

MSP 405

12G SDI/ 4K HDMI//Fiber Converter



User Manual

RGBlink[®]

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Thank you for choosing our product!

This User Manual is designed to show you how to use this converter quickly and make use of all the features. Please read all directions and instructions carefully before using this product.

Declarations

FCC/Warranty

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area may cause harmful interference, in which case the user will be responsible for correcting any interference.

Guarantee and Compensation

RGBlink provides a guarantee relating to perfect manufacturing as part of the legally stipulated terms of guarantee. On receipt, the purchaser must immediately inspect all delivered goods for damage incurred during transport.

The period of guarantee begins on the date of transfer of risks, in the case of special systems and software on the date of commissioning, at latest 30 days after the transfer of risks. In the event of justified notice of compliant, RGBlink can repair the fault or provide a replacement at its own discretion within an appropriate period. If this measure proves to be impossible or unsuccessful, the purchaser can demand a reduction in the purchase price or cancellation of the contract.

If the purchaser or a third party carries out modifications or repairs on goods delivered by RGBlink, or if the goods are handled incorrectly, in particular if the systems are commissioned operated incorrectly or if, after the transfer of risks, the goods are subject to influences not agreed upon in the contract, all guarantee claims of the purchaser will be rendered invalid. Not included in the guarantee coverage are system failures which are attributed to programs or special electronic circuitry provided by the purchaser, e.g. interfaces. Normal wear as well as normal maintenance are not subject to the guarantee provided by RGBlink either.

The environmental conditions as well as the servicing and maintenance regulations specified in this manual must be complied with by the customer.

Operators Safety Summary

The general safety information in this summary is for operating personnel.

Do Not Remove Covers or Panels

There are no user-serviceable parts within the unit. To avoid personal injury, do not remove the top cover. Do not operate the unit without the cover installed.

Use the Proper Power Cord

Use only the standard power cord for your product.

Do Not Operate in Explosive Atmospheres

To avoid explosion, do not operate this product in an explosive atmosphere.

Installation Safety Summary

Safety Precautions

For all MSP 405 installation procedures, please observe the following important safety and handling rules to avoid damage to yourself and the equipment.

Unpacking and Inspection

Before opening MSP 405 shipping box, inspect it for damage. If you find any damage, notify the shipping carrier immediately for all claims adjustments. As you open the box, compare its contents against the packing slip. If you find any shortages, contact your sales representative.

Once you have removed all the components from their packaging and checked that all the listed components are present, visually inspect the system to ensure there was no damage during shipping. If there is damage, notify the shipping carrier immediately for all claims adjustments.

Site Preparation

The environment in which you install your MSP 405 should be clean, properly lit, free from static, and have adequate power, ventilation, and space for all components.

Chapter 1 About Your Product

1.1 Product Overview

The MSP 405 is a professional video converter designed for high-demand 4K ultra-high-definition applications. It boasts HDMI, SDI, and fiber optic interfaces, supporting various video signal inputs and outputs. All interfaces support video transmission up to 3840×2160P@60Hz in ultra-high-definition, with backward compatibility for 1920×1080P@60Hz HD resolution and 1280×720P@60Hz SD resolution.

The MSP 405 integrates multiple video conversion functions, which is capable of converting video signals from any one of HDMI, SDI, or fiber optic inputs to any of the other two protocol outputs. It utilizes high-performance FPGA pure hardware algorithms, ensuring real-time and accurate signal transmission.

Additionally, the MSP 405 offers video monitoring, audio de-embedded and embedded, excellent line equalization and driving capability, as well as signal clock recovery and relay function, which is ideal for medium to long-distance applications where video signal transmission delay is critical, such as in large-scale stage and event setups.

With its strong anti-interference, high security, compact size, and lightweight design, the MSP 405 is an ideal choice for converting and transmitting SDI and HDMI video signals.

To meet different application, MSP 405 works not only as a small converter, but also packs with different mechanic accessories.

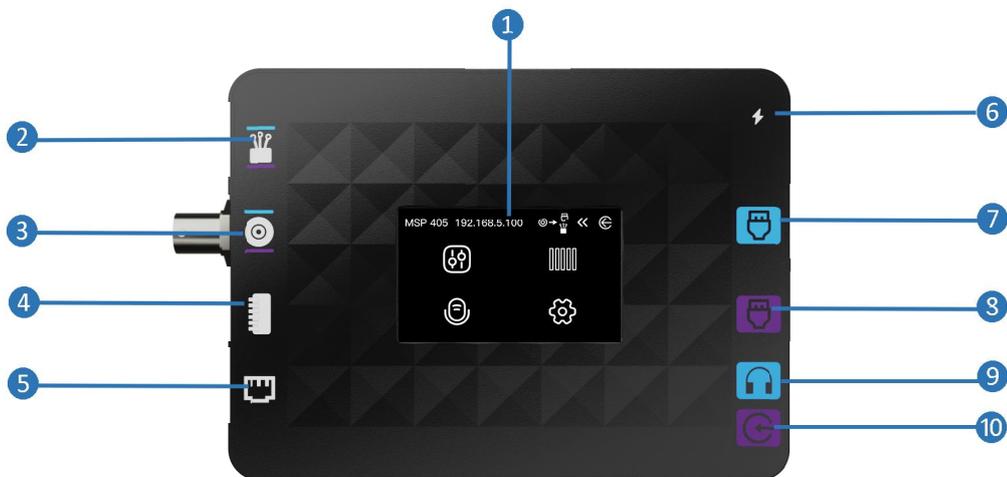
- MSP 405: with battery case for camera battery to clip, and work standalone as a mobile unit
- MSP 405pro: install up to 4 units to a 1U size rack for installation and with redundant power supply capacity
- MSP 405premier: install up to 2 units to a 1U size rack and back panel in lockable connection for premier quality

1.2 Key Features

- Arbitrary format conversion between 12G SDI, HDMI2.0 and fiber signals.
- Multiple embedded test pattern for HDMI, SDI, fiber signal tests.
- LCD touch screen for input signal monitoring and menu operation.
- Two external batteries as main and backup power supplies, allowing automatic battery switch.
- Built-in audio and 1-CH analog audio input and audio output.
- Network level-up support and constant optimized product performances.

