Product Data Sheet

Modular Video Matrix Switchers and Signal Cards

AVS800, front view

AVS800, back view, with signal cards installed

AVS1600, front view

AVS1600, back view, with signal cards installed

Overview

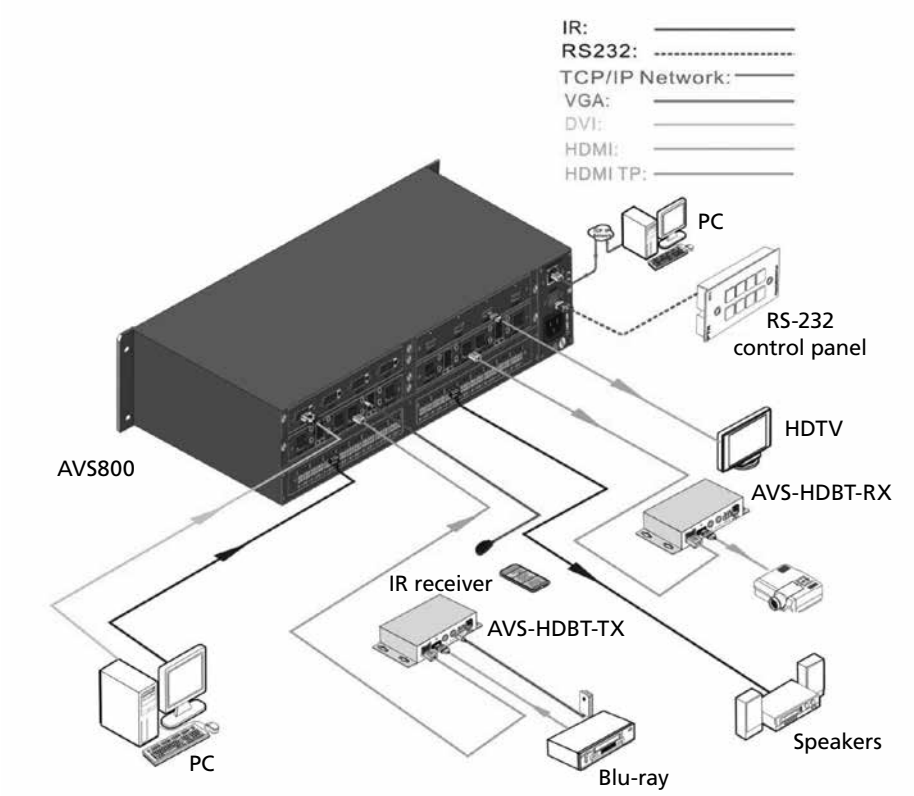
The Modular Matrix Switcher is a high-performance video and audio modular matrix switcher. It supports different video signals with cross switching. Every video or audio signal is transmitted and switched independently to decrease signal attenuation. The Switcher supports various changeable cards including HDMI, DVI, VGA, SDI, and HDBaseT, and all the cards support hot plug-and-play. Users can choose to insert different signal cards for different applications. The Switcher has a power fail memory function and audio can break away from or follow the video to the switch. It has an RS-232 port for serial control and an optional IP port for TCP/IP control. It can be easily controlled by third-party devices.

With its flexible design, the Switcher can be used for different projects and is an all-in-one solution. Applications include multimedia conference rooms, control rooms, broadcasting rooms, shopping centers, etc. The Switcher handles all the audiovisual management, including the switching, driving, scaling, etc.

