

THE EVOLUTION OF INTEGRATED VIDEO SWITCHING AND TRANSPORT TECHNOLOGY FOR IP/ETHERNET NETWORKS



## INTRODUCTION

The MD8000 is a next-generation media networking system that provides an unmatched level of flexibility and signal integrity for all types of media including video, audio and file/data transport applications compatible with widely available network topologies.

By combining a wide variety of signal and network interfaces with an integrated switching fabric, all based on Ethernet/IP the MD8000 goes beyond what has been possible before today. Through the use of an innovative architecture, coupled with extensive development and deployment experience, the MD8000 is able to provide an unprecedented level of performance.

This document provides an overview of the main elements of the MD8000's design philosophy and describes a number of key features that respond to the challenges associated with building broadcaster's and service provider's next generation media networks.

#### **EVOLUTION OF THE MD8000 PRODUCT LINE**

First introduced in 2004, the MD6000 product line preceded the MD8000. Media Links has successfully deployed several MD6000 systems worldwide for a number of high profile, high value events. These include the 2006 FIFA<sup>TM</sup> World Cup in Germany and the 2006 Asian Games in Doha, Qatar. In both cases, MD6000 units were used extensively throughout the contribution networks to provide flawless, error-free transport of live video signals that were provided to broadcasters and audiences around the world.

Starting with many of the key technologies that were developed and extensively field-proven in the MD6000, the MD8000 has been designed to deliver a significantly expanded range of features to increase both flexibility and performance.

Chief among these is the migration to an integrated switching and transport multiplexing architecture, which gives network designers a much greater range of options for system layout. Each shelf in the MD8000 product line can function as a simple multiplexer or as an advanced switch.

As a multiplexer the MD8000 combines video, audio, telephony and file based/data signals into one or more high-speed optical links. As an advanced switch, the MD8000 can be configured as a multi-service switch to allow individual services to be extracted from incoming signals, distributed to one or more outbound signals, or delivered directly out of the shelf in their native video or other formats. In fact, because of the MD8000's integrated ETHERNET signal routing fabric, both multiplexing and switching can be combined in every shelf for maximum flexibility and efficiency. MD6000 systems pioneered the use of IP/ETHERNET encapsulation technology for error detection/correction and lossless/hitless protection switching; however, the transport interfaces were limited to POS SONET/SDH.

As long-haul networking technology has evolved, there is an increasing need to connect directly to native Ethernet/IP networks. The MD8000 systems address this need by offering both native Ethernet and native SDH/SONET network interfaces in a single, flexible architecture. Unique capability allows installation of both Ethernet and SONET trunk interfaces within a signal shelf and switching between them.

Technology for the MD8000 network interface includes GFP for SONET/SDH links with OC-3/STM-1, OC12/STM-4 and OC48/STM16 interfaces. For higher speed S0-NET/SDH interfaces 10Gb WAN Phy is utilized. Native Ethernet interfaces include 1GbE and 10GbE LAN Phy.

Additionally, the MD8000 includes a wide variety of user interface signals including: SD-SDI, HD-SDI, DVB-ASI, AES audio, 10/100/1000BT Ethernet, E1/T1 and OC-3/STM-1 with both copper and fiber interfaces through modular rear connector panels. The MD8000 also allows integrated processing capabilities including JPEG2000 and H.264 encoding/decoding as well as frame synchronization.

#### SIGNIFICANT IMPROVEMENTS

The opportunity to utilize newly available technology to enhance product performance combined with the evolution of long-haul networking technology fostered the initiative to develop the MD8000 product line. Here are some of the specific improvements that are characterized in the new Media Links platform:

- 1. Many new long-haul, multiple-wavelength transport links have been optimized to use native IP/ETHERNET transport. This has resulted in significant cost reductions for carriers, and significant increases in operational efficiency, particularly for native IP/ETHERNET services. To fully capitalize on these developments, the MD8000 must interoperate successfully in this environment. MD8000 systems can use 1 Gigabit and 10 Gigabit LAN Ethernet interfaces as well as 10Gb WAN to take advantage of this flexible and less expensive transport infrastructure.
- 2. Video and data access systems can benefit from local access and edge switching as well as native video access interfaces. The MD8000 product line integrates media encapsulation/de-encapsulation interfaces, video codecs, data interfaces and stream switching in one shelf. In many cases this can provide a compact, single chassis solution where multiple shelf solutions were needed in the past (See figure 1).

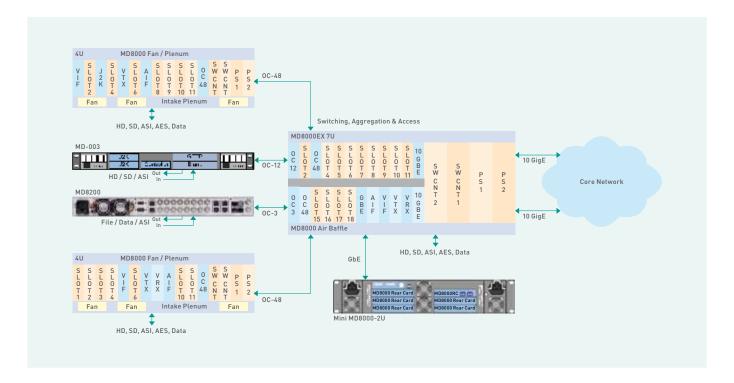


Figure 1. MD8000 Combined Switching, Aggregation and Access

- 3. Existing data IP routers from other suppliers, which have been engineered for a high volume of low bit rate streams, are cost-prohibitive for edge routing of high performance/bandwidth media, particularly HD video. In addition, testing has shown that these units may not provide the 100% quality of service, and low delay that broadcaster's demand. MD8000 systems designed specifically for media offer cost effective 100% QoS, non blocking video steam and data switching similar to what legacy video/audio cross-point switchers offer.
- 4. Native IP/MPLS and self routing technologies present some challenges for high performance video traffic due to a number of factors. The main drawbacks include scheduling of bandwidth and a lack of native support for multicasting (thereby requiring an overlay technique). In these cases it is difficult to configure routes that ensure bandwidth is reserved for known future events (i.e. the football game this evening). The most effective method of managing these events is via a booking and scheduling management system. However, there is significant complexity in interfacing a network resource reservation management system to control a wide-area IP/MPLS network. MD8000 systems, combined with bandwidth management reservation and booking systems, can provide guaranteed service reservations as well as multi-point service distribution. (more on this later in Network Design and Implementation Section)
- **5.** Some IP/MPLS switch fabric does not provide full bandwidth cross-point capability. This is due to the bursty nature of data services and systems have been designed where many ports share back plane bandwidth but are not capable of running simultaneously at full rate. MD8000 core switch fabric is non-blocking and full rate to allow complete utilization of all available bandwidth and has no limitations for multipoint signal distribution.

#### **KEY FEATURES OF THE MD8000**

- 1. 100% QoS. The MD8000 provides a Quality of Service level of 100%, meaning that the system is designed to have every bit of every video stream delivered intact and in the correct sequence to every destination all the time. Even when the system is fully loaded, all services will be transported without competing for resources every video stream is managed to ensure that a complete, full bandwidth path exists from end-to-end across the entire network for the entire duration of that signal. Compare this with IP routers that have a design goal of a packet loss ratio of less than 0.1% (or if each node is heavily over-provisioned and under-loaded, perhaps 0.01%), which means that packets can be lost on every HD stream every second, and a ten second signal dropout eight times a day will not violate the router design constraints.
- 2. Integration with IP/ETHERNET transport systems. No real networking system with regional or national scope can operate on a totally isolated basis, at least not economically. By integrating smoothly with existing core equipment, using standard protocols, MD8000 signals can easily coexist with other IP/ETHERNET transport equipment (See figure 2). This can save significant amounts of expense for both equipment and network management, by avoiding the need to construct special circuits or tunnels for TDM and other specialized signal flows.

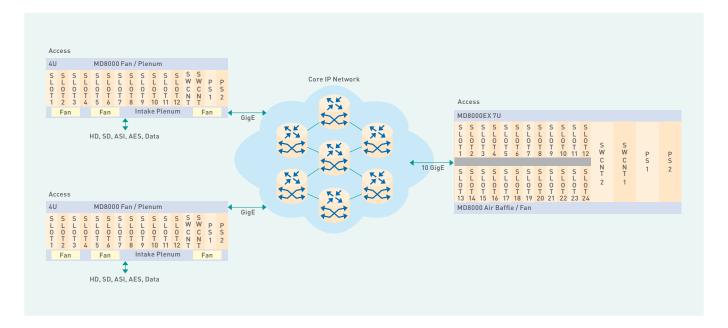


Figure 2. MD8000 Access Interface to Core Network

- **3. Core network compatibility.** As multi-national and transcontinental networks grow to meet the demands of data users around the world, the technology of choice for new installations is high-capacity IP/ETHERNET. These universal backbones can support any type of service, at a cost that is dramatically lower than earlier technologies such as SDH/SONET and PDH. The MD8000 is fully compatible with these new core networks, thereby avoiding the need to construct special overlays.
- **4. Native IP transport for native IP signal flows.** Avoids the headaches of translating IP services into a non-native form, and leverage the power of IP/ETHERNET to handle voice, data, video and audio services. Also, network links can be configured for specific bandwidth rates.

