

Savlink New Solution

USB 3.2 Gen 1 USB AM to AF Extension AOC

(Compatible with USB 2.0 and 1.1)

W/O Power Port | 5Gbps | 50M

Model: (SUMF-3250)

Specification

ECN Change History Form

Edition	Release Date	Change Details	Prepare	Examine and verify	Ratify
1.0	2024.1.22	First Edition Release	R&D		

Product View

The Savlink 50m Longest USB 3.0 Active Optical Cable (AOC) is a high-performance electro-optical conversion module designed to overcome the physical limitations of traditional copper cables. By utilizing optical fiber between the connectors, this cable delivers lossless, high-speed data transmission over distances far beyond the standard 5-meter limit of conventional USB, making it the ideal solution for industrial, medical, and high-end computing applications.

Traditional USB 3.0 fiber cables have long suffered from two major defects: the inability to supply power to remote devices and bandwidth bottlenecks for low-speed peripherals. Savlink has successfully engineered solutions to both:

Hybrid Power & Data Transmission: Unlike passive fiber cables that cannot conduct electricity, Savlink AOC integrates a hybrid design that combines optical data channels with dedicated power lines. This breakthrough allows the cable to directly power remote devices (such as external hard drives or industrial cameras) without requiring an external power adapter, ensuring true plug-and-play functionality.

Intelligent Protocol Conversion (Super Technology): Equipped with an advanced proprietary chip set, the cable performs real-time mutual conversion between USB 3.0 and USB 2.0 & 1.1 protocols. This innovation enables USB 2.0 devices to share the Super Speed bandwidth (up to 5Gbps) of the USB 3.0 interface, eliminating latency and significantly boosting the performance of legacy peripherals



II. Product Features

- Extends USB 3.0 and USB 2.0 connections up to 50 meters without signal degradation.
- Supports all USB device types with transfer rates up to 5Gbps.
- Proprietary technology substantially boosts the bandwidth performance of USB 2.0 and 1.1 devices.
- No need for an optional USB power port on the device and providing up to 5V/900mA to drive remote peripherals.
- Fully compatible with Windows and Mac operating systems; no drivers required.
- Easily expand the number of devices by connecting additional USB hubs to the remote end.
- Support directional transmission. Please avoid over-bending & use a USB active cable in the direction of Host → Device. Host End for PC, Laptop... Device End for USB drive, webcam, mobile hard disk, gaming peripherals...
- Ideal for a broad range of peripherals, including printers, scanners, hard drives, audio interfaces, touch screens, webcams, and game controllers. AR VR, Storage Camera, and USB 3.2 devices for conference rooms and data centers.

III. Performance Parameters

Parameter	Specification
Interface type	1 x USB A Male + 1 x USB A Female Nickel Plated
Cable	Hybrid with OM3 Fiber
Power Consumption	900mAW
Bandwidth	5Gbps
USB Version	USB 3.2 Version Compatible with USB 2.0 & 1.1
Power	No external power required
Driver	Hot-Plug Support/No Driver
Jacket Material	Standard: PVC Customize: TPE or CMP or LSZH or TPU
Correct connection	Host to Device
Temperature Range	Operating : 0~50 degree C Storage: -20 ~70 degree C
Bend Radius	48mm, and depends on your connected devices.
Operating Humidity	10% to 85% RH, non-Condensing
Storage Humidity	5% to 90% RH, Non-Condensing
O/E Converter	2-channel 850 nm VCSEL array
Tensile strength	200N
Crush resistance	100N
Video Bandwidth	Not Support
Safety and Emission	CE / FCC / RoHS / REACH / UL VW-1
Cable length	5m/7.5m/15m/20m/30m/50m Custom length available.
Shell	Zinc Shell or Custom Design
Package	1PCS/ Anti-Static Foil Bag + Yellow Box

3.2 Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
Supply Voltage	VCC	-0.5	5.5	V
Operating Temperature	Top	0	50	°C
Storage Temperature	Ts	-20	70	°C
Storage Relative Humidity	Hs	5	90	%RH

3.3 Recommended Operating Conditions

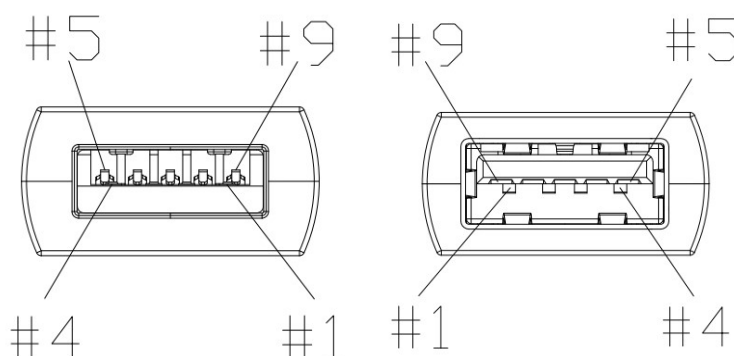
Parameter	Symbol	Minimum	Typical	Maximum	Units
Supply Voltage	VCC	4.75	5	5.25	V
Operating Temperature	Top	0		50	°C