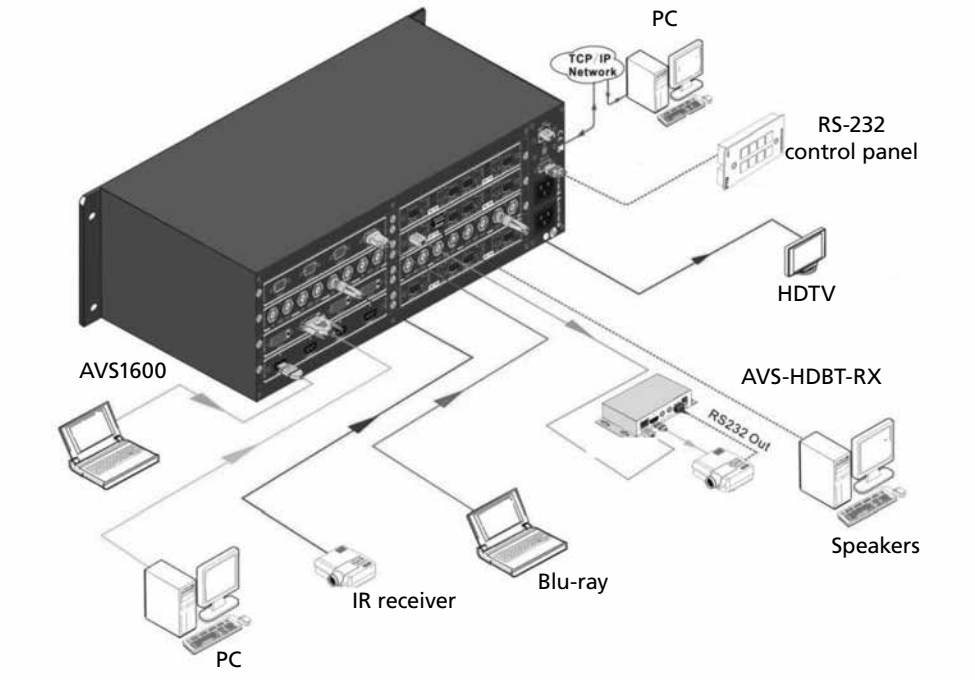
Features

- Modular chassis with configurable I/O slots..
- Various I/O cards includes HDMI, HDBaseT, DVI, and VGA cards (compatible with YUV, YC, and CVBS) to configure any matrix.
- True cross-point switching, any input to any output, regardless of signal format.
- Supports HDMI1.4a and 3D.
- Integrated HDBaseT technology.
- Controllable via button, RS-232, and optional TCP/IP, also compatible with third-party control.
- HDCP compliant.
- LCD display.

Application diagram, AVS800.



Application diagram, AVS1600.



Specifications: AVS800 and AVS1600

Hardware	
User Controls	Front-panel buttons
Connectors	AVS800: Serial control port: RS-232 DB9 female connector, Pin 2 = TX, Pin 3 = RX, Pin 5 = GND; (2) Input Card Slots, (2) Output Card Slots; Audio: Input: (8) 3.5-mm captive screw connectors 5-pole stereo, Output: (8) 3.5-mm captive screw connectors 5-pole stereo; TCP/IP port: (1) RJ-45; AVS1600: Serial control port: RS-232 DB9 female connector, Pin 2 = TX, Pin 3 = RX, Pin 5 = GND; (4) Input Card slots; (4) Output card slots; TCP/IP port: (1) RJ-45
Dimensions	AVS800: 3.5"H x 19"W x 12.6"D (8.8 x 48.3 x 32 cm); AVS1600: 5.25"H x 19"W x 12.6"D (13.3 x 48.3 x 32 cm)
Weight	AVS800: 6.6 lb. (3 kg); AVS1600: 7.7 lb. (3.5 kg)
Power	
Power Supply	100–240 VAC, 50/60 Hz
Power Consumption	AVS800: 60 W (max.); AVS1600: 84 W (max.)
Environment	
Temperature	-14 to +104° F (-10 to +40° C)
Humidity	10–90%
Audio (AVS800 Only, via Pre-Installed Stereo Audio Card)	
CMRR	>90 dB @ 20 Hz–20 kHz
Frequency response	20 Hz–20 kHz, ±0.5 dB
impedance	Input: >10 K-ohms, Output: 50 ohms
Stereo channel separation	>80 dB @ 1kHz
THD + Noise	1% @ 1 kHz, 0.3% @ 20 kHz at nominal level
Audio bits per sample	18 bits per channel, 2 channels (L, R)

Product photos: AVS800 and AVS1600.

AVS800,
front view

AVS800,
back view,
with fixed
audio cards

AVS1600,
front view

AVS1600,
back view,
with signal cards
installed

Signal Cards that install in the AVS800 and AVS1600.

