

SCORPION MIO Modules

Miniature input and output modules for video, HDMI, audio, data, and Ethernet signals in the SCORPION platform

SCORPION miniature input and output modules (MIOs) allow for ingest of video, audio, Ethernet and data into SCORPION media processing platforms. Supporting a wide range of different signal types, conversion, and processing features, these MIOs combined with SCORPION enclosures and software services allow for a high degree of customization and flexibility for many applications and workflows.

►Signal Interfaces

Video 12G/6G/3G/HD/SD-SDI ASI Analog Video/Reference	Audio AES/MADI/Analog/ Intercom/DANTE	Ethernet 10/100/1000MbE 10GE	Data RS232/422/485 GPIO/USB/SCTE	HDMI 4K/UHD/3C/HD
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►Features & Benefits

- SCORPION-X18 supports up to 18 single slot or 8 dual slot modules
- SCORPION-4 supports up to 4 single slot or 2 dual slot modules
- SCORPION-2 supports up to 2 single slot or 1 dual slot modules
- Module synergy is enclosure and software service dependent
- On-board processing and edge monitoring features
- Powerful miniature signal interfaces for variety of signal formats and processing

►MIO Modules

Module	Description	Module IO	Features
MIO-AES-D4	AES de-embedder from 6G/3G/HD/SD-SDI	4 unbalanced AES3 outputs (DIN)	This module de-embeds up to 4 AES from an input SDI signal. Source can be routed to the module in the SCORPION-X18 or SCORPION-4 frame using the crosspoint or FPGA respectively or using the direct path from an SFP port on SCORPION-2
MIO-AES-LTC-D4	AES and LTC de-embedder from 6G/3G/HD/SD-SDI	4 unbalanced AES3 outputs (DIN)	This module de-embeds up to 4 AES or LTC from an input SDI signal. Source can be routed to the module in the SCORPION-X18 or SCORPION-4 frame using the crosspoint or FPGA respectively or using the direct path from an SFP port on SCORPION-2
MIO-AES-IN4-IP	AES input gateway	4 unbalanced AES3 inputs (DIN)	This module encapsulates up to 4 AES3 to AES67. This can be done as a flow possessing 1, 2, 4, or 8 channels
MIO-AES-IP	AES bi-directional gateway	2 unbalanced AES3 outputs and 2 unbalanced AES3 inputs (DIN)	This module encapsulates up to 2 AES3 to AES67 and de-encapsulates up to 2 AES3 from AES67. This can be done as a flow possessing 1, 2, or 4 channels
MIO-AES-OUT4-IP	AES output gateway	4 unbalanced AES3 outputs (DIN)	This module de-encapsulates up to 4 AES3 from AES67. This can be done as a flow possessing 1, 2, 4, or 8 channels
MIO-AVR	Analog video/reference receiver	1 output (BNC)	This module is paired with the MIO-AVT to receive a reference or analog video signal over IP or dark fiber
MIO-AVT	Analog video/reference transmitter with loopout	1 analog input (HD-BNC) and 1 analog loopout (HD-BNC)	This module is paired with the MIO-AVR to distribute reference or analog video signal over IP or dark fiber
MIO-BLADE-Z21	Microservice module capable of running software services	8 IO (HD-BNC), direction and format is software service dependent	The microservice module functionality is defined by the software service loaded on it (see MIO-BLADE-Z21 product page for more details).
MIO-DE4-3G	6G/3G/HD/SD data embedder	24 pin terminal block. 3 bi-directional serial channels (RS232/422/485) with 6 GPI and 6 GPO	This module embeds SCTE104/GPI/Serial data into an input SDI signal. GPI and SCTE triggers can be either physical or software based. External connections for GPIs and serial data for discrete inputs. The recipient SDI source can be routed to the module in the SCORPION-X18 or SCORPION-4 frame using the crosspoint or FPGA respectively or using the direct path from an SFP port on SCORPION-2
MIO-DD4-3G	6G/3G/HD/SD data embedder	24 pin terminal block. 3 bi-directional serial channels (RS232/422/485) with 6 GPI and 6 GPO	This module de-embeds SCTE104/GPI/Serial data from an input SDI signal. External connections for GPOs and serial data for discrete outputs. The SDI source can be routed to the module in the SCORPION-X18 or SCORPION-4 frame using the crosspoint or FPGA respectively or using the direct path from an SFP port on SCORPION-2
MIO-DANTE-64	DANTE to TDM convertor	2 RJ45	This module converts external DANTE to or from TDM which can be routed to the module in the SCORPION-X18 or SCORPION-4 frame using the crosspoint or FPGA respectively or using the direct path from an SFP port on SCORPION-2
MIO-GE-RJ45-IP	10/100/1000Mb Ethernet interface	1 RJ45	This module is a MIO interface for 10/100/1000MbE traffic. The data can either be passed through directly into the frame for conversion to fiber or for aggregation (chassis APP dependent) or is capable of a port tunnel mode for LAN extension.