3.4 Characteristics

Parameter	Description	Minimum	Typical	Maximum	Units
VCC	Supply Voltage	4.75	5	5.25	V
IBUS	Current at USB Bus Power	49.5	55	60.5	mA
RDIF	Differential impedance		90		Ω
USB3.0 AOC TX Characteristic					
PTX	Optical TX output power	0			dBm
Rj	Random jitter			3	ps
Dj	Deterministic jitter			60	ps
Tj	Total jitter at a 10-12 BER			100	ps
USB3.0 AOC RX Characteristic					
SRX	RX sensitivity	-7.5			dBm
CAC-COUPPLING	AC coupling capacitor on RXOUT	75	100	200	nF

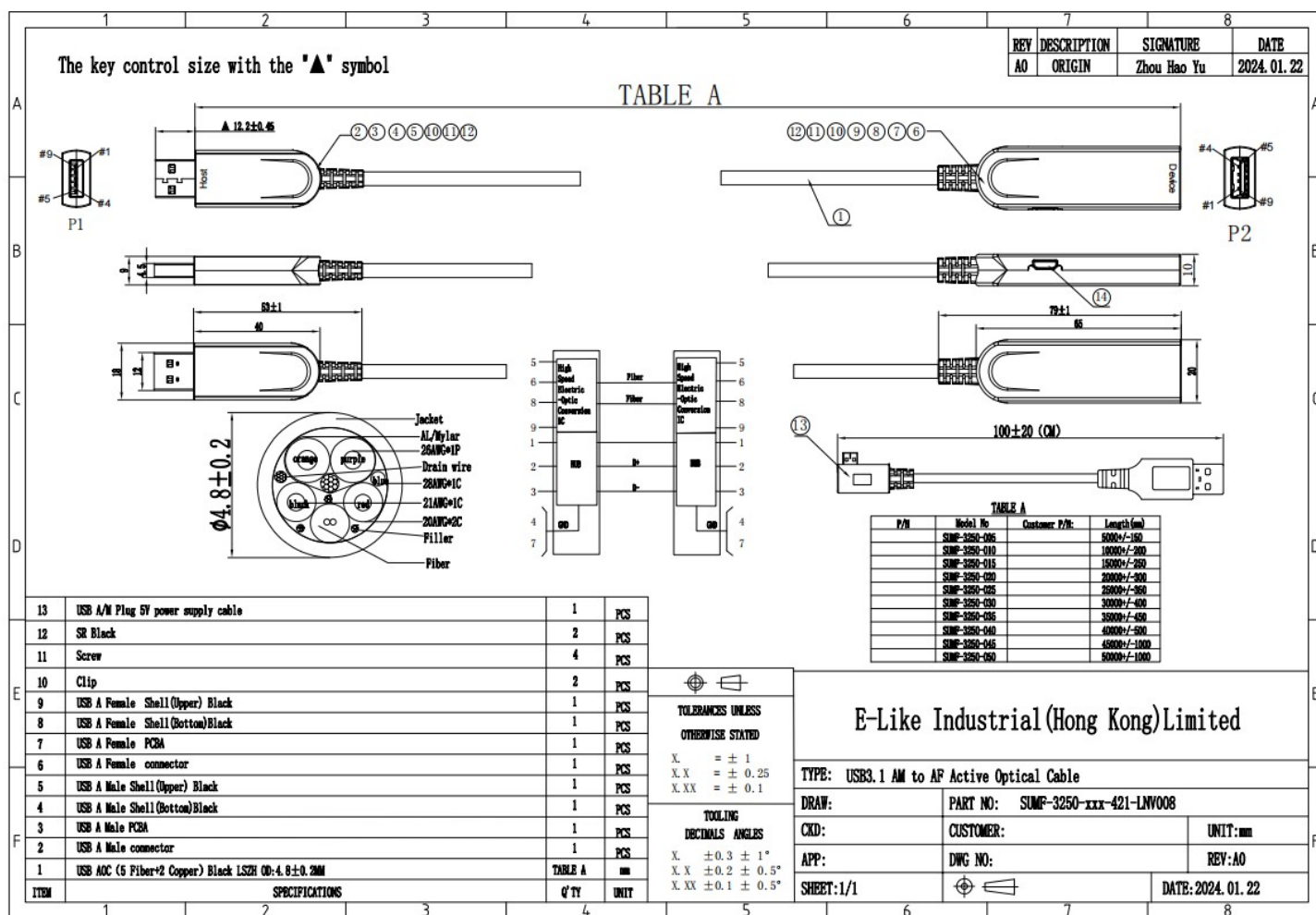
IV. Interface Definition

4.1 Savlink USB 3.2 Gen 1 USB AM to AF Extension AOC Typical Interface Circuit



PIN	Signal Name	Description
1	VBUS	Power
2	D-	USB2.0 differential pair
3	D+	
4	GND	Ground for power return
5	StdA_SSRX-	Super Speed receiver differential pair
