

# TMX-xxxxSDI2 Series High Definition Digital Video Tracking Matrix Switcher

Professional Matrix Switchers



Installation and Operation Manual

#### Remark:

- All rights reserved for translation, reprint or reproduction
- Contents may change without prior announcement
- All technical specifications are guideline data and not guaranteed features
- Taiden Co., Ltd. is not responsible for any damage caused by improper use of this manual
- The equipment must be connected to earth!
- This product conforms to the rules of the European directive 2014/30/EU.
- If any detailed information needed, please contact your local agent or TAIDEN service center in your region.
  Any feedback, advice and suggestion about the products is appreciated
- TAIDEN is the registered trademark of TAIDEN Co., Ltd.

- 1. Read and keep these instructions.
- 2. Heed all warnings and follow all instructions.
- The apparatus shall not be exposed to dripping or splashing and that no objects filled with liquids, such as vases, shall be placed on the apparatus.
- 4. The MAINS plug serving as a disconnection device, should be easy to operate.
- 5. The apparatus should be connected to the MAINS socket-outlet with protective earth.
- 6. Clean only with dry cloth.
- 7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- 9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade and the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- 11. Only use attachments/accessories specified by the manufacturer.
- 12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
- 13. Unplug this apparatus during lightning storms or when unused for long periods of time.
- 14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

- 15. Do not place the equipment on any uneven or unstable stand; original product package or appropriate package should be used to avoid damage caused by strong impacts during transportation.
- 16. Power supply cords:

#### AC 100 V-240 V 50 Hz/ 60 Hz

- 17. The quantity of connected units in one system should not exceed prescribed quantity. For service, please contact the nearest TAIDEN Service Center.
- Use ONLY specified connection cable to connect the system equipment.
- All TAIDEN products are guaranteed for definite time (see the WARRANTY CARD for details) excluding the following cases:
  - All damage or malfunction caused by human negligence;
  - Damage or malfunction caused by improper operating by operator;
  - C. Parts damage or loss caused by disassembling the product by non-authorized personnel.
- 20. Upon receipt of the product, please fill out the Warranty Card enclosed and post it to TAIDEN Service Center nearby in your region.



TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

**CAUTION:** To reduce the risk of electric shock, DO NOT open covers, no user serviceable parts inside. Refer servicing to qualified service personnel only.

**CAUTION:** DO NOT use alcohol, ammonia or petroleum solvents or abrasive cleaners to clean the devices.



The lightning flash with an arrowhead symbol, with an equilateral triangle, is intended to alert the user to the presence of uninsulated 'dangerous voltage' within the products enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation mark within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

**WARNING:** To reduce the risk of fire or electric shock, DO NOT expose units to rain or moisture.



Attention: Installation should be performed by qualified service personnel only in accordance with the National Electrical or applicable local codes.



Power Disconnect: Units with or without ON - OFFswitch have power supplied to the unit whenever the power cord is inserted into the power source; however, the unit is operational only when the ON – OFF switch is in the ON position. The power cord is the main power disconnect for all units

**WARNING:** The apparatus should be connected to a mains socket outlet with a protective earthing connection.

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# About this manual

This manual is a comprehensive guide to the installation and operation of **TAIDEN** SDI Series High Definition Digital Video Tracking Matrix Switchers. It includes: connection and operation, protocol and control code, etc.

The manual is divided into the following chapters:

# Chapter 1: High Definition Digital Video Tracking Matrix Switchers

Descriptions in detail of the functions and indications, installation and connection, configuration and operation of High Definition Digital Video Tracking Matrix Switchers.

### Chapter 2: IR Remote Control

Introduction into the operation of IR remote control.

# Chapter 3: Communication protocol and control code

Detailed description of codes and their function.

#### **Chapter 4: Technical data**

Mechanical and electrical details of the High Definition Digital Video Tracking Matrix Switchers.

# This manual is applicable to:

#### TMX-1608SDI2

16x8 High Definition Digital Video Tracking Matrix Switcher (SD/HD/3G)

#### TMX-1604SDI2

16x4 High Definition Digital Video Tracking Matrix Switcher (SD/HD/3G)

#### TMX-0808SDI2

8x8 High Definition Digital Video Tracking Matrix Switcher (SD/HD/3G)

#### TMX-0804SDI2

8x4 High Definition Digital Video Tracking Matrix Switcher (SD/HD/3G)

#### TMX-0404SDI2

4x4 High Definition Digital Video Tracking Matrix Switcher (SD/HD/3G)

# **Chapter 1. High Definition Digital Video Tracking Matrix Switchers**

### 1.1 Functions and indications



Figure 1.1 Panels of SDI Matrix Switcher

#### Front panel:

#### 1. "MENU" button

- a) If in current state, press "MENU" go to main menu;
- b) If in menu state, press "MENU" go to sub menu;
- c) Select/Deselect in network configuration.

