (transmitters), the recommended minimum distance between the portable and mobile RF communication devices (transmitters) and the device applies as listed below. This is based on the maximum output power of the communication device.			
Maximum nominal output power of the transmitter (W)	Recommended minimum distance according to the frequency of the transmitter (m)		
	150 kHz to 80 MHz $d = 1.2 \sqrt{P}$	80 MHz to 800 MHz $d = 1.2 \sqrt{P}$	800 MHz to 2.7 GHz $d = 2.3 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23
For transmitters whose maximum nominal output power is not shown above, the recommended minimum distance "d" in meters (m) can be determined using the formula for calculating the frequency of the transmitter. "P" here stands for the transmitter's maximum measured nominal output power in watts (W), as recommended by the transmitter's manufacturer.			
<b>Note:</b> For 80 MHz and 800 MHz, the recommended minimum distance for the higher frequency range applies.			
<b>Note:</b> This information may not be applicable in all situations. Absorption and reflection by structures, objects, and people impact the propagation of electromagnetic waves.			

**Recommended minimum distance between portable or mobile RF communications devices and the DVI transmission links**

DVI transmission links are intended for use in an electromagnetic environment in which interference due to electromagnetic radiation is controlled. The customer or user of the device can help prevent electromagnetic interference by maintaining the recommended minimum distance between portable and mobile RF communications devices (transmitters) and the device. The interference immunity regarding adjacent fields has been confirmed for the following wireless RF communications devices:

Test frequency (MHz)	Bandwidth <sup>a)</sup> (MHz)	Service <sup>a)</sup>	Modulation <sup>b)</sup>	Maximum power (W)	Minimum distance (m)	Measurement level (V/m)	Compliance level (V/m)
385	380 - 390	TETRA 400	Pulse modulation <sup>b)</sup> 18 Hz	1.8	0.3	27	27
450	430 - 470	GMRS 460 FRS 460	FM ±5 kHz deviation 1 kHz sine	2	0.3	28	28
710	704 - 787	LTE band 13, 17	Pulse modulation <sup>b)</sup> 217 Hz	0.2	0.3	9	9
745							
780							
810	800 - 960	GSM 800/900 TETRA 800 iDEN 820 CDMA 850 LTE band 5	Pulse modulation <sup>b)</sup> 18 Hz	2	0.3	28	28
870							
930							
1720	1700 - 1990	GSM 1800; CDMA 1900 GSM 1900 DECT LTE band 1, 3, 4, 25 UMTS	Pulse modulation <sup>b)</sup> 217 Hz	2	0.3	28	28
1845							
1970							
2450	2400 - 2570	Bluetooth WLAN 802.11 b/g/n RFID 2450 LTE band 7	Pulse modulation <sup>b)</sup> 217 Hz	2	0.3	28	28
5240	5100 - 5800	WLAN 802.11 a/n	Pulse modulation <sup>b)</sup> 217 Hz	0.2	0.3	9	9
5500							
5785							

a) For some radio services, only the frequencies for the radio contact from the mobile communications device to the base station ("Uplink") is included in the table.

b) The carrier is modulated by a square wave with 50 % duty cycle.

## Dimensional drawings

All dimensions in mm.

