



# User Guide

## MS-210SP

HDBaseT™ Extender Set - 4K to 40m (10G), 70m @ 1080p. PoC, 2-way S/PDIF, one-way analogue audio pass-through, RS-232 pass through, with single channel bi-directional IR. HDCP2.2 compliant



# Contents

---

Introduction	03
Key Features	03
Connectivity Overview (TX and RX)	04
Understanding the LED's	05
Cabling for HDBaseT	05
IR Control & RS-232 Control	06
Audio	06
Specifications & Package Contents	07
Schematic	08

# Notices

---

- This MSolutions product contains electrical components that may be damaged by electrical spikes, surges, electric shock, lightning strikes, etc. Use of surge protection is highly recommended in order to protect and extend the life of your equipment.
- The transmission distances of HDMI over Cat cables are measured using TE CONNECTIVITY 1427071-6 EIA/TIA-568-B termination (T568B) of cables is recommended for optimal performance. To minimise interference of unshielded twisted pairs in the CAT5e/6 cable, do not run the HDBaseT / Cat5e/6/6a cabling with or in close parallel proximity to mains power cables.
- Do not substitute or use any other power supply other than the enclosed unit, or an MSolutions approved replacement. Do not disassemble either the Transmitter or Receiver units for any reason. Doing so will void the manufacturer's warranty.
- The terms HDMI and HDMI High-Definition Multimedia Interface, and the HDMI logo are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.
- Dolby is a trademark of Dolby Laboratories.
- MSolutions reserves the right to change the specifications of this unit without prior notice. As a result of this, physical representations or graphical elements contained within this user guide may not be accurate.

# Introduction

---

The MSolutions MS-210SP is a 4K HDMI HDBaseT extender set allowing for uncompressed video and audio to be extended up to 40m at 4K UHD & HDR (10.2Gbps), and 70m at 1080p or lower resolutions.

S/PDIF audio return enables the sink to return audio to an audio amplification or distribution device located remotely to the display. An additional one way analogue audio pass-through allows for a separate audio signal to be returned from the receiver to the transmitter.

The extender provides bi-directional RS-232 and a single channel IR link between TX to RX, or RX to TX. Bi-directional PoC (Power over Cable) allows for either the TX or RX to be powered.

## Key Features

---

- Uncompressed extension of HDMI at resolutions up to 4K 60Hz 4:2:0 / 4K 30Hz 4:4:4 using HDBaseT technology
- 4K signal extension to 40m over single CAT including HDR formats supported under 10.2Gbps
- 1080p or lower video resolutions up to 70m over single CAT
- Supports HDMI pass-through all known HDMI audio formats including Dolby Atmos / DTS:X
- Bi-directional 12V PoC (Power over Cable)
- Bi-directional S/PDIF (Digital Optical Toslink) connectivity (TX to RX, RX to TX)
- Independent 1-way analogue audio pass-through (RX to TX)
- Bi-directional RS-232 serial pass through
- Single channel 5V IR pass-through (TX to RX, or, RX to TX)
- CEC (Consumer Electronics Control) pass through
- HDCP2.2 compliant

Video resolution capabilities - 10.2Gbps HDMI 1.4 specification max:

Resolution	Refresh	Chroma	Depth
4096x2160 (DCI) 3840x2160	50Hz / 60Hz 30Hz 24Hz	4:2:0 4:2:0 / 4:2:2 / 4:4:4 / RGB 4:2:0 / 4:2:2 / 4:4:4 / RGB	8-bit 8 / 10 / 12-bit 8 / 10 / 12-bit
1920x1080	up to 60Hz	4:4:4 / RGB	up to 16-bit
1280x720 1024x768	up to 60Hz	4:4:4 / RGB	up to 16-bit
VGA to WUXGA	up to 60Hz		