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MIO-HDMI-2-4K-IP	4K/UHD HDMI input and output module	1 4K/UHD HDMI input and 1 4K/UHD HDMI output	This module acts as an input and output module for 4K/UHD HDMI. Depending on the chassis requirement, the module either converts signals to SDI (SCORPION-X18 or SCORPION-4) or ST2110 directly (SCORPION-2). Supports HDR metadata.
MIO-HDMI-IN1-4K-IP	4K/UHD HDMI input module	1 4K/UHD HDMI input	This module acts as an input module for 4K/UHD HDMI. Depending on the chassis requirement, the module either converts signals to SDI (SCORPION-X18 or SCORPION-4) or ST2110 directly (SCORPION-2). Supports HDR metadata.
MIO-HDMI-IN-3G	3G/HD HDMI input module	1 3G HDMI input	This module acts as an input module for 3G HDMI. In all SCORPION enclosures, this module can convert an HDMI source into SDI where it can then be used in SDI, IP, or dark fiber workflows.
MIO-HDMI-IN-4K	4K/UHD HDMI input module with quad SDI inputs or outputs	1 4K/UHD HDMI input and 1 quad SDI (4 HD-BNC s) configurable as input or output	This module acts as an input module for 4K/UHD HDMI. Additionally the quad SDI IO can be configured as an input or output path (configurable for quad-link SDI or single-link) for bringing additional signals into a SCORPION enclosure or simply to convert a 4K HDMI signal to a quad-link SDI source.
MIO-HDMI-OUT1-4K-IP	4K/UHD HDMI output module	1 4K/UHD HDMI output	This module acts as an output module for 4K/UHD HDMI. Depending on the chassis requirement, the module either converts signals from SDI (SCORPION-X18 or SCORPION-4) or from ST2110 directly (SCORPION-2). Supports HDR metadata.
MIO-HDMI-OUT-3G	3G/HD HDMI output module	1 3G HDMI output	This module acts as an output module for 3G HDMI. In all SCORPION enclosures, this module can convert an SDI signal into HDMI.
MIO-HDMI-OUT-4K	4K/UHD HDMI output module with quad SDI inputs or outputs	1 4K/UHD HDMI output and 1 quad SDI (4 HD-BNC) configurable as input or output	This module acts as an output module for 4K/UHD HDMI. Additionally the quad SDI IO can be configured as an input or output path (configurable for quad-link SDI or single-link) for bringing additional signals into a SCORPION enclosure or simply to create a 4K HDMI signal to a quad-link SDI source.
MIO-IT-IP	4 wire intercom, analog audio, serial, and GPIO gateway	24 pin terminal block. 2 bi-directional serial channels (RS232/422/485), 2 bi-directional analog audio channels, with 2 GPI and 2 GPO	This module is capable of 2 paths of 4 wire intercom. Supports 2 paths of analog audio conversion to/from AES67, 2 paths of RS232/422/485 and 2 GPIs in a ST2110-40 ANC packet.
MIO-MADI-2-IP	MADI bi-directional gateway	2 AES10 outputs and 2 AES10 inputs (DIN)	This module encapsulates 1 AES10 to an MPEG-TS and de-encapsulates 1 AES10 from an MPEG-TS.
MIO-USB-A	USB-A HID interface	1 USB-A	This module allows for transport of an HID argument with a USB-A connector over IP or dark fiber networks.
MIO-USB-B	USB-B HID interface	1 USB-B	This module allows for transport of an HID argument with a USB-B connector over IP or dark fiber networks.
MIO-VB-2-12G	SDI interface supporting 12G to SD and ASI	2 SDI (BNC)	This module is a configurable SDI interface supporting 12G/6G/3G/HD/SD-SDI and ASI signals. In a SCORPION-X18, SCORPION-4, or SCORPION-2 frame this can be configured for 2 inputs, 2 outputs, or as a transceiver. For 12G-SDI in a SCORPION-X18 or when used in a SCORPION-X18+NETAD enclosure, the module must be used as a transceiver.
MIO-VTR-2-12G	Dual 12G to SD and ASI transceiver	2 SDI inputs (HD-BNC) and 2 SDI outputs (HD-BNC)	This module is a static SDI interface supporting 12G/6G/3G/HD/SD-SDI and ASI signals. In a SCORPION-X18, SCORPION-4, or SCORPION-2 frame this can provide 2 inputs and 2 outputs (Note: Restrictions apply to use with 12G-SDI in the SCORPION-X18 and SCORPION-X18+NETAD, please inquire with a sales representative for more information)

Specifications

Electrical Inputs (MIO-VB-2-12G):