Input Cards		
Product Code	**Inputs**	**Signal Format**
AVS-4I-DVI	4	DVI
AVS-4I-UNI	4	DVI, HDMI, VGA, AV, YPbPr
AVS-4I-VGA	4	VGA and analog audio
AVS-4I-HDB	4	HDBT, RS-232, IR
AVS-4I-HDM	4	HDMI and analog audio
Output cards		
Product Code	**Outputs**	**Signal Format**
AVS-4O-DVI	4	DVI
AVS-4O-VGA	4 VGA, 4 stereo audio	VGA, analog audio
AVS-4O-HDM	4, 4 PCM audio	HDMI and analog audio
AVS-4O-HDB	4, 4 audio	HDBT, RS-232, IR

DVI Signal Cards: AVS-4I-DVI and AVS-4O-DVI

- Compatible with HDMI 1.3 and HDCP.
- Do not support audio signals.
- Use embedded EDID management technology.
- Support DDC.

AVS-4I-DVI input card:

- Input card with maximum of four input signals.
- Input signal can pass to an output device through AVS-4O-DVI, or pass through other kinds of output cards.

AVS-4I-DVI Card.

AVS-4O-DVI output card:

- Output card with maximum four output signals.
- Accepts output signals from AVS-4I-DVI, or other kinds of input cards.

AVS-4O-DVI Card.

Specifications for DVI Signal Cards: AVS-4I-DVI and AVS-4O-DVI

Input	
Connector	(4) DB24+5 female DVI
Input Level	TMDS 2.9–3.3 V
Input Impedance	75 ohms
Output	
Connector	(4) DB24+5 female DVI
Output Level	TMDS 2.9–3.3 V
Output Impedance	75 ohms
General	
Gain	0 dB
Bandwidth	340 MHz (10.2 Gbps)
Video Signal	DVI 1.0/HDMI 1.3 full digital TMDS signal
Switching speed	200 ns (max.)
Max. time delay	5 ns (±1 ns)
Crosstalk	< -50 dB @ 5 MHz
EDID and DDC	Supports Extended Display Identification Data (EDID) and Display Data Channel (DDC) using DVI and HDMI standards. EDID and DDC signals are actively buffered
HDCP	Compliant with HDCP using DVI and HDMI 1.3 standards

DVI Signal Card: AVS-4I-UNI

- Seamless DVI input signal card.
- Fully compatible with HDMI 1.3 and HDCP 1.4.
- Supports seamless transmission for high-definition DVI, HDMI, VGA, and YPbPr signals.
- Automatically identifies the format of the input signal, and adjusts gthe output resolution.
- Uses embedded EDID management technology, supporting DDC.
- Supports a maximum of four input signals.

AVS-4I-UNI input card.

Specifications for DVI Signal Card: AVS-4I-UNI

Input	
Connector	(4) DB24+5 female DVI
Input Level	TMDS 2.9–3.3 V
Input Impedance	75 ohms
General	
Gain	0 dB
Bandwidth	340 MHz (10.2 Gbps)
Video Signal	DVI, HDMI, VGA, C-Video, YPbPr
Switching speed	200 ns (max.)
Max. time delay	5 ns (±1 ns)
Crosstalk	< -50 dB @ 5 MHz
EDID and DDC	Supports Extended Display Identification Data (EDID) and Display Data Channel (DDC) using DVI and HDMI standards. EDID and DDC signals are actively buffered
HDCP	Compliant with HDCP using DVI and HDMI 1.3 standards

Pin Layout of the DVI-I connector (Dual-Link). (Female)

DVI-I connector.

DVI-I connector pinout.

Pin	Function	Pin	Function
1	TMDS Data 2-	13	TMDS Data 3+
2	TMDS Data 2+	14	+5V Power
3	TMDS Data 2/4 Shield	15	Ground (return for +5 V, Hsync and Vsync)
4	TMDS Data 4-	16	Hot-plug detect
5	TMDS Data 4+	17	TMDS Data 0-
6	DDC Clock	18	TMDS Data 0+
7	DDC Data	19	TMDS Data 0/5 Shield
8	Analog Vertical Sync	20	TMDS Data 5-
9	TMDS Data 1-	21	TMDS Data 5+
10	TMDS Data 1+	22	TMDS Clock Shield
11	TMDS Data 1/3 Shield	23	TMDS Clock +
12	TMDS Data 3-	24	TMDS Clock -

VGA Signal Cards: AVS-4I-VGA and AVS-4O-VGA

- Scale all inputs to 1080p.
- Compatible with C-Video, YUV, YC (Factory preset function).
- Support RGBHV, RGsB, RGBS, RsGsBs, YUV, YC, and Composite video.