#### 2. "⇔" (Left) button

3. "⇔" (Right) button

#### 4. "Exit" button

• Return to previous directory or root.

#### 5. IR receiving window

 Receives the IR signals from remote control; make sure the remote control aims at the window.

#### 6. "NETWORK" indicator

 Indicator flashes if Matrix Switcher is communicating with conference main unit.

#### 7. "ACTIVE" indicator

 Indicator will be turned on if Matrix Switcher executes switch instructions.

#### 8. "POWER" indicator

#### 9. LCD

Rear panel:

#### 10. RJ45 interface

#### 11. RS-422/TAINET interface

- RS-422 for connecting to dome camera;
- TAINET for connecting to VIDEO SWITCH of main unit.
- 12. USB interface for upgrade
- 13. Video inputs
- 14. Video outputs

#### Note:

If only one connector of an output channel (Full-HD/ 1080p50/ 60Hz) connects a SDI device, please connect a 75 ohm dummy load for the other connector.

#### 15. Grounding point

#### 16. Power cable interface

- 17. RS-422/232 interface
  - RS-422 for connecting to dome camera;
  - RS-232 for connecting to keyboard (Baud rate: 9600).

#### 18. Control interface COM1

#### 1.2.1 Installation

1U High Definition Digital Video Tracking Matrix Switcher just needs to put it into the cabinet, and fix it by screws. As figure 1.2.



Figure 1.2 Installation

#### 1.2.2 Connection with control devices

High Definition Digital Video Tracking Matrix Switcher can be can be controlled by Central Control System via RS-232 interface COM1. It also offers a USB interface used for software upgrade. As figure 1.3.

#### 1.2.3 Connection with input, output devices

High Definition Digital Video Tracking Matrix Switcher supports various digital video signal sources, including: full HD (3G), HD and SD. As figure 1.3.

Please use good quality Twisted Pair cable to connect input and output device, i.e. RG59 and RG60.

#### Control Interface:

Control Type	
COM (RS-232)	9 pin female D connector
COM1	Baud rate: 115200, data: 8 bits, stop: 1 bit, no parity check bit
RJ45	TCP/IP
TAINET	Baud rate: 19200, to TO VIDEO SWITCHER of main unit
RS-422	Baud rate: 9600, to dome camera
RS-232	Baud rate: 9600, to keyboard

#### Note:

If connected with camera by RS232 protocol, the matrix switcher and the camera must be common ground.



Figure 1.3 Connection for input and output devices

# 1.3 Setup and Operation

#### 1.3.1 Menu setup

#### 1.3.1.1 Menu setup

To explain menu setup of SDI series Matrix Switcher, TMX-1608SDI2 serves as example.

#### TMX-1608SDI2 main interface:



Press "MENU" to enter main menu and press "⇔/⇔" until "Setting" prompts; Press "MENU" again to enter setup menu, including:

- 1. Ring
- 2. Video Track
- 3. Video Track Type
- 4. Video Track Delay

Press "EXIT" to exit menu.

Menu 1 to menu 4 are explained explicitly:

#### 1. Ring

Buzzer ring on-off of this unit. If buzzer ring is setup "on", the buzzer will ring when front panel operation or IR remote control. The buzzer ring can be setup "off".

- ON: buzzer is on ;
- OFF: buzzer is off.

TMX-1608SDI2 V1.00.00.01
1. Press "MENU" to enter setup menu and press "⇔/⇔" until "Setting" prompts;
Main Menu: 4. Setting
↓ 2. Press "MENU" and press "⇔/⇔" until "Ring'
prompts;
Ring OFF
↓ 3. Press "MENU" to enter setup;
Ring ■ FF
$\square$ 4. Press " $\Leftrightarrow$ / $\Rightarrow$ " to select parameter;
Ring ■ N
5. Press "MENU" to confirm.
Ring ON

#### 2. Video Track

Select the function of video track on or off.



#### 3、Video Track Type

When Video Track is on, camera protocol can be selected from HCS-3316RS232/ HCS-3316RS485/ SONY HD1/ PELCO D/ PELCO P1/ PELCO P2/ SONY D70/ SONY D100/ SONY BRC-Z330/ SONY BRC300/ SONY BRC700. Please select correct protocol according to actual device type.



∫. Press "MENU" to confirm.