**5.** Integration with IP/ETHERNET switching systems. In most large multi-service networks, high-quality video services will only make up a portion of the overall system load. In many nodes along an end-to-end path, signals will need to be switched from one path to another, without requiring any local video inputs or outputs. At these switching nodes the service provider has the option of installing MD8000 or traditional IP/ETHERNET switching infrastructure. Generally, the MD8000 systems have an advantage where there is significant audio/video content and/or native video/audio interfaces (See figure 3).

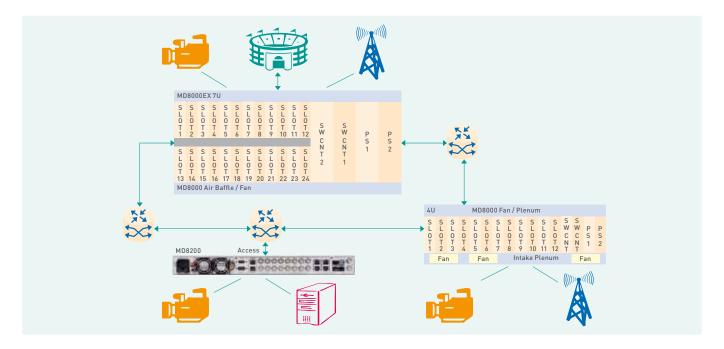


Figure 3. MD8000 Media Centric Switching Meshed with IP/ETHERNET Network

- **6. Low end-to-end delay.** By avoiding the buffers, packet stores, and impediments introduced by probabilistic packet engines, the MD8000 can achieve incredible throughput on every port. Input to output delays can be measured in terms of microseconds, not hundreds of milliseconds.
- **7. Error detection and correction.** The MD8000 systems provide robust error detection and forward error correction which can be enabled or disabled on a per service basis. This can provide solid video performance even in degraded network conditions.
- **8. Lossless Hitless protection switching.** The most reliable network designs need to accommodate disasters that can happen in the real world fiber cuts, power failures, human error, etc. That's why the MD8000 provides completely lossless hitless protection switching on a wide variety of video and data interfaces, so that when disasters happen, your signals don't need to suffer any interruption. Competing technologies may offer features such as "hitless", "hot standby", "fast re-route" and "automatic protection switching" but these services involve loss of signal/freeze frame for some duration up to and over 50 milliseconds. With lossless hitless protection switching, not a single bit of video is lost or delivered out of order, for outages lasting as little as a few milliseconds up to ones that may take weeks to repair. No other technology on the market can meet that level of performance, and no other company has as much experience with this advanced technology (See figure 4). Switching occurs between packets and the missing RTP sequenced packet is recovered from the protect path resulting in no loss of video.

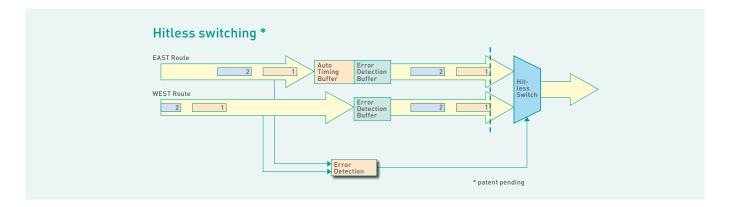


Figure 4. Lossless, hitless Switching.

## STANDARDS BASED OPERATION

The MD8000 system is based on existing Ethernet standards as well as GFP/SONET/SDH standards. In addition, all video interfaces will be standard compliant to SMPTE's 2022 family of video over IP standards. This includes both encapsulation and FEC. SDI, HDSDI, DVB-ASI and JPEG2000 encapsulated signals will all follow these standards.

#### **EFFICIENT BANDWIDTH MANAGEMENT**

Another key feature of the MD8000 is its ability to apportion bandwidth on any interface for specific purposes, both for current usage and for future planned usage. Several varieties of connections can be provided:

- **1.** Video connections can be made with dedicated bandwidth at a constant bit rate, which ensures that no other applications will compete for those network resources.
- 2. Video connections can also be scheduled for a future time, with automatic checks made to ensure that adequate bandwidth will exist at the required time along the entire route. This prevents a current service from blocking a future scheduled event by occupying bandwidth on a limited capacity link when an alternative route could have been used instead.
- **3.** Data connections can be made over dedicated bandwidth, with a firm upper limit on occupied bandwidth. If the data arrival rate at the input port exceeds the allocated bandwidth, then the excess data will be rejected and not be transported over the link. This is particularly useful for links over a carrier backbone that has a limit on total bandwidth. For example, if a wide area network connection is physically a Gigabit Ethernet connection, but only 500 Megabits of capacity have been purchased, the MD8000 can be configured to rate-limit a data connection over this bandwidth to ensure that the 500 Mbps limit is not exceeded.
- **4.** Data connections can also be configured to use any bandwidth up to a user-defined limit on a port that is not occupied by other services. For example, a data port could be configured to share a 500 Mbps link with a 300 Mbps occasional video service. The data port would limit its own throughput to 200 Mbps whenever the video service was active (ensuring no possibility of overcrowding), but allowing data flows to reach 500 Mbps when the video services were inactive. This feature might be useful during preparation time for live events when large files need to be downloaded to a remote graphics server, or after the end of the event when raw footage needs to be retrieved from a remote server for archiving.

## **NETWORK DESIGN AND IMPLEMENTATION**

There are 3 main Network Applications of MD8000 systems. The specific applications depend on the requirements and size of the network.

#### 1. Metro or Local Private Networks

These networks are created entirely with MD8000 and Media Links compatible network equipment. These networks are primarily implemented over dark fiber or wavelengths (See Figure 5). All switching in these networks is performed by the MD8000 layer 2 switch.

Video is switched by setting static entries in the outgoing switch port MAC table via a provisioning system or booking/scheduling system.

Data is switched by setting VLAN forwarding and allowing dynamic MAC learning. All signals, data or video utilize 801.2P/Q VLAN IDs with prioritization.

The MD8000 is set as default to disable the broadcast (flooding) of multicast packets. In these networks, multicast destination MAC addresses are utilized so multiple receivers can be joined to a video stream without ever impacting the original received stream. So even for a unicast service, a multicast destination address is utilized.

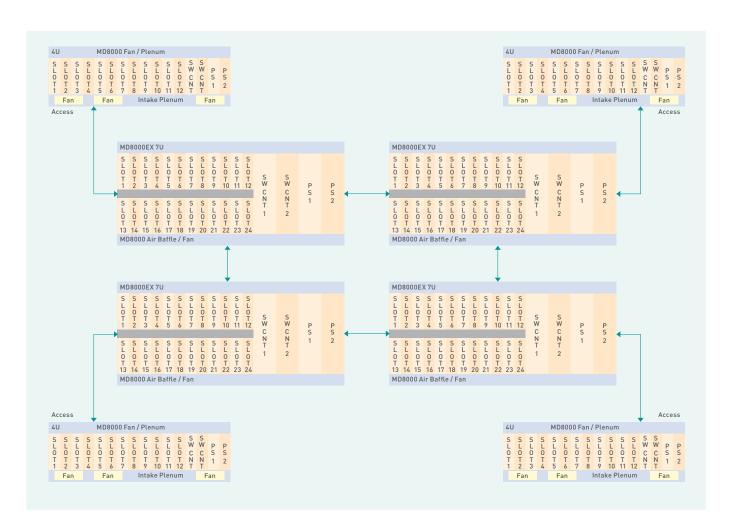


Figure 5. Metro/Local Private Network

As mentioned above, services are classified as video (video, audio and high priority data) and low priority data. The user can set the VLAN priority of all signals; however video is always set as a higher priority than data. In each system a specific group of VLAN IDs is defined as data so the MD8000 system knows by VLAN ID if the stream is video or data. Video VLANs are not allowed to be provisioned for low priority data and visa-versa.

