The Most Variable
Modular Extender Family

MODEX

visual engineering
LIGHTWARE

Modular Extender Family

Configuration

Configuration / Media Connectors

Configuration / Video & Audio modules

Configuration / Interface Modules

Application-Specific Modular Extenders

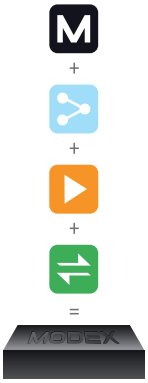
MODEX units are the world's fastest and probably the most reliable modular extenders supporting the AV and Broadcast industry formats. MODEX offers a full range of modular transmitters and receivers extending digital and analog video and audio, USB KVM, Ethernet and control signals over a single fiber or CATx.

The technology built into the MODEX family breaks with many standard limitations, allowing 30 meters DVI cable on input, Advanced EDID Management, Pixel Accurate Reclocking, LAN, RS-232, RS-422 and USB control, remote powering and more.

The half unit extender allows one Video Module and two Interface Modules (which can be different or identical).

The MODEX units are fixed configurations and are custom manufactured by Lightware.

Customizing a MODEX is a really easy and simple four step process.



Step1: Choose a MODEX frame

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Step2: Choose a fiber Media Connector

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Step3: Select one Video Module

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Step4: Select two Interface Modules

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Finish: Your MODEX is ready to use

MODEX Graphical User Interface

MODEX Modular Extenders have their own built- in websites for control. When a MODEX is connected to a controlling computer the user meets the MODEX Graphical User Interface. This GUI allows the user to control all the functions of both MODEX transmitters and receivers in an easy and user friendly way. The GUI is smart and intuitive and is also optimized for tablets. The EDID Manager, Frame Detector and advanced audio settings are also available from the GUI, with setup presets that can be saved and applied quickly any time.

To find out more about the MODEX GUI please read the Quick Start Guide, which has detailed description of the software. The Quick Start Guide is available at: modex.lightware.eu

Event Manager

The Event Manager is a smart, built-in feature in the Lightware HDBaseT compatible TPS extender family, the MODEX line and in some select matrix switchers like the MMX6x2-HT series units. The feature is available through the freely downloadable Lightware Device Controller software.

The Event Manager was developed to handle tasks from the most simple to expert ones, like controlling the rolling shutter, the air conditioning system or the lights based on any condition changes on the media ports, such as a new source being connected or removed.

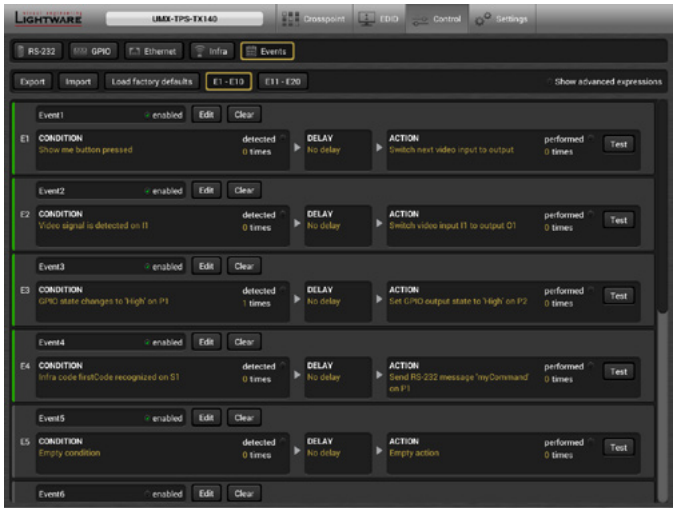
Event Manager application is continuously updated with additional features via firmware upgrades: a delay can be added between the condition and the action and more actions can be triggered by a single condition change. With the help of the 'condition count' and 'action test' features, the predefined settings can be tested before going live. The system can recognize infrared commands which can also be set as conditions, and commands can also be sent via Ethernet.

Event Manager Wizard

Assigning an action to a condition is quick and easy with the Wizard function of Event Manager.
The most typical examples of the currently selectable conditions and actions within the Event Manager Wizard are the following:

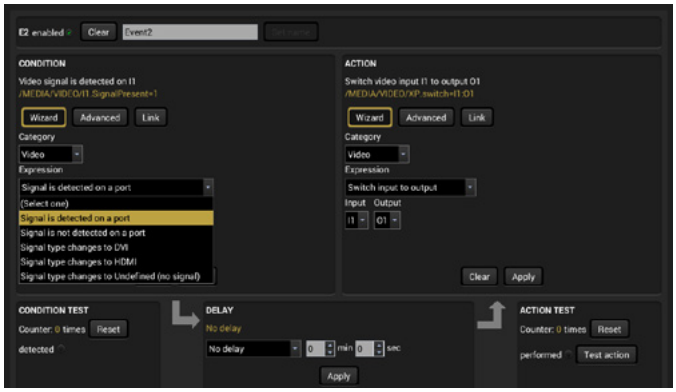
Conditions	
Video	Signal is detected on a port
Video	Signal is not detected on a port
Audio	Signal is detected on a port
Audio	Signal is not detected on a port
Audio	Signal type changes to PCM
Audio	Signal type changes to Compressed
Audio	Signal type changes to HBR
Audio	Signal type changes to Undefined (no signal)
IR	Infra code recognized
General	OPT / TPS link state changes to Connected
General	OPT / TPS link state changes to Disconnected

Actions	
Video	Switch input to output
Video	Enable autoselect output
Video	Disable autoselect on output
Ethernet	Send TCP command
Ethernet	Send UDP command
R232	Send RS232 message
EDID	Switch EDID
Audio	Set audio volume
Audio	Mute output
Audio	Unmute output
Audio	Increase/decrease volume

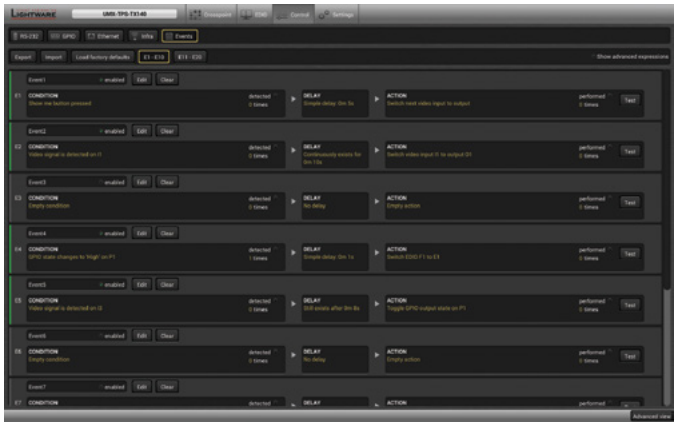


The Events menu contains separately configurable Events

The Event Wizard makes the setup easy with simple dropdown options

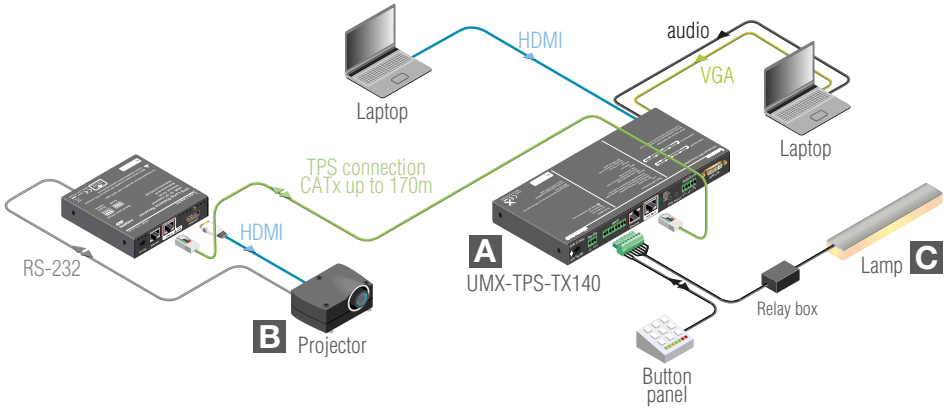


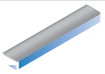
There are many default Expressions available to choose from



Green lines show which Event is configured and active, the rest stays grey

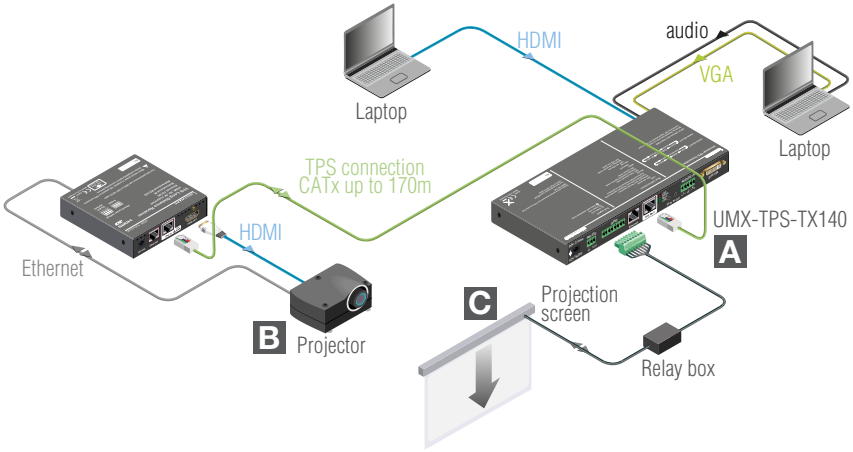
Event Example A

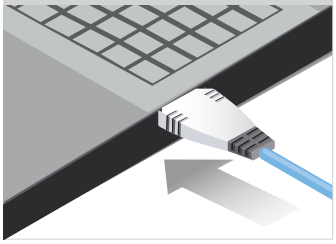


Condition	Action	
 Press button panel		A Input select on the TPS transmitter
		B Switch on the projector using RS-232
		C Switch off the lamp using the transmitter's GPIO port

With a button panel connected through the GPIO port, the UMX-TPS-TX140 can be controlled from a remote location; input switching is available even if the transmitter is mounted under desk. In the example above there are three actions followed by a condition. When an input selector button is pressed on the remote button panel, the selected input port is switched to the output, the projector turns on.