Video Track Type PELCO P2

The maximal number of cameras that can be connected to the HD Digital Video Tracking Matrix Switcher is shown in follow:

Protocol	predefined position	ned position Camera No.		
TMX-16xxSDI2				
PELCO-D	64	16	1024	
PELCO-P	64	16	1024	
VISCA	64	14	896	
TMX-08xxSI	012			
PELCO-D	64	8	512	
PELCO-P	64	8	512	
VISCA	64	7	448	
TMX-04xxSDI2				
PELCO-D	64	4	256	
PELCO-P	64	4	256	
VISCA	64	4	256	

# 4. Video Track Delay

The interval ranges from 0 second to 8 seconds by steps of 0.5 seconds.

TMX-1608SDI2 V1.00.00.01				
Main Menu: 4. Setting				
↓ 2. Press "MENU" and press "⇔/⇔" until "Video Track Delay" prompts;				
VideoTrackDelay: <u>2</u> .0 S				
J 3. Press "MENU" to enter setup;				
VideoTrackDelay: ■ .0 S				
↓ 4. Press "⇔/⇒" to adjust parameter;				
VideoTrackDelay: ■ .5 S				
J. 5. Press "MENU" to confirm.				



#### 1.3.2 Switch operation

To explain menu operation of SDI series Matrix Switcher, TMX-1608SDI2 type serves as example. All SDI series Matrix Switcher can refer to it.

#### TMX-1608SDI2 main interface:



Press "MENU" to enter switch menu, including:

1. Switch Video

#### 2. Switch Through

- \* Switch through one channel or all channels.
- 3. Close
  - \* Close one output or all outputs.
- 4. Setting
  - \* Setup menu.

#### 5. Status

- \* Request channel state.
- 6. Net Setting

#### Note:

- "Input channel" and "output channel" number must be less than matrix type.
- This operation only supports the SDI resolution not more than 1080P60 and the operation time less than 1 ms.

Menu 1 to menu 6 are explained explicitly:

#### 1. Switch Video

Video switch key, switches one input video signal to any or all output channels.

Example: Switch Video signal of input channel 1 to output channel 8



#### Note:

- If input channel displays "0", output channel is closed.
- If output channel displays "All", input channel is switched to all output channels.

#### 2. Switch Through

Switch through one input channel or all input channels to corresponding output channel(s).

Example: Switch through channel 2.



#### 3. Close

Note:

Close one output channel or all output channels.





Select "All" stands for closing all channels.

Setup menu (refer to section 1.3.1 for details).



↓ 1. Press "MENU" and press "⇔/⇔" until "Setting" prompts;

2. Press "MENU" to enter setup status.



Request corresponding state of input and output

Main Menu: 5. Status	
☐ 1. Press "M "Status" pro	ENU" and press "⇔/⇔" until mpts;
Video: 3 → :1	
↓    2. Press "ME status;	NU" to request corresponding
3. Press "⇔/≓	" to request next status.
Video: 5 → :2	

#### 6. Net Setting

Set up the IP address, Subnet mask, Gateway and Host IP.

#### Example: set the IP address as 192.168.2.219.



address of the conference main unit, the NETWORK indicator will blink that means the communication between the matrix and the conference main unit is set.

# **Chapter 2. IR Remote Control**



Users can use remote control to operate matrixes, the function of remote control key is the same as matrix front panel key (Please refer to chapter 1 for detailed instructions).

Please refer to sections of menu operation for detailed operation method of remote control key.

The remote control can be used for all **TAIDEN** matrix main units with IR receipt function.

# Chapter 3. Communication protocol and control code

This code system is used for controlling and operating **TAIDEN** professional Matrix Switchers by central control system or user programming software.

Protocol: Baud Rate: 115200; Data: 8 bits; Stop: 1 bit; Parity Check Bit: No. UDP port: 1600.

Туре	Code	Description			
	[x1]All.	Input channel [x1] switch to all output channels			
	All#.	Setup all channels one-to-one correspondence: 1->1, 2->2, 3->3			
	All\$. Close all channels (Audio & Video)				
	[x1]#.	Input channel [x1] switch to output channel [x1] (Audio & Video)			
	[x1]\$.	Close output channel [x1] (Audio & Video)			
	[x1]V[x2].	Video of input channel [x1] switch to output channel [x2] (Video)			
	[x1]A[x2].	Audio of input channel [x1] switch to output channel [x2] (Audio)			
	[x1]B[x2].	Video and audio of input channel [x1] switch to output channel [x2] (Audio & Video)			
	Save[X].	Save current status to scene [X] (X: 0 ~ 9)			
	Recall[X].	Recall scene [X] (X: 0 ~ 9)			
	Clear[X].	Clear scene [X], status of all output channel are closed (X: 0 ~ 9)			
P	Туре*.	Query the matrix type			
bera	Version.	Query the matrix version			
tion	Status[x].	Query the input status of the output channel [x]			
Co	Status.	Query the input status of all output channels			
de	Default.	Factory reset			
	Demo.	Work in demo mode			
	Undo.	Cancel the current operation and return to the last switch status			
		Camera control			
	Camora <sup>0</sup> / 2d <sup>0</sup> / 2d <sup>0</sup> / 2d	%2d: camera ID (01 to 16)			
		%2d: type (00 stop, 01 right, 02 left, 03 up, 04 down, 05 far, 06 near)			
		%2d: speed control (01 slow, 02 fast)			
		Predefine position settings			
	SetPreset%2d%2d.	%2d: camera ID (01 to 16)			
		%2d: predefine position (01 to 64)			
		Predefine position recall			
	CallPreset%2d%2d.	%2d: camera ID (01 to 16)			
		%2d: predefine position (01 to 64)			