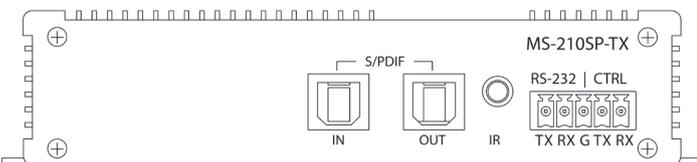
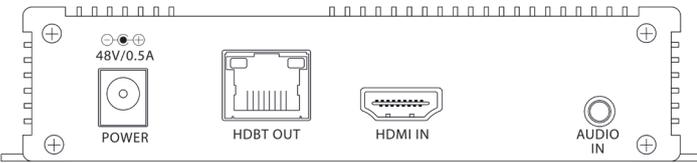
# Connectivity Overview - TX

## Front panel:

- Power - connect to supplied 12V/2A power supply
- HDBaseT Out - connect to Cat cable to receiver
- HDMI In - connect to HDMI source
- Audio Out - connect to audio amplification / distribution device

## Rear panel:

- S/PDIF In - connect to optical audio device
- S/PDIF Out - connect to optical audio device
- IR - connect to either IR transmitter or IR receiver cables
- RS-232 - use supplied 5-pin phoenix connector to connect to serial device



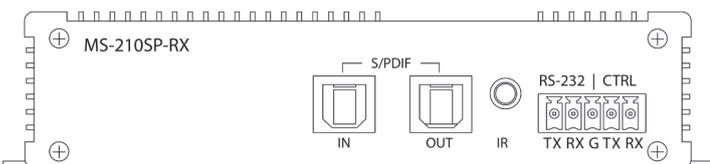
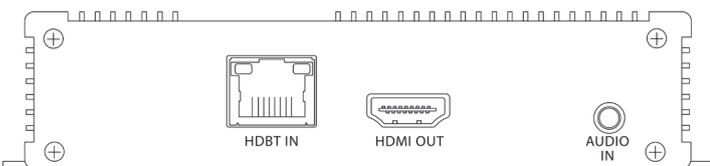
# Connectivity Overview - RX

## Front panel:

- Power - connect to supplied 12V/2A power supply
- HDBaseT In - connect to Cat cable from transmitter
- HDMI Out - connect to HDMI sink device
- Audio In - connect to audio device

## Rear panel:

- S/PDIF In - connect to optical audio device or display
- S/PDIF Out - connect to optical audio device
- IR - connect to either IR transmitter or IR receiver cables
- RS-232 - use supplied 5-pin phoenix connector to connect to serial device



# Understanding the LED's

---

This MSolutions extender set includes status LED indicators on both the Transmitter and Receiver products to show active connections and to further help integrators diagnose potential problems with the associated cabling.

The RJ45 HDBaseT connections on both the transmitter and receiver units have orange and green LED's.

- The orange LED indicates that the unit is receiving power. The LED will blink continuously.
- The green LED indicates that the unit is communicating with the unit attached to the far side of the link over the Cat cable. The LED will be solid whilst the units are able to host a HDBaseT link across the infrastructure.
- Internal LED's that may be seen through venting of the product are not indicative of a working / non-working unit.

## Cabling for HDBaseT

---

It is important that the interconnecting Cat cable between the MSolutions HDBaseT products is terminated using the correct RJ45 pin configuration. The link Cat cable must be a 'straight' (pin-to-pin) Cat cable and it is advised that this is wired to the T568B wiring standard as this format is less prone to EMI (Electro-Magnetic Interference).

When installing Cat cables it is advised that the best possible Cat cable quality possible is used. HDMI distribution products will only work if used with Cat5e standard cable or above. MSolutions recommends using a Cat6 (or higher) cable for installations, especially when running over longer distances, in areas of high EMI, or with 4K signal distribution.

The HDMI cable infrastructure should be compliant to High-Speed standards, especially where 4K is being distributed. It is important to understand that where excessive HDMI cable lengths are used, this brings increased reduction in signal integrity over distance compared to HDBaseT. It is therefore recommended to use short HDMI cables to ensure the integrity of the signal over the link.

For HDBaseT and HDMI testing capabilities, please refer to the MSolutions MS-TestPro to prove both Cat and HDMI cables can be used for video signal distribution.

# IR Control

---

The MS-210SP can distribute infrared commands from either the receiver to the transmitter, to provide source control from the display; or, from transmitter to receiver to provide display control from a centrally located control processor.