### 12.1 Single-link versions

#### Transmitter module

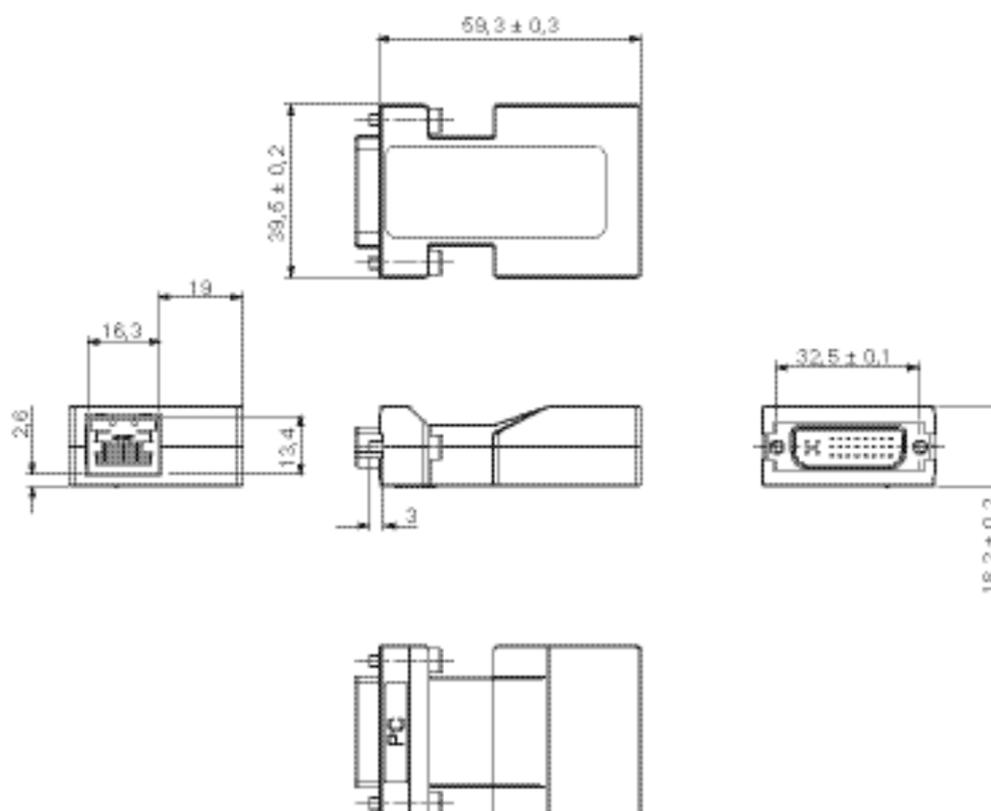


Figure 12-1 Views of the transmitter module

Receiver module with lateral cable connection

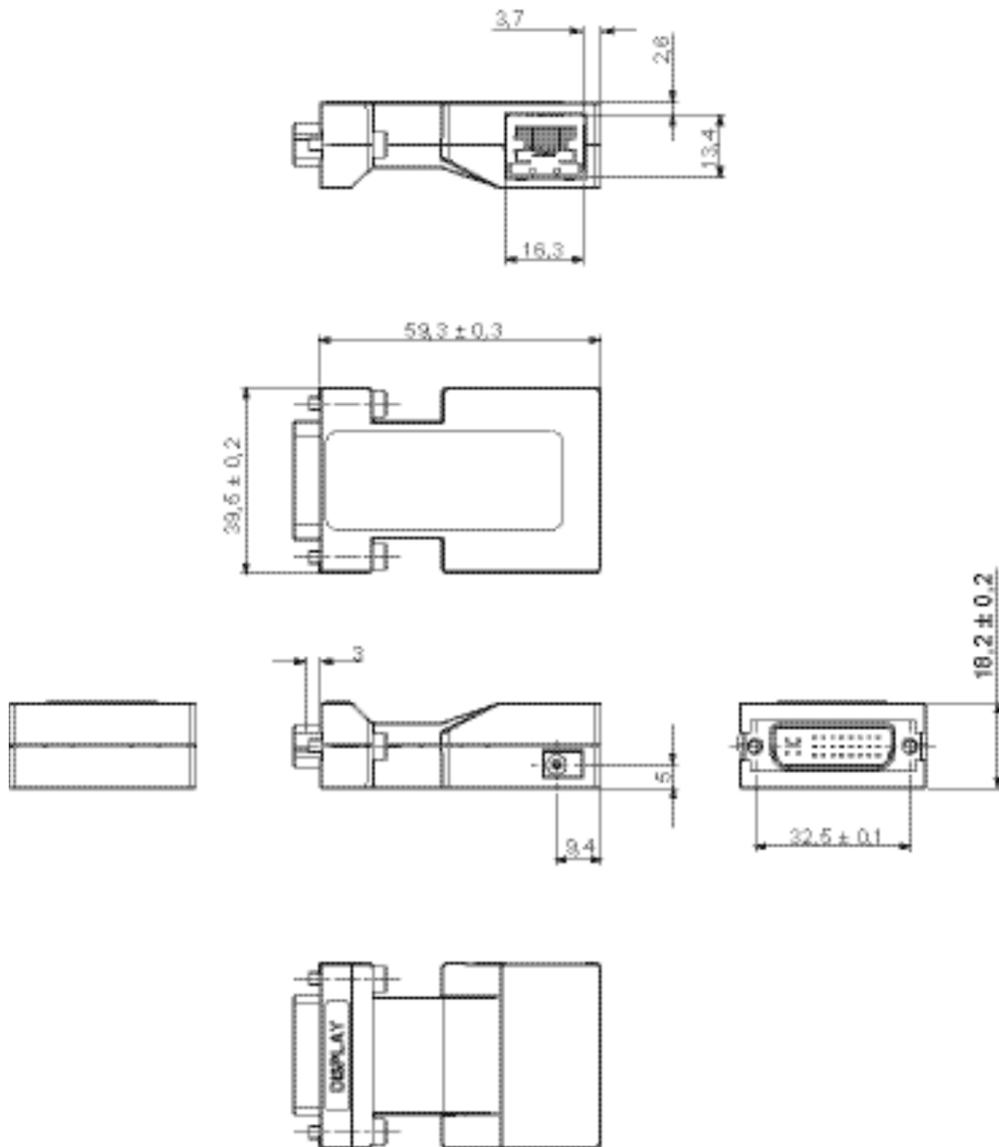


Figure 12-2 Views of the receiver module, cable connection at side

Receiver module with cable connection at rear

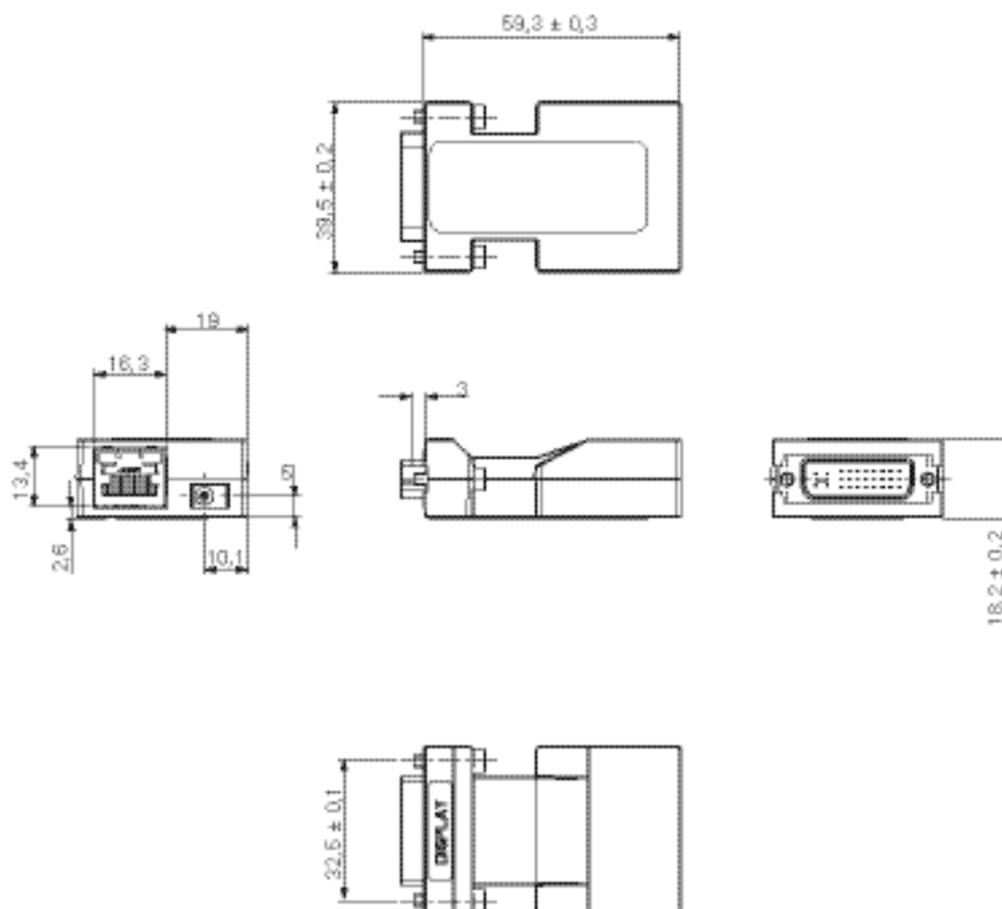


Figure 12-3 Views of the receiver module, cable connection at rear

## 12.2 Dual-link versions

### Transmitter module

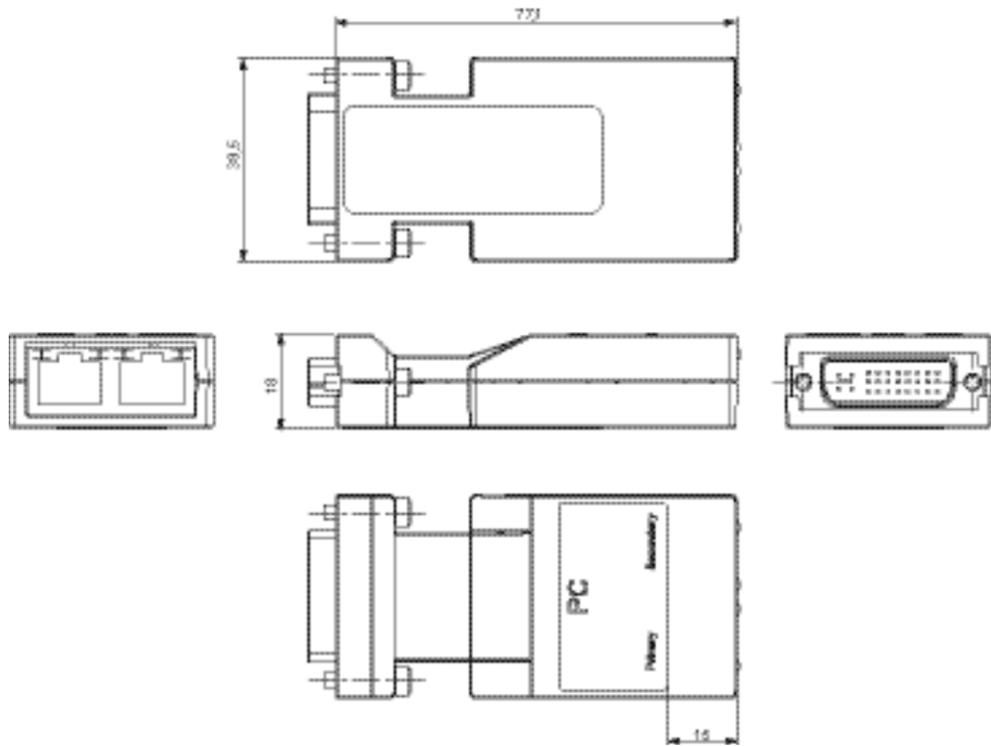