AVS-4I-VGA: input card

- Provides a maximum of four VGA inputs and four stereo audio inputs.
- Input signal can pass to output device through any kinds of output cards.

AVS-4I-VGA card.

AVS-4O-VGA: output card

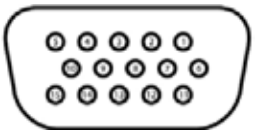
- Maximum four VGA output signal and four stereo audio outputs.
- Accepts output video signal from AVS-4I-VGA, or other kinds of input cards.
- Accepts output audio signal from the audio of the input signal.

AVS-VO-VGA card.

Specifications for VGA Signal Cards: AVS-4I-VGA and AVS-4O-VGA

Video Input	
Connector	(4) HD 15-pin female VGA
Input Level	0.5–2.0 Vp-p
Input Impedance	75 ohms
Audio Input	
Connector	(4) stereo audio, 3-pin terminal block
CMRR	>90 dB @ 20 Hz – 20 kHz
Input impedance	>10 K
Video Output	
Connector	(4) HD 15-pin female VGA
Audio Output	
Connector	(4) 3.5-mm stero audio
CMRR	>90 dB @ 20 Hz – 20 kHz
Input impedance	>10 K
General	
Gain	0 dB
Bandwidth	350 MHz (-3 dB), full load
Video Signal	VGA-UXGA, RGBHV, RGBS, RGsB, RsGsBs, component video, S-video, and C-video
Switching speed	200 ns (max.)
Max. time delay	5 ns (±1 ns)
Crosstalk	< -50 dB @ 5 MHz

Pin layout of the VGA connectors (female):



VGA connector.

VGA connector pinout.

Pin	Function	Pin	Function
1	RED	9	KEY/PWR
2	GREEN	10	GND
3	BLUE	11	ID0/RES
4	ID2/RES	12	ID1/SDA
5	GND	13	HSync
6	RED_RTN	14	VSync
7	GREEN_RTN	15	ID3/SCL
8	BLUE_RTN	—	—

Connect the devices via VGA-to-Component or VGA- to-C-Video cable as shown below:

Connect with Component Video (YPbPr) Source

Connect with Composite Video (C-VIDEO) Source

HDMI Signal Cards: AVS-4I-HDM and AVS-4O-HDM

- 4K HDMI signal cards.
- Support hot-plug.
- Comply with HDMI 1.4 and HDCP 1.4 standards.
- Compatible with a DVI signal.
- Support a high-definition HDMI source up to 4K x 2K
- Comply with the 1080p 3D standard.
- Provide an auxiliary audio port as a supplement to HDMI embedded audio.
- Embedded with the EDID management technology.

AVS-4I-HDM input card:

- Supports a maximum of four input signals.
- Input signal can pass to an output device through AVS-4O-HDM, or pass through other kinds of output cards.

AVS-4I-HDM card.

NOTE: When matching with output cards that do not support 4K x 2K, adjust the output resolution to 1080p to enable reliable output.

AVS-4O-HDM Output card:

- Supports a maximum of four output signals.
- Outputs signals from AVS-4I-HDM, or other kinds of input cards.
- HDCP compliant status can be set via an RS-232 command.

AVS-4O-HDM card.