1.3 Panel Introduction

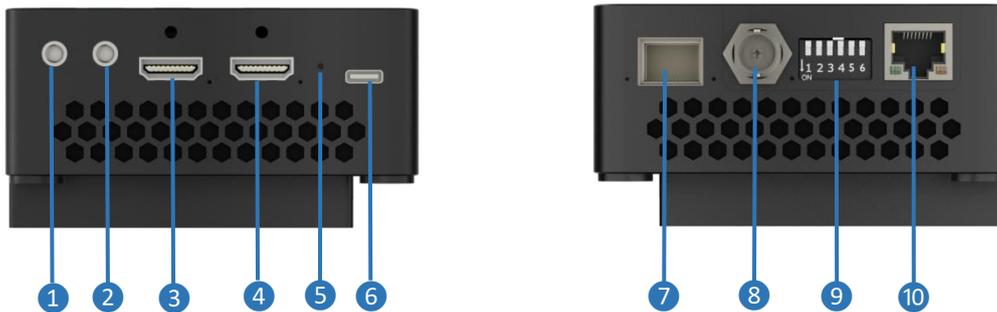
1.3.1 Front Panel Description



No.	Item	Description
①	LCD Screen	Built-in preview monitor for signal monitoring.
②		Fiber input/output port icon.
③		SDI input/output port icon.

④		DIP switch icon.
⑤		Ethernet port icon.
⑥		Power jack icon.
⑦		HDMI output port icon.
⑧		HDMI input port icon.
⑨		Analog audio output icon.
⑩		Analog audio input icon.

1.3.2 Interface Panel Description

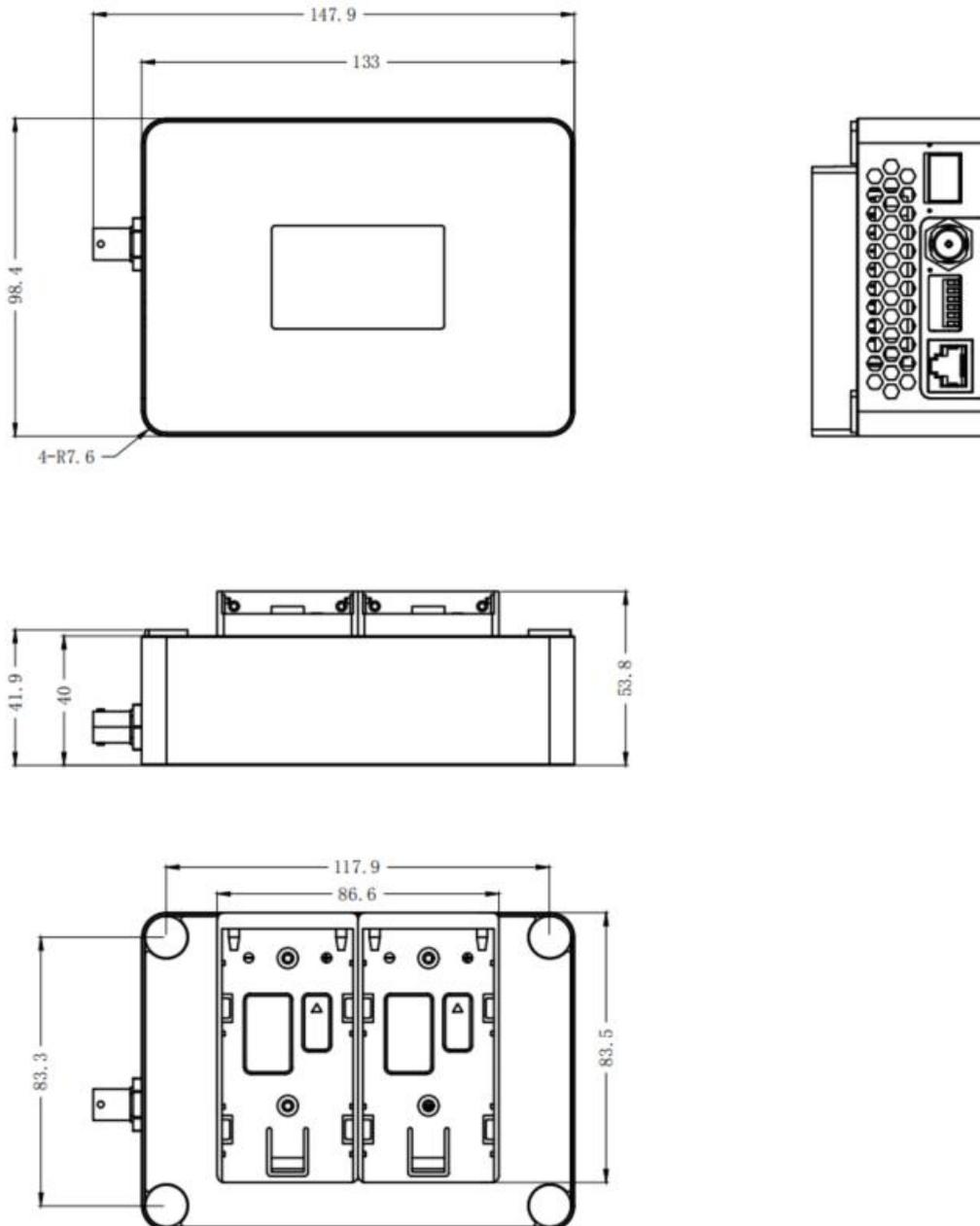


No.	Item	Description
①	LINE IN	Analog audio input port to input the audio signals. Connect it to audio mixer, CD player, or other such audio equipment.
②	LINE OUT	Analog audio output port to output the results of audio mixing. Connect it to recorder, amplifier, speaker, or other such equipment.
③	HDMI IN	HDMI input port. Connect it to camera, DVD, PC or other such HDMI signals.
④	HDMI OUT	HDMI output port. Connect it to projector or external display.