Figure 12-4 Views of the dual-link transmitter module

**Receiver module**

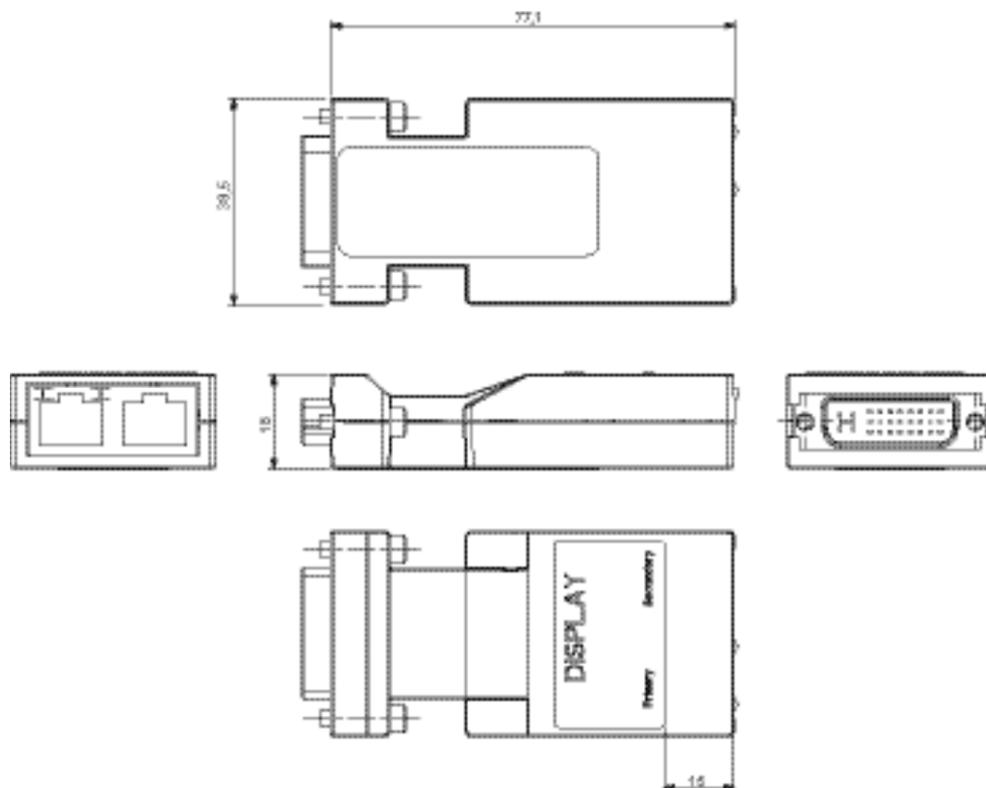


Figure 12-5 Views of the dual-link receiver module

# Appendix

# A

## A.1 Warranty

Opening of the housing, or electrical or mechanical changes on or in the device, result in cancellation of the warranty. For warranty details, please contact the sales partner from whom you purchased the product. These warranty conditions are neither extended nor limited by the contents of this instruction manual.

## A.2 Repairs

Please contact the sales partner from whom you purchased the product.

## A.3 Environmental protection

Please observe all local requirements and laws pertaining to the disposal of displays.

## A.4 Accessory devices

Devices used together with DVI transmission links TDL (e.g. monitor or PC) must also comply with the relevant safety specifications.

## A.5 Markings

Because of the module size, not all relevant identifications can be provided on the housing. Article number and respective serial number are printed.

<b>TDL module</b>	<b>Order number</b>
TDL0000-T	6GF6010-9DA01
TDL0000-R0	6GF6010-9DA02
TDL0000-R9	6GF6010-9DA03
TDL3600-SL	6GF6010-0DA36
TDL3600-SL	6GF6010-1DA36
TDL2300-SL	6GF6010-1DA23
TDL3600-DL	6GF6010-2DB00
TDL3600-QL	6GF6010-4DB36

## Markings and symbols

Marking/symbol	Description
	Symbol for "Caution, observe accompanying documents".
	CE marking (EU mark of conformity)
	MET marking, accounting for U.S. and Canadian national regulations.
	WEEE Product must be disposed of separately; materials can be recycled.
	Marking in accordance with ACPEIP (Administration on the Control of Pollution Caused by Electronic Information Products) (China RoHS).
	Symbol for "Observe instruction manual".