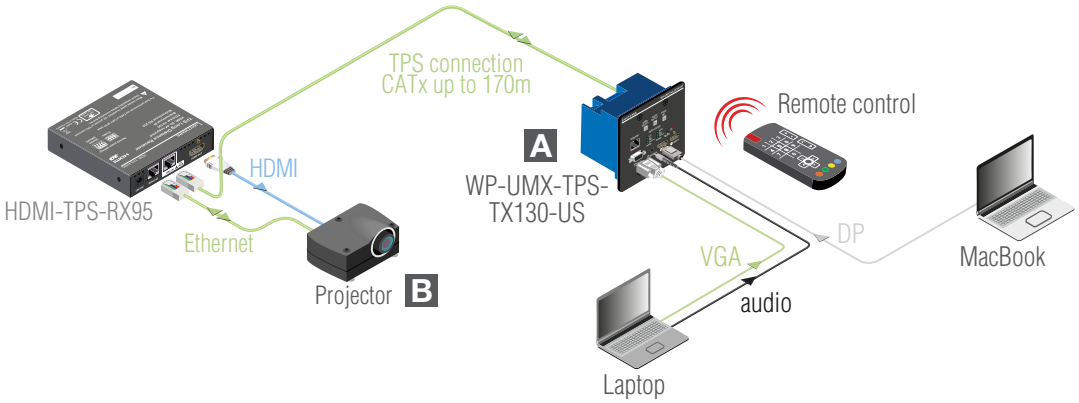
Event Example B



Condition	Action	
		A Input select on the TPS transmitter
		B Switch on the projector using RS-232
		C Roll down the projection screen using the transmitter's GPIO port

The projector and the rolling screen (via relay box) are connected to the UMX-TPS-TX140. When the user connects a laptop to the HDMI port of the transmitter, then the connected input is selected automatically, the screen goes down and the projector turns on to display the source.

Event Example C

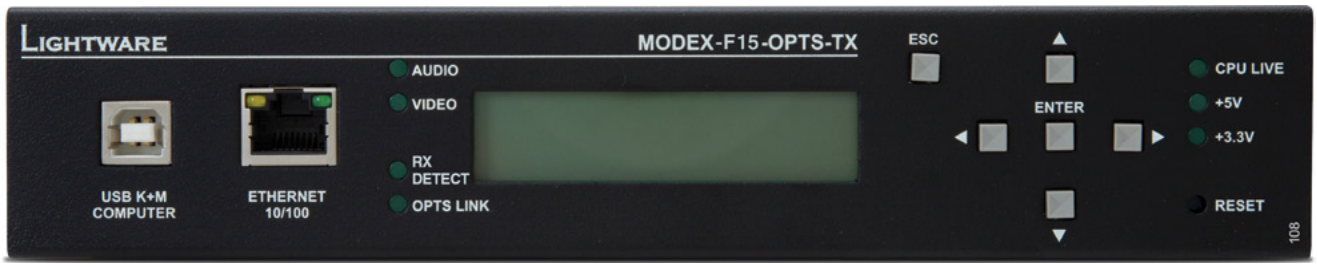


Condition	Action	
Press remote control	INPUT INPUT	A Input select on the TPS transmitter
		B Switch on the projector using RS-232

A MacBook with DisplayPort and another laptop with VGA and analog audio are connected to the WP-UMX-TPS-TX130-US wallplate which means there are two audio signals and two video signals connected. These inputs can be switched via IR using a remote control. For example the analog audio of the Laptop can be mixed with the DisplayPort video of the MacBook. The Event Manager helps the user assign actions like switching the projector on when the desired input is selected.

MODEX Frames

The MODEX frame unit received a thorough hardware and firmware upgrade in Q4 2015. The upgrade improves the cooling system, it has monitoring functions checking voltage and temperature and also separately checking the optical unit temperatures. Remote firmware upgrade via optical link is now also available. The front panel has an additional 10/100 Mbps Ethernet port (with full functionality, but can be used as control interface) and USB KVM connectors (transmitter has one USB-B for the computer; receiver has two USB-A connectors for the keyboard and mouse). Keyboard and mouse functions are emulated by the extender and no USB enumeration occurs during and after operator switching. The connected computer is not aware of a keyboard or mouse being changed.



MODEX-TX Specifications

Ethernet	RJ-45 connector
USB KVM	USB-B female connector
Front panel buttons:	Yes
Front panel LCD:	Yes, 2 x 16 characters
WEB:	Built-in website (TCP/IP Ethernet)
EDID Management:	119 factory and 31 user programmable EDID
EDID emulation:	256-Byte Extended EDID v1.3

General (for Half RU Extender):	
Dimensions:	221 W x 240 D x 42,5 H mm
Weight:	1950 g (excluding all modules)
Power consumption:	12 W (typ.) 19 W (max.) without modules 15 W (typ.) 25 W (max.) with modules
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing
Compliance:	CE
Warranty:	3 years

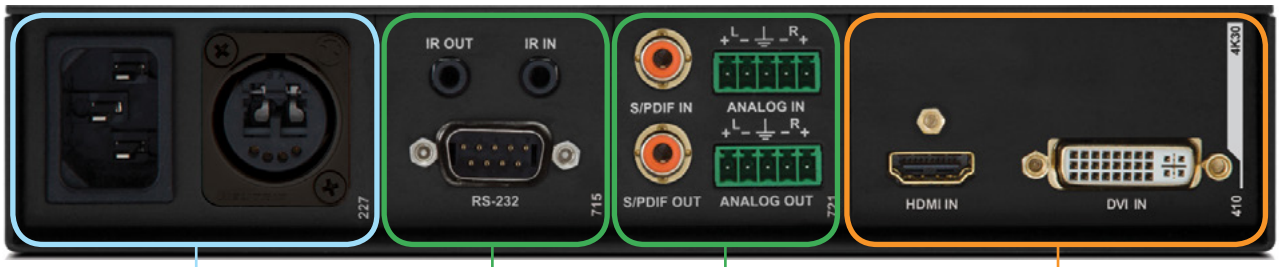
MODEX-RX Specifications

Ethernet	RJ-45 connector
USB KVM	2 x USB-A female connector
Front panel buttons:	Yes
Front panel LCD:	Yes, 2 x 16 characters
WEB:	Built-in website (TCP/IP Ethernet)
EDID Management:	119 factory and 31 user programmable EDID
EDID emulation:	256-Byte Extended EDID v1.3

General (for Half RU Extender):	
Dimensions:	221 W x 240 D x 42,5 H mm
Weight:	1950 g (excluding all modules)
Power consumption:	12 W (typ.) 19 W (max.) without modules 15 W (typ.) 25 W (max.) with modules
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +75 °C
Humidity:	10% to 90% non-condensing
Compliance:	CE
Warranty:	3 years

MODEX Modules

The half-unit extender has a media connector module, one video module and two identical or different interface modules. Modules are selected according to the signal types an actual application requires. Signals are transferred by the MODEX extender pair or end point transmitter or receiver.



Video Module

MODEX supports most video formats: DisplayPort 1.1, HDMI 1.4 with 3D, Dual-Link DVI, SDI, and 3G-SDI. The video format conversion is automatic if the two ends have different modules.
The video & audio modules are also capable of transmitting audio. External S/PDIF, RCA or the Embedded Audio present in different video signals are accepted as source. Embedding and extracting audio or transmitting in both directions simultaneously are also supported.

Interface Modules

MODEX architecture allows the transmission of a wide variety of auxiliary signal types through the interface modules. All auxiliary signal types can be simultaneously transmitted at full bandwidth reducing the need for additional extenders and cabling.
Both modex frames have up to two module slots for interface modules, which can be any control signal, audio or Ethernet.

Media Connector

The MODEX range includes a family of long distance transmitters and receivers for sending and receiving video, audio, RS-232 and IR control, USB KVM and Ethernet over a single fiber cable. The Media Connector, the heart of the MODEX determines the signal transportation type and the direction of transport.

Media Connectors

MODEX unit configurations can include various long distance transmitters and receivers for sending and receiving video, audio, RS-232 and IR control, USB KVM and Ethernet over a single fiber or CATx cable. The media connector is the heart of a MODEX unit as it determines the type of signal transportation.

OPTS & OPTM Media connectors

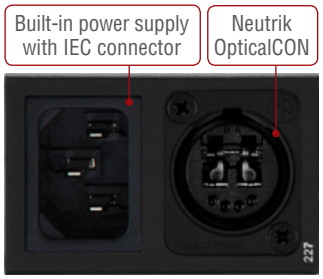
Part No: see the Connectors table

The OPTS and OPTM Media Connectors provide transmission over a one Single Mode (OPTS) or Multi Mode (OPTM) fiber. Most fiber connector types are available to choose the best option for your application such as Neutrik OpticalCON, industrial grade LC ODVA, ST, SC, HF4, EBCM, EBCJ or LEMO. For a cost-effective smart solution Lightware introduced the LC breakout Media Connector which allows the user to connect another MODEX extender with a patch cable at the end point to send signals to two MODEX units over a single Neutric OpticalCON duo cable. There are also two optional power connectors provided – to see the available combinations please check the 'Optional Fiber and Power Connectors' chart.