⑤	IP Reset Button	To reset the IP address to the default address 192.168.5.100 by inserting a hard probe into the hole to press the internal reset button.
⑥	Power Socket	USB Type-C power socket supports 12V/1.5A power supply.
⑦	Fiber	Fiber input/output port. Connect to the SFP modules, and transmit signals to another MSP 405 via an optical fiber cable. Notes: The SFP modules are not included in the package box, order SFP modules separately if necessary. Check the SFP modules info at Multi-Model-SFP .
⑧	SDI	SDI input/output port. Set SDI as input or output on the menu. The SDI input can be connected to HD camera. The SDI output can be connected to SDI monitor
⑨	Function DIP Switch	Toggle the DIP switch to different positions to activate various functions or configuration modes. More details please refer to 6.2 DIP Switch Description .
⑩	LAN	Ethernet port for device upgrade.

1.4 Dimension

Following is the dimension of MSP 405 for your reference: 147.9mm × 98.4mm × 41.9mm.

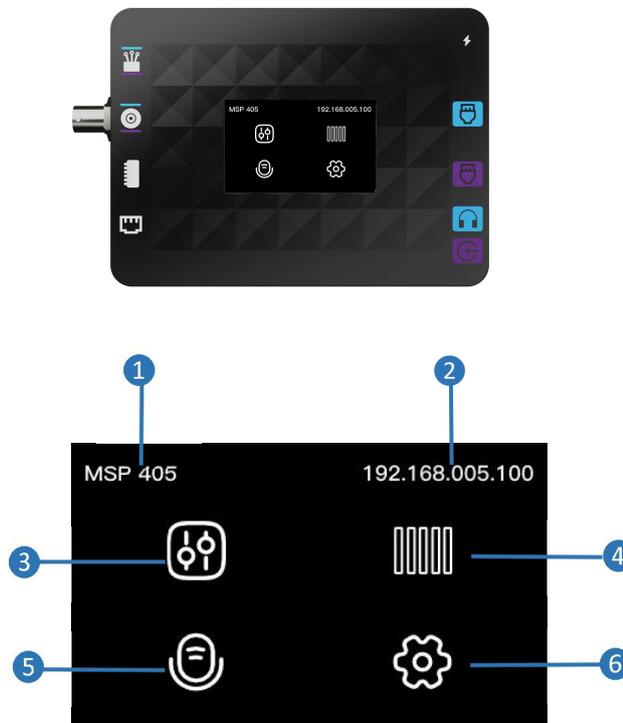


Chapter 2 Menu Introduction

2.1 Menu

MSP 405 embeds 2.4-inch LCD touch screen for video signal preview and menu control.

MSP 405 will display preview interface automatically when powered on. Tap screen to enter main interface.



No.	Item	Description
①	MSP 405	Device name
②	192.168.5.100	Current IP address
③		Mode selection. Select different input/output conversion format.
④		Test Pattern. Tap to enter TP setting interface.

5		Embedded audio. Enter to enable and disable the analog audio input and output.
6		Setting. Tap to check firmware version, set language, set IP address, reset, etc..

Chapter 3 Use Your Product

MSP 405 is a device that functions as both a transmitter and receiver. Designed for flexibility, it supports signal transmission across various interfaces: SDI to HDMI + optical fiber, HDMI to SDI + optical fiber, and optical fiber to SDI + HDMI when paired with another MSP 405 unit. The MSP 405 also serves as a signal validation tool, testing the stability and seamless conversion between SDI, HDMI, and fiber during video system deployment. This significantly improves setup efficiency while reducing time and labor costs.

Required components are listed as follows:

- **Power Adapter:** Provides power to the device with a voltage of DC 12V and a maximum current of no less than 1.5A. The power adapter should support USB Power Delivery Protocol 2.0 and compatible with USB PD 3.0.
- **MSP 405:** Device for format conversion between SDI and HDMI signals.
- **HDMI Monitor:** Ensure the HDMI cable and monitor are working properly.
- **SDI Signal Source:** Provides SDI signal.
- **PC:** Used for outputting HDMI signal and configure the resolution.
- **SDI Monitor:** Verify the SDI cable and SDI signal source are working properly.
- **SDI Cable:** Connects the SDI signal source to the MSP 405 and the SDI signal source to the SDI monitor.
- **HDMI Cable:** Connects the PC to the MSP 405 and the PC to the HDMI monitor.

Then follow steps below for connection:

- **Fiber Cable and SFP Fiber transceivers:** Used for connecting the input and output ports of the MSP 405 transceiver and receiver.

After the components are confirmed, please conduct the following checks:

1. Check the Devices

Ensure that all devices are in good condition with no damage or abnormalities.

2. Check the Power Adapter

Verify that the power adapter or battery meets the required voltage of 12V , power of 18W and current of no less than 1.5A.

3. Check HDMI Signals and Cables

Connect the HDMI output port of PC to the HDMI input port of HDMI monitor using an HDMI cable. Make sure the HDMI signal is displayed correctly on the monitor.