The MD8000 controller can then manage bandwidth on each outgoing trunk port and prohibit a user from over provisioning a trunk port with high priority traffic. Every time a video service is provisioned onto a trunk port the cumulative bandwidth is calculated. If the new service exceeds 97% of the trunk bandwidth, the new service is not allowed. Low priority data services are not calculated in the port table and allowed as best effort to pass when available bandwidth exists and can utilize the remaining headroom. Both the switch ports and trunk modules manage congestion by priority processing of high priority VLANs.

## 2. Wide Area or Long Distance SONET/SDH Networks

These network operate in the same fashion as the private networks do however, the MD8000 switching and access equipment is connected via SONET/SDH networking equipment (See figure 6).

Since the MD8000 utilized Ethernet technology (GFP & 10Gb WAN Phy) packets are sent over the SONET or SDH network and the layer 2 switch can operate in the same way as mentioned above. 100% QoS is maintained for high priority traffic.

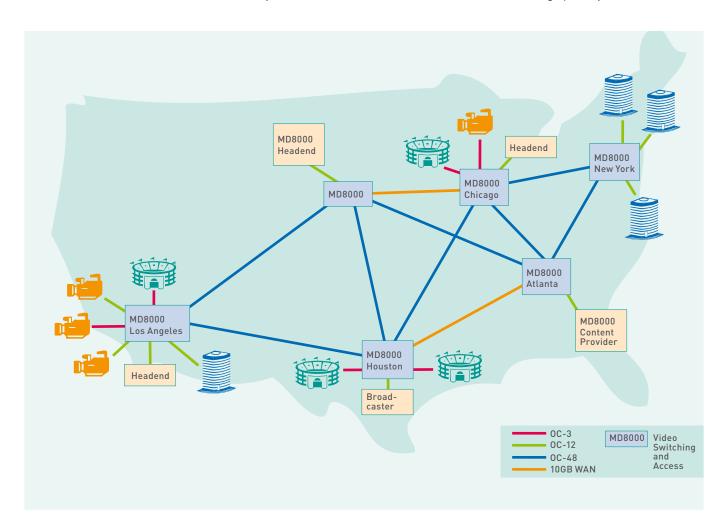


Figure 6. Wide Area or Long Distance Networks

It is important to note that booking/scheduling systems can be utilized so that the operator does not have to manually provision every link in order to get a service from one side of the country to the other. The scheduling system is initially set up to understand the bandwidth requirements of each video/audio/data service and the available bandwidth on each network link. In addition, specific links can be prioritized over others with user value setting or based on route miles. When a service is booked, the scheduling system calculates the route based on the preset rules and what bandwidth is available. At each video switching center along the route, the video stream is transitioned from an incoming trunk port to an outgoing trunk port, never transitioning back to baseband video, but staying in the Ethernet domain.

This achieves very low delay/jitter and provides very reliable service.

#### 3. Wide Area or Long Distance IP Networks

In this case, the MD8000 serves in mostly an access capacity and core switching is handled by an IP/MPLS/VPLS core network. The MD8000 equipment provides encapsulation and encoding/decoding functions as well as local aggregation/de-aggregation switching. The MD8000 hands of signals and receives signals from the core network (See figure 7).

In these networks, QoS can be managed in two ways. The most reliable method is similar to what was used in the first two network cases. This is where the booking/scheduling system controls the signal path through both the MD8000 edge equipment and the IP routers in the core. In order for this to function, the scheduling system must have the ability to place MAC or IP entrees in the route tables of each router in the signal path. Again paths are determined based on shortest path or least hops or other customer entered value criteria. This may or may not be possible in all cases so a second case needs to be created.

A second method to manage QoS in these types of networks is by actively managing the MD8000 edge equipment and traffic engineering the core network. In this case, the core routes would need to essentially be static and communicated to the scheduling system ahead of time.

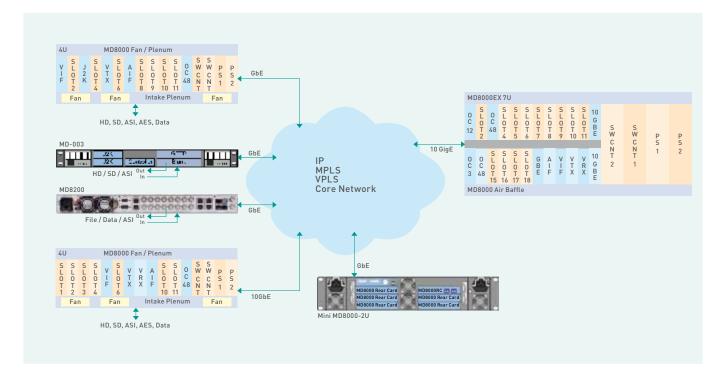


Figure 7. Wide Area or Long Distance IP Networks

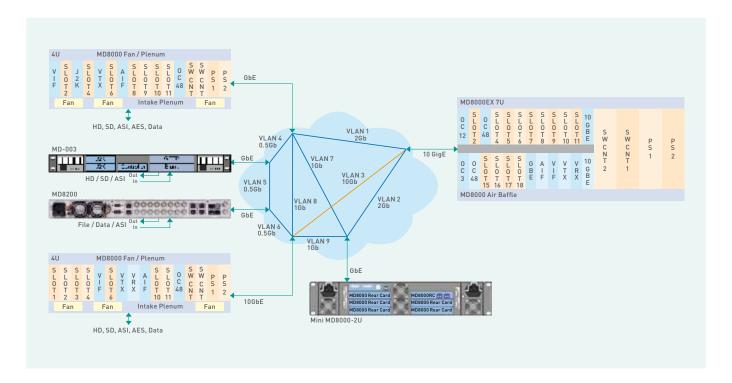


Figure 8. Traffic Engineered Core and Scheduled Edge

However in this case the scheduling system has to manage multiple point to point connections (perhaps by VLAN) on a single or multiple ports, each of which go to different locations and could be different bandwidths. In the previous two network examples (1 & 2) each MD8000 port is only connected to a single other MD8000 port. However, not so in this case.

As long as the core behaves in the manor as described to the edge scheduling system, then the scheduling of bandwidth would be effective and QoS would be maintained (See figure 8). Again, if the bandwidth on a single VLAN as calculated by the scheduling system would exceed 97% of the capacity then it would not be allowed. The rule for 97% of the port capacity would also apply.

# DESCRIPTION OF THE NETWORK BOOKING/SCHEDULING MANAGER

Through the use of a centralized network scheduling manager, the route for each type of signal can be directed through the system with just end point and service type selection from the user. The scheduling manager must be configured prior to use with the exact link capacities of the network and the service types that are going to be deployed.

One version of the scheduling system will be available in software form directly from Media Links; other versions can be purchased from well-known suppliers. Because of the MD8000's deterministic switching and simple control interface, the task of interfacing the MD8000 to the scheduling system is much simpler than the task of interfacing the scheduling to a complex MPLS or IP routing systems.

#### CONCLUSION

Overall, the MD8000 offers a significant step forward in the evolution of integrated video switching and transport technology. By giving users the ability to flexibly combine 100% QoS video delivery and high-speed data transport on a single backbone, the MD8000 has become the fulfilment of many broadcasters' goals: economical, high performance transport of all their valuable video, audio, telephony, and data signals on a single, integrated backbone.

Media Global Links Co., Ltd.
Kanagawa science park C-1225 3-2-1
Sakado Takatsu Kawasaki City 213-0012
Japan
Phone +81 44-829-2600
Fax +81 44-813-8966

1294 Blue Hills Avenue, Bloomfield, CT 06002, USA Phone +1 860-206-9163 Fax +1 860-206-9165 info@medialinks.com

Media Links, INC

Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany Phone +49 6151-9385-0 Fax +49 6151-9385-35 info@medialinks.eu

query@medialinks.co.jp



# MD8000 COMPONENTS TABLE OF CONTENT

## **CHASSIS**

CHASSIS	
MD8000-Chassis Local Video Access Platform	C01
INTERFACE MODULES	
TRUNK BOARDS:	
2GbE 2 Port 100 / 1000BT Trunk Module	T01
10G-LAN 10G LAN Phy Trunk Module	T02
10G-WAN 10G WAN Phy Trunk Module	T03
OC-3 2 Port OC-3/STM-1 Trunk Module	T04
OC-12 2 Port OC-12/STM-4 Trunk Module	T05
OC-48 2 Port OC-48/STM-16 Trunk Module	T06
LINE BOARDS:	
VIF HD/SD - Video Module	L01
VTX-4S 4 Port SD/DVB-ASI - Video Module TX	L02
VRX-4S 4 Port SD/DVB-ASI - Video Module RX	L03
JPEG JPEG2000 Transmit/Receive - Video Module	L04
AIF-2S 4 Port AES - Audio Module	L05
AIF-4S 8 Port AES - Audio Module	L06
FE-4S 4 Port 10 / 100 BaseT Fast Ethernet Module	L07
2GbE 2 Port 10/100/1000 BaseT Ethernet Line Module	L08
E1/T1-8S 8 Port E1/T1 Line Module	L09
2STM1-L 2 Port STM1/0C3 Line Module	L10

