

# Active Optical Cables

Take ultra-high-bandwidth HDMI and DisplayPort the distance



## Introduction

Professional AV applications require seamless, low-profile, affordable video transmission solutions that can support today's ever-increasing ultra-high-bandwidth resolutions at extensive distances. Black Box Active Optical Cables (AOCs) provide an all-in-one, easy-to-install, ultra-reliable solution for Pro AV installations in control rooms, digital signage, healthcare, conference rooms or any other application where ultra-high-definition video signals need to extend over long distances.



# Benefits of Active Optical Cables

## Flawless Extension of Ultra-High-Bandwidth Video

Active Optical Cables utilise fibre-optic technology that supports expansive bandwidth and can easily handle the highest video resolutions available today. Fibre technology is built into the AOC connectors, converting the electrical signal from the source into optical for transmission over fibre, and then back to electrical for display on a monitor. Whether transmitting the ultra-high-definition 4K60 resolutions of today, the 8K60 resolutions of tomorrow or even higher resolutions in the future, AOCs can flawlessly extend the signal hundreds of metres.

## Amazing Audio Quality

Active Optical Cable provides immersive audio quality that is essential for AV applications. These cables support PCM 8-Channel, DTS-HD and Dolby Digital True HD Surround Sound audio for theater quality sound. Additionally, AOCs can transmit up to 32 audio channels with a 1536 kHz sampling rate, and HDMI AOCs support Audio Return Channel (ARC).

## Plug and Play, Premium Reliability

In addition to supporting the highest bandwidth at the longest distances, Active Optical Cables are also an ultra-reliable, all-in-one solution that is simple to install. There is no software, external power or additional hardware needed for an AOC to work. It's as easy as installing a common HDMI cable at home. Combine this all-in-one design with the superior resistance to EMI/RFI interference that comes with fibre optics, and you can count on AOCs to provide guaranteed, 24/7 performance without any momentary signal losses or delays.

## Hybrid Fibre/Copper Construction

Black Box Active Optical Cables feature a hybrid copper/fibre design ideal for Pro AV applications. These cables contain a combination of copper and fibre, where the fibre cabling transmits the high-bandwidth data while the lower-bandwidth CEC, DDC, EDID and HPD signals are transmitted over copper, along with the power. This construction allows these AOCs to receive their power from the source, similar to a traditional copper AV cable, and eliminates the need for a bulky external power supply.

## Low Profile, Thin and Flexible

With a super-thin fibre-optic profile, Active Optical Cables fit easily behind today's ultra-thin displays. And since they need no external power, there are no bulky power supplies requiring install modifications to hide. Active Optical Cables are also extremely flexible and come with a superior bend radius that makes them easy to pull through tight spaces and navigate around corners and bends. In addition, AOCs are significantly lighter than standard copper cabling: Five metres of copper cable weighs approximately one kilogram, while 10 metres of AOC weighs less than 300 grams. This puts much less stress on your equipment and infrastructure when making long-distance connections that run through ceilings and walls.

## Outstanding Video Quality

Active Optical Cables can extend HDMI 2.0 up to 4096 x 2160 at 60 Hz (4:4:4) and DisplayPort 1.4 up to 7680 x 4320 at 60 Hz (4:2:0) hundreds of metres. These cables are compatible with HDCP 2.2, EDID, CEC and DDC, 21:9 cinema aspect ratios, as well as 3D visual effects, to ensure the end-to-end video quality professional AV applications require. They also support high-dynamic-range (HDR) video, ensuring an expansive contrast ratio and perfect colour accuracy with 48-bit colour depth.

## Full Compliance with the Latest HDMI and DisplayPort Standards

High-end AV applications don't just need the best video resolutions, but a solution that can display them while also providing the features necessary to support their content. Active Optical Cables do just that, providing 4K60 and 8K60 video resolutions while also supporting the full feature set of the HDMI 2.0 and DisplayPort 1.4 specifications. They also have the ability to support future generations of HDMI and DisplayPort specifications as they expand to even higher resolutions.