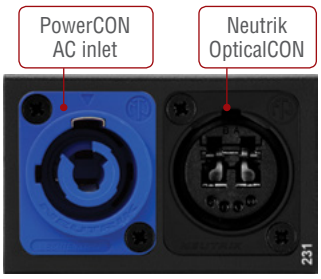
Optical Fiber and Power Connectors

	Mod. No.	Fiber connector	Power connector	Part number
OPTS (RX/TX)	227	Neutrik OpticalCON DUO	IEC C14 AC	9161 0227
	231	Neutrik OpticalCON DUO	PowerCON AC	9161 0231
	229	LC ODVA	IEC C14 AC	9161 0229
	235	ST	IEC C14 AC	9161 0235
	237	SC	IEC C14 AC	9161 0237
	233	HICON HI-FIBER4	IEC C14 AC	9161 0233
	223	Expanded Beam Mini (HMA)	IEC C14 AC	9161 0223
	207	Expanded Beam Junior (HMA)	IEC C14 AC	9161 0207
	239 (TX)	SMPTE 304M HDTV socket	IEC C14 AC	9161 0239
	240 (RX)	SMPTE 304M HDTV plug	IEC C14 AC	9161 0240
	241	Neutrik OpticalCON DUO and LC	IEC C14 AC	9161 0241
OPTM (RX/TX)	228	Neutrik OpticalCON DUO	IEC C14 AC	9161 0228
	232	Neutrik OpticalCON DUO	PowerCON AC	9161 0232
	230	LC ODVA	IEC C14 AC	9161 0230
	236	ST	IEC C14 AC	9161 0236
	238	SC	IEC C14 AC	9161 0238
	234	HICON HI-FIBER4	IEC C14 AC	9161 0234
	226	Expanded Beam Mini (HMA)	IEC C14 AC	9161 0226
	210	Expanded Beam Junior (HMA)	IEC C14 AC	9161 0210
	242	Neutrik OpticalCON DUO and LC	IEC C14 AC	9161 0242

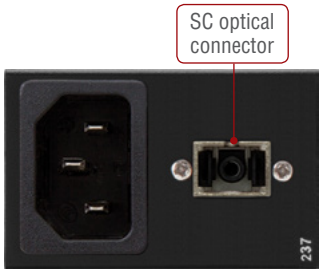
OPTS: singlemode MODEX Media connector
OPTM: multimode MODEX Media connector



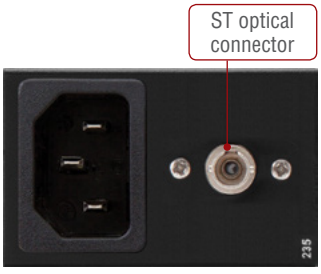
MODEX-CON-OPTS/M-NT



MODEX-CON-OPTS/M-NT-PCN

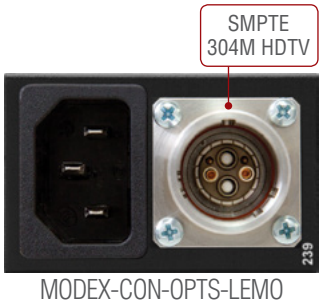


MODEX-CON-OPTS/M-SC

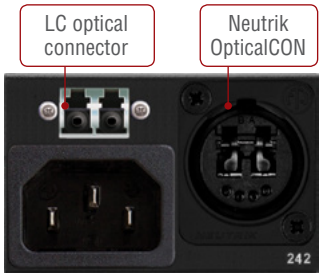


MODEX-CON-OPTS/M-ST

MODEX-CON-OPTS/M-ODVA



MODEX-CON-OPTS-LEMO



MODEX-CON-OPTS/M-NT-BRK-LC

MODEX-CON-OPTS/M-EBCJ

MODEX-CON-OPTS/M-HF4

Module Specifications

	Module Number	Power Consumption:	Weight:
OPTS/ OPTM	207/210	0,75 W typ., 1.1 W max.	380g
	223/226		335g
	227/228		285g
	229/230		295g
	231/232		290g
	233/234		310g
	235/236		270g
	237/238		270g
	239		315g
	240		390g
	241/242		300g

Optical Budget Data

MODEX-OPTS-RX/TX

Wavelength	TX Power	RX Sensitivity	Link Budget
1310 nm	-5.5 dBm	-21.5 dBm	16 dBm
1490 nm	-8.5 dBm	-21.5 dBm	13 dBm
1550 nm	-8.5 dBm	-21.5 dBm	13 dBm

MODEX-OPTS-RX/TX

Wavelength	TX Power	RX Sensitivity	Link Budget
850 nm	-7.5 dBm	-18.5 dBm	11 dBm
1310 nm	-3.5 dBm	-18.5 dBm	15 dBm
1550 nm	-3.5 dBm	-19.5 dBm	16 dBm

Fiber Specifications

Link speed:	6,25 Gbps
Singlemode fiber wavelength:	1310, 1490, 1550 nm
Multimode fiber wavelength:	850, 1310, 1550 nm
Singlemode extension distance:	10 km (32800 ft)
Multimode extension distance:	300 m (1000 ft)
Optical transmission channel 1:	OPTS/OPTM connection

Video Specifications:	
Supported video resolutions:	Up to 4K (30 Hz, 4:2:2, 297 MHz, 24 bit)
Max pixel clock:	297 MHz
Frame delay:	No delay
Video signal latency:	Approx. 3 lines

Audio Specifications:	
Embedded audio:*	8 channel PCM or HBR compressed
Forward audio:	2 channel PCM or 5.1 compressed
Return audio:	2 channel PCM or 5.1 compressed

*configurable, the embedded audio in the video stream can be switched to any other audio.

Ethernet Specifications:	
Ethernet:	10/100 Mbit/s

USB Specifications:	
USB standards:	Only HID devices, Smart Card
USB HUB:	Not supported
Device number:	2 USB HID devices

Video Modules

Various video formats are supported by the MODEX video modules: DisplayPort 1.1, HDMI 1.4 with 3D, Dual-Link DVI, SDI, 3G-SDI, analog VGA and Interlaced Composite Video. The video format conversion is automatic if the two ends have different modules. The Video & Audio modules are also capable of transmitting audio. The source may be external S/PDIF, RCA, XLR or the Embedded Audio present in different video signals. Embedding and extracting audio or transmitting in both directions simultaneously are also supported.

Format	Audio Channels	Embedded Audio (24/30bit 1080p60)	Embedded audio (36bit 1080p60 or 24bit 4K@30)	Forward Audio	Return Audio
PCM 32 kHz	8	✓	✓	✓ 2 ch.	✓ 2 ch.
PCM 44.1 kHz	8	✓	✓	✓ 2 ch.	✓ 2 ch.
PCM 48 kHz	8	✓	✓	✓ 2 ch.	✓ 2 ch.
PCM 88.2 kHz	8	✓	✓	×	×
PCM 96 kHz	8	✓	✓	×	×
PCM 176.4 kHz	2	✓	×	×	×
PCM 176.4 kHz	8	✓	×	×	×
PCM 192 kHz	2	✓	×	×	×
PCM 192 kHz	8	✓	×	×	×
Dolby Digital (AC3)	5.1	✓	✓	✓	✓
Dolby Digital Plus	2.0	✓	×	×	×
Dolby Digital Plus	5.1	✓	×	×	×
Dolby TrueHD	2.0	✓	×	×	×
Dolby TrueHD	7.1	✓	×	×	×
DTS	5.1	✓	✓	✓	✓
DTS ES	6.1	✓	✓	✓	✓
DTS 96/24	6.1	✓	✓	×	×
DTS-HD-HRA	5.1	✓	×	×	×
DTS-HD-HRA	7.1	✓	×	×	×
DTS-HD Master Audio	5.1	✓	×	×	×
DTS-HD Master Audio	7.1	✓	×	×	×

4K UHD HDMI Input Module with Monitor Out

MODEX-AV-2HDMI-4K-IM-LH

Part No: 9161 0443

Features

- DVI 1.0, HDMI 1.4 compliant
- Video connectors: 2xHDMI (input), HDMI (output)
- Resolution up to 4K UHD on both inputs and the output
- 3D support
- Deep color support up to 36bpp
- Embedded 7.1 HBR audio support
- HDCP 1.4 compliant
- EDID emulation
- Max cable length: 15m
- Autoselect function
- CEC
- Audio Return Channel (ARC) support
- Built-in test pattern generator

Specifications

Max resolution:	1600x1200 @ 60Hz 36bit 3840x2160 @ 30Hz 24bit 1920x1080p @ 120Hz 24bit
Max cable length:	15m / 22 AWG
Color depth:	24, 30, 36 bit deep color
Color space:	RGB, YCbCr 4:4:4/4:2:2
Frame delay:	No delay
Data rate:	9 Gbps
Max pixel clock:	300 MHz
Supported video standards:	DVI 1.0, HDMI 1.4
3D support:	Yes
Embedded audio / Return audio:	Yes / Yes (IN2 and OUT)
EDID emulation:	Yes, Advanced EDID management
HDCP compliancy:	1.4
Audio capability:*	4 stereo PCM or HBR compressed
Weight:	105 g
Power consumption:	5.5 W (typ.) / 10.7 W (max.)
Connectors:	3 x HDMI with lock screw
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

*The transmitted audio depends on the Media connector. For final audio transmission capabilities please see the chosen Media connectors audio specification.