# MD8000 COMPONENTS TABLE OF CONTENT

## **INTERFACE MODULES**

## **LINE BOARDS:**

10GbE-1Sch 10GigE LAN	L11
UVRX-2022 4 Port 3G HD/SD/DVB-ASI - Video Module	L12
UVRX-J2K-2022 4 Port JPEG2000 Video Module	L13
UVRX-2022 4 Port 3G HD/SD/DVB-ASI - Video Module	L14
UVRX-J2K-2022 4 Port JPEG2000 Video Module	L15

200 Gigabit Local Access Video and Data Transport Platform

#### **FUNCTIONS**

- Interfaces for DVB-ASI, SDI, HD-SDI, JPEG2000, E1/T1, 10/100/1000 BaseT and Audio
- Supports multicast and multiple unicast of all video and data streams
- Supports SONET/SDH and IP/Ethernet Trunk interfaces

#### **FEATURES**

- · 100% QoS
- · Core SONET/SDH compatibility
- Integration with IP/MPLS transport systems
- · Hitless / Seamless Switching
- · SNMP control and management

### **APPLICATIONS**

- Carrier Class Media Networks
- High Performance Studio Interconnects
- Flawless Contribution Video Transport
- · Reliable Content Delivery System
- Integrated Live, Recorded and File-Based Communications

## MD8000-Chassis

## Local Video Access Platform

A powerful, cost effective video and data networking solution supporting all current and future MD8000 Line and Trunk cards. Services range from low rate multiport DVB-ASI, JPEG2000 for SD/HD to uncompressed HD-SDI over 10G LAN/WAN PHY.

The MD8000 system is based on existing Ethernet standards, as well as GFP/SONET/SDH Standards. In addition, all video interfaces are standards compliant to SMPTE's 2022 family of video over IP standards. This includes both encapsulation and FEC. SDI, HD-SDI, DVB-ASI and JPEG2000 encapsulated signals will all follow these standards.

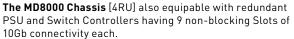
**Multicast to multiple destination transmission** is supported and in cases with non-multicast enabled networks, multiple unicasts of the same stream can be initiated provided the bandwidth of the NIC port is not exceeded.

**The MD8000 family sets the stage for convergence** between SONET/SDH and IP based networks with the use of the ITU-T G.7041 Generic Framing Protocol. GFP provides a gateway between Legacy SONET/SDH infrastructure and next generation IP/Ethernet networks.

3 different available Chassis types offer a cost effective configuration:

**The MD8000EX Chassis** [7RU] providing redundant PSU and Switch Controllers and a whole of 14 non-blocking Slots of 10Gb and 10 non-blocking Slots of 5Gb connectivity each.

- 200Gbps Non-blocking L2 Switch Fabric
- All 24 slots available for either Trunk or access modules



- 90Gbps Non-blocking L2 Switch Fabric
- 9 Slots available for access and trunk modules

**The MD8000SX Chassis** [2RU] with redundant PSU, single Switch Controller and 6 non-blocking Slots of 10Gb connectivity each.

- 60Gbps Non-blocking L2 Switch Fabric
- 6 Slots available for access and trunk modules



MD8000EX



MD8000



MD8000SX

#### **General Features**

- 10Gb connectivity per slot
- All modules "hot-swappable"
- Mid plane design with no active components on rear connectors
- Cable management for all modules from behind
- Power consumption: 30W per board, 80W per SWCNT-board
- Add/Drop/Pass Capability
- One to any multicast capability
- Multiple Unicast for non multicast enabled networks
- SFP Modules support DDS (Tx/Rx Power, Laser Bias, etc.)

# MD8000-Chassis

## **SPECIFICATIONS**

GENERAL	Dimensions	MD8000EX	7RU for 19" Rack Mount H: 12.25" / 31,12 cm W: 17.5" / 44,45 cm D: 22.0" / 55,88 cm	
		MD8000	4RU for 19" Rack Mount H: 7.0" / 17,78 cm	
			W: 17.5" / 44,45 cm D: 22.0" / 55,88 cm	
		MD8000SX	2RU for 19" Rack Mount H: 3.5" / 8,89 cm	
			W: 17.5" / 44,45 cm D: 22.0" / 55,88 cm	
	Weight	7RU	60 lbs. / 27 kg	
		4RU	42 lbs. / 19,2 kg	
		2RU	33 lbs. / 15 kg	
	Ambient Operating Temperature		0°C to +55°C 32°F to 131°F	
	Subminiature D		External Alarm Output	
AC	Power Supply Units		2 Slots for redundant PSU	
	Input Voltage		90 to 240 VAC (50/60 Hz)	
	Power Consumption		80W per SWCNT-board	
			30W per module	
SWITCH CONTROLLER	IP Switch Controller Slots		2 Slots for redundant IP Switch Controllers (except 2RU Chassis)	
	1x RJ45		10/100 BaseT for Management Connection	
	1x BNC		Black Burst Signal Input Cable (BNC)	
	1x Subminiature D		External Clock Input	

Specifications subject to change

**ORDER CODE** 

## **ORDERING INFORMATION**

24 slot user Interface (7RU Chassis)	MD80T002	MD8000EX Chassis(EU)
AC Power Supply for 7RU Chassis	MDPS0010	MD6U1500-PS(EU)
24 User Interface (7RU) Chassis with DC Power Input	MD80T006	MD8000EX(DC) Chassis
48V DC Power Supply for 7RU Chassis	MDPS0014	MD6U1000-PS(DC)
24 Port x 10Gb Switch Module (7RU Chassis)	MD803004	SWCNT24-F-SD
9+3 User Interface (4RU Chassis)	MD80T001	MD8000 Chassis(EU)
9+3 User Interface (4RU Chassis) with DC Power Input	MD80T005	MD8000(DC) Chassis
AC Power Supply for 4RU Chassis	MDPS0011	MD-4U1000-PS(EU)
48V DC Power Supply for 4RU Chassis	MDPS0015	MD-4U500-PS(DC)
6 User Interface (2RU Chassis)	MD80T009	MD8000SX Chassis(EU)
AC Power Supply for 2RU Chassis	MDPS0016	MD-1U800-PS
9 Port x 10Gb Switch Module (4RU Chassis)	MD803003	SWCNT9-F+SD

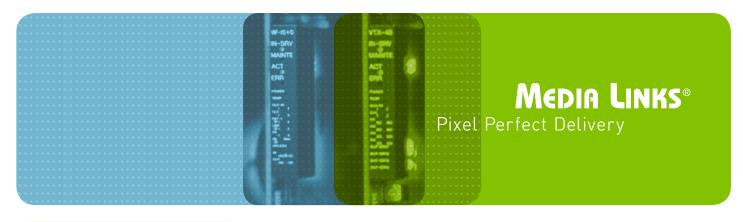
**ORDER NUMBER** 

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002,

Röntgenstrasse 3 D-64291 Darmstadt Phone +1 860-206-9163 Phone +49 6151-9385-0 Fax +1 860-206-9165 Fax +49 6151-9385-35 info@medialinks.com info@medialinks.eu

Media Links Systems GmbH

MEDIA LINKS®



Dual Port 10/100/1000 BaseT Trunk Interface for MD8000

#### **FUNCTIONS**

- · Network Interface for MD8000
- User Configurable Maximum Bandwidth Limits
- Compliant to 802.3 Ethernet Standards

#### **FEATURES**

- · Operates at 100 or 1000Mbps
- Wide Range of SFP Optical Modules
- · Optical and Electrical Interfaces
- · Optical Range of up to 120km

## **APPLICATIONS**

- Compressed Video Streams via 100BaseT links
- Uncompressed SD and Compressed HD Video over Gigabit Links
- Direct Connections to Industry-Standard Routers and Switches

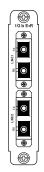
## MD8000-2GbE

# 2 Port 100/1000BT Trunk Module

**The Dual-Port Gigabit Ethernet Trunk Interface** provides a flexible network interface module for all MD8000 series applications. This single card provides interfaces to two separate transport networks, each of which can operate at any of the popular Ethernet interface speeds of 100 Mbit/sec or at 1000 Mbit/sec. This flexibility gives network designers the ability to create a wide range of redundant or non-redundant network architectures that comply with all applicable Ethernet signal standards.