Download Our White Paper:

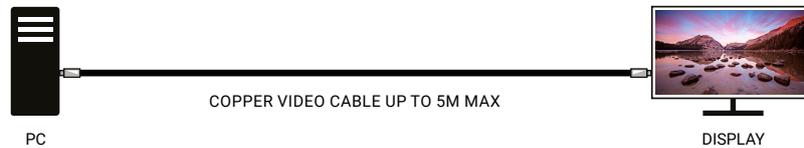
Active Optical Cables: Ultra-High-Definition Solutions for the Professional AV Applications of Today and Tomorrow

**BLACK-BOX.EU/WHITEPAPERS**

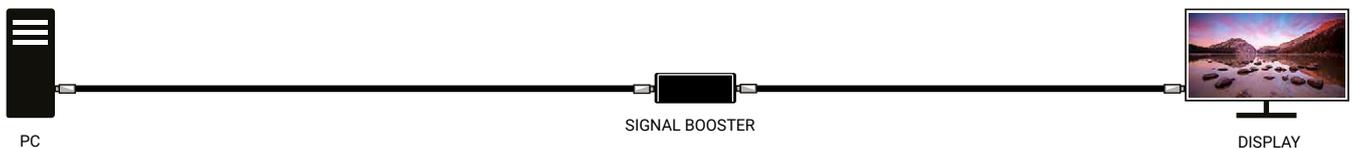


# Positioning of Active Optical Cables (AOC) in AV Extensions

**Standard copper video cables** are the typical choice for transmitting AV signals short distances. However, as resolutions reach 4K60, copper cabling starts getting bulkier, and achieving a standard distance of 5 metres becomes increasingly difficult. This problem will only get worse as 8K solutions become more common, and as video resolutions continue to expand, copper cables will either have to get shorter or become so big, inflexible and pricey that they will no longer be an attractive solution.



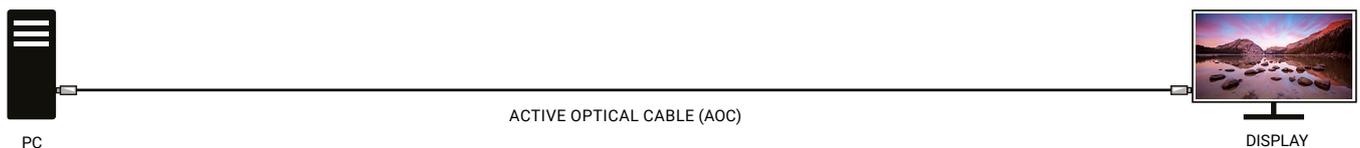
**Active copper extender cables** can achieve longer distances and support UHD video resolutions, making them suitable for mid-range installations where resolutions don't exceed 4K30, and routing through ceilings and walls is not required. But these solutions are also bulkier and become increasingly expensive at longer distances. They also contain equalisation controls for video adjustment that can sometimes be temperamental and often require external power to work.



**AV extenders** are available today that support video resolutions up to 4K60 at extended distances. They require a transmitter at the source, a receiver at the screen, and external power supplies, making a clean or space-saving installation difficult. The additional connections also add more potential points of failure. They can utilise either copper or fibre cabling to connect the transmitter and receiver, with copper typically maxing out at 100 metres, while fibre cabling can get into the kilometres. As resolutions reach 4K60 and beyond, the distances shrink while the extenders become much more expensive.

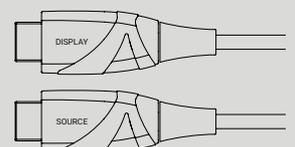


**Active Optical Cables (AOC)** are the all-in-one cable solution that provides ultra-high-bandwidth data transmission over short and long distance. As the video resolutions get higher, the AOC cabling stays the same ultra-thin size, and the distances it can extend a signal do not change. AOCs can extend HDMI 2.0 up to 4K60 Hz (4:4:4) and DisplayPort 1.4 up to 8K60 (4:2:0) hundreds of metres, and do not require bulky external power supplies. On top of that, the minimal points of failure in a single cable solution and the ultra-high immunity to EMI/RFI interference ensure flawless quality that keeps your signal up 24/7.