4K UHD HDMI Input Module with Monitor Out

MODEX-AV-5HDMI-4K-IM-LH

Part No: 9161 0442

Features

- DVI 1.0, HDMI 1.4 compliant
- Video connectors: 5xHDMI (input), HDMI (output)
- Resolution up to 4K UHD on both inputs and the output
- 3D support
- Deep color support up to 36bpp
- Embedded 7.1 HBR audio support
- HDCP 1.4 compliant
- EDID emulation
- Max cable length: 15m
- Autoselect function
- CEC
- Audio Return Channel (ARC) support
- Built-in test pattern generator

Specifications

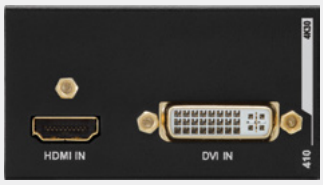
Max resolution:	1600x1200 @ 60Hz 36bit 3840x2160 @ 30Hz 24bit 1920x1080p @ 120Hz 24bit
Max cable length:	15m / 22 AWG
Color depth:	24, 30, 36 bit deep color
Color space:	RGB, YCbCr 4:4:4/4:2:2
Frame delay:	No delay
Data rate:	9 Gbps
Max pixel clock:	300 MHz
Supported video standards:	DVI 1.0, HDMI 1.4
3D support:	Yes
Embedded audio / Return audio:	Yes / Yes (IN2 and OUT)
EDID emulation:	Yes, Advanced EDID management
HDCP compliancy:	1.4
Audio capability:*	4 stereo PCM or HBR compressed
Weight:	150 g
Power consumption:	6.7 W (typ.), 12.8 W (max.)
Connectors:	6 x HDMI
ESD protection:	4 stereo PCM or HBR compressed
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

*The transmitted audio depends on the Media connector. For final audio transmission capabilities please see the chosen Media connectors audio specification.

4K UHD HDMI and DVI Input Module

MODEX-AV-HDMI-DVI-4K-IM

Part No: 9161 0410



Features

- HDMI 1.4, DVI and HDCP 1.4 compliant
- Resolution up to 3840x2160@30Hz, 1600x1200@60Hz
- Supports any 3D formats
- 30 m copper cable compensation
- HDCP enable/disable
- Advanced EDID Management

Specifications

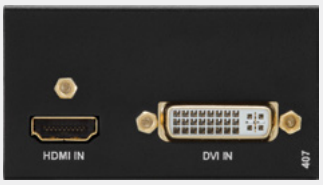
Max resolution:	1600x1200 @ 60Hz 36bit 3840x2160 @ 30Hz 24bit 1920x1080p @ 120Hz 24bit
Max cable length:	30m / 22 AWG
Color depth:	24, 30, 36 bit deep color
Color space:	RGB, YCbCr 4:4:4/4:2:2
Frame delay:	No delay
Data rate:	9 Gbps
Max pixel clock:	300 MHz
Supported video standards:	DVI 1.0, HDMI 1.4
3D support:	Yes
Embedded audio / Return audio:	Yes / No
EDID emulation:	Yes, Advanced EDID Management
HDCP compliancy:	1.4
Audio capability:*	4 stereo PCM or HBR compressed
Weight:	105 g
Power consumption:	2.75 W (max.)
Connectors:	DVI-D, HDMI
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

*The transmitted audio depends on the Media connector. For final audio transmission capabilities please see the chosen Media connectors audio specification.

HDMI 1.3 and DVI Input Module

MODEX-AV-HDMI-DVI-IM

Part No: 9161 0407



Features

- HDMI 1.3 and DVI signals, one signal per module
- HDCP 1.3 compliant with enable/disable mode
- 36-bit deep color support
- 30m copper cable compensation
- Advance Edid Managemen

Specifications

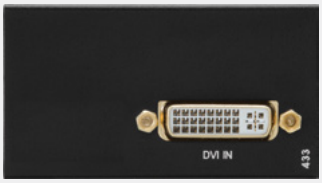
Max resolution:	1920x1200 @ 36bit 1600x1200 @ 24bit
Max (in/out) cable length:	30 m / 22 AWG
Color depth:	24, 30, 36 bit deep color
Color space:	RGB, YCbCr 4:4:4/4:2:2
Frame delay:	No delay
Data rate:	Total max 6,75 Gbps
Max pixel clock:	225 MHz
Supported video standards:	DVI 1.0, HDMI 1.3a
3D support:	No
Embedded audio / Return audio:	Yes / No
EDID emulation:	Yes, Advanced EDID Management
HDCP compliancy:	1.3
Audio capability:*	4 stereo PCM or HBR compressed
Weight:	105 g
Power consumption:	1,3 W (typ.) 2,2 W (max.)
Connectors:	DVI-D, HDMI
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

*The transmitted audio depends on the Media connector. For final audio transmission capabilities please see the chosen Media connectors audio specification.

DVI Input Module

MODEX-AV-DVI-IM

Part No: 9161 0433



Features

- HDMI 1.3 and DVI signals
- HDCP 1.3 compliant with enable/disable mode
- 36-bit deep color support
- 30m copper cable compensation
- Advance Edid Management

Specifications

Max resolution:	1920x1200@36bit 1600x1200@24bit
Max (in/out) cable length:	30 m / 22 AWG
Color depth:	24, 30, 36 bit deep color
Color space:	RGB, YCbCr 4:4:4/4:2:2
Frame delay:	No delay
Data rate:	Total max 6,75 Gbps
Max pixel clock:	225 MHz
Supported video standards:	DVI 1.0, HDMI 1.3a
3D support:	No
Embedded audio / Return audio:	Yes / No
EDID emulation:	Yes, Advanced EDID Management
HDCP compliancy:	1.3
Audio capability:*	4 stereo PCM or HBR compressed
Weight:	95 g
Power consumption:	0,4 W (typ.) 0,7 W (max.)
Connectors:	DVI-D
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

*The transmitted audio depends on the Media connector. For final audio transmission capabilities please see the chosen Media connectors audio specification.

Dual-Link DVI Input Module

MODEX-AV-DVIDL-IM

Part No: 9161 0401

Features

- Pro series Dual-Link DVI input module
- Resolution up to 2560 x 1600, 1920x1200@120Hz
- HDCP 1.1 compliant
- Advanced EDID Management

Specifications

Max resolution:	2560x1600@60Hz 1920x1200@120Hz
Max (in/out) cable length:	20 m / 22 AWG
Color depth:	8 bit per color
Color space:	RGB
Frame delay:	No delay
Data rate:	Total max 9,9 Gbps
Max pixel clock:	165 MHz
Supported video formats:	DVI 1.0
3D support:	Yes
Embedded audio / Return audio:	No / No
EDID emulation:	Yes, Advanced EDID Management
HDCP compliancy:	1.1
Audio capability:	Not supported
Weight:	100 g
Power consumption:	1,4 W (typ.) 2 W (max.)
Connectors:	DVI-D
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

3G-SDI Input Module with Two SDI Loop Out

MODEX-AV-3GSDI-IM

Part No: 9161 0426

Features

- Accepts SD-SDI, HD-SDI and 3G-SDI video signals
- SDI multichannel audio de-embedding
- Auto detects input formats
- Input signals are automatically equalized and reclocked
- Two loop outputs for further transmission of the input

Specifications

Max resolution:	1920 x 1080p @ 60Hz 3G-SDI Level A: 1920x1080p YCbCr 4:2:2 3G-SDI Level B: 1920x1080p YCbCr 4:2:2
Max input cable length:	130 m @ 3G-SDI
Color depth:	20 bit
Color space:	10 bit / Y, 10 bit / CbCr, 12 bit RGB
Frame delay:	No delay
Data rate:	Total max 2,97 Gbps
Supported video standards:	SD-SDI, HD-SDI, 3G-SDI
3D support:	No
Embedded audio:	Yes
EDID emulation:	No
Audio capability:*	4 stereo PCM
Weight:	120 g
Power consumption:	0,7 W (typ.) 1,1 W (max.)
Connectors:	3 x BNC (1 x in, 2 x loop out)
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing
Part number:	9161 0426

*The transmitted audio depends on the Media connector. For final audio transmission capabilities please see the chosen Media connectors audio specification.

Supported Resolutions

Signal type	Resolution	Refresh	ColorSpace	Sampling	Color depth
HD-SDI	720p	50 / 59,94 / 60	YCbCr	422	10
	1080i	50 / 59,94 / 60	YCbCr	422	10
	1080sF	25 / 29,97 / 30	YCbCr	422	10
	1080p	23,98 / 24 / 25 / 29,97 / 30	YCbCr	422	10
3G-SDI (3G-A)	720p	50	YCbCr / RGB	444	10
		59,94	YCbCr / RGB	444	10
		60	YCbCr / RGB	444	10
	1080i	50	YCbCr	422 / 444	12
		50	YCbCr / RGB	444	10
		50	RGB	444	12
		59,94	YCbCr	422 / 444	12
		59,94	YCbCr / RGB	444	10
		59,94	RGB	444	12
		60	YCbCr	422 / 444	12
		60	YCbCr / RGB	444	10
		60	RGB	444	12
3G-SDI (3G-A)	1080sF	25	YCbCr	422 / 444	12
		25	RGB	444	10
		29,97	YCbCr	422 / 444	12
		29,97	RGB	444	10
		30	YCbCr	422 / 444	12
		30	RGB	444	10
	1080p	23,98	YCbCr / RGB	444	10
		24	YCbCr / RGB	444	10
		25	YCbCr	422 / 444	12
		25	YCbCr / RGB	444	10
		25	RGB	444	12
		29,97	YCbCr	422 / 444	12
		29,97	YCbCr / RGB	444	10
		29,97	RGB	444	12
		30	YCbCr	422 / 444	12
		30	YCbCr / RGB	444	10
		30	RGB	444	12
		50 / 59,94 / 60	YCbCr	422	10
3G-SDI (3G-B)	1080i	50 / 59,94 / 60	YCbCr	444	10
	1080sF	29,97 / 30	YCbCr	444	10
	1080p	50 / 59,94 / 60	YCbCr	422	10

DisplayPort 1.1 Input Module

MODEX-AV-DP-IM

Part No: 9161 0419

Features

- Accepts DisplayPort 1.1a signals with Embedded Audio
- Up to 2560 x 1600 pixel resolution with 10.8 Gbps bandwidth speed
- Audio embedding, de-embedding
- HDCP 1.3 compliant

Specifications

Max resolution:	2560x1600 @ 60Hz
Max DP cable length:	15 m / 24 AWG
Color depth:	24, 30, 36 bit deep color
Color space:	RGB/YUV (4:4:4) – 10-bit color YUV (4:2:2/4:2:0) – 12-bit color RGB (4:4:4) to YUV (4:4:4)
Frame delay:	No delay
Data rate:	Total max: 10.8 Gbps (1.62/2.7 Gbps/lane)
Supported video standards:	DP 1.1a compliant
3D support:	Yes
Embedded audio	Yes
EDID emulation:	Yes, Advanced EDID Management
HDCP compliancy:	1.3

Audio capability:*	4 stereo PCM or HBR compressed
Weight:	95 g
Power consumption:	0,8 W (typ.) 2,5 W (max.)
Connectors:	Standard DisplayPort gold plated connector
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

*The transmitted audio depends on the Media connector. For final audio transmission capabilities please see the chosen Media connectors audio specification.

