User Manual

TL-AD-HD2

4K HDMI Audio Decoder

Preface

Read this user manual carefully before using this product. Pictures shown in this manual is for reference only, different model and specifications are subject to real product.

This manual is only for operation instruction only, not for any maintenance usage.

Trademarks

Product model and logo are trademarks. Any other trademarks mentioned in this manual are acknowledged as the properties of the trademark owner. No part of this publication may be copied or reproduced without the prior written consent.

FCC Statement

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation.

Operation of this equipment in a residential area is likely to cause interference, in which case the user at their own expense will be required to take whatever measures may be necessary to correct the interference

Any changes or modifications not expressly approved by the manufacture would void the user's authority to operate the equipment.

SAFETY PRECAUTIONS

To insure the best from the product, please read all instructions carefully before using the device. Save this manual for further reference.

- Unpack the equipment carefully and save the original box and packing material for possible future shipment

- Follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.

- Do not dismantle the housing or modify the module. It may result in electrical shock or burn.

- Using supplies or parts not meeting the products' specifications may cause damage, deterioration or malfunction.

- Refer all servicing to qualified service personnel.

- To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.

- Do not put any heavy items on the extension cable in case of extrusion.

- Do not remove the housing of the device as opening or removing housing may expose you to dangerous voltage or other hazards.

- Install the device in a place with fine ventilation to avoid damage caused by overheat.

- Keep the module away from liquids.

- Spillage into the housing may result in fire, electrical shock, or equipment damage. If an object or liquid falls or spills on to the housing, unplug the module immediately.

- Do not twist or pull by force ends of the optical cable. It can cause malfunction.

- Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.

- Unplug the power cord when left unused for a long period of time.

- Information on disposal for scrapped devices: do not burn or mix with general household waste, please treat them as normal electrical wastes.

Table of Contents

1. Introduction

1.1 Introduction to TL-AD-HD

The TL-AD-HD2 4K UHD HDMI with Dolby® Digital/DTS® Stereo Audio Decoder supports the transmission of high bandwidth (18Gbps) video and allows the associated audio signal to be simultaneously extracted and split to both digital and analog audio outputs, providing high quality audio and video performance. This unit can decode standard Dolby Digital & DTS formats up to 5.1 and output the audio as stereo (LPCM 2.0) over HDMI, S/PDIF (optical and coaxial) as well as analog RCA connections. It can also support the pass-through of HD and standard bitstream formats as well as LPCM 7.1 with audio sampling rates up to 192 kHz if needed.

If the connected display supports ARC (Audio Return Channel), and has it enabled, then this unit can extract the ARC audio and output it via all available audio outputs. Both the input and output HDMI ports support 4K UHD resolutions up to 4K@60Hz (YUV 4:4:4, 8-bit). Built in EDID management support allows the user select from multiple EDIDs and, with the use of optional PC software, to edit, upload and download EDID files.

1.2 Features

- HDMI input and output with 18Gbps (600MHz) 4K UHD support

- DVI 1.0 compliant with the use of an HDMI-DVI adaptor

- HDCP 1.4 and 2.2 compliant

- Supports HD resolutions up to 3840x2160@60 Hz (YUV 4:4:4, 8-bit) & 4096x2160@60 Hz (YUV 4:4:4, 8-bit)

- Supports 48-bit Deep Color up to 1080p60

- Supports pass-through of LPCM 7.1, bitstream and HD bitstream audio formats over HDMI

- Embedded Dolby Digital Decoder technology

- Embedded DTS 2.0 + Digital Out Decoder technology

- Integrated digital interpolation filter and Digital-to-Analog Converter (DAC)

- Supports LPCM sampling rates up to 96kHz.

- Supports Dolby Digital sampling rates up to 48kHz.

- Supports DTS sampling rates up to 96kHz.

- Simultaneous audio output via HDMI, analog stereo, Coaxial and Optical.

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- Supports coaxial and optical audio sampling rates up to 96kHz.

- Support extracting HDMI audio signal from HDTV's ARC connection.