Reclocked Standards: SMPTE ST 2081 (12G-SDI), SMPTE ST 424M (3Gb/s), SMPTE ST 292M (1.5Gb/s), SMPTE ST 259M (270Mb/s), DVB-ASI

Connector: BNC per IEC 61169-8 Annex A

Impedance: 75Ω (nominal)

Equalization: Automatic to 80m @3Gb/s, 100m @1.5Gb/s, 250m @270Mb/s (with Belden 1694A or equivalent cable)

Return Loss: > 15dB up to 1.5GHz, > 10dB up to 3GHz, > 7dB up to 6GHz, > 4dB up to 12GHz

Electrical Outputs (MIO-VB-2-12G):

Connector: BNC per IEC 61169-8 Annex A

Impedance: 75Ω (nominal)

Signal Level: 800mV (nominal)

DC Offset: 0V ± 0.5V

Rise and Fall Time (relocked SFPs only):

- 12G: < 45ps
- HD/3G: < 135ps
- SD: < 900ps

Overshoot (relocked SFPs only): < 10% of amplitude

Alignment Jitter (relocked SFPs only): < 0.2UI to 1.485Gb/s, < 0.3UI to 2.97Gb/s, < 0.3UI to 12Gb/s

Ethernet Input/Output

(MIO-GE-RJ45, MIO-DANTE-64):

Standard: IEEE 802.3 (10 BaseT), IEEE 802.3u (100 BaseTX), IEEE 802.3ab (1000BaseTX)

Number of Ports: 1, 2 (main/backup MIO-DANTE-64)

Connector: RJ-45

Cable requirements:

- 10 BaseT: UTP category 3, 4, or 5 cable up to 328ft/100m (2 pairs)
- 100 Base Tx: UTP category 5 cable up to 328ft/100m (2 pairs)
- 1000Base Tx: UTP category 5 cable up to 164/50m (4 pairs)

HDMI:

Connector Type: HDMI

Number of Connectors: 1

Resolution: 4K (4096x2160/60) max (-4K HDMI version), 3G (1920x1080/60) max (-3G version)

HDMI Audio: Yes

AES Inputs:

Standard: SMPTE ST 276 — unbalanced AES, Dolby E compatible

Number of Inputs: 2 (3606AES-IP)

Connector: Mini DIN 1.0/2.3

Sampling Rate: 32-48kHz

Impedance: 75Ω

Return Loss: > 15dB

Amplitude (min to max): 320mV to 1.2V p-p

AES Outputs:

Standard: SMPTE ST 276 — Unbalanced AES, Dolby E compatible

Number of Outputs: 2 (3606AES-IP), 4 (3606AES-D4)

Connector: Mini DIN 1.0/2.3

Sampling Rate: 32-48kHz

Impedance: 75Ω

Return Loss: > 15dB

Amplitude: 1.0V p-p ± 0.1V p-p

Rise/Fall time: 35ns ± 5ns

Analog Video Input (MIO-AVT):

Standard: NTSC (SMPTE ST 170), PAL (ITU-R 624-4)

Number of Inputs: 1

Connector: HD-BNC

Signal Quantization: 12 bits

System Bandwidth: 5.5MHz

Input Level: 1.0V p-p (nominal)

Gain Equalization: Up to 250m of Belden 1694A or equivalent (adjustable)

Impedance: 75Ω

Return Loss: > 30dB to 5.5MHz

SNR: > 62dB

Differential Gain: < 0.7%

Differential Phase: < 1.0°

Passband Ripple: NTSC: < ±0.2dB to 5.5MHz, PAL: < ±0.2dB to 5.8MHz

Chroma/Luma Gain: 98-103%

Chroma/Luma Delay: < 5ns

Analog Video Output (MIO-AVR):

Standard: NTSC (SMPTE ST 170), PAL (ITU-R 624-4)

Number of Outputs: 1

Connector: BNC per IEC 61169-8 Annex A

System Bandwidth: 5.5MHz

Level: 1.0V p-p (nominal), 1.5V p-p (max.)

Gain: Unity gain nominal, adjustable 90-150%

Impedance: 75Ω

Return Loss: > 25dB to 5.5MHz

SNR: > 62dB

Differential Gain: < 0.7%

Differential Phase: < 1.0°

Passband Ripple: NTSC: < ±0.2dB to 5.5MHz, PAL: < ±0.2dB to 5.8MHz

Chroma/Luma Gain: 97-102%

Chroma/Luma Delay: < 5ns

Intercom Module Analog Audio (MIO-IT-IP):