4K UHD HDMI Output Module

MODEX-AV-HDMI-4K-OM

Part No: 9161 0416

Features

- HDMI 1.4, DVI and HDCP 1.4 compliant
- Resolution up to 3840x2160@30Hz, 1600x1200@60Hz
- Supports any 3D formats
- 30 m copper cable compensation
- HDCP enable/disable
- Advanced EDID Management

Specifications

Max resolution:	1600x1200 @ 60Hz 36bit 3840x2160 @ 30Hz 24bit 1920x1080p @ 120Hz 24bit
Color depth:	24, 30, 36 bit deep color
Color space:	RGB, YCbCr 4:4:4/4:2:2
Frame delay:	No delay
Data rate:	9 Gbps
Max pixel clock:	300 MHz
Supported video standards:	DVI 1.0, HDMI 1.4
3D support:	Yes
Embedded audio / Return audio:	Yes / No
EDID emulation:	Yes, Advanced EDID Management
HDCP compliancy:	1.4

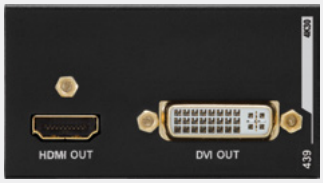
Audio capability:*	4 stereo PCM or HBR compressed
Weight:	95 g
Power consumption:	0.38 W (typ.), 2.88 W (max.)
Connectors:	HDMI
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

*The transmitted audio depends on the Media connector. For final audio transmission capabilities please see the chosen Media connectors audio specification.

4K UHD HDMI and DVI Dual Output Module

MODEX-AV-HDMI-DVI-4K-OM

Part No: 9161 0439



Features

- HDMI 1.4 and DVI signals
- HDMI and DVI connectors output the same signal simultaneously
- HDCP 1.4 compliant with enable/disable
- Resolution up to 3840x2160@30Hz, 1920x1080p@120Hz, 1600x1200@60Hz
- Supports any 3D formats
- Advanced EDID Management

Specifications

Max resolution:	1600x1200 @ 60Hz 36bit 3840x2160 @ 30Hz 24bit 1920x1080p @ 120Hz 24bit
Color depth:	24, 30, 36 bit deep color
Color space:	RGB, YCbCr 4:4:4/4:2:2
Frame delay:	No delay
Data rate:	9 Gbps
Max pixel clock:	300 MHz
Supported video standards:	DVI 1.0, HDMI 1.4
3D support:	Yes
Embedded audio / Return audio:	Yes / Yes (on HDMI connector)
EDID emulation:	Yes, Advanced EDID Management
HDCP compliancy:	1.4
Video test pattern generator (both outputs)	480p, 576p or 720p with different patterns
Audio capability:*	4 stereo PCM or HBR compressed
Weight:	110 g
Power consumption:	0.38 W (typ.), 2.88 W (max.)
Connectors:	DVI-D, HDMI
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

*The transmitted audio depends on the Media connector. For final audio transmission capabilities please see the chosen Media connectors audio specification.

4K UHD DVI Output Module

MODEX-AV-DVI-4K-OM

Part No: 9161 0436

Features

- HDMI 1.4, DVI and HDCP 1.4 compliant
- Supports deep color and Embedded Audio
- Resolution up to 3840x2160@30Hz, 1920x1080p@120Hz, 1600x1200@60Hz
- Supports any 3D formats

Specifications

Max resolution:	1600x1200 @ 60Hz 36bit 3840x2160 @ 30Hz 24bit 1920x1080p @ 120Hz 24bit
Color depth:	24, 30, 36 bit deep color
Color space:	RGB, YCbCr 4:4:4/4:2:2
Frame delay:	No delay
Data rate:	9 Gbps
Max pixel clock:	300 MHz
Supported video standards:	DVI 1.0, HDMI 1.4
3D support:	Yes
Embedded audio / Return audio:	Yes / No
EDID emulation:	Yes, Advanced EDID Management
HDCP compliancy:	1.4
Audio capability:*	4 stereo PCM or HBR compressed
Weight:	100 g
Power consumption:	0.38 W (typ.), 2.88 W (max.)
Connectors:	DVI
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

*The transmitted audio depends on the Media connector. For final audio transmission capabilities please see the chosen Media connectors audio specification.

HDMI 1.3 Output Module

MODEX-AV-HDMI-OM

Part No: 9161 0413

Features

- HDMI 1.3, DVI and HDCP 1.3 compliant
- 36-bit deep color support

Specifications

Max resolution:	1920x1200@36bit 1600x1200@24bit
Color depth:	24, 30, 36 bit deep color
Color space:	RGB, YCbCr 4:4:4/4:2:2
Frame delay:	No delay
Data rate:	Total max 6,75 Gbps
Max pixel clock:	225 MHz
Supported video standards:	DVI 1.0, HDMI 1.3a
3D support:	No
Embedded audio / Return audio:	Yes / No
EDID emulation:	Yes, Advanced EDID Management
HDCP compliancy:	1.3
Audio capability:*	4 stereo PCM or HBR compressed
Weight:	95 g
Power consumption:	0,4 W (typ.) 0,7 W (max.)
Connectors:	HDMI
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

*The transmitted audio depends on the Media connector. For final audio transmission capabilities please see the chosen Media connectors audio specification.

DVI Output Module

MODEX-AV-DVI-OM

Part No: 9161 0430

Features

- HDMI 1.3, DVI and HDCP 1.3 compliant
- 36-bit deep color and Embedded Audio support

Specifications

Max resolution:	1920x1200@36bit 1600x1200@24bit
Color depth:	24, 30, 36 bit deep color
Color space:	RGB, YCbCr 4:4:4/4:2:2
Frame delay:	No delay
Data rate:	Total max 6,75 Gbps
Max pixel clock:	225 MHz
Supported video standards:	DVI 1.0, HDMI 1.3a
3D support:	No
Embedded audio / Return audio:	Yes / No
EDID emulation:	Yes, Advanced EDID Management
HDCP compliancy:	1.3
Audio capability:*	4 stereo PCM or HBR compressed
Weight:	95 g
Power consumption:	0,4 W (typ.) 0,7 W (max.)
Connectors:	DVI-D
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

*The transmitted audio depends on the Media connector. For final audio transmission capabilities please see the chosen Media connectors audio specification.

Dual-Link DVI Output Module

MODEX-AV-DVIDL-OM

Part No: 9161 0404

Features

- Pro series Dual-Link DVI output module
- Resolution up to 2560 x 1600, 1920x1200@120Hz
- HDCP 1.3 compliant
- DVI output can power external peripheral devices on the +5V port with 500 mA max current limit.

Specifications

Max resolution:	2560x1600 @ 60Hz 1920x1200 @ 120Hz
Color depth:	8 bit per color
Color space:	RGB
Frame delay:	No delay
Data rate:	Total max 9,9 Gbps
Max pixel clock:	165 MHz
Supported video standards:	DVI 1.0
3D support:	Yes
Embedded audio / Return audio:	No / No
EDID emulation:	Yes, Advanced EDID Management
HDCP compliancy:	1.3
Audio capability:	Not supported
Weight:	100 g
Power consumption:	3,5 W (typ.) 3,5 W (max.)
Connectors:	DVI-D
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

DisplayPort 1.1 Output Module

MODEX-AV-DP-OM

Part No: 9161 0422

Features

- Transmits DisplayPort 1.1a signals with Embedded Audio
- Up to 2560 x 1600 pixel resolution with 10.8 Gbps bandwidth speed
- Audio embedding, de-embedding
- HDCP 1.3 compliant
- Compatible with Apple Cinema Display, 27” and 30” LCD displays

Specifications

Max resolution:	2560x1600 @ 60Hz
Color depth:	24,30,36 bit deep color
Color space:	RGB/YUV (4:4:4) – 10-bit color YUV (4:2:2/4:2:0) – 12-bit color RGB (4:4:4) to YUV (4:4:4)
Frame delay:	No delay
Data rate:	Total max: 10.8 Gbps (1.62/2.7 Gbps/lane)
Supported video standards:	DP 1.1a compliant
3D support:	Yes
Embedded audio	Yes
EDID emulation:	Yes, Advanced EDID Management
HDCP compliancy:	1.3
Audio capability:*	4 stereo PCM or HBR compressed
Weight:	95 g
Power consumption:	0,8 W (typ.) 2,5 W (max.)
Connectors:	Standard DisplayPort gold plated connector
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

*The transmitted audio depends on the Media connector. For final audio transmission capabilities please see the chosen Media connectors audio specification.