- Provides EDID management with EDID bypass and 1 user modifiable EDID

- PC based EDID management tool support

- Supports RS-232 style control via a Virtual COM port over USB

Note: *4K UHD sources or equivalently high-bandwidth signals require an appropriate compatible display and HDMI cables in order to achieve the best image quality. The use of "Premium High-Speed HDMI" cables is highly recommended.*
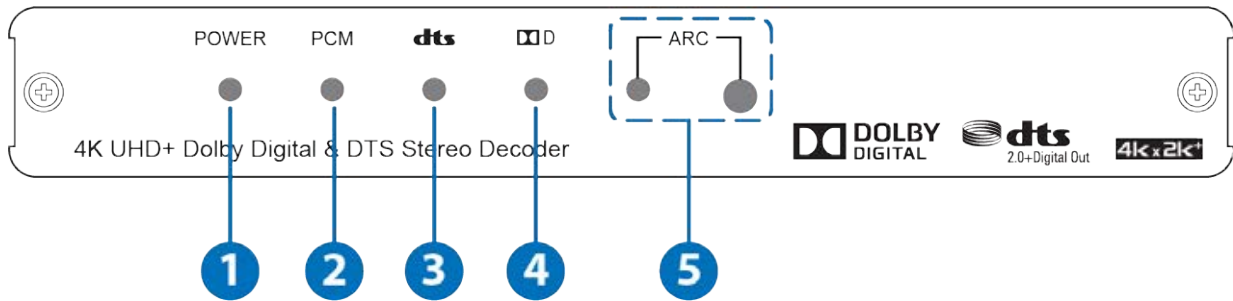
1.3 Packing List

➢ 1 x TL-AD-HD2

➢ 1 x Power adapter (DC 5V 2.6A)

➢ 1 x QR code card linking to the user manual

Notes: If you find any defective or missing parts, please contact your local dealer.

2. Panel Description

2.1 Front Panel

1) **POWER LED:** This LED will illuminate to indicate the unit is on and receiving power.

2) **PCM LED:** This LED will illuminate when LPCM audio is detected on the HDMI input. If the ARC function is active, this LED will illuminate when LPCM is detected from the ARC source.

3) **dts LED:** This LED will illuminate when DTS 2.0+Digital audio is detected on the HDMI input. If the ARC function is active, this LED will illuminate when DTS 2.0+Digital audio is detected from the ARC source.

4) **Dolby LED:** This LED will illuminate when Dolby Digital audio is detected on the HDMI input. If the ARC function is active, this LED will illuminate when Dolby Digital audio is detected from the ARC source.

5) **ARC LED/ ARC Button:** Pressing this button will enable/disable the unit's ARC (Audio Return Channel) functionality. When the ARC function is enabled, the LED will illuminate and ARC audio sent back from the connected display will be output over all local audio outputs. When the ARC function is not enabled the LED will remain off.

Note: Please ensure that the connected display supports ARC and that the display's ARC function is enabled before activating the ARC functionality of this unit. Failure to meet these requirements will result in no audio output.

2.2 Rear Panel
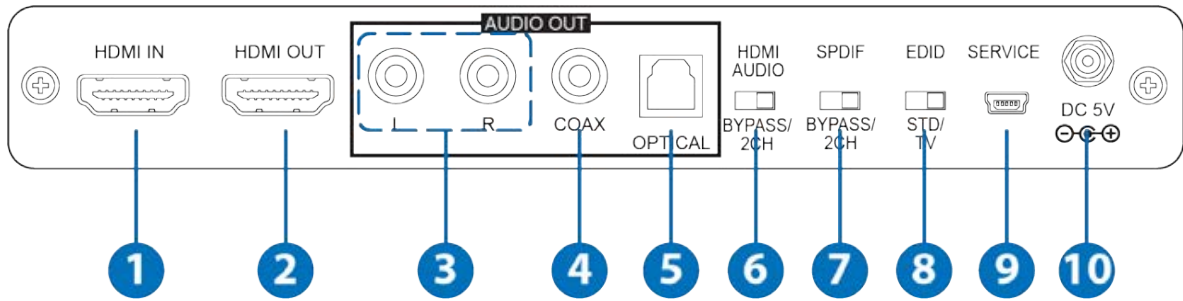
1) **HDMI IN:** Connect to HDMI source equipment such as a media player, game console or set-top box.