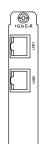
**Both electrical and optical interfaces are supported.** The MD8000-2GbE-E version includes two standard RJ-45 electrical connections that can be used for full-duplex 100 or 1000BaseT applications. The MD8000-2GbE-O units are designed to provide two independent optical Gigabit Ethernet connections. These units require one Small Formfactor Pluggable (SFP) device for each of the two interfaces, which can be independently selected for the desired optical wavelength and distance from the four choices shown on this data sheet.

The MD8000-2GbE module can be installed in any available slot in either the 4-RU MD8000 chassis or the 7-RU MD8000EX chassis. In combination with MD8000 signal interface cards and the flexible switch/controller units, many different types of media signals can be transported over common Ethernet network infrastructures. Full system configuration and alarm reporting is available through the extensive SNMP MIB and the NaviNet™ network management system.



Name	Туре	Discription
LINE1 TX	SC	1Gbps Ethernet Output 1
LINE1 RX	SC	1Gbps Ethernet Input 1
LINE2 TX	SC	1Gbps Ethernet Output 2
LINE2 RX	SC	1Gbps Ethernet Input 2

**Optical Rear Board Connectors** 



Name	Туре	Discription
LINE1	RJ-45	1Gbps Ethernet In/Out 1
LINE2	RJ-45	1Gbps Ethernet In/Out 2

**Electrical Rear Board Connectors** 

# MD8000-2GbE

## **SPECIFICATIONS**

Parameter			-LX (10 km)	-LH (40 km)	-LZ (80 km)	
Physical	Transport Media		Single mode Fiber			
Characteristics	Characteristics No. of fibers used		2 (1 for In and 1 for Out)			
	Connector Ty	/pe	SC			
Optical	Data Rate		1.250 Gbps			
Characteristics	GbE Transmission over fiber		IEEE802.3z			
	Wave Length		1310 nm		1550 nm	
	Input	Max	-3.0 dBm	-3.0 dBm	-3.0 dBm	
	Level	Min	– 19.9 dBm	- 20.0 dBm	- 24.0 dBm	
	Output	Мах	-3.0 dBm	0.0 dBm	0.0 dBm	
	Level	Min	– 11.5 dBm	-4.0 dBm	+ 5.2 dBm	
Ethernet	Transmission	n Speed	1 Gbps			
	Access Method		CSMA/CD Full-Duplex			
	GbE Transmission over		IEEE802.3ab			
	twisted-pair					
	Transmission Media		<1000BASE-T>			
			UTP CAT5e or higher			
Max Cable Length		100 m				
Packet Encapsulation	Packet Encapsulation Network Protocol		IPv4			
	Packet Size		1500 Bytes (Including the IP Header)			

Specifications subject to change

## ORDERING INFORMATION ORDER NR. ORDER CODE

2 Port GbE Trunk Module with Optical Rear Panel w/o Optics	MD802504	1GEther-2Trunk-F(no Opt.) +JP opt. Interface
2 Port GbE Trunk Module with Electrical Rear Panel	MD802504	1GEther-2Trunk-F(no Opt.) +JP ele Interface

## **OPTICAL PLUG-INS [SFP]**

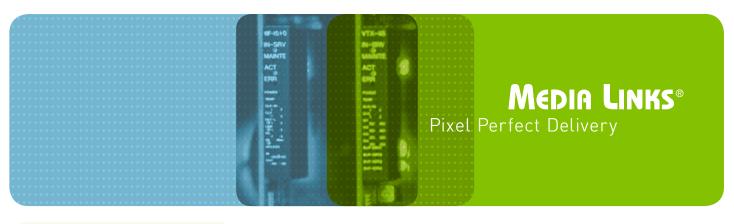
1 Gb SFP Optical Module, 1310 nm, 10 km, ROHS, Digital Diagnostics	SFP-1310-1G10
1 Gb SFP Optical Module, 1310 nm, 40 km, ROHS, Digital Diagnostics	SFP-1310-1G40
1 Gb SFP Optical Module, 1550 nm, 80 km, ROHS, Digital Diagnostics	SFP-1550-1G80
1 Gb SFP Optical Module, 1550 nm, 120 km, ROHS, Digital Diagnostics	SFP-1550-1G120

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002, USA

Phone +1 860-206-9163 Fax +1 860-206-9165 info@medialinks.com Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany Phone +49 6151-9385-0 Fax +49 6151-9385-35

info@medialinks.eu

MEDIA LINKS®



10GigE LAN Trunk Module Interfaces MD8000 Ethernet packets to the Transport Network

## **FUNCTIONS**

- External optical interface to transport network
- Internal electrical interface to MD8000 SW-CNT modules

#### **FEATURES**

- · XFP Optics
- LAN Phy 10.3125 Gbit/s with 64B/66B encoding
- · Optical rear connector
- · Modular Rear Panel I/O

## **APPLICATIONS**

- · Carrier Class Media Networks
- High Performance Studio Interconnects
- Flawless Contribution Video Transport
- · Reliable Content Delivery Systems
- Integrated Live, Recorded and File-Based Communications

## MD8000-10G-LAN

# 10G LAN Phy Trunk Module

The 10GigE LAN Trunk Module interfaces the transport network to the MD8000  $20 \times 10$ Gb SW-CNT Modules by transferring Ethernet packets via the backplane to and from the SW-CNT Modules.

The 10GigE LAN Trunk Module has one external optical 10Gbps Ethernet interface to the transport network and one 10Gbps internal electrical interface via the backplane to each (of 2) SW-CNT board.

The 10GigE LAN Trunk Module accepts small form factor pluggable [XFP] optics to support optical budgets of 300 meters, 10km, 40km and 80km. There is also XFP available for DWDM networks up to 80km.



Name	Type	Discription	
TX	SC	10Gbps Ethernet Output	
RX	SC	10Gbps Ethernet Output	

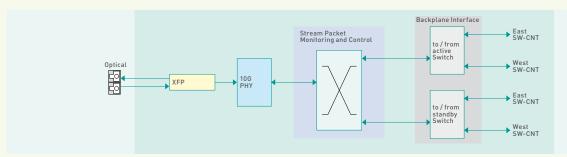
**Optical Rear Board Connectors** 



Name	Condition to illuminate
IN-SRV	Status Monitored
MAINTE	Under Maintenance
ACT	Normal Operation
ERR	Board Failure Detected
POWER	<ul> <li>Board Power Voltage Low (Warning)</li> </ul>
TEMP	<ul> <li>Board Temperature High (Warning)</li> </ul>
LINK	Sync Pattern Sensed
LOS	<ul><li>Loss of Signal</li></ul>
TX/RX	TX: Transmitting
	RX: Receiving
RXERR	<ul> <li>Receiving Error Detected</li> </ul>
LINE1/2	SWCNT for the selected channel:
	<ul><li>1: SWCNT#1; 2: SWCNT#2</li></ul>

Front Panel LEDs

# MD8000-10G-LAN



Blockdiagram

## **SPECIFICATIONS**

Item			10Gb-SR (300 m)	10Gb-LR (10 km)	10Gb-ER (40 km)	10Gb-ZR (80 km)	
Physical			Multi mode Fiber	Single mode Fiber			
Characteristics	No. of core wires	used	2 (1 for In and 1 for Out)				
	Connector Type  Data Rate  Wave Length		SC				
Optical			10.3125 Mbps				
Characteristics			840 – 860 nm	1260 – 1355 nm	1530 – 1565 nm		
	Input	Max	– 1.0 dBm	+ 0.5 dBm	– 1.0 dBm	- 7.0 dBm	
	Output Max -		– 9.9 dBm	– 14.4 dBm	– 15.8 dBm	- 24.0 dBm	
			- 1.0 dBm	+0.5 dBm	+ 4.0 dBm	+ 4.0 dBm	
			– 7.3 dBm	-8.2 dBm	- 4.7 dBm	0.0 dBm	

Specifications subject to change

## **ORDERING INFORMATION**

10GigE LAN Trunk Module

ON .	ORDER NR	ORDER CODE
	MD802704	10 GFther-1Trunk-F(no Opt.)+JP

## **OPTICAL PLUG-IN [XFP]**

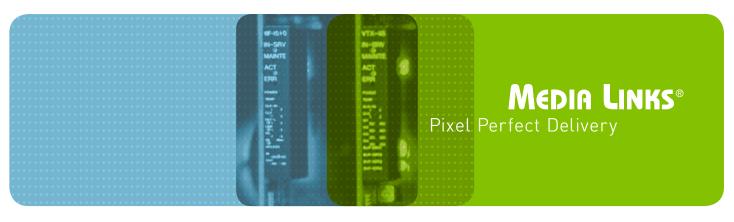
10GbE XFP Optical Module, 850 nm, 300 m, ROHS, Digital Diagnostics	XFP-850-300
10GbE, OC-192, STM-64 XFP Optical Module, 1310 nm, 10 km, ROHS, Digital Diagnostics	XFP-1310-10
10GbE, OC-192, STM-64 XFP Optical Module, 1550 nm, 40 km, ROHS, Digital Diagnostics	XFP-1550-40
10GbE, OC-192, STM-64 XFP Optical Module, 1550 nm, 80 km, ROHS, Digital Diagnostics	XFP-1550-80
10GbE, OC-192, STM-64 XFP Optical Module, DWDM, 80 km XX for ITU Channel Number, ROHS, Digi. Diagn.	XFP-DWDM-80-XX