4. Check SDI Signal and Cables

Connect the SDI output port of the SDI signal source (e.g., a camera) to the SDI input port of SDI monitor using an SDI cable. Verify that the SDI signal is displayed on the monitor.

5. Check Grounding and Power Off

Confirm that the signal source and monitor are properly grounded, then disconnect all power cables.

3.1 Application Example 1

To convert SDI to HDMI with UHD resolution (3840×2160p@60Hz) for HDMI-compatible back-end devices or displays, follow these steps:

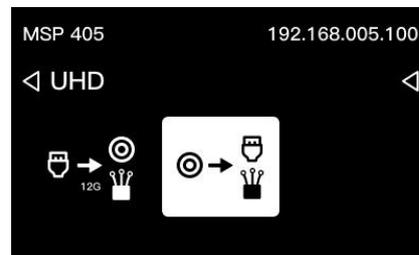


1. Connect HDMI and SDI Cables

Use an SDI cable to connect the SDI output port of the SDI signal (e.g., a camera) to the SDI input port of the MSP 405. Use an HDMI cable to connect the HDMI output port of the MSP 405 to the HDMI input port of the HDMI monitor.

2. Select a Mode

Tap  to enter the mode selection interface. Set the MSP 405 to SDI input to HDMI/Fiber output.



3. Check SDI Input Signal

Check the SDI input signal via the MSP 405's LCD screen. If the signal is not displayed, first check if the MSP 405 is receiving adequate power, then verify the output of the SDI camera, and try using a shorter cable to connect the MSP 405 and SDI camera if necessary.

4. Check HDMI Output Signal

Check the HDMI output signal on the HDMI monitor. Ensure the HDMI display is powered on and set to the correct input. If the signal is not displayed, replace the HDMI cable,

reboot the device if needed and switch the mode to Mode 12  (refer to [6.2 DIP switch description](#)) for troubleshooting.

3.2 Application Example 2

To convert HDMI to SDI with UHD resolution (3840×2160p@60Hz) for SDI-compatible back-end devices or displays, follow these steps:

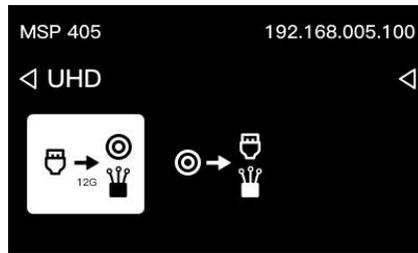


1. Connect HDMI and SDI Cables

Use an HDMI cable to connect the HDMI output port of the SDI signal (e.g., a computer) to the HDMI input port of the MSP 405 device 1. Use an SDI cable to connect the SDI output port of the MSP 405 to the SDI input port of the SDI monitor.

2. Select a Mode

Tap  to enter the mode selection interface. Set the MSP 405 to SDI input to HDMI/Fiber output.



3. Check SDI Input Signal

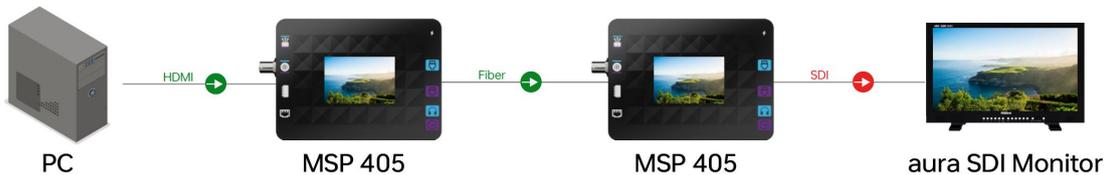
Please refer to Application Example 1.

4. Check HDMI Output Signal

Please refer to Application Example 1.

3.3 Application Example 3

If you need to convert **HDMI Input to Fiber and SDI Output**, follow steps blow:



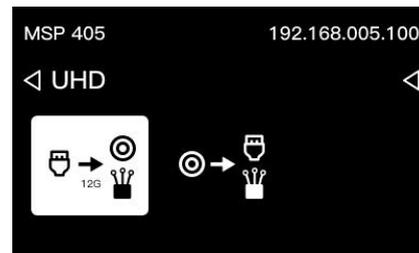
1. Connect HDMI Cables

Use an HDMI cable to connect the HDMI output port of a device (e.g., a camera) to the HDMI input port of MSP 405 Device 1. Use another HDMI cable to connect the HDMI output port of MSP 405 Device 1 to the HDMI input port of a display for real-time

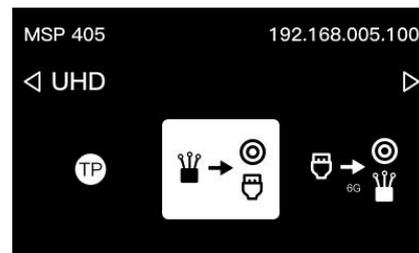
monitoring of the SDI input from the camera.

2. Select a Mode

Tap  to enter the mode selection interface. Set **MSP 405 Device 1** to **HDMI Input to Fiber and SDI Output** mode.