Interface Modules

The MODEX architecture allows each transmitter and receiver to support a wide variety of auxiliary signal types through the interface modules. All auxiliary signal types can be simultaneously transmitted at full bandwidth over fiber optical or twisted pair cables, reducing the need for additional extenders and cabling.
MODEX frames have auxiliary interface slots, adding control signal, audio or Ethernet.

Ethernet 10/100 Mbit Module

MODEX-IF-ETH

Part No: 9161 0718

Features

- 10/100 Mbit Ethernet transmission
- Full duplex autodetect connection
- PoE is not supported, but can connect to PoE devices

Specifications

Ethernet data rate:	10/100Base-T, full duplex with autodetect
Ethernet protocol:	ARP, ICMP (ping), IP, TCP, DHCP, HTTP, SMTP, Telnet
Power over Ethernet:	Not supported
Auto-MDIX:	Yes

Weight:	70 g
Power consumption:	0,05 W (typ.) 0,066 W (max.)
Connectors:	1 RJ-45
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

RS-232 and Two-port Ethernet 10/100 Mbit Module

MODEX-IF-2ETH-RS232

Part No: 9161 0730

Features

- Two RJ-45 and an RS-232 connectors
- 10/100 Mbit Ethernet transmission
- Bi-directional RS-232 for AV device control
- Configurable RS-232 baud rate
- Full duplex autodetect connection
- PoE is not supported, but can connect to PoE devices

Specifications

Ethernet data rate:	10/100Base-T, full duplex with autodetect
Ethernet protocol:	ARP, ICMP (ping), IP, TCP, DHCP, HTTP, SMTP, Telnet
Power over Ethernet:	Not supported
Auto-MDIX:	Yes
Supported baud rate:	2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200 / 128000 / 153600 / 230400 / 256000 (configurable)
Signal type:	RX/TX bi-directional
Weight:	85 g
Power consumption:	1,5 W (typ.) 2,3 W (max.)
Connectors:	2 x RJ-45, male 9-pole D-sub male
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

Ethernet 4 port 10/100 Mbit Module

MODEX-IF-4ETH

Part No: 9161 0726

Features

- FFour RJ-45 connectors
- 10/100 Mbit Ethernet transmission
- PoE is not supported, but can connect to PoE devices

Specifications

Ethernet data rate:	10/100Base-T, full duplex with autodetect
Ethernet protocol:	ARP, ICMP (ping), IP, TCP, DHCP, HTTP, SMTP, Telnet
Power over Ethernet:	Not supported
Auto-MDIX:	Yes
Weight:	75 g
Power consumption:	1,5 W (typ.) 2,3 W (max.)
Connectors:	4 x RJ-45
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

Ethernet 10/100 Mbit Module with EtherCON Connector

MODEX-IF-ETH-ECN

Part No: 9161 0727

Features

- DDurable latch lock Neutric EtherCON connector
- 10/100 Mbit Ethernet transmission
- Full duplex autodetect connection
- PoE is not supported, but can connect to PoE devices

Specifications

Ethernet data rate:	10/100Base-T, full duplex with autodetect
Ethernet protocol:	ARP, ICMP (ping), IP, TCP, DHCP, HTTP, SMTP, Telnet
Power over Ethernet:	Not supported
Auto-MDIX:	Yes
Weight:	75 g
Power consumption:	0,1 W (typ.) 0,2 W (max.)
Connectors:	Neutrik Ethercon RJ-45 receptacle with latch lock (NE8FBH-S)
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

Digital and Analog Audio Input Module

MODEX-IF-AUDIN

Part No: 9161 0719

Features

- S SPDIF 5.1 audio input with two-channel stereo and 5.1 digital audio up to 24-bit, 96 kHz
- Balanced analog audio input
- Gain, volume level control and phase inversion

Specifications

S/PDIF Digital Audio	
Audio formats:	S/PDIF
Supported sample rates:	16 to 48 kHz
AES/EBU compatibility:	No
Bit depths:	Up to 24 bit
Analog Audio	
Sample frequency:	16 to 96 kHz
Maximum level:	Input: 4.4 Vp-p
Frequency response:	20Hz to 20 kHz: ±1dB
Gain:	-5dB to 19dB;
Input impedance:	28 kΩ
Weight:	80 g
Power consumption:	0,2 W (typ.) 0,33 W (max.)
Connectors:	1 x RCA, 1 x 5 pole PHOENIX
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

Digital and Analog Audio Output Module

MODEX-IF-AUDOUT

Part No: 9161 0720

Features

- SPDIF 5.1 audio input with two-channel stereo and 5.1 digital audio up to 24-bit, 96 kHz
- Balanced analog audio input
- Gain, volume level control and phase inversion

Specifications

S/PDIF Digital Audio	
Audio formats:	S/PDIF
Supported sample rates:	16 to 48 kHz
AES/EBU compatibility:	No
Bit depths:	Up to 24 bit

Analog Audio	
Sample frequency:	16 to 96 kHz
Maximum level:	4.4 Vp-p (6 dBu)
Frequency response:	20Hz to 20 kHz: ±1dB
Gain:	+5dB to -73dB (and -∞dB)
Output impedance:	1.2 kΩ

Weight:	80 g
Power consumption:	0,2 W (typ.) 0,33 W (max.)
Connectors:	1 x RCA, 1 x 5 pole PHOENIX
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

Digital and Analog Bi-directional Audio Module

MODEX-IF-AUD

Part No: 9161 0721

Features

- SPDIF 5.1 audio input and output withtwo-channel stereo and 5.1 digital audio up to 24-bit, 96 kHz
- Balanced analog audio input and output
- Gain, volume level control and phase inversion

Specifications

S/PDIF Digital Audio	
Audio formats:	S/PDIF
Supported sample rates:	16 to 48 kHz (input), 16 to 48 kHz (output)
AES/EBU compatibility:	No
Bit depths:	Up to 24 bit

Analog Audio	
Sample frequency:	16 to 96 kHz
Maximum level:	Input: 4.4 Vp-p; output: 4.4 Vp-p (6 dBu)
Frequency response:	20Hz to 20 kHz: ±1dB
Gain:	Input: -5dB to 19dB; Output: +5dB to -73dB (and -∞dB)
Input/output impedance:	Input: 28 kΩ, output: 1.2 kΩ

Weight:	90 g
Power consumption:	0,2 W (typ.) 0,33 W (max.)
Connectors:	2 x RCA, 2 x 5 pole PHOENIX
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

RS-232 and IR Module

MODEX-IF-RS232-IR

Part No: 9161 0715

Features

- Bi-directional RS-232 for AV device control
- Bi-directional IR control
- Configurable RS-232 baud rate

Specifications

RS-232	
Supported baud rate:	2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200 / 128000 / 153600 / 230400 / 256000 (configurable)
Signal type	RX/TX bi-directional

IR	
Supported frequencies (input carrier freq):	38 kHz
Supported frequencies (output carrier freq):	38 kHz (configurable)

Weight:	65 g
Power consumption:	0,1 W (typ.) 0,2 W (max.)
Connectors:	2 x 3.5mm TRS connector (1/8'' mini-jack) 9-pole D-sub male
ESD protection:	No
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

RS-232 Module

MODEX-IF-RS232

Part No: 9161 0712

Features

- Bi-directional RS-232 for AV device control
- Configurable RS-232 baud rate

Specifications

RS-232	
Supported baud rate:	2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200 / 128000 / 153600 / 230400 / 256000 (configurable)
Signal type	RX/TX bi-directional

Weight:	60 g
Power consumption:	0,1 W (typ.) 0,2 W (max.)
Connectors:	9-pole D-sub male
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

RS-232 Double Module

MODEX-IF-2xRS232

Part No: 9161 0713

Features

- Bi-directional RS-232 for AV device control
- Configurable RS-232 baud rate

Specifications

RS-232 Double	
Supported baud rate:	2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200 / 128000 / 153600 / 230400 / 256000 (configurable)
Signal type	RX/TX bi-directional
Weight:	70 g
Power consumption:	0,1 W (typ.) 0,2 W (max.)
Connectors:	2 x 9-pole D-sub male
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

RS-232 and RS-422 Module

MODEX-IF-RS232-RS422

Part No: 9161 0714

Features

- Bi-directional RS-232 for AV device control
- Bi-directional RS-422 control
- Configurable RS-232/422 baud rate

Specifications

RS-232	
Supported baud rate:	2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200 / 128000 / 153600 / 230400 / 256000 (configurable)
Signal type	RX/TX bi-directional
RS-422	
Pin assigment:	1: RX-, 2:RX+, 3:TX+, 4:TX-, 5:GND
Signal levels:	±5 V
Weight:	70 g
Power consumption:	0,1 W (typ.) 0,2 W (max.)
Connectors:	2 x 9-pole D-sub male
ESD protection:	IEC61000–4–2 Level 4
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

RS-422 and 2 x Ethernet 10/100 Mbit Module

MODEX-IF-2ETH-RS422

Part No: 9161 0731

Features

- Two RJ-45 and an RS-422 connectors
- 10/100 Mbit Ethernet transmission
- Bi-directional RS-422 for AV device control
- Configurable RS-422 baud rate
- PoE is not supported, but can connect to PoE devices

Specifications

Ethernet data rate:	10/100Base-T, full duplex with autodetect
Ethernet protocol:	ARP, ICMP (ping), IP, TCP, DHCP, HTTP, SMTP, Telnet
Power over Ethernet:	Not supported
Auto-MDIX:	Yes
Weight:	85 g
Power consumption:	1.5 W (typ) 2.3 W (max)
Connectors:	2 x RJ-45, 9-pole D-sub male
ESD protection:	IEC61000–4–2 Level 4 0
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +85 °C
Humidity:	10% to 90% non-condensing