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002, USA

Phone +1 860-206-9163
Fax +1 860-206-9165
info@medialinks.com

Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany Phone +49 6151-9385-0 Fax +49 6151-9385-35 info@medialinks.eu

MEDIA LINKS®



10G WAN PHY
Trunk Module Interfaces
MD8000 Ethernet packets
to SONET/SDH Transport
Networks

## **FUNCTIONS**

- External optical interface to transport network
- Internal electrical interface to MD8000 SW-CNT modules

## **FEATURES**

- · XFP Optics
- · SONET/SDH WAN Phy
- · Optical rear connector
- Modular Rear Panel I/O

#### **APPLICATIONS**

- · Carrier Class Media Networks
- · High Performance Studio Interconnects
- Flawless Contribution Video Transport
- · Reliable Content Delivery Systems
- Integrated Live, Recorded and File-Based Communications

## MD8000-10G-WAN

## 10G WAN Phy Trunk Module

The 10G WAN Phy Trunk Module interfaces SONET/SDH transport networks to the MD8000 System. Any line or trunk service can interface to the 10G WAN Phy Trunk via the MD8000 20 x 10Gb Switch Controller (SW-CNT).

The 10G WAN Phy Trunk Module has one external optical 10G WAN PHY SONET/SDH interface to the transport network and one 10Gbps internal electrical interface via the backplane to each (of 2) SW-CNT board.

The 10G WAN Phy Trunk Module accepts small form factor pluggable [XFP] optics to support optical budgets of 300 meters, 10km, 40km and 80km. There is also XFP available for DWDM networks up to 80km.

**Network timing can be recovered** via receive optical port or via T1/E1 external input.





Name	Туре	Discription
TX	SC	10Gbps Ethernet Input
RX	SC	10Gbps Ethernet Output

#### Rear Board Connectors

Name	Condition to illuminate		
IN-SRV	Status Monitored		
MAINTE	Under Maintenance		
ACT	Normal Operation		
ERR	<ul> <li>Board Failure Detected</li> </ul>		
POWER	<ul> <li>Board Power Voltage Low (Warning)</li> </ul>		
TEMP	<ul><li>Board Temperature High (Warning)</li></ul>		
SYNC	<ul> <li>Signal Synchronized with the circuit</li> </ul>		
LOS/LOF	<ul><li>LOS: Loss of Signal Detected</li></ul>		
	<ul><li>LOF: Loss of Frame Detected</li></ul>		
AIS-P/RDI-L • AIS-P: Path Alarm Indication Detected			
	RDI-L: Remote Line Defect Detected		
TX/RX	TX: Line Transmitting		
	RX: Line Receiving		
RXERR	<ul> <li>RXERR: Line Receive Error Detected</li> </ul>		
LINE1/2	SWCNT for the selected channel		
	• 1: SWCNT #1; 2: SWCNT #2		
CLK1/2	Clock Source		
	• 1: From SWCNT #1		
	• 2: From SWCNT #2		
CLK S/M	Clock Mode		
	S: Slave; M: Master		

Front Panel LED

# MD8000-10G-WAN

## **SPECIFICATIONS**

Parameter			10Gb WAN			
		I-64.1 (SR-1) (10 km)	S-64.2b (IR-2) (40 km) P1L1-2D2 (LR-2) (80 km)			
Physical Transport Media		Single mode Fiber	Single mode Fiber			
Characteristics	No. of core wire	s used	2 (1 for In and 1 for Out)			
Connector Type		SC				
Optical	Characteristics Wave Length Input level Min		9.95328 Mbps			
Characteristics			1260 – 1355 nm	55 nm 1530 – 1565 nm		
			< −11.0 dBm	< −14.0 dBm	< -24.0 dBm	
			- 1.0 dBm	+ 2.0 dBm	+ 4.0 dBm	
	Level	Min	- 6.0 dBm	– 1.0 dBm	0.0 dBm	
Power Consumption	Power Consumption		17 watts			

Specifications subject to change

## **ORDERING INFORMATION**

ORDER NR ORDER CODE

## **OPTICAL PLUG-IN [XFP]**

10GbE, OC-192, STM-64 XFP Optical Module, 1310 nm, 10 km, ROHS, Digital Diagnostics	XFP-1310-10
10GbE, OC-192, STM-64 XFP Optical Module, 1550 nm, 40 km, ROHS, Digital Diagnostics	XFP-1550-40
10GbE, OC-192, STM-64 XFP Optical Module, 1550 nm, 80 km, ROHS, Digital Diagnostics	XFP-1550-80
10GbE, OC-192, STM-64 XFP Optical Module, DWDM, 80 km XX for ITU Channel Number, ROHS, Digital Diagnostics	XFP-DWDM-80-XX

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002, USA

Phone +1 860-206-9163 Fax +1 860-206-9165 info@medialinks.com Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany Phone +49 6151-9385-0 Fax +49 6151-9385-35 info@medialinks.eu

MEDIA LINKS®

2 Port OC-3/STM-1 Trunk Module Interfaces MD8000 Ethernet Packets to the Transport Network

#### **FUNCTIONS**

- GFP Support for IP Network Integration
- STS/VC concatenation for efficient network utilization

### **FEATURES**

- Plugable SFP Optics with CWDM / DWM supported
- Dual Port OC-3/STM-1 SONET/SDH Card

## **APPLICATIONS**

- · Carrier Class Media Networks
- High Performance Studio Interconnects
- Flawless Contribution Video Transport
- · Reliable Content Delivery Systems
- Integrated Live, Recorded and File-Based Communications

## MD8000-0C-3

# 2 Port OC-3/STM-1 Trunk Module

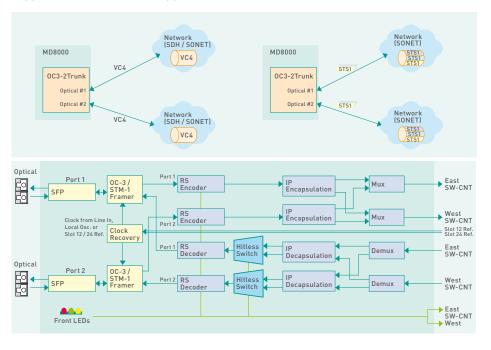


**The 2 Port OC-3/STM-1 Trunk Module** interfaces the transport network to the MD8000 non-blocking Layer 2 Switch Fabric by transferring Ethernet via the backplane to and from the SW-CNT Modules.

**The OC-3/STM-1 Trunk board has two ports** for the 155 (145.26 effective) Mbps SDH/ SONET network interface and connect to the dual switch controllers in the MD8000 system.

**GFP supported for easy integration** to carrier IP networks. STS/VC concatenation modes configurable as VC4 only for SDH. The logical path for SONET is 1 x STS-3 or 3 x STS-1, for efficient core network utilization and multi service termination to a single trunk port.

**The 2 Port OC-3/STM-1 Trunk Module accepts** small form factor pluggable [SFP] optics to support optical budgets of 10km, 40km, 80km and 120km. As well as a full support for CWDM/DWDM applications.