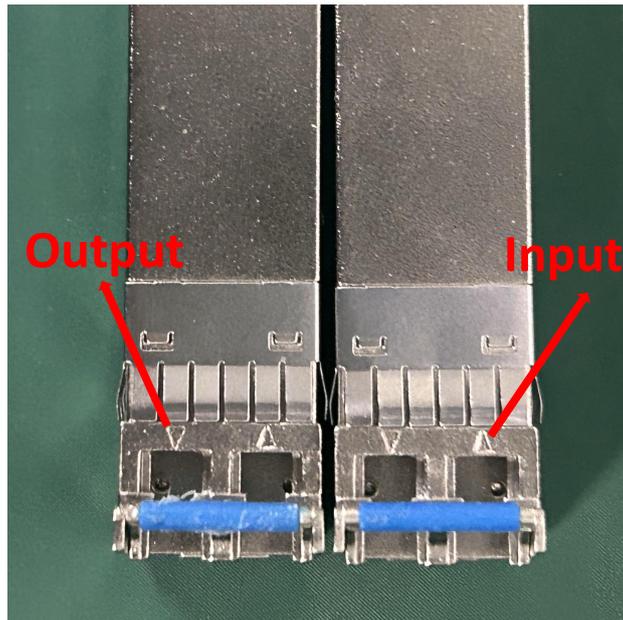
3. Set **MSP 405 Device 2** to **Fiber Input to HDMI Output** mode.



4. Connect the status display screen to the HDMI input port of MSP 405 device 2 using an HDMI cable.

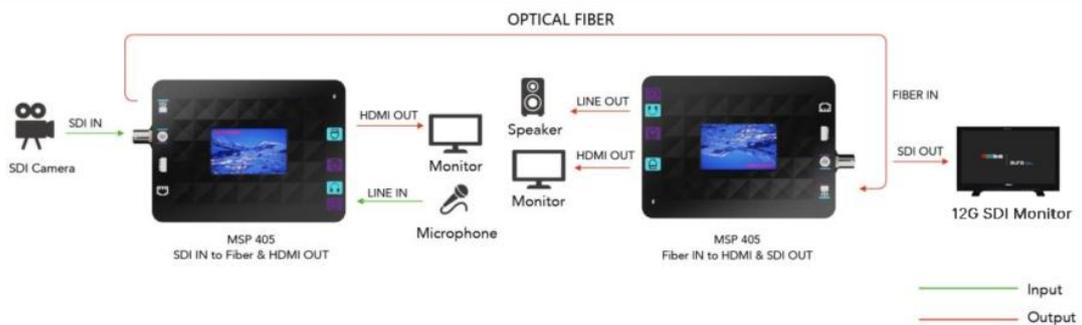
5. Prepare two fiber optic cables and the corresponding SFP pluggable transceivers.

First, insert the pluggable transceivers into the fiber optic interface slots of two MSP 405 devices respectively. Then, connect the two MSP 405 devices with the fiber optic cables according to the input and output markings on the pluggable transceivers.



6. Connect the HDMI output port of the MSP 405 Device 2, which receives fiber signal, to your terminal display so as to enable conversion between fiber and HDMI signals.

3.4 Application Example 4



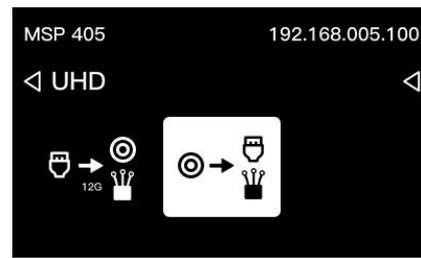
1. Connect HDMI and SDI Cables

Use an SDI cable to connect the SDI output port of a device (e.g., a camera) to the SDI input port of MSP 405 Device 1. Use an HDMI cable to connect the HDMI output port of MSP 405 Device 1 to the HDMI input port of a display for real-time monitoring of the SDI input from the camera.

2. Select a Mode

Tap  to enter the mode selection interface. Set **MSP 405 Device 1** to **SDI Input to**

Fiber and HDMI Output mode.

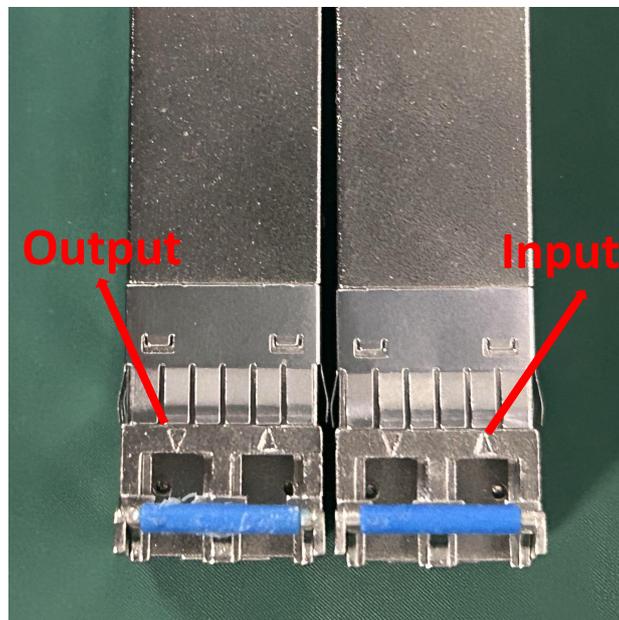


3. Set MSP 405 Device 2 to Fiber Input to HDMI and SDI Output mode.



4. Prepare two fiber optic cables and the corresponding SFP pluggable transceivers.

First, insert the pluggable transceivers into the fiber optic interface slots of two MSP 405 devices respectively. Then, connect the two MSP 405 devices with the fiber optic cables according to the input and output markings on the pluggable transceivers.



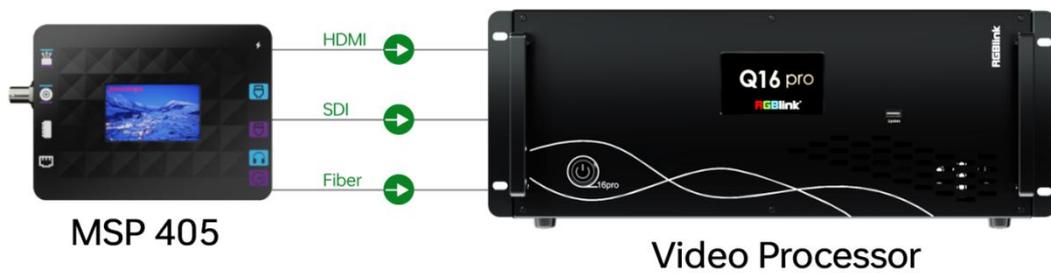
5. Connect the HDMI port of MSP 405 Device 2, which receives fiber signal, to your terminal display device so as to achieve signal conversion.