Specifications for HDMI Signal Cards: AVS-4I-HDM and AVS-4O-HDM

Video Input	
Connectors	(4) HDMI female
Input Level	TMDS 2.9–3.3 V
Input Impedance	100 ohms (differential)
Audio Input	
Connectors	(4) analog 3-pin pluggable terminal blocks
Input impedance	75 ohms
Frequency response	20 Hz – 20 kHz
Video Output	
Connector	(4) HDMI female
Output Level	TMDS 2.9–3.3 V
Output Impedance	100 ohms (differential)

Specifications for HDMI Signal Cards: AVS-4I-HDM and AVS-4O-HDM (continued)

Audio Output	
Connectors	(4) analog 3-pin pluggable terminal blocks
Output impedance	75 ohms
Frequency response	20 Hz – 20 kHz
Environment	
Temperature	-14 to +104° F (-10 to +40° C)
Humidity	10–90%
General	
Gain	0 dB
Bandwidth	6.75 Gbps
Crosstalk	< -50 dB @ 5 MHz
Max. Resolution	4K x 2K
Transmission Distance	1080p < or = 70 m; 4K x 2K < or = 40 m
Switching speed	200 ns (max.)
SNR	> 70 dB @ 100 MHz - 100 m
Return loss	< -30 dB @ 5 kHz
HDMI standard	Supports HDMI 1.4 and DVI 1.0
Supported audio format	Embedded HDMI audio: PCM, Dolby Digital, DTS, DTS-HD; Analog audio: PCM
EDID and HDCP management	Compliant with HDCP 1.4; supports manual EDID management

HDMI connector pin layout.

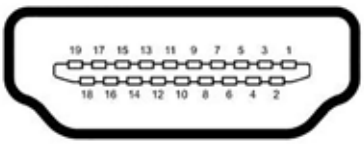


Figure 2-13. HDMI female connector.

HDMI connector pinout.

Pin	Function	Pin	Function
1	TMDS Data 2-	11	TMDS Clock Shield
2	TMDS Data 2 Shield	12	TMDS Clock-
3	TMDS Data 2-	13	CEC
4	TMDS Data 1+	14	Not connected
5	TMDS Data 1 Shield	15	DDC Clock
6	TMDS Data 1-	16	DDC Data
7	TMDS Data 0+	17	Ground
8	TMDS Data 0 Shield	18	+5 V Power
9	TMDS Data 0-	19	Hot-plug detect
10	TMDS Clock+	20	SHELL

4K Twisted-Pair Cards: AVS-4I-HDB and AVS-4O-HDB

4K Twisted pair card (HDMI/DVI extender):

- Support hot-plug.
- Support HDTV.
- Compatible with HDBT 1.0, HDMI 1.4a and HDCP 1.4.
- Support a wide resolution range from 480p to 4K x 2K.
- Comply with the 1080p 3D standard.
- Extend an HDBT signal up to 70 m at 1080p or 40 m at 4K.
- Support bi-directional RS-232 transmission on a single cable.
- Auxiliary audio ports support a stereo signal.
- Embedded with the EDID management technology.

AVS-4I-HDB Input card:

- Supports a maximum input of four HDMI TP signals.
- Input signal can pass to the output device through AVS-4O-HDB, or pass through other kinds of output cards that need to work with an HDBT transmitter.

AVS-4I-HDB card.

NOTE: When matching with output cards that do not support 4K x 2K, adjust the output resolution to 1080p to enable reliable output.

AVS-4O-HDB Output card:

- Supports a maximum of four output HDBT signals.
- Outputs signals from AVS-4I-HDB or other kinds of input cards that need to work with an HDBT receiver.

AVS-4O-HDB card.

Specifications for 4K Twisted-Pair Cards: AVS-4I-HDB and AVS-4O-HDB

AVS-4I-HDB and AVS-4O-HDB specifications.

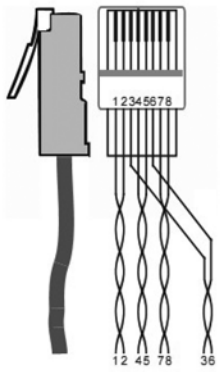
Video Input	
Connectors	(4) HDBT RJ-45 female (with dual-color indicator)
Input Level	TMDS 2.9–3.3 V
Input Impedance	100 ohms (differential)
Audio Input	
Connectors	(4) 3.5-mm stereo audio connectors
Input Impedance	75 ohms
Frequency Response	20 Hz to 20 kHz
Video Output	
Connector	(4) HDBT RJ-45 female (with dual-color indicator)
Output Level	TMDS 2.9–3.3 V
Output Impedance	100 ohms (differential)

Specifications for 4K Twisted-Pair Cards: AVS-4I-HDB and AVS-4O-HDB (continued)

AVS-4I-HDB and AVS-4O-HDB specifications.