# MD8000-0C-3

## **SPECIFICATIONS**

Parameter I		IR-1 (<15km) LR-1 (<40km) LR-2 (<80km)				
Physical	Transport Media		Single mode Fiber			
		2 (1 for In and 1 for Out)				
		SC				
Optical	Data Rate		155.52 Mbps			
Characteristics	Wave Length		1261nm ~1360 nm		1480 nm ~1580 nm	
	Input	Max	-8.0 dBm	– 10.0 dBm	- 10.0 dBm	
	Power	Min	- 28.0 dBm	-34.0 dBm	-34.0 dBm	
	Output	Max	-8.0 dBm	-5.0 dBm	-5.0 dBm	
	Power	Min	– 15.0 dBm	0.0 dBm	0.0 dBm	
Power Consumption  Standards  OC-3  STM-1 (international)  GFP		23VA or less				
		Telcordia GR-253-CORE				
		national)	ITU-T G.707			
		ITU-T G.7041				

Specifications subject to change

**ORDER CODE** 

## **ORDERING INFORMATION**

2 Port OC-3/STM-1 Trunk Module, w/o Optics	MD802824	OC3-2Trunk+LS(no Opt.)

ORDER NR

## **OPTICAL PLUG-INS [SFP]**

OC-3/STM-1 SFP Optical Module, 1310 nm, 15 km, ROHS, Digital Diagnostics	SFP-1310-155-15
OC-3/STM-1 SFP Optical Module, 1310 nm, 40 km, ROHS, Digital Diagnostics	SFP-1310-155-40
OC-3/STM-1 SFP Optical Module, 1550 nm, 80 km, ROHS, Digital Diagnostics	SFP-1310-155-80

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002, USA

Phone +1 860-206-9163 Fax +1 860-206-9165 info@medialinks.com Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany Phone +49 6151-9385-0 Fax +49 6151-9385-35

info@medialinks.eu

MEDIA LINKS®



2 Port OC-12/STM-4 Trunk Module Interfaces MD8000 Ethernet Packets to the Transport Network

## **FUNCTIONS**

- GFP Support for IP Network Integration
- STS/VC concatenation for efficient network utilization

### **FEATURES**

- Plugable SFP Optics with CWDM / DWM supported
- Dual Port OC-12/STM-4 SONET/SDH Card

## **APPLICATIONS**

- · Carrier Class Media Networks
- High Performance Studio Interconnects
- Flawless Contribution Video Transport
- · Reliable Content Delivery Systems
- Integrated Live, Recorded and File-Based Communications

## MD8000-0C-12

# 2 Port OC-12/STM-4 Trunk Module

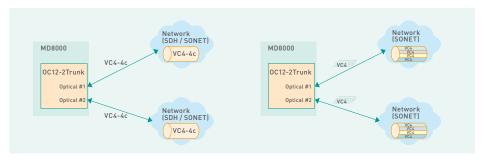


**The 2 Port OC-12 / STM-4 Trunk Module interfaces** the transport network to the MD8000 non-blocking Layer 2 Switch Fabric by transferring Ethernet via the backplane to and from the SW-CNT Modules.

**The OC-12 / STM-4 Trunk board has two ports** for the 622 (581.068 effective) Mbps SDH/SONET network interface and to connect to the dual switch controllers in the MD8000 system.

**GFP supported for easy integration to carrier IP networks.** STS/VC concatenation modes configurable as STS12c x 2 Ports (SONET), VC4-4c x 2 Ports (SDH), 4 x STS3c x 2 Ports (SONET), 4 x VC4 x 2 Ports (SDH) for efficient core network utilization and multi service termination to a single trunk port. Additional supported modes (STS Model) include a combined mode of one port of STS12c (SONET), with the second port supporting logical paths of 12 x STS1 x 1 Port (SONET).

**The 2 Port OC-12 / STM-4 Trunk Module accepts** small form factor pluggable [SFP] optics to support optical budgets of 10km, 40km, 80km and 120km. As well as a full support for CWDM/DWDM applications



# MD8000-0C-12

## **SPECIFICATIONS**

Parameter		IR-1 / S-4.1 (≤15km)	LR-1 / L-4.1(≤40km)	LR-2 / L-4.2 (<80km)		
Physical	Transport Media		Single mode Fiber			
Characteristics	No. of fibers used		2 (1 for In and 1 for Out)			
	Connector Type		SC			
Optical	Optical Data Rate			622.080 Mbps (581.068 Mbps effective)		
Characteristics	Wave Length		1272nm ~1356 nm	1280nm ~1335 nm	1500 nm ~1580 nm	
	Input	Max	-8.0 dBm	-8.0 dBm	-9.0 dBm	
	Power	Min	- 28.0 dBm	- 28.0 dBm	- 28.0 dBm	
	Output	Max	-8.0 dBm	-3.0 dBm	-2.0 dBm	
	Power	Min	– 15.0 dBm	+ 2.0 dBm	+3.0 dBm	
Power Consumption		24VA or less				
Standards	OC-12		Telcordia GR-253-CORE / ITU-T G.707			
	STM-4 (international)		ITU-T G.707			
	GFP		ITU-T G.7041			

Specifications subject to change

**ORDER CODE** 

## **ORDERING INFORMATION**

2 Port OC-12/STM-4 Trunk Module, w/o Optics	MD802914	OC12-2Trunk+STS1(no opt)

ORDER NR

## **OPTICAL PLUG-INS [SFP]**

OC-12/STM-4 SFP Optical Module, 1310 nm, 15 km, ROHS, Digital Diagnostics	SFP-1310-622-15
OC-12/STM-4 SFP Optical Module, 1310 nm, 40 km, ROHS, Digital Diagnostics	SFP-1310-622-40
OC-12/STM-4 SFP Optical Module, 1550 nm, 80 km, ROHS, Digital Diagnostics	SFP-1550-622-80
OC-12/STM-4 SFP Optical Module, 1550 nm, 120 km, ROHS, Digital Diagnostics	SFP-1550-622-120

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002, USA

Phone +1 860-206-9163 Fax +1 860-206-9165 info@medialinks.com Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany Phone +49 6151-9385-0 Fax +49 6151-9385-35

info@medialinks.eu

MEDIA LINKS®



2 Port OC-48/STM-16 Trunk Module Interfaces MD8000 Ethernet Packets to the Transport Network

## **FUNCTIONS**

- GFP Support for IP Network Integration
- STS/VC concatenation for efficient network utilization

### **FEATURES**

- Plugable SFP Optics with CWDM / DWM supported
- Dual Port 0C-48/STM-16 SONET/SDH Card

## **APPLICATIONS**

- · Carrier Class Media Networks
- High Performance Studio Interconnects
- Flawless Contribution Video Transport
- · Reliable Content Delivery Systems
- Integrated Live, Recorded and File-Based Communications

## MD8000-0C-48

# 2 Port OC-48/STM-16 Trunk Module



**The 2 Port OC-48 / STM-16 Trunk Module interfaces** the transport network to the MD8000 non-blocking Layer 2 Switch Fabric by transferring Ethernet via the backplane to and from the SW-CNT Modules.

The OC-48 / STM-16 Trunk board has two ports for the 2.488.32 (2.32427 effective) Gbps SDH/SONET network interface and connect to the dual switch controllers in the MD8000 system.

**GFP supported for easy integration to carrier IP networks.** STS/VC concatenation modes configurable as STS48c x 2 Ports (SONET), VC4-16c x 2 Ports (SDH), 4 x STS12c x 2 Ports (SONET), 4 x VC4 x 2 Ports (SDH) for efficient core network utilization and multi service termination to a single trunk port.

**The 2 Port OC-12 / STM-4 Trunk Module accepts** small form factor pluggable [SFP] optics to support optical budgets of 10km, 40km, 80km and 120km. As well as a full support for CWDM/DWDM applications.

# MD8000-0C-48

## **SPECIFICATIONS**

Parameter If			IR-1 / S-16.1 (≤15km)	LR-1 / L-16.1(≤40km)	LR-2 / L-16.2 (<80km)
Physical Transport Media		Single mode Fiber			
Characteristics	No. of fibers used		2 (1 for In and 1 for Out)		
Connector		уре	SC		
Optical	Data Rate		2.48832 Gbps		
Characteristics	Wave Length		1272nm ~1356 nm	1280nm ~1335 nm	1500 nm ~1580 nm
	Input	Max	-8.0 dBm	-8.0 dBm	-9.0 dBm
Power Output Power	Power	Min	- 28.0 dBm	- 28.0 dBm	- 28.0 dBm
	Output	Max	-8.0 dBm	-3.0 dBm	-2.0 dBm
	Power	Min	– 15.0 dBm	+ 2.0 dBm	+3.0 dBm
Power Consumption Standards 0C-48		25VA or less			
			Telcordia GR-253-CORE		
	STM-16 (inte	ernational)	ITU-T G.707		
GFP IT		ITU-T G.7041			

Specifications subject to change

**ORDER CODE** 

## **ORDERING INFORMATION**

2 Port OC-48/STM-16 Trunk Module w/o Optics	MD802324	OC48-2Trunk-F+LS(no opt)

**ORDER NR** 

## **OPTICAL PLUG-INS [SFP]**

OC-48/STM-16 SFP Optical Module, 1310 nm, 15 km, ROHS, Digital Diagnostics	SFP-1310-248-15
OC-48/STM-16 SFP Optical Module, 1310 nm, 40 km, ROHS, Digital Diagnostics	SFP-1310-248-40
OC-48/STM-16 SFP Optical Module, 1550 nm, 80 km, ROHS, Digital Diagnostics	SFP-1550-248-80

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002, USA

Phone +1 860-206-9163 Fax +1 860-206-9165 info@medialinks.com Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany Phone +49 6151-9385-0 Fax +49 6151-9385-35

info@medialinks.eu

MEDIA LINKS®

Bi-Directional HD-SDI/SD-SDI/DVB-ASI Video Module Adapts Local Video Feeds to the Wide Area Network via the MD8000 SW-CNT

#### **FUNCTIONS**

- External interface to HD/SD/DVB-ASI user circuit
- · Optical or Electrical Interface
- · Transparent with Robust FEC
- · Hitless Path Failure Protection

#### **FEATURES**

- · HD/SD/ASI in one Module
- · 297M Optical Interface
- · 292M/250M Coax Interface
- · Tx & Rx in one Module

## **APPLICATIONS**

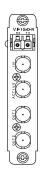
- · Carrier Class Media Networks
- High Performance Studio Interconnects
- Flawless Contribution Video Transport
- · Reliable Content Delivery Systems
- Integrated Live, Recorded and File-Based Communications

# MD8000-VIF HD/SD

# Video Module

The VIF board accepts one channel of HD-SDI, SD-SDI, or DVB-ASI signal input, and encapsulates the signal into Ethernet frames with or without robust Forward Error Correction (FEC) and transfers them to the MD8000 SW-CNT modules. Input to VIF can be via coax or fiber. Input monitor is always coax, regardless of input.