6	StdA_SSRX+	
7	GND_DRAIN	Ground for signal return
8	StdA_SSTX-	Super Speed transmitter differential pair
9	StdA_SSTX+	

4.1 Savlink USB 3.2 Gen 1 USB AM to AF Extension AOC Interface Circuit

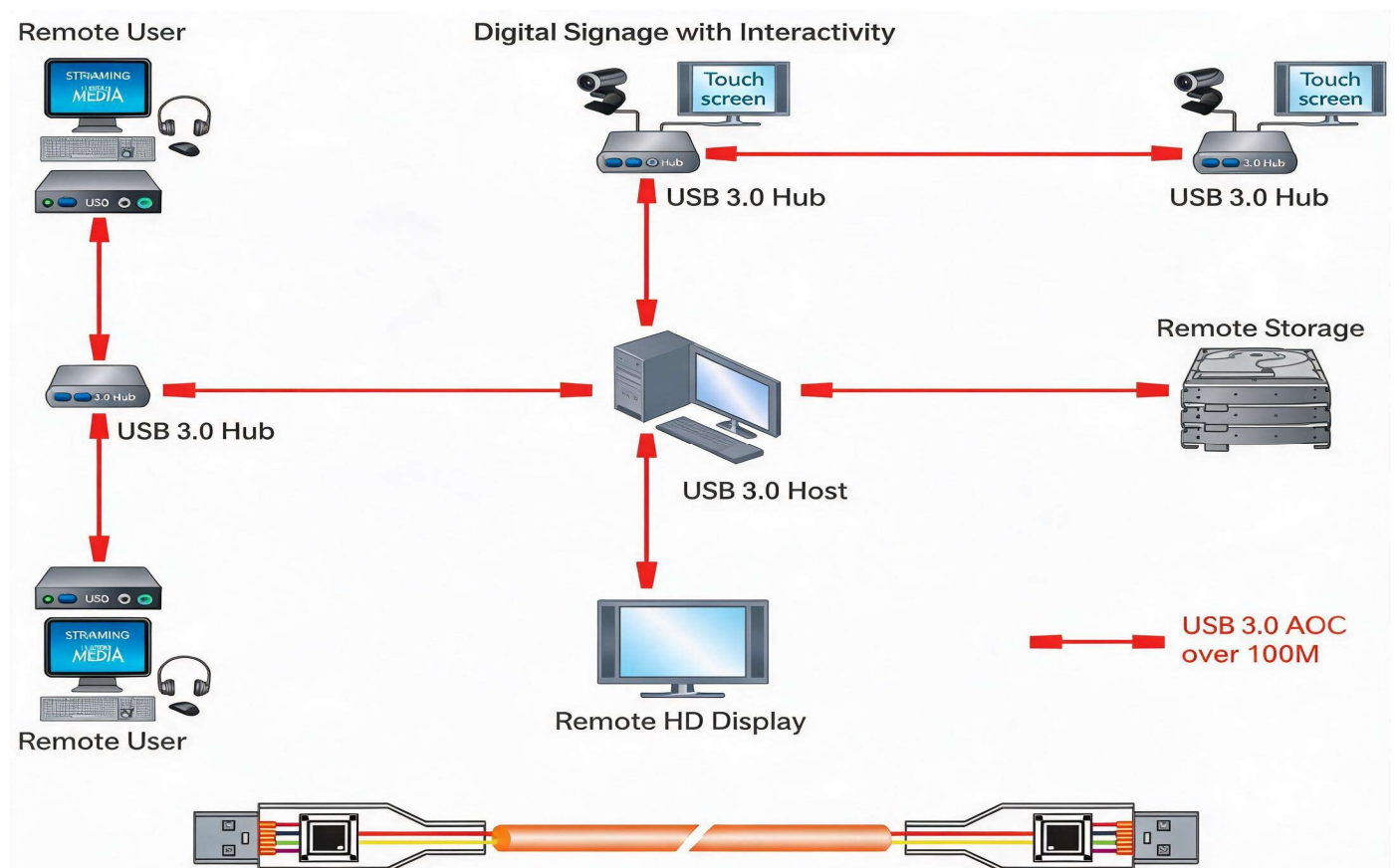


V. Working Principle

- USB active optic cable built-in optical conversion chip for 10Gbps data transfer via optical signals, ensuring zero latency, zero data loss, and electromagnetic interference. Backward compatible with USB 3.0 & 2.0.
- Active USB 3.2 extension cable only supports directional transmission. Please avoid over-bending, and use this active cable in the direction of Host → Device. Host End for PC, Laptop... Device End for U disk, webcam, mobile hard disk, gaming peripherals...