Control Port	
Control signal	(4) RS-232
Control connector	3-pin pluggable terminal block
Audio Output	
Connectors	(4) 3.5-mm stereo audio connectors
Input Impedance	75 ohms
Frequency Response	20 Hz to 20 kHz
General	
Gain	0 dB
Bandwidth	10.2 Gbps
Crosstalk	< -50 dB @ 5 MHz
Max. Resolution	4K x 2K
Transmission Distance	1080p < or = 70 m; 4K x 2K < or = 40 m
Switching speed	200 ns (max.)
SNR	>70 dB @ 100 MHz - 100 M
Return loss	< -30 dB @ 5 kHz
Supported audio format	Embedded HDMI audio: PCM, Dolby Digital, DTS, DTS-HD; Analog audio: PCM
HDMI standard	Supports HDMI 1.4
EDID and HDCP management	Compliant with HDCP 1.4; Supports manual EDID management
Environment	
Temperature	-14 to +104° F (-10 to +40° C)
Humidity	10–90%

Cable pinout diagram.



NOTE: Cable connectors must be metal, and the shielded layer must be connected to the connector's metal shell to ground the cable.

TIA pinouts.

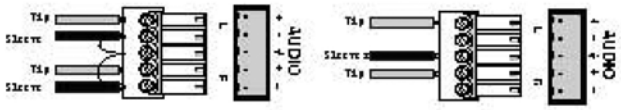
TIA/EIA 568A connector pinout.		TIA/EIA 568B connector pinout.	
Pin	**Cable Color**	**Pin**	**Cable Color**
1	Green/White	1	Orange/White
2	Green	2	Orange
3	Orange/White	3	Green/White
4	Blue	4	Blue
5	Blue/White	5	Blue/White
6	Orange	6	Green
7	Brown/White	7	Brown/White
8	Brown	8	Brown

Stereo Audio Card (Pre-Installed in AVS800)

- 8 x 8 stereo audio crosspoint switching card is pre-installed in AVS800.
- Ssupports balanced/unbalanced audio via a different connection.
- Cannot be hot-plugged—you must power off the unit to remove or install the card in the chassis.

Audio card.

Balanced Audio Connection.



Unbalanced Audio Connection.

Specifications for Stereo Audio Card (Pre-Installed in AVS800)

Stereo Audio Card specifications.

Input Connectors	(8) 3.5-mm stereo captive screw connectors, 5-pole
Input Level	TMDS 2.9–3.3 V
Input Impedance	> 10 k-ohms
Output Connectors	(8) 3.5-mm stereo captive screw connectors, 5-pole
Output impedance	50 ohms
General	
Frequency Response	20 Hz – 20 kHz, ±0.5 dB
CMRR	>90 dB @ 20 Hz – 20 kHz
Stereo channel separation	>80 dB @ 1 kHz
THD + Noise	1% @ 1 kHz, 0.3% @ 20 kHz at nominal level
EDID and DDC	Supports Extended Display Identification Data (EDID) and Display Data Channel (DDC) using DVI and HDMI standards. EDID and DDC signals are actively buffered.
HDCP	Compliant with HDCP using DVI and HDMI 1.3 standards

Ordering Information

Item	Code
Modular Video Matrix Switcher	
8 x 8	**AVS800**
16 x 16	**AVS1600**
Input Signal Cards	
DVI	**AVS-4I-DVI**
DVI, HDMI, VGA, AV. YPbPr	**AVS-4I-UNI**
VGA	**AVS-4I-VGA**
HDBaseT	**AVS-4I-HDB**
HDMI	**AVS-4I-HDM**
Output Signal Cards	
DVI	**AVS-4O-DVI**
VGA, Analog Audio	**AVS-4O-VGA**
HDMI and Analog Audio	**AVS-4O-HDM**
HDBaseT, RS-232, IR	**AVS-4O-HDB**

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