RS-422	
Supported BAUD Rate:	2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200 / 128000 / 153600 / 230400 / 256000 (configurable)
Signal type:	RX/TX bi-directional
Pin assignment:	1: RX-, 2:RX+, 3:TX+, 4:TX-, 5:GND
Signal levels:	±5 V

IR and 2xEthernet 10/100 Mbit Module

MODEX-IF-2ETH-IR

Part No: 9161 0732

Features

- Two RJ-45 and one IR ports
- 10/100 Mbit Ethernet transmission
- IR for AV device control
- Full duplex autodetect connection
- PoE is not supported, but can connect to PoE devices

Specifications

Ethernet data rate:	10/100Base-T, full duplex with autodetect
Ethernet protocol:	ARP, ICMP (ping), IP, TCP, DHCP, HTTP, SMTP, Telnet
Power over Ethernet:	Not supported
Auto-MDIX:	Yes
Weight:	80 g
Power consumption:	1.5 W (typ) 2.3 W (max)
Connectors:	2 x 3.5mm TRS connector (1/8'' mini-jack) 2 x RJ-45
ESD protection:	IEC61000–4–2 Level 4 0
Operation temperature:	0°C - +50 °C
Storage temperature:	-20°C - +70 °C
Humidity:	10% to 90% non-condensing

IR	
Supported frequencies (input carrier freq):	38 kHz
Supported frequencies (output carrier freq):	38 kHz (configurable)

Frames		
MODEX-F15-OPTS-TX	MODEX-OPTS-TX - Singlemode fiber optical transmitter frame with USB KVM and Ethernet ports	9161 0108
MODEX-F15-OPTS-RX	MODEX-OPTS-RX - Singlemode fiber optical receiver frame with USB KVM and Ethernet ports	9161 0109
MODEX-F15-OPTM-TX	MODEX-OPTM-TX - Multimode fiber optical transmitter frame with USB KVM and Ethernet ports	9161 0110
MODEX-F15-OPTM-RX	MODEX-OPTM-RX - Multimode fiber optical receiver frame with USB KVM and Ethernet ports	9161 0111
Media Connector		
MODEX-CON-OPTM-NT	OPTM multimode Media Core input/output with Neutrik OpticalCON DUO and IEC C14 AC inlet (RX/TX)	9161 0228
MODEX-CON-OPTS-NT	OPTS singlemode Media Core input/output with Neutrik OpticalCON DUO and IEC C14 AC inlet (RX/TX)	9161 0227
MODEX-CON-OPTM-NT-PCN	OPTM multimode Media Core input/output with Neutrik OpticalCON DUO and PowerCON AC inlet (RX/TX)	9161 0232
MODEX-CON-OPTS-NT-PCN	OPTS singlemode Media Core input/output with Neutrik OpticalCON DUO and PowerCON AC inlet (RX/TX)	9161 0231
MODEX-CON-OPTM-ODVA	OPTM multimode Media Core input/output with industrial LC ODVA compliant connector and IEC C14 AC inlet (RX/TX)	9161 0230
MODEX-CON-OPTS-ODVA	OPTS singlemode Media Core input/output with industrial LC ODVA compliant connector and IEC C14 AC inlet (RX/TX)	9161 0229
MODEX-CON-OPTM-SC	OPTM multimode Media Core input/output with SC optical connector and IEC C14 AC inlet (RX/TX)	9161 0238
MODEX-CON-OPTS-SC	OPTS singlemode Media Core input/output with SC optical connector and IEC C14 AC inlet (RX/TX)	9161 0237
MODEX-CON-OPTM-ST	OPTM multimode Media Core input/output with ST optical connector and IEC C14 AC inlet (RX/TX)	9161 0236
MODEX-CON-OPTS-ST	OPTS singlemode Media Core input/output with ST optical connector and IEC C14 AC inlet (RX/TX)	9161 0235
Alternative versions (E.g. EBC Mini, EBC Junior, HICON Hi-Fiber4, Lemo 3K.93C, etc.) Call sales for availability		*Call*
Video & Audio modules		
MODEX-AV-DVIDL-IM	Dual-Link DVI input module	9161 0401
MODEX-AV-DVIDL-OM	Dual-Link DVI output module	9161 0404
MODEX-AV-HDMI-DVI-IM	HDMI 1.3 and DVI input module	9161 0407
MODEX-AV-HDMI-DVI-4K-IM	HDMI and DVI 3D and 4K input module	9161 0410
MODEX-AV-HDMI-OM	HDMI 1.3 output module	9161 0413
MODEX-AV-HDMI-4K-OM	HDMI 3D and 4K output module	9161 0416
MODEX-AV-DP-IM	DisplayPort 1.1 input module	9161 0419
MODEX-AV-DP-OM	DisplayPort 1.1 output module	9161 0422
MODEX-AV-3GSDI-IM	3G-SDI input module with 2 SDI loop out	9161 0426
MODEX-AV-DVI-OM	DVI output module	9161 0430
MODEX-AV-DVI-IM	DVI input module	9161 0433
MODEX-AV-DVI-4K-OM	4K UHD DVI output module	9161 0436
MODEX-AV-HDMI-DVI-4K-OM	4K UHD HDMI and DVI dual output module	9161 0439
MODEX-AV-BLANK	Blank panel for video module slot	9161 0699
Interface modules		
MODEX-IF-8GPIO*	8 GPIO module	9161 0701
MODEX-IF-2x8GPIO*	16 GPIO module	9161 0702
MODEX-IF-8GPIO-3RELAY*	8 GPIO and 3 Relay module	9161 0703
MODEX-IF-8GPIO-RS232*	8 GPIO and RS-232 module	9161 0704
MODEX-IF-8GPIO-RS422*	8 GPIO and RS-422 module	9161 0705
MODEX-IF-8GPIO-IR*	8 GPIO and IR module	9161 0706
MODEX-IF-3RELAY*	3 Relay module	9161 0707
MODEX-IF-2x3RELAY*	6 Relay module	9161 0708
MODEX-IF-3RELAY-RS232*	3 Relay and RS-232 module	9161 0709
MODEX-IF-3RELAY-RS422*	3 Relay and RS-422 module	9161 0710
MODEX-IF-3RELAY-IR*	3 Relay and IR module	9161 0711
MODEX-IF-RS232	RS-232 module	9161 0712
MODEX-IF-2xRS232	RS-232 double module	9161 0713
MODEX-IF-RS232-RS422	RS-232 and RS-422 module	9161 0714
MODEX-IF-RS232-IR	RS-232 and IR module	9161 0715

MODEX-IF-MIC*	Microphone/Line input module with phantom power	9161 0716
MODEX-IF-ETH	Ethernet 10/100 Mbit module	9161 0718
MODEX-IF-AUDIN	Digital and analog audio input module	9161 0719
MODEX-IF-AUDOUT	Digital and analog audio output module	9161 0720
MODEX-IF-AUD	Digital and analog bi-directional audio module	9161 0721
MODEX-IF-DSPIN*	Digital and analog audio input module with Dolby & DTS decoder (DSP)	9161 0722
MODEX-IF-DSPOUT*	Digital and analog audio output module with Dolby & DTS decoder (DSP)	9161 0723
MODEX-IF-DSP*	Digital and analog bi-directional audio module with Dolby & DTS decoder (DSP)	9161 0724
MODEX-IF-4ETH	4 ports Ethernet 10/100 Mbit module	9161 0726
MODEX-IF-ETH-ECN	Ethernet 10/100 Mbit module with EtherCON connector	9161 0727
MODEX-IF-2ETH-8GPIO*	2 ports Ethernet 10/100 Mbit and 8 GPIO module	9161 0728
MODEX-IF-2ETH-3Relay*	2 ports Ethernet 10/100 Mbit and 3 Relay module	9161 0729
MODEX-IF-2ETH-RS232	RS-232 and 2 port Ethernet 10/100 Mbit module	9161 0730
MODEX-IF-2ETH-RS422	2 ports Ethernet 10/100 Mbit and RS422 module	9161 0731
MODEX-IF-2ETH-IR	2 ports Ethernet 10/100 Mbit and IR module	9161 0732
MODEX-IF-BLANK	Blank panel for interface module slot	9161 0999

*under development

Creating and ordering a MODEX Configuration

The right configuration for an application can be virtually built online by following the four configuration steps and selecting the right frames and modules. Based on the created configuration the MODEX unit can be ordered. The best way to do this is by creating a list of the five selected part numbers. Please try our online MODEX configurator, which is available at buildyourmodex.com

See Example 1 and 2 below for typical order list samples.