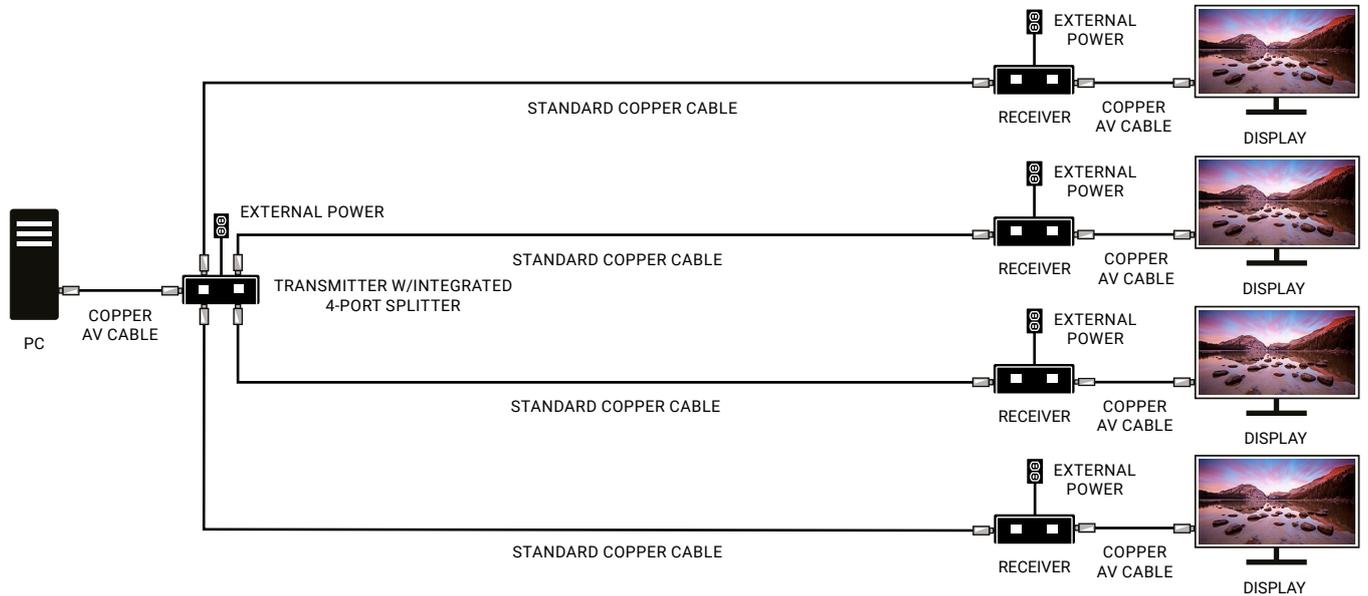


## Black Box AV Expert Tip

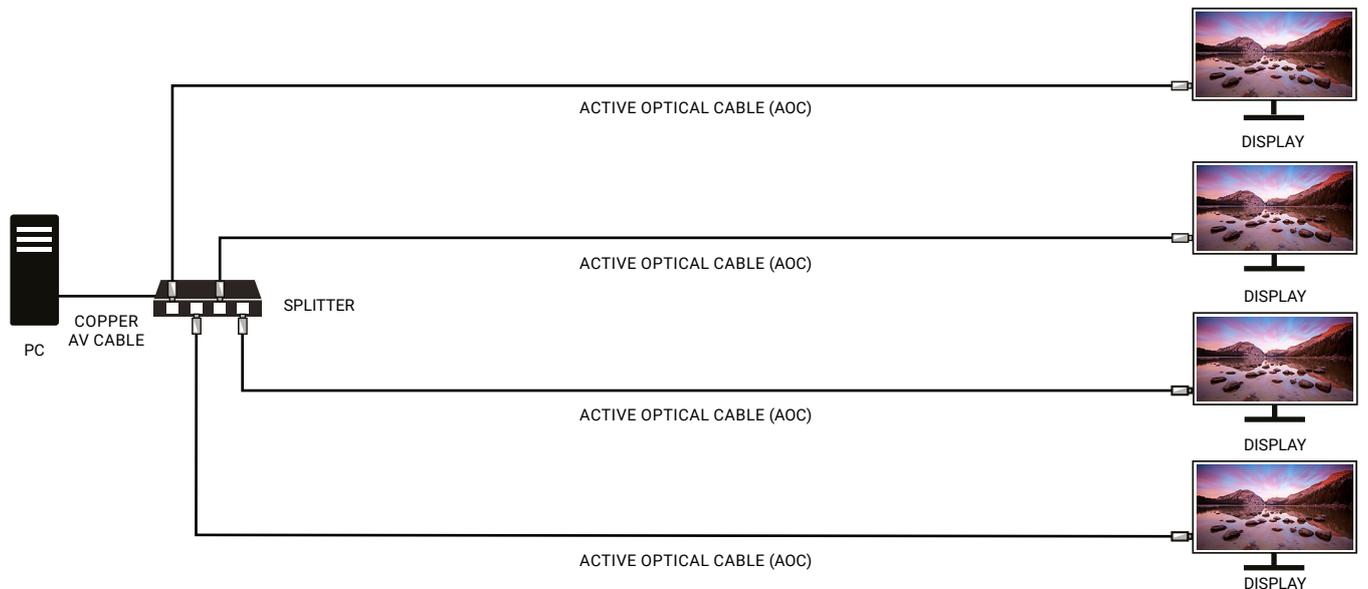
Active Optical Cables from Black Box feature connectors that are clearly marked source and display, which makes installation quick and easy. Connect the source connector to the source and the display connector to the display, and you are ready to transmit UHD content.



**AV extenders that combine extension with splitting and/or switching** are even more complex and expensive, requiring numerous devices to accomplish the desired result. A copper or fibre AV extender solution with a splitter and/or switch built into the transmitter unit would be required, along with multiple receiver units to connect to all of the monitors. If that kind of solution is not available, one would have to combine a standard splitter or switch with multiple extender kits to get the same result but with a much higher risk of incompatibility problems.



**Active Optical Cables (AOCs)** are not only used to connect a single source to a single display but can also be utilised in applications that call for splitting and/or switching. Active Optical Cables make this type of setup much easier by connecting directly to a standard HDMI splitter or switch, just like a normal passive cable. You do not need any special transmitter or receiver hardware, and the only additional points of failure are between the splitter/switch ports and the connected AOCs.



# Active Optical Cable (AOC) in AV Applications



## Digital Signage

The most discrete solution to connect media players or any other AV source to 4K or 8K displays. AOCs have no need for power supplies or bulky extender units that won't fit behind today's ultra-thin screens.



## Control Rooms

Flawless 24/7 functionality with no risk of momentary lapses in signal. Active Optical Cables easily extend uncompressed 4K60 HDMI or 8K60 DisplayPort AV signals between the remote UHD source and the display.



## Medical Imagery

Deliver MRI or X-ray images to doctors' meeting rooms or the OR with precise, lossless image reproduction. Due to their high EMI/RFI immunity and absence of external power supplies, AOCs are superior to alternative solutions, such as AV extenders, in these applications.



## Video Walls

Connect remote UHD sources to your video switch or video wall controller without impacting video quality. This all-in-one cable solution allows for a clean installation without extender units and their power supplies.



## Meeting Rooms

Bridge the distance between the displays in your meeting rooms and existing hardware, such as video switchers, video splitters or computers. The thin, flexible AOC can be routed behind displays with minimal visibility and is easy to install in tight spaces with corners and bends.