3.4 Test Modes

The MSP 405 can be served as an all-in-one field testing "Swiss Army knife" to verify input/output interface functionality during system deployment, significantly improving setup and testing efficiency.

Application Scenario 1: Output Signal Verification

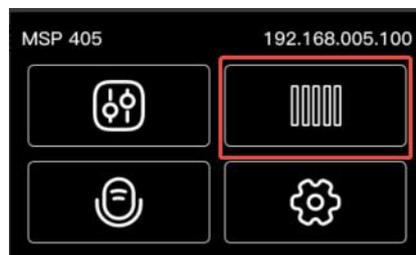
The MSP 405 provides multiple built-in test templates to rapidly validate display integrity, synchronization accuracy, and signal stability.



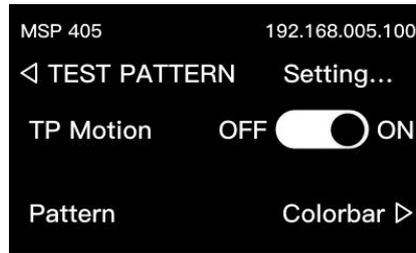
1. Set conversion mode to FHD or UHD.



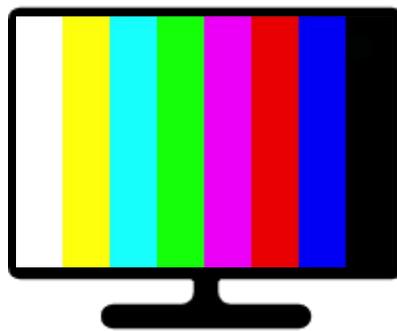
2. Navigate to Menu > Test Icon.



3. Select a test template (color bars, grid, etc.). Enable "TP Motion" for dynamic pattern display.



4. Templates will show on connected displays while being output via SDI/HDMI/fiber simultaneously.



Application Scenario 2: Input Interface Testing

The MSP 405 can function as a temporary display substitute to test output interfaces of other devices.



1. Set conversion mode to FHD/UHD.
2. Select input source (HDMI IN/SDI IN/Fiber).
3. The MSP 405 will display the input content for visual verification.

Application Scenario 3: Source Device Validation

Test signal sources (e.g., cameras, media servers) by routing their outputs to the MSP 405.

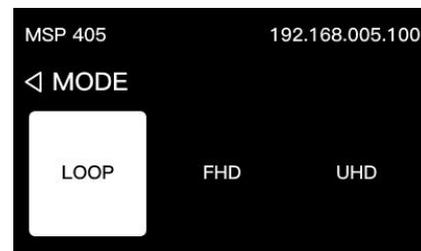
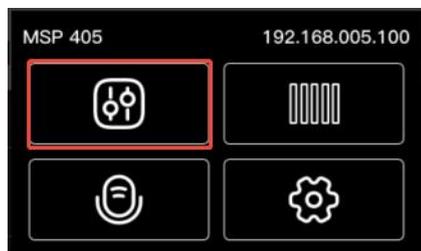


1. Connect SDI output from broadcast cameras.
2. Feed HDMI signals from PCs/media servers.
3. Real-time input monitoring confirms signal health.

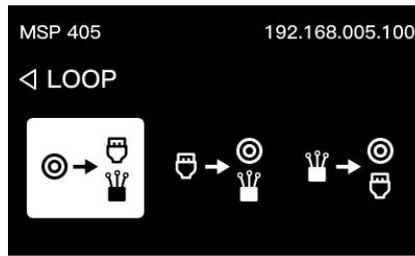
3.5 Loop Modes

The MSP 405 supports zero-latency loop-through conversion, enabling real-time signal conversion between SDI, HDMI, and fiber while preserving the original resolution. This mode is critical for scenarios demanding strict synchronization, including live broadcast production, studio operations and medical imaging systems. Proceed as follows:

1. Select the Mode Selection icon in the menu and then select "LOOP".



-
2. Choose the desired output format (e.g., SDI→HDMI+fiber).



3. Verify real-time output using the connected reference monitor or the built-in test patterns.

3.6 Audio

MSP 405 requires enabling Line In to ingest external signals without distortion, while Line Out must be activated to output processed video; disabling either will interrupt the corresponding signal chain, though the core conversion function remains operational.



Chapter 4 Order Code

4.1 Product Code

Order Code	Item
601-0405-01-0	MSP 405

Chapter 5 Support

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Chapter 6 Appendix

6.1 Specification

Interface	Input	HDMI	1×HDMI-A
		SDI	1×BNC
		Fiber	1×LC
	Output	HDMI	1×HDMI-A
		SDI	1×BNC
		Fiber	1×LC
	Audio	Line In	1×3.5mm Audio Socket
		Line Out	1×3.5mm Audio Socket
	Power	Power	1×USB Type-C Power Jack
	Control	LAN	1×RJ45
		Reset	1×IP Reset Button
		Switch	1×DIP Switch
Performance	Resolution	HDMI/SD	720p@50/59.94/60
		I/Fiber	1080i@50/59.94/60
			1080p@25/29.97/30/50/59.94/60 2160p@25/29.97/30/50/59.94/60
	Supported Standards	HDMI	2.0b
		SDI/Fiber	HD/3G/6G/12G-SDI
	Fan	1×built-in fan (speed auto adjusted)	
Power	Input Power	USB Type-C 12V/1.5A	
Physical	Net Weight	500g	
	Net Dimension	147.9mm × 98.4mm × 41.9mm	

6.2 DIP Switch Description

Mode	Position	Function	Description
Mode 0	 OFF	Functions disabled	Functions of the entire device/system are disabled.
Mode 1	 	SDI→HDMI+OPT	1. Converts SDI signal to HDMI output, supports RGB format, no delay. 2. Converts SDI signal to optical output, with clock recovery, supports loop output, no delay.
Mode 2	 	HDMI→SDI+OPT	1. Converts HDMI signal to SDI output, supports YCbCr 4:2:2 format, no delay. 2. Synchronizes optical signal with SDI output.