2) **HDMI OUT:** Connect to an HDMI TV, monitor or amplifier for digital video and audio output.

3) **L/R OUT:** Connect to powered speakers or an amplifier for stereo analog audio output.

4) **COAX OUT:** Connect to powered speakers or an amplifier for digital audio output using an appropriate coaxial cable.

5) **OPTICAL:** Connect to powered speakers or an amplifier for digital audio output using an appropriate optical cable.

6) **HDMI AUDIO BYPASS/2CH:** This switch controls the audio output format for the HDMI port. Moving the switch to the left sets it to "BYPASS" which allows audio to pass unchanged from the HDMI input port. Moving the switch to the right sets it to "2CH" which enables decoding Dolby Digital and DTS audio from the HDMI input and down-mixing it to LPCM 2.0.

7) **SPDIF BYPASS/2CH:** This switch controls the audio output format for the S/PDIF audio output ports (Optical and Coaxial). Moving the switch to the left sets it to "BYPASS" which allows audio to pass unchanged from the HDMI input port. Moving the switch to the right sets it to "2CH" which enables decoding Dolby Digital and DTS audio from the HDMI input and down-mixing it to LPCM 2.0.

8) **EDID:** This switch controls which EDID is sent to the connected HDMI input device. Moving the switch to the left sets it to "STD" mode which will use the

internal (user) EDID. Moving the switch to the right sets it to "TV" mode which will pass the EDID from the connected display device to the HDMI input device.

Note: By default, the "STD" EDID contains video resolution support up to 1080p@60Hz and audio support including LPCM 2.0 up to 96kHz, Dolby Digital (5.1 channel) and DTS (5.1 channel).

9) **SERVICE:** This slot is for EDID management, control and firmware update use. Connect directly to your PC/laptop using a standard Mini-USB cable to connect using the PC software or to send commands (via virtual COM port).

10) **DC 5V:** Plug the 5V DC power adapter into the unit and connect it to an AC wall outlet for power.

3. System Connection

3.1 Usage Precautions

1) System should be installed in a clean environment with proper temperature and humidity.
2) All of the power switches, plugs, sockets and power cords should be insulated and checked for safety.
3) All devices should be connected before being powered on.

4) System Diagram shown in this manual is for reference only, more specific schemes depend on real-time applications.