VI. Applications

- Computers
- Servers
- External hard drives
- Workspace
- Home theater
- Data Storage & Transfer
- Cameras (DSLR/Mirrorless Tethering)
- Smart Education & Training



VII. Q&A

Q1: What is a USB AOC, and how is it different from standard copper cables or passive fiber cables?

A1: An USB AOC (Active Optical Cable) is an active cable equipped with built-in electro-optical conversion chips. It supports ultra-long-distance transmission up to 50 meters with zero signal loss and is completely immune to electromagnetic interference (EMI). Utilizing a hybrid power-and-data design, it also provides stable 5V/900mA power to remote devices, solving the traditional problem of fiber cables being unable to supply power.

Q2: What is the actual data transfer speed of this USB 3.1 AOC? Is it compatible with USB 2.0 and USB 1.1?

A2: This product supports the USB 3.1 protocol with a theoretical transfer rate of up to 5Gbps. It is backward compatible with USB 2.0 and 1.1 devices.

Q3: Why can USB AOC achieve distances of up to 50 meters or more?

A3: Traditional copper cables suffer severe signal attenuation beyond 5 meters. In contrast, Active Optical Cables transmit high-speed signals via optical fiber, which experiences extremely low signal loss. This allows for stable, long-distance transmission of up to 50 meters, breaking through the physical limitations of copper wiring.

Q4: Can this cable supply power to external hard drives or industrial cameras?

A4: Yes. Thanks to its hybrid design, this cable can drive most external hard drives, industrial cameras, and capture cards. For high-power consumption devices, we recommend connecting the device's original power adapter to ensure stable operation.

Q5: Can I connect a USB hub to the end of this cable to attach more devices?

A5: Yes. This cable supports cascading. You can connect a USB hub to the device end to expand the interface and simultaneously connect multiple peripherals, such as keyboards, mice, and flash drives. However, please ensure the total power consumption of the connected devices does not exceed the hub's capacity.

Q6: What is "directional transmission," and what happens if I plug it in backwards?

A6: A USB AOC is an **active device** and must be connected strictly according to direction:

Host End: Must be connected to the computer, host machine, or gaming console.

Device End: Must be connected to the peripheral (e.g., hard drive, camera, keyboard).

⚠ Warning: Plugging the cable in backwards will prevent the chip from working, resulting in device failure. It may even damage the cable or the USB port on your host device.

Q7: Can I fold or tightly bundle this cable like a network cable?

A7: No. Although the fiber optic cable is thin, it contains electro-optical conversion chips and copper wires, making the connectors relatively fragile. Please avoid excessive bending (**minimum bend radius > 5 cm**) and do not pull the cable forcefully.

Q8: Does it support hot-swapping?

A8: Yes. You can plug and unplug the cable while the system is running, just like a standard USB cable, without needing to restart your computer.

Q9: What scenarios is this cable suitable for?

A9: It is the ideal solution for overcoming long-distance transmission challenges, particularly in:

- **Industrial Vision:** Connecting industrial cameras to control systems over long distances.
- **Medical Imaging:** Remote linking of operating room equipment to central controllers.
- **AV Engineering:** 4K/8K video capture, live streaming, and large-screen connectivity.
- **Office Environments:** Deploying meeting room hosts remotely from desktop keyboards and monitors.

Q10: Does it require driver installation? Which operating systems are supported?

A10: **No drivers are required.** It is truly plug-and-play. It fully supports **Windows** (XP/7/10/11), **macOS**, **Linux**, and **Android** systems.

Q11: What should I do if the device is not recognized?

A11: Please follow these troubleshooting steps:

- **Check Direction:** Ensure the cable is oriented correctly (**Host → Device**).
- **Check Power:** If using a high-power device (like an external HDD), ensure the auxiliary power cable is connected and powered.
- **Check Port:** Try plugging the Host end into a USB 3.0 port (usually blue) on the back of the computer motherboard.
- **Check System:** Open Device Manager to see if there are any unknown devices or error warnings.