Mode 3		SDI→HDMI+OPT	1. Converts SDI signal to HDMI output, with format conversion, output resolution of 1920x1080P@60Hz.
			2. Converts SDI signal to optical output, with clock recovery, supports loop output, no delay.
Mode 4		SDI→HDMI+OPT	1. Converts SDI signal to HDMI output, with format conversion, output resolution of 3840x2160P@60Hz.
			2. Converts SDI signal to optical output, with clock recovery, supports loop output, no delay.
Mode 5		HDMI→SDI+OPT	1. Converts HDMI signal to HD-SDI output, with format conversion, output resolution of 1920x1080P@30Hz.
			2. Synchronizes optical signal with SDI output.
Mode 6		HDMI→SDI+OPT	1. Converts HDMI signal to 3G-SDI output, with format conversion, output resolution of 1920x1080P@60Hz.
			2. Synchronizes optical signal with SDI output.
Mode 7		HDMI→SDI+OPT	1. Converts HDMI signal to 6G-SDI output, with format conversion, output resolution of 3840x2160P@30Hz.
			2. Synchronizes optical signal with SDI output.
Mode 8		HDMI→SDI+OPT	1. Converts HDMI signal to 12G-SDI output, with format conversion, output resolution of 3840x2160P@60Hz.
			2. Synchronizes optical signal with SDI output.
Mode 9		OPT→SDI+HDMI +OPT	1. Converts optical signal to SDI output, with clock recovery, supports loop output, no delay.
			2. Synchronizes HDMI output.
			3. Synchronizes optical signal with SDI output.
Mode 10		OPT→SDI+HDMI +OPT	1. Converts optical signal to 3G-SDI output, with format conversion, output resolution of 1920x1080P@60Hz.
			2. Synchronizes HDMI with SDI output.
			3. Synchronizes optical signal with SDI output.
Mode 11		OPT→SDI+HDMI +OPT	1. Converts optical signal to 12G-SDI output, with format conversion, output resolution of 3840x2160P@60Hz.
			2. Synchronizes HDMI with SDI output.
			3. Synchronizes optical signal with SDI output.
Mode 12		Test Pattern_2K	Outputs 2K test pattern, with HDMI output at 1920x1080P@60Hz.

Mode 13			Test Pattern _2K	Outputs 2K test pattern, with HDMI, optical, and SDI outputs all at 1920x1080P@60Hz.
Mode 14		 	Test Pattern _4K	Outputs 4K test pattern, with HDMI output at 3840x2160P@60Hz.
Mode 15			Test Pattern _4K	Outputs 4K test pattern, with HDMI, optical, and SDI outputs all at 3840x2160P@60Hz.
/			AUDIO	Uses the embedded audio from the video signal for the video output.
/			AUDIO	Uses the audio from the analog audio input port for the video output.
/			Test Pattern	Sets the test pattern to a static state.
/			Test Pattern	Sets the test pattern to a moving state.

6.3 Interface Performance

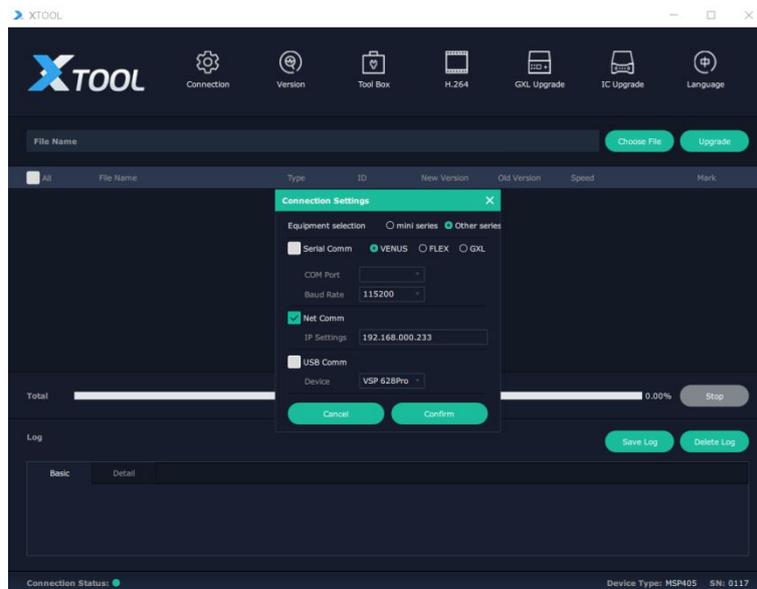
Interface	Item	Description
SDI	Resolution	1280×720p50/59.94/60
		1920×1080i50/59.94/60
		1920×1080p25/29.97/30/50/59.94/60
		3840×2160p25/29.97/30/50/59.94/60
	Date Rate	Supports HD-SDI, 3G-A-SDI, 3G-B-SDI, 6G-SDI, 12G-SDI, adaptive
	Standards	SMPTE292M, SMPTE424M, SMPTE2081-1:2015, SMPTE2082-1:2015
	Color Space	YCbCr 4:2:2
	Color Depth	10bit
	Audio	48kHz sample rate, 24-bit, stereo
	Transmission Distance	HD-SDI
3G-SDI		≤150 meters
6G-SDI		≤100 meters
12G-SDI		≤70 meters
HDMI	Resolution	1280×720p50/59.94/60
		1920×1080i50/59.94/60
		1920×1080p25/29.97/30/50/59.94/60
		3840×2160p25/29.97/30/50/59.94/60
	Color Space	RGB, YCbCr 4:4:4, YCbCr 4:2:2
Color Depth	8/10/12/16bit	
Audio	48kHz sample rate, 24-bit, stereo	
Fiber Optic	Resolution	1280×720p50/59.94/60
		1920×1080i50/59.94/60
		1920×1080p25/29.97/30/50/59.94/60