## Transportation

Bring UHD video and audio from far away to your displays, so you can monitor traffic and delays. Designed using LSZH jacketing that limits exposure to harmful chemicals in congested, high-traffic areas in the event of a fire.





## HDMI 2.0 Active Optical Cable 4K60 4:4:4

### Features

#### Video/Audio

- Full HDMI 2.0 compliance with 4096 x 2160/3840 x 2160 (4K)@ 60 Hz 4:4:4 resolutions up to 100 metres
- 30-/36-/48-bit deep colour
- Data transfer rates up to 18 Gbps
- EDID/CEC/DDC and HDCP 2.2 conform
- Delivers dual video streams to compatible displays
- 21:9 cinema aspect ratio and BT.2020 colorimetry
- Compliant with category 2 specifications – 600-MHz clock frequency
- Up to 32 audio channels with a 1536 kHz sampling rate
- Supports up to eight PCM channels, DTS-HD Master and Dolby Digital True HD surround sound audio
- Delivers multi-stream audio to up to four users
- Compatible with Audio Return Channel (ARC)

### Physical

- Gold-plated, zinc-alloy HDMI connectors for enhanced durability and performance
- OM3 fibre technology greatly reduces EMI/RFI emissions
- Triple-shielding further protects against interference for optimal signal quality
- Hybrid construction utilises both fibre and copper to supply power
- Extended temperature range from 0° to 70° C for installations in harsh environments or manufacturing floors
- LSZH jacket complies with fire protection regulations and increases the safety of employees in the event of a fire
- Available in multiple standard lengths from 10 to 100 metres
- Three-year Double Diamond warranty

HDMI 2.0 Active Optical Cable	Part Number
10-Metre Cable	AOC-HL-H2-10M
15-Metre Cable	AOC-HL-H2-15M
30-Metre Cable	AOC-HL-H2-30M
50-Metre Spool	AOC-HL-H2-50M
100-Metre Spool	AOC-HL-H2-100M



## DisplayPort 1.4 Active Optical Cable 8K60

### Features

#### Video/Audio

- DisplayPort 1.4 compliance with 7680 x 4320 (8K) @ 60 Hz 4:2:0 resolutions up to 100 metres
- 30-/36-/48-bit deep colour
- Data transfer rates up to 32.4 Gbps
- EDID/CEC/DDC and HDCP 2.2 conform
- Delivers dual video streams to compatible displays
- 21:9 cinema aspect ratio
- Supports BT.2020 colorimetry
- Supports up to 32 audio channels with a 1536 kHz sampling

### Physical

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DisplayPort 1.4 Active Optical Cable	Part Number
10-Metre Cable	AOC-HL-DP4-10M
15-Metre Cable	AOC-HL-DP4-15M
30-Metre Cable	AOC-HL-DP4-30M
40-Metre Spool	AOC-HL-DP4-40M
50-Metre Spool	AOC-HL-DP4-50M
100-Metre Spool	AOC-HL-DP4-100M

## WHY BLACK BOX

### Expertise

Black Box project engineers can assist with system assessment, design, deployment and training.

### Breadth

Black Box offers the most comprehensive suite of engineered AV and infrastructure solutions in the industry.

### Support

Reflecting our commitment to complete satisfaction, our dedicated team of highly trained support technicians is available by phone free of charge, every day of the year.

### Warranties

Our Active Optical Cables come with a three-year Double Diamond warranty and extension options are available.

### Experience

Providing leading technology solutions since 1976, Black Box helps more than 175,000 customers in 150 countries build, manage, optimise and secure IT infrastructures.

### Centre of Expertise

Black Box offers a Centre of Expertise, featuring professional services and support agreements that help optimise customers' systems and maximise uptime.

### Service Level Agreements

Our service level agreements give customers access to technical support, product training, dedicated application engineers and more.