## A.6 Trademarks

The EIZO Logo is a registered trademark of EIZO Corporation in Japan and other countries.  
EIZO is a registered trademark of EIZO Corporation in Japan and other countries.  
RadiForce is a registered trademark of EIZO Corporation in Japan and other countries.  
RadiCS is a registered trademark of EIZO Corporation in Japan and other countries.  
RadiNET is a registered trademark of EIZO Corporation in Japan and other countries.  
ScreenManager is a registered trademark of EIZO Corporation in Japan and other countries.  
Windows is a registered trademark of Microsoft Corporation in the United States and other countries.  
Apple is a registered trademark of Apple Inc.  
Macintosh is a registered trademark of Apple Inc.  
Mac is a registered trademark of Apple Inc.  
VESA is a registered trademark or a trademark of Video Electronics Standards Association in the United States and other countries.  
All other trademarks are the properties of their respective owners.

## A.7 Contact

### Support during installation and for technical questions

Medical Monitor Solutions [www.eizo-or.com](http://www.eizo-or.com)

## A.8 China RoHS

TDL/SDL-Series: 6GF6010-#D\$## with \$ = A...Z, # = 0...9

根据SJ/T11364-2014《电子电气产品有害物质限制使用标识要求》特提供如下有关污染控制方面的信息。  
The following product pollution control information is provided according to SJ/T11364-2014 Marking for the restriction of the use of hazardous substances in electrical and electronic product.

### 电子电气产品有害物质限制使用标志说明

#### Explanation of Marking for Restriction of Hazardous Substances



该标志表明本产品不含有超过中国标准GB/T26572-2011《电子电气产品中限用物质的限量要求》中限量的有毒有害物质。该标志还表示本产品废弃后可以回收利用，不应随意丢弃。

This symbol indicates the product does not contain hazardous materials in excess of the limits established by the Chinese standard GB/T26572-2011 Requirements of concentration limits for certain restricted substances in electrical and electronic products. The symbol also signifies that the product can be recycled after being discarded, and should not be casually discarded.

### 有毒有害物质或元素的名称及含量

#### Name and Concentration of Hazardous Substances

部件名称 Component Name	有毒有害物质或元素 Hazardous substances' name					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电源 Power Supply	O	O	O	O	O	O
其他 电路板 Other Circuit Boards	O	O	O	O	O	O
其他 ( 电缆等 ) Others (cables, etc.)	O	O	O	O	O	O
机架、底盘 Housing, Chassis	O	O	O	O	O	O
附件 ( 信号电缆、输电线等 ) Accessories (signal cable, power line, etc.)	O	O	O	O	O	O

本表格依据SJ/T 11364 的规定编制。

O: 表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572 标准规定的限量要求以下

X: 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572 标准规定的限量要求

- 此表所列数据为发布时所能获得的最佳信息。
- 由于缺少经济上或技术上合理可行的替代物质或方案，此医疗设备运用以上一些有害物质来实现设备的预期临床功能，或给人员或环境提供更好的保护效果。

This list is based on SJ/T 11364.

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.

X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in GB/T 26572.

- Data listed in the table represents best information available at the time of publication.
- Applications of hazardous substances in this medical device are required to achieve its intended clinical uses, and/or to provide better protection to human beings and/or to environment, due to lack of reasonably (economically or technically) available substitutes.

产品中有毒有害物质或元素的名称及含量 Table of hazardous substances' name and concentration.

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Instructions for Use, 05/2019  
TDL-Single Link/TDL-Dual Link  
1029106-004