Example 1

- **MODEX frame**
  MODEX-F15-OPTS-TX — 9161 0108
- **Media connector**
  MODEX-CON-NT-OPTS — 9161 0227
- **Video module** MODEX-AV-HDMI-DVI-4K-IM — 9161 0410
- **Interface modules**
  MODEX-IF-RS232-IR — 9161 0715
  MODEX-IF-AUD — 9161 0721

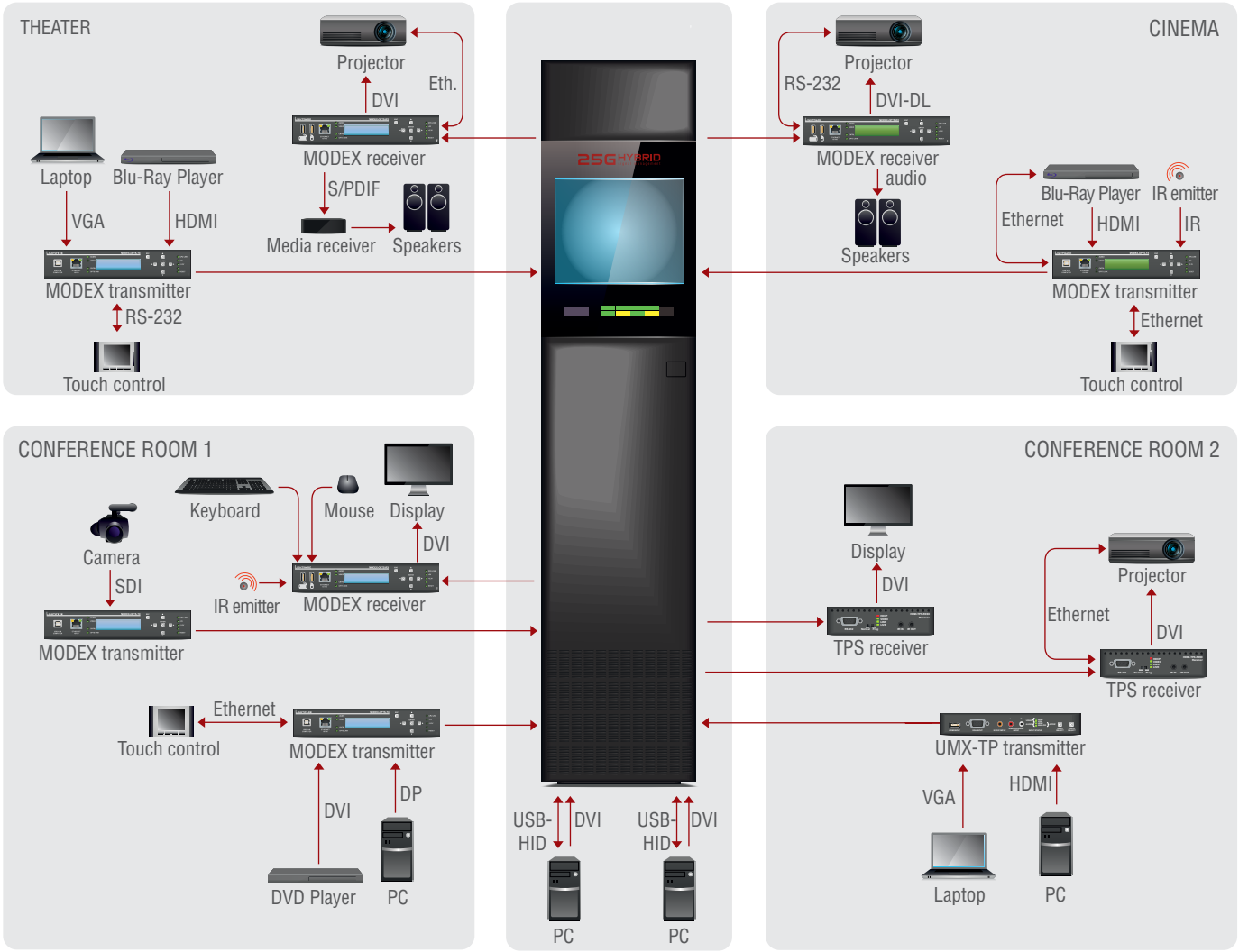
- **MODEX frame**
  MODEX-F15-OPTS-RX — 9161 0109
- **Media connector**
  MODEX-CON-NT-OPTS — 9161 0227
- **Video module** MODEX-AV-HDMI-4K-OM — 9161 0416
- **Interface modules**
  MODEX-IF-AUDOUT — 9161 0720
  Blank panel — 9161 0999

Example 2

- **MODEX frame**
  MODEX-F15-OPTM-TX — 9161 0110
- **Media connector**
  MODEX-CON-OPTM-NT-PCN — 9161 0232
- **Video module** MODEX-AV-3GSDI-IM — 9161 0426
- **Interface modules**
  Blank panel — 9161 0999
  Blank panel — 9161 0999

- **MODEX frame**
  MODEX-F15-OPTM-RX — 9161 0111
- **Media connector**
  MODEX-CON-OPTM-NT-PCN — 9161 0232
- **Video module** MODEX-AV-DVI-OM — 9161 0430
- **Interface modules**
  MODEX-IF-AUDOUT — 9161 0720
  MODEX-IF-AUDOUT — 9161 0720

Integrated System

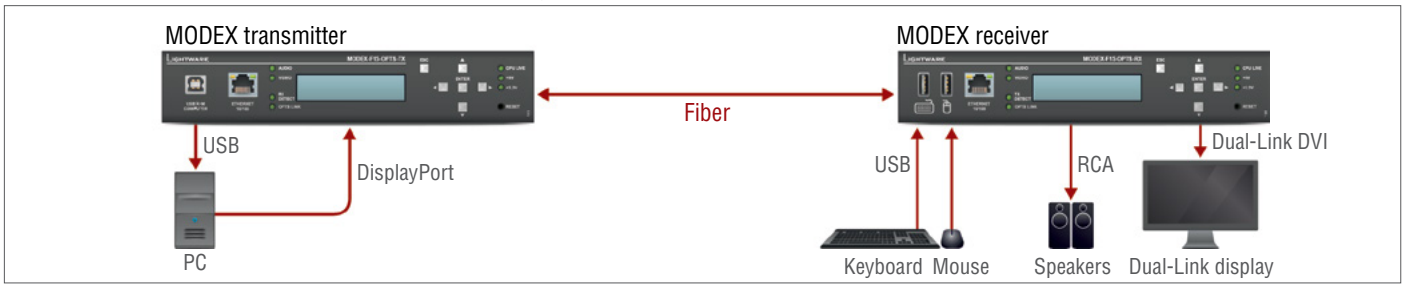


25G HYBRID Signal Management with MODEX Extenders

MODEX extenders connected to a 25G matrix as end-points combine into a full signal path infrastructure from end to end. The Hybrid hardware and software design allows switching and transmission of all signals over one single fiber or CAT cable in a single router. The 25G Hybrid matrix is the world's first fully compatible HDMI 1.4 matrix switcher that also provides HEC and ARC functions, supports 4K resolutions and full 3D formats. 25G Hybrid has eight separate Media Layers, establishing the expression and the method of Multilayer Switching.

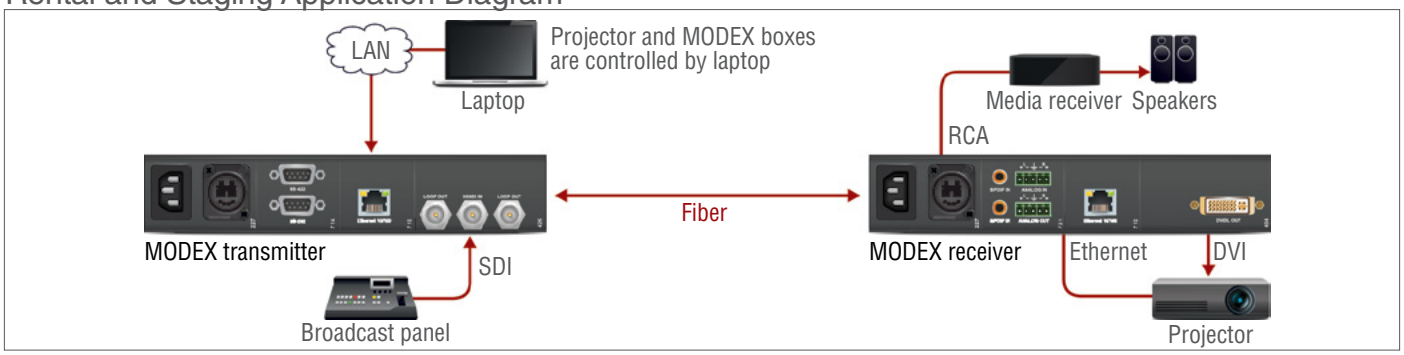
25G Hybrid switchers do not only handle inputs and outputs, because our design engineers have added a third dimension, the Media Layers. A 25G Hybrid router has as many Media Layers as signal types, which means that there are so many individual routers included, as many signal formats are incorporated.
MODEX extenders can function as far end connection points of these layers, granting the user limitless variability and a wide range of installation options.

USB KVM Standalone Application Diagram



Any transmitter can be connected to any receiver: the DisplayPort input is converted to Dual-Link output automatically by the MODEX transmitting the USB KVM device signals as well.

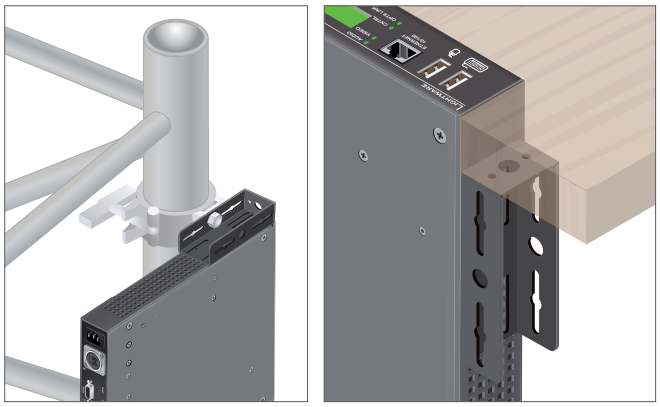
Rental and Staging Application Diagram



SDI transmitter connects directly to the DVI receiver. The transmission is format free; MODEX sends the video pixels regardless of the video format.

Optional Accessories

Devices can be mounted in several ways, depending on the application. Rack shelf and mounting brackets are available and offer easy mounting on truss systems with standard clamps or can be used to build the unit into a piece of furniture.



Mounting Bracket V2 Part No: 5240 0273
This mounting bracket makes through-furniture and under-desk mounting easy and allows truss mounting with standards clamps for our MODEX family and other upcoming extenders as well.

Rack Shelf Part No: 5240 0935
1U high rack shelf provides mounting holes for fastening two half-rack sized units.

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