Number of Signals: 2 inputs, 2 outputs

Type: Balanced Analog Audio

Industry Standards: Clearcom, RTS-Telex

Connector: Multi-pin Removable terminal block

Input Impedance: > 10K Ω

Output Impedance: 66Ω

Signal Resolution: 24-bit

Sampling Rate: 48kHz

Gain Flatness: ± 2dB

Maximum Input Level: +20dBu

Maximum Output Level: Into 10K Ω +20dBu, Into 600Ω +19dBu, SNR TBD

THD: TBD

Crosstalk: TBD

Controllable Gain: -10dB to +10dB

Intercom Module Unbalanced/Party-Line

Type Audio (MIO-IT-IP):

Number of Signals: 2

Type: Analog Audio, Full Duplex, Unbalanced

Industry Standard: ClearCom, RTS-Telex

Connector: Multi-pin removable terminal block

Signal Coupling: AC coupled (accommodates 30V "wet" inputs)

Bridging Impedance: > 10K Ω

Signal Resolution: 24-bit

Sampling Rate: 48kHz

Sidetone Null: > 25dB

Sidetone Null Range: 100-300Ω load

Frequency Response: 120-20kHz

Gain Flatness: ± 2dB

Maximum Input Level: +5dBu

Maximum Output Level: +5dBu (into 200Ω load)

SNR: TBD

THD: TBD

Crosstalk: TBD

Controllable Gain: -5dB to +5dB (into 200Ω load)

Receive Signaling: 4V DC min (ClearCom), 20kHz ± 500Hz (RTS), 11V DC min (ClearCom), 20kHz ± 100Hz (RTS)

Send Signaling: 4V DC min (ClearCom), 20kHz ± 100Hz (RTS)

Intercom Module RS-422/485 Serial Data (MIO-IT-IP):

Number of Signals: 2

Connector: Multi-pin removable terminal block

Type: RS-485 or RS-422 (selectable)

Input Termination: 120Ω or Open (selectable)

Input Failsafe Bias: 200mV (3.3mA into 60Ω) or None (selectable)

Bit Rate: RS-485: Compatible with all Telex RS-485 rates, RS-422: 460kb/s

Intercom Module General Purpose

Inputs (MIO-IT-IP):

Type: Opto-isolated, Active low

Number of inputs: 2

Connector: Multi-pin removable terminal block

Voltage: Safe Voltage Range: -20V to +10V, Off Condition (min): > +3.5V, On Condition (max): < +2.5V (active low)

Current:

Minimum: 1mA

Maximum: 10mA (internally limited)

Intercom Module General Purpose

Output (MIO-IT-IP):

Type: Dry contact relay closure, normally open

Number of Outputs: 2

Connector: Multi-pin removable terminal block

Minimum Current: 100mA

Ordering Information - Available MIO modules

MIO-VB-2-12G	12G/6G/3G/HD/SD/ASI video access module	MIO-USB-B	USB-B HID interface
MIO-GE-RJ45-IP	1GbE Ethernet access module with onboard processing	MIO-HDMI-IN-3G	HDMI input access module
MIO-AES-IP	Dual AES67 encapsulator and de-encapsulator	MIO-HDMI-OUT-3G	HDMI output access module
MIO-AES-IN4-IP	Quad AES67 encapsulator	MIO-HDMI-IN-4K	4K SDI or HDMI input module, dual slot
MIO-AES-OUT4-IP	Quad AES67 de-encapsulator	MIO-HDMI-OUT-4K	4K SDI or HDMI output module, dual slot
MIO-AES-D4	AES audio de-embedder module	MIO-HDMI-IN1-4K-IP	HDMI input module with onboard processing, dual slot
MIO-MADI-2-IP	Single MADI encapsulator and de-encapsulator	MIO-HDMI-OUT1-4K-IP	HDMI output module with onboard processing, dual slot
MIO-DANTE-64	Dante® to TDM bridge module	MIO-HDMI-2-4K-IP	HDMI microservice module
MIO-IT-IP	Intercom transceiver module (2x analog audio in/out, 2x serial data, 4x GPIO), dual slot	MIO-BLADE-Z21	Microservice module
MIO-AVT	Analog video/Black Burst transmit module with loop out Analog video/Black Burst receive module	MIO-DE4-3G	3G/HD/SD-SDI SCTE/data/LTC/GPI embedding module
MIO-AVR	Analog video/Black Burst receive module	MIO-DD4-3G	3G/HD/SD-SDI SCTE/data/LTC/GPI de-embedding module
MIO-USB-A	USB-A HID interface		
+SA	Standalone frame option * Note: Some mini I/O modules must have this option when placed inside SCORPION-2 and SCORPION-4 standalone frames (please consult a sales representative if you have any questions)		

Available Enclosures

SCORPION-X18	Media Processing Platform Multi-Frame with onboard 80x80 crosspoint (holds 18 modules)	SCORPION-2	Media Processing Platform — Miniature Frame (holds 2 modules)
SCORPION-4	Media Processing Platform — Standalone Frame (holds 4 modules)		