The MS-210SP is supplied with a single 5V IR transmitter that can be connected to either of the 3.5mm jack sockets on the transmitter or receiver to the labelled 'IR' port. The 5V IR Receiver is then connected to the 3.5mm jack socket labelled 'IR' on the opposite end of the link.

Please use the supplied MSolutions IR equipment within this kit - alternative manufacturers IR cabling may not have the same pin configuration which, if used, could damage the componentry inside the MSolutions extender, or the IR cabling.

Note: the 3.5mm jack sockets are bi-directional - it is only possible to send IR control in one direction depending on which end of the link has the IR transmitter or receiver. It is not possible to send IR controls in two directions simultaneously.

# RS-232 Control

---

The MS-210SP can distribute bi-directional serial commands between the transmitter and receiver to allow for control commands to be sent alongside the video and audio distribution. This uses the left side of the phoenix connector.

Each HDBaseT unit is fitted with a 5-pin phoenix connector block that will need the serial TX, RX and Ground pins terminating into for serial pass-through. HDBaseT has the ability to transparently send any type of serial data as both pieces of equipment are able to communicate using the same baud rate, stop-gap, and parity.

The opposing connections on the right of the phoenix connector are used for firmware upgrading. Please note: the ground connector is shared.

# Audio

---

The MS-210SP allows for bi-directional Optical audio signals to be transferred between TX and RX and vice-versa. This enables digital audio signals to be sent in either direction based on requirement of the install.

A single analogue audio channel (independent to the S/PDIF), can also be simultaneously run from RX to TX using the 3.5mm jack connections.

Note: these connections do not embed or de-embed audio from the HDMI video link.

# Specifications

---

## Transmitter

- Video connectivity: 1 x HDMI input (female), 1 x HDBaseT output (RJ45 keystone)
- Digital audio connectivity: 2 x S/PDIF Toslink Optical (in and out)
- Analogue audio connectivity: 1 x analogue audio output - 3.5mm jack (female)
- IR connectivity: 1 x 3.5mm stereo jack (female) - IR TX or IR RX
- RS-232 connectivity: 1 x 5-pin phoenix connector, block included
- Power supply: 1 x 12V/2A DC
- Individual unit dimensions (W x D x H): 135 x 70 x 31mm
- Individual unit weight: 0.2kg
- Operating temperature: 32°F to 104°F (0°C to 40°C)
- Storage temperature: -4°F to 140°F (-20°C to 60°C)
- Operating humidity: 0-80% non condensing

## Receiver

- Video connectivity: 1 x HDBaseT input (RJ45 keystone), 1 x HDMI output (female)
- Digital audio connectivity: 2 x S/PDIF Toslink Optical (in and out)
- Analogue audio connectivity: 1 x analogue audio input - 3.5mm jack (female)
- IR connectivity: 1 x 3.5mm stereo jack (female) - IR TX or IR RX
- RS-232 connectivity (TX & RX): 1 x 5-pin phoenix connector, block included
- Power supply: 1 x 12V/2A DC
- Individual unit dimensions (W x D x H): 135 x 70 x 31mm
- Individual unit weight: 0.2kg
- Operating temperature: 32°F to 104°F (0°C to 40°C)
- Storage temperature: -4°F to 140°F (-20°C to 60°C)
- Operating humidity: 0-80% non condensing