3.2 System Diagram
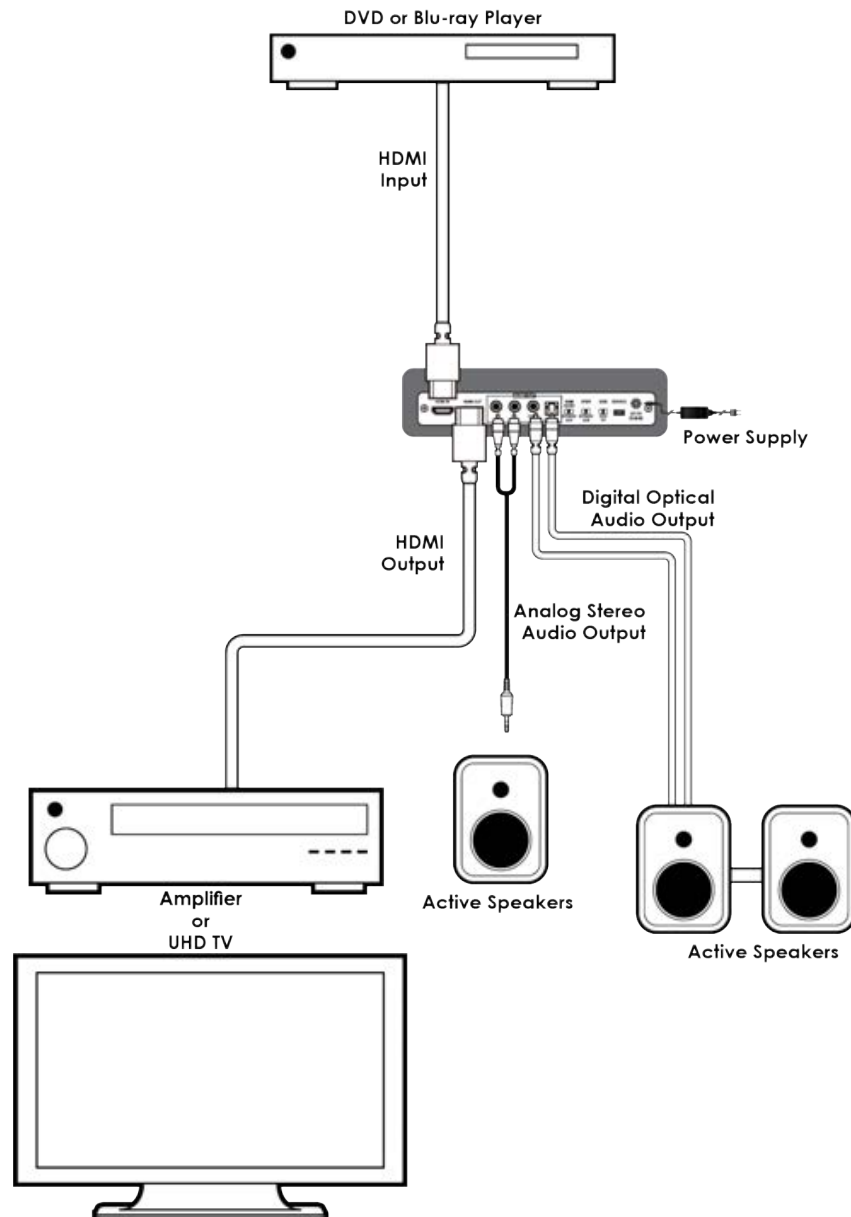
3.3 Connection Procedure

Step1. Connect an HDMI source (Blu-ray, cable box) to the 'HDMI IN' port of the TL-AD-HD2.

Step2. Connect a stereo RCA, optical, or coaxial audio cable between the TL-AD-HD2 and stereo amplifier.

Step3. Connect an HDMI sink (AV receiver or TV) to the 'HDMI OUT' port of the TL-AD-HD.

Step4. Apply power to the TL-AD-HD2.

Step5. Apply power to the HDMI sink (AV receiver or TV) and HDMI source (Blu-ray, cable box).

4. Virtual COM Port Settings & Commands

Settings:

Baud Rate: 115200bps

Data bits: 8

Parity: None

Flow Control: None

Stop Bits: 1

Commands:

Command Name	Description	Parameters
P0	SET UNIT POWER OFF	NONE
P1	SET UNIT POWER ON	NONE
P?	GET POWER STATUS	NONE
SOURCEDET	SHOW INPUT INFORMATION	NONE
SINKINFO	SHOW SINK INFORMATION	NONE
HDCPIN	SET/SHOW INPUT HDCP STATUS	HDCPIN N [N=1~3, ?] 1: FOLLOW IN 2: FOLLOW OUT 3: APPLE MODE ?: GET STATUS *Default: FOLLOW OUT*
ECHO	SET/SHOW CONSOLE AUTO ECHO MODE	ECHO N [N=0, 1, ?] 0: OFF 1: ON ?: GET STATUS *Default: ON*
FADEFAULT	SET UNIT TO FACTORY DEFAULT	NONE
VER	SHOW UNIT FIRMWARE VERSION	NONE
REBOOT	SYSTEM REBOOT	NONE
?	SHOW DESCRIPTION OF COMMAND	NONE
HELP	SHOW DESCRIPTIONs OF COMMAND	NONE

5. Specifications

5.1 General

Input Signal	1 × HDMI（Type A Receptacle） 1 x Mini-USB (service & control only)
Output Signal	1 × HDMI（Type A Receptacle） 1 × OPTICAL（Toslink Receptacle） 1 × COAX（Black RCA Receptacle） 1 × L/R（Red & White RCA Receptacle）
Maximum Video Compatibility	Deep Color 8/10/12/16 Bit at 1080p and 2160p/60
HDMI Resolution	Up to 4Kx2K@60Hz
HDMI Embedded Audio	PCM, Dolby Digital, Dolby TrueHD, dts, dts-HD
Decoded Audio	PCM 2.0
HDMI Cable	≤15m AWG24 HDMI standard cable
Power Supply	Input: AC (50HZ, 60HZ) 100V-240V; Output: DC5V/2.6A
Maximum Power Consumption	4.8W
Operating Temperature	-10 ~ +55℃
Storage Temperature	-20 ~ 70℃
Operating Humidity	10 ~ 90%
Storage Humidity	10 ~90%
Dimensions (W x H x D)	180mm x 25mm x 104mm
Weight	358g