#### Note:

[x1], [x2] is channel number of input or output; only 1~16 (depend on the number of the matrix's input/output channel) available, otherwise regarded as error.

- "[" and "]" do not send code;
- End each command by code such as ".", ";".

### Command examples:

# 1. [x1]All.

For example: Input channel 3 switch to all output channels, code is "3All.".

# 2. All#.

Setup all channels one-to-one correspondence: 1->1, 2->2, 3->3...8->8.

# 3. All\$.

Close all output channels.

# 4. [x]#.

For example: Input channel 5 switch to output channel 5, code is "5#.".

# 5. [x]\$.

For example: Close output channel 5, code is "5\$.".

# 6. [x1]V[x2].

For example: Video of input channel 3 switch to output channel 5, code is "3V5.". Video of input channel 3 switch to output channel 8, 9, 12, code is "3V8,9,12.".

# 7. [x1]B[x2].

For example: Video and audio of input channel 1 switch to output channel 2, 3, 5, code is "1B2,3,5.".

# 8. Save[x].

For example: Save current status to scene 7, code is "Save7.".

# 9. Recall[x].

For example: Recall scene 5, code is "Recall5.".

# Chapter 4. Technical data

Type Spec.	TMX-1608SDI2	TMX-1604SDI2	TMX-0808SDI2	TMX-0804SDI2	TMX-0404SDI2
Video			<u> </u>	<u> </u>	
Date rates	Date rates 143 Mbps - 2.97 Gbps				
Date types	es 8 bit or 10 bit				
Video input					
Connectors	16 BNC	16 BNC females  8 BNC females  4 BNC females			4 BNC females
Input cable equalizatior	Input cable equalization    Typical equalization cable length (RG60/ Ø1.0 mm standard cable):      ≥ 50 m @ 2.97 Gbps (odd channel)      ≥ 60 m @ 2.97 Gbps (even integer channel)      > 90 m @ 1.485 Gbps				cable):
Input level			0.7 V - 1.2 Vp-p		
Nominal level			0.8 Vр-р		
Impedance			75 Ohm		
Return loss		20 dB -	30 dB @ 5 MHz to 7	1.5 GHz	
Video output					
Connectors	8 × double-decker BNC female	4 × double-decker BNC female	8 × double-decker BNC female	4 × double-decker BNC female	
Nominal level		0.8 V±7%			
Output level			0.5 V - 1.6 Vp-p		
Impedance		75 Ohm			
Return loss	>15 dB @ 5 MHz to 1.5 GHz				
DC offset		± 100 mV with no offset at input			
Jitter	Jitter 20 ps - 30 ps @ HD/3G rate 40 ps - 60 ps @ SD rate				
Rise and fall time (20~80%)	SD: 600 ps HD/3G: 100 ps				
Control					
COM (RS-232)	COM (RS-232) RS-232, 9 pin female D connector				
COM1	Baudrate: 115200, data: 8 bits, stop: 1 bit, no parity				
RJ45	TCP/IP				
RS-422	Baud rate: 9600, to dome camera				
RS-232	Baud rate: 9600, to keyboard				
General spec.					
Power supply 100 V AC - 240 V AC, 50/60 Hz					
Temperature      Operating: 0 °C to + 50 °C; storage: -20 °C to + 70 °C					
Humidity	Storage and operating: 10% to 90%				
Dimensions h × w ×d (mm)	483×208×43 (1U high, full rack width)				

Type Spec.	TMX-1608SDI2	TMX-1604SDI2	TMX-0808SDI2	TMX-0804SDI2	TMX-0404SDI2
Weight	3.2 kg	3.0 kg	3.0 kg	2.8 kg	2.7 kg
Mean time between failures			30, 000 hours		

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