		3840×2160p25/29.97/30/50/59.94/60	
	Data Rate	Supports HD-SDI, 3G-A-SDI, 3G-B-SDI, 6G-SDI, 12G-SDI, adaptive	
	Standards	SMPTE292M, SMPTE424M, SMPTE2081-1:2015, SMPTE2082-1:2015	
	Color Space	YCbCr 4:2:2	
	Color Depth	10bit	
	Audio	48kHz sample rate, 24-bit, stereo	
	Transmission Wavelength	1310±10nm	
	Transmission Power	-3dBm~1dBm	
	Reception Wavelength	1260nm~1580nm	
	Reception Power	-11dBm~1dBm	
	Transmission Distance	Single-mode	≤50000 meters
		Multi-mode	≤700 meters
Analog Audio In	/	Stereo Analog Audio Input	
Analog Audio Out	/	Stereo Analog Audio Output	
LAN	/	100 Mbps Ethernet Port	
Power	/	USB Type-C power input	
		USB Type-C 12V/1.5A	
		Supports dual battery power, with approximately 3 hours of single battery life	
		When both USB Type-C and the battery are connected, it automatically switches to USB Type-C power mode	

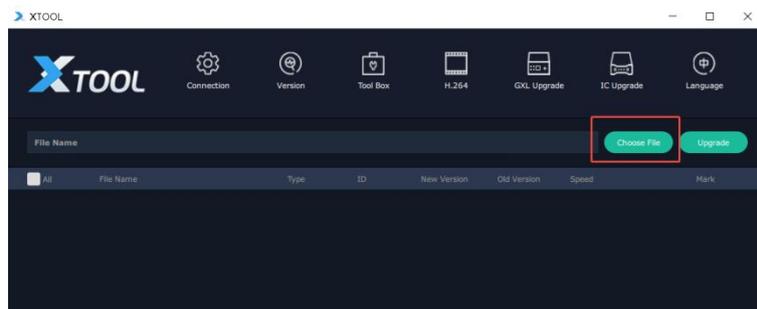
6.4 Upgrade Guide

The MSP 405 devices use XTOOL to upgrade. Proceed as follows:

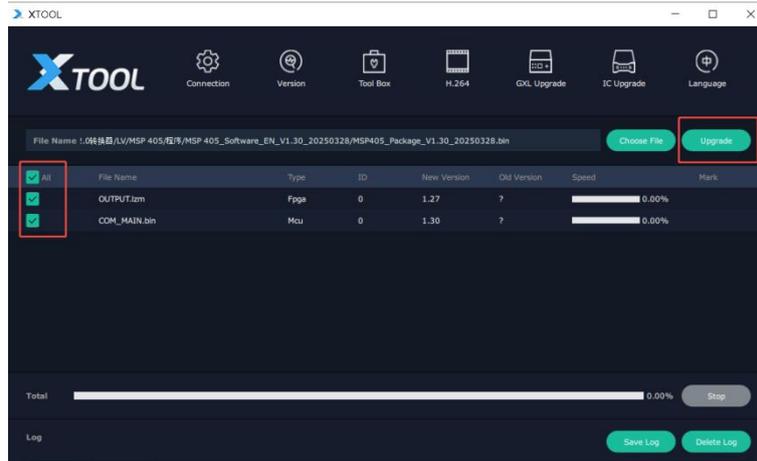
1. Download the upgrade package from the official website (click [MSP_405](#)) and launch XTOOL.
2. Connect the device via Ethernet, ensuring your PC and device are on the same LAN.
3. Check the IP address on the MSP 405 device. In XTOOL's "Connection", set the "Network Comm" to match the device's IP.



4. Load the upgrade file: Click “Choose File” and choose the MSP 405 firmware package.



5. Select target modules and click “Upgrade”. The device will update automatically.



6.5 Revision History

The table below lists the changes of MSP 405 User Manual.

Format	Time	ECO#	Description	Principal
V1.0	2024-05-15	0000#	First Release	Aster
V1.1	2024-08-22	0001#	<ol style="list-style-type: none"> 1. Add application example 2. Update DIP switch description 3. Add interface performance 	Aster
V1.2	2025-03-17	0002#	<ol style="list-style-type: none"> 1. Modify the color space and color depth of HDMI 2. Modify the IP reset address 3. Modify the transmission distance of the fiber 4. Modify the application diagrams of Application Example 2 and 3 5. Add mode examples on Application Example 2 and 3 	Alyssa
V1.3	2025-04-15	0003#	<ol style="list-style-type: none"> 1. Modify 1.1 Product Overview and 1.2 Key Features 2. Modify all application diagrams and operation steps in scenarios 3. Add 3.4 Test Modes, 3.5 Loop Modes, and 3.6 Audio to Chapter 3 4. Add 6.5 Upgrade Guide to Chapter 6 	Alyssa

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