5.2 DVI and HDMI Supported Resolutions

| DVI and HDMI Supported Resolutions (Hz)	Input	Output
640x480@60/72/75/85	√	√
720x400@85	√	√
800x600@56/60/72/75/85	√	√
1024x768@60/70/75/85	√	√
1280x720@60	√	√
1280x768@60/75/85	√	√
1280x800@60	√	√
1360x768@60	√	√
1440x900@60	√	√
1600x900@60	√	√
1600x1200@60	√	√
1920x1080@60	√	√
1920x1200@60	√	√
1440x576i@50	√	√
1440x480i@59.94/60	√	√
720x480p@59.94/60	√	√
720x576p@50	√	√
1280x720p@50/59.94/60	√	√
1920x1080i@50/59.94/60	√	√
1920x1080p@23.97/24/25/29.97/30/50/59.94/60	√	√
3840x2160@24/25/30/50/60 (YUV 4:4:4)	√	√
4096x2160@24/25/30/50/60 (YUV 4:4:4)	√	√
3840x2160@60 (YUV 4:2:0)	√	√
4096x2160@60 (YUV 4:2:0)	√	√

5.3 Supported Audio

Input Level/Freq.	Output	Output Level Vrms/dB±10%	THD+N (A-Weight)	Frequency Response	SNR >90dB	Crosstalk <-90dB
HDMI 0dB/1kHz 48~96kHz	Analog	2 Vrms	< 0.01%	±1 dBFS	>104dB	<-110dB
	Coaxial	0 dB	< 0.00001%	±1 dBFS	>141dB	<-164dB
	Optical	0 dB	< 0.00001%	±1 dBFS	>141dB	<-163dB
	HDMI	0 dB	< 0.00001%	±1 dBFS	>141dB	<-164dB

5.4 Input to Output Audio Formats

Audio Input	Input Format	Audio Output				
		Analog L/R	HDMI		SPDIF	
			Switch Status		Switch Status	
			BYPASS	2CH	BYPASS	2CH
HDMI	LPCM 2.0	Analog 2 Channel	LPCM 2.0	LPCM 2.0	LPCM 2.0	LPCM 2.0
	Dolby Digital	Decoded Lt/Rt	Bitstream Pass-through	LPCM 2.0 (Lt/Rt)	Bitstream Pass-through	LPCM 2.0 (Lt/Rt)
	DTS	Decoded Lt/Rt	Bitstream Pass-through	LPCM 2.0 (Lt/Rt)	Bitstream Pass-through	LPCM 2.0 (Lt/Rt)
HDMI ARC	LPCM 2.0	Analog 2 Channel	HDMI Pass-through ARC Bitstream Pass-through		LPCM 2.0	LPCM 2.0
	Dolby Digital	Decoded Lt/Rt			LPCM 2.0 (Lt/Rt)	
	DTS	Decoded Lt/Rt			LPCM 2.0 (Lt/Rt)	