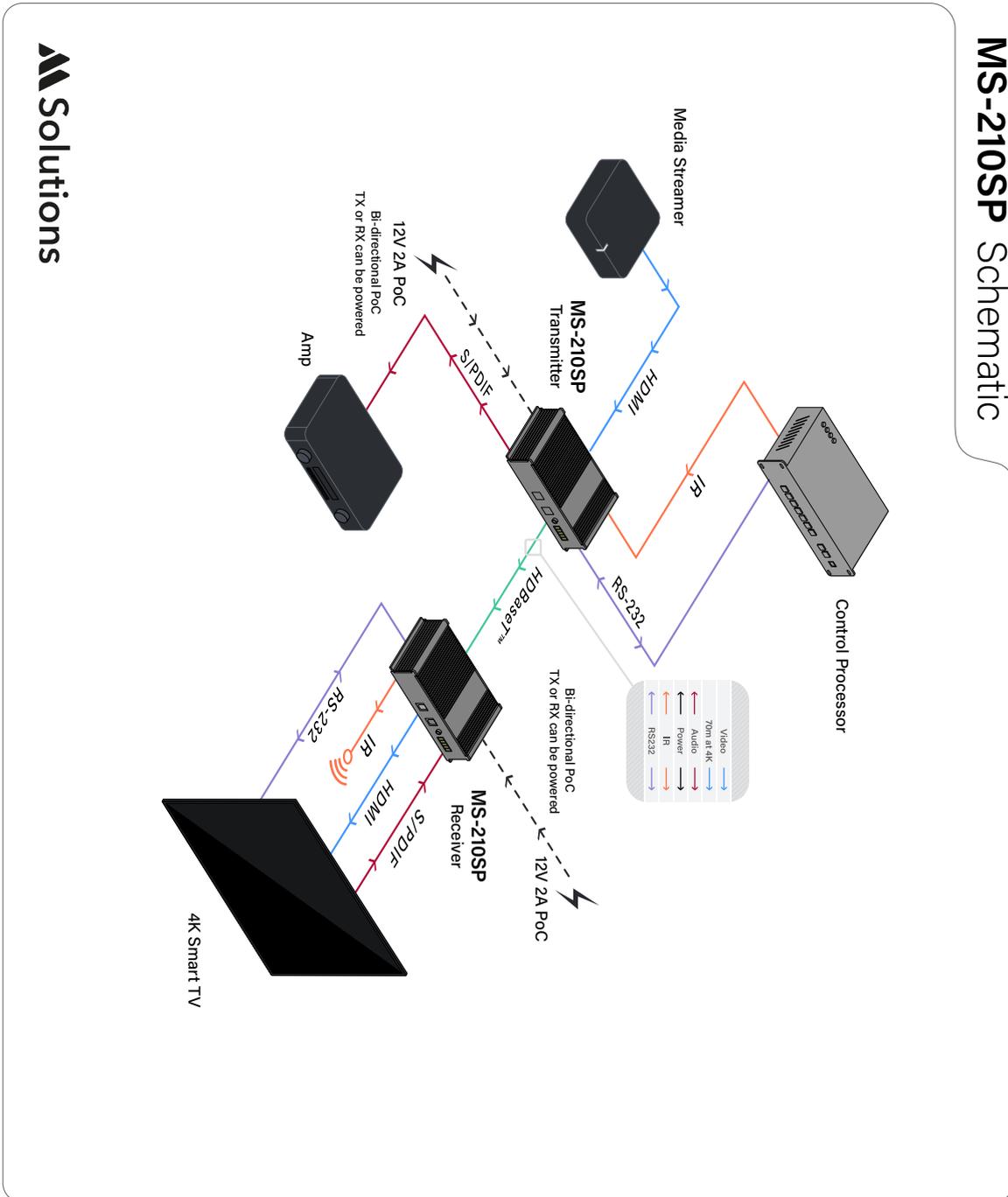
# Package Contents

---

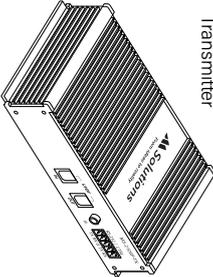
- 1 x MST-210SP (transmitter)
- 1 x MSR-210SP (receiver)
- 1 x 12V/2A DC power supply with US, UK, and EU clips
- 1 x 5V IR transmitter
- 1 x 5V IR receiver
- 2 x 5-pin phoenix connector blocks

# Schematic

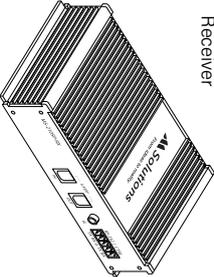
## MS-210SP Schematic



Solutions



**MS-210SP**  
Transmitter



**MS-210SP**  
Receiver

Legend for connection types:

- HDMI
- HDBaseT™
- IR
- RS-232
- Audio



[www.m4sol.com](http://www.m4sol.com)