6. Panel Drawing
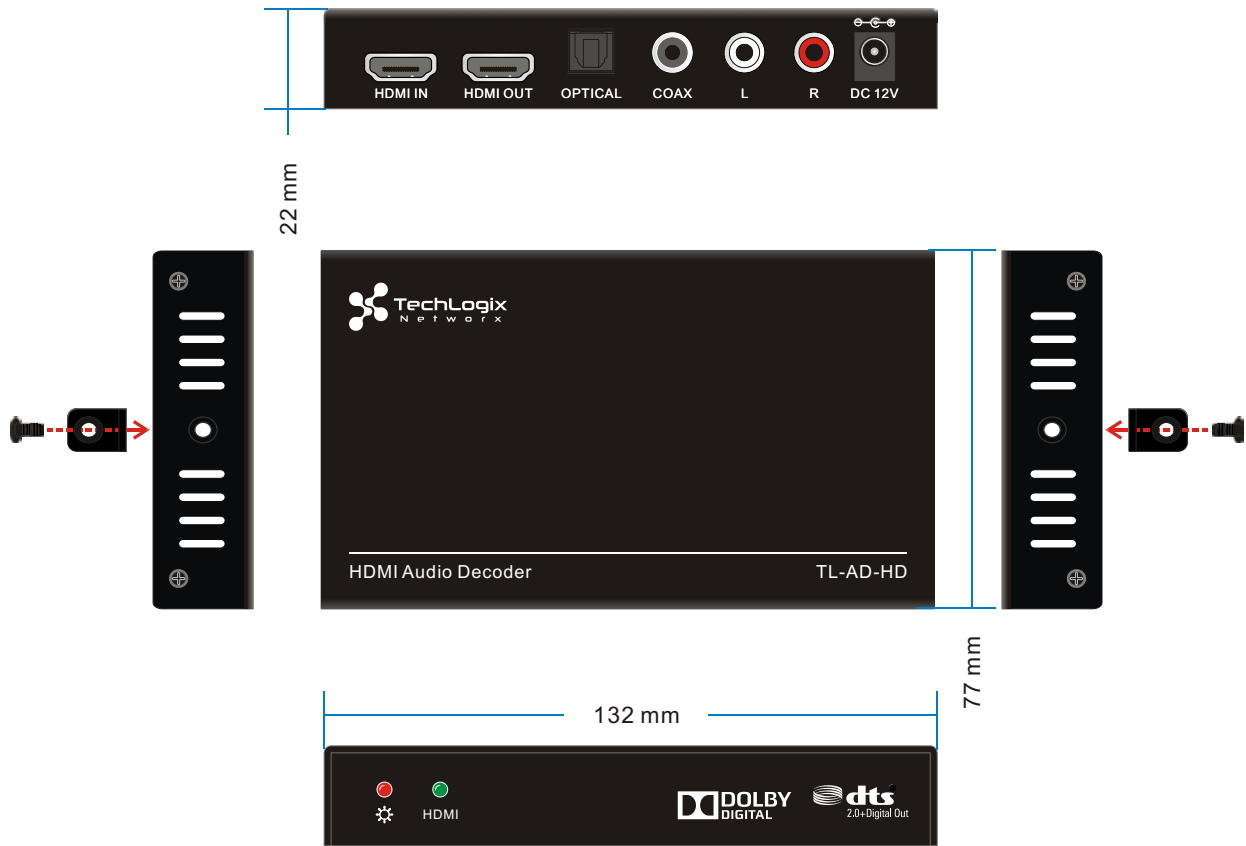
7. Troubleshooting & Maintenance

Problems	Causes	Solutions
Image ghosting or bad color	Incorrect setting on the display	Check the display's setting
	A cable of poor quality	Try another high quality connection cable
No output image	No signal at the input / output end	Check with oscilloscope or multimeter if there is any signal at the input / output end.
	Fail or loose connection	Reset or replace the input and output cables
Noise or static on analog audio	Bad grounding	Check the grounding and make sure it is connected well.

If your problem persists after following the above troubleshooting steps, seek further help from authorized dealer or our technical support.

8. After-sales Service

If there appear some problems when running the device, please check and deal with the problems reference to this user manual. Any transport costs are borne by the users during the warranty.

1) **Product Limited Warranty:** We warrant that our products will be free from defects in materials and workmanship for **three years.** Please see warranty page posted on www.tlnetworx.com for more info.
2) **What the warranty does not cover:**
   ● Warranty expiration.
   ● Factory applied serial number has been altered or removed from the product.
   ● Damage, deterioration or malfunction caused by:
     ● Normal wear and tear
     ● Use of supplies or parts not meeting our specifications
     ● No certificate or invoice as the proof of warranty.
     ● The product model showed on the warranty card does not match with the model of the product for repairing or had been altered.
     ● Damage caused by force majeure.
     ● Servicing not authorized
     ● Any other causes which does not relate to a product defect
   ● Delivery, installation or labor charges for installation or setup of the product
3) **Technical Support:** Email to our after-sales department or make a call, please inform us the following information about your cases.
   ● Product version and name.
   ● Detailed failure situations.
   ● The formation of the cases.

Remarks: For any questions or problems, please try to get help from your local distributor.