In addition the VIF board accepts Ethernet packets transferred from the SW-CNT and provides a unique video output. The Ethernet stream can originate anywhere in the MD8000 network and can be HD-SDI/SD-SDI or DVB-ASI. Outputs are provided for coax and fiber. The VIF provides robust Forward Error Correction (FEC) and Lossless/Hitless path protection switching for extremely robust signal transport.



Name	Туре	Discription	
TX	LC (Optical)	HD/SD/DVB Optical Output	
RX	LC (Optical)	HD/SD/DVB Optical Input	
IN	BNC (75ohm)	HD/SD/DVB Input	
ACTIVE	BNC (75ohm)	HD/SD/DVB Active Output	
OUT1/2	BNC (75ohm)	HD/SD/DVB Output	

**Rear Board Connectors** 



Name	Condition to illuminate		
IN-SRV	Status Monitored		
MAINTE	Under Maintenance		
ACT	Normal Operation		
ERR	Board Failure Detected		
POWER	Board Power Voltage Low (Warning)		
TEMP	Board Temperature High (Warning)		
CLK-IN1/2	<ul><li>Unused</li></ul>		
CLK1/2	<ul> <li>Unused</li> </ul>		
PKT-L1/2	Input stream of the selected channel		
	1: Packet input from Line 1		
	2: Packet input from Line 2		
LINE1/2	SWCNT for the selected channel		
	1: SWCNT #1; 2: SWCNT #2		
RS-F/E	RS-F: Uncorrectable Error Detected		
	RS-E: Correctable Error Detected		
Hit/Man	Hit: Hitless Switching mode		
	Man: Manual Switching mode		
HITLESS	Hitless Switching can be enabled		
IN-HD/SD	HD: HD Input		
	SD: SD or DVB-ASI Input		
OUT-HD/SD	HD: HD Output		
	SD: SD or DVB-ASI Output		

# MD8000-VIF

## **SPECIFICATIONS**

Input/Output	HD-SDI	Format	1080i (50 Hz, 59.94 Hz, 60 Hz)		
Signal			720p (50 Hz, 59.94 Hz, 60 Hz); SMPTE 292M		
		Embedded Audio	16CH		
	SD-SDI	Format	625i (50 Hz), 525i (59.94 Hz); SMPTE 259M		
		Embedded Audio	8CH		
	DVB-ASI	Format	MPEG2-TS		
	Connectors	Input	1x BNC		
		Active Out	1x BNC		
		Output	2x BNC		
HD-SDI	Impedance	75 ohm, unbalanced			
INPUT	Return Loss	15 dB or more (5 MHz – 742.5 MHz) 10 dB or more (742.5 MHz – 1.485 GHz)			
	Cable Length	Max 100 m (at 5C-FB coax cable)			
SD-SDI/DVB-ASI INPUT	Impedance	75 ohm, unbalanced			
	Return Loss	15 dB or more (5 MHz – 270 MHz)			
	Cable Length	Max 200 m for SD-SDI, 100 m for DVB-A	ASI (at 5C-2V coax cable)		
OUTPUT / ACTIVE	HD-SDI	Signal Amplitude	800 mVp-p ± 10% (75 ohm Load)		
		Rise Time	Less than 270 ps (at 20% – 80% Amplitude)		
		Fall Time	Less than 270 ps (at 20% – 80% Amplitude)		
		Impedance	75 ohm, unbalanced		
		Return Loss	15 dB or more (5 MHz – 742.5 MHz)		
			10 dB or more (742.5 MHz – 1.485 GHz)		
		DC Offset	0.0 V ± 0.5 V		
		Jitter	Timing: 1 UI or less		
			Alignment: 0.2 UI or less		
	SD-SDI	Signal Amplitude	800 mVp-p ± 10% (75 ohm Load)		
		Rise Time	0.4 – 1.5 ns (at 20% – 80% Amplitude)		
		Fall Time	0.4 – 1.5 ns (at 20% – 80% Amplitude)		
		ABS (Rise – Fall)	0.5 ns or less		
		Time Difference	Less than 0.5 ns		
		Impedance	75 ohm, unbalanced		
		Return Loss	15 dB or more (5 MHz – 270 MHz)		
		DC Offset	0.0 V ± 0.5 V		
		Jitter	Timing: 0.2 UI or less		
			Alignment: 0.2 UI or less		

Specifications subject to change

**ORDER CODE** 

#### **ORDERING INFORMATION ORDER NR**

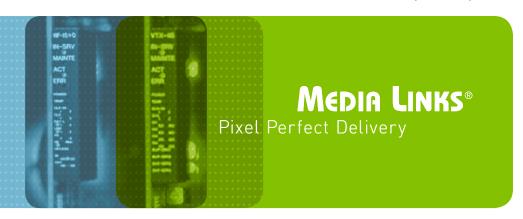
HD/SD/SDTI/DVB-ASI Bi-Directional Video Module with electrical In- & Output	MD801001	VIF-1Sch-F
HD/SD/SDTI/DVB-ASI Bi-Directional Video Module with electrical and optical In- & Output	MD801002	VIF-1Sch-F+Opt
DVB-ASI, HD-SDI bi-directional Video Module with 2022-1/2	MD801037	VIF-1Sch-F(2022)
DVB-ASI, HD-SDI bi-directional Video Module with 2022-1/2 w Optical Interface	MD801038	VIF-1Sch-F(2022)-A

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002,

Röntgenstrasse 3 D-64291 Darmstadt Phone +1 860-206-9163 Phone +49 6151-9385-0 Fax +1 860-206-9165 Fax +49 6151-9385-35 info@medialinks.com info@medialinks.eu

Media Links Systems GmbH

MEDIA LINKS®



4 Port SD/SDTI/DVB-ASI Video Module Adapts Local Video Feeds to the Wide Area Network via the MD8000 SW-CNT

## **FUNCTIONS**

- External interface to SD/SDTI/DVB-ASI user circuit
- Internal electrical interface to MD8000 SW-CNT modules

#### **FEATURES**

- · Accepts 1-4 input signals
- DVB-ASI can operate in byte or burst mode
- · Granular bandwidth allocation

## **APPLICATIONS**

- Carrier Class Media Delivery Networks
- High Performance Studio Interconnects
- Flawless Contribution Video Transport
- · Reliable Content Delivery Systems
- Integrated Live, Recorded and File-Based Communications

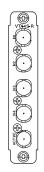
## MD8000-VTX-4S

## 4 Port SD/DVB-ASI Video Module TX

The VTX-4S board accepts one to four channels of SD-SDI, SDTI or DVB-ASI signal input, encapsulates them port by port into Ethernet frames with or without robust Forward Error Correction (FEC) and transfers them to the MD8000 SW-CNT modules.

**Four Terminating inputs are provided** with one monitor output. In addition to uncompressed SDI or SDTI, CBR (Constant Bit Rate) DVB-ASI signals in either in byte or burst mode, can be accepted by the VTX-4/s.

**Each encapsulated video service (SDI/SDTI/DVB-ASI)** can have a unique destination or multiple destinations in the network.



Name	Туре	Discription
IN1	BNC (75ohm)	SD-SDI or DVB-ASI Signal Input 1
IN2	BNC (75ohm)	SD-SDI or DVB-ASI Signal Input 2
IN3	BNC (75ohm)	SD-SDI or DVB-ASI Signal Input 3
IN4	BNC (75ohm)	SD-SDI or DVB-ASI Signal Input 4
ACTIVE	BNC (75ohm)	Active Output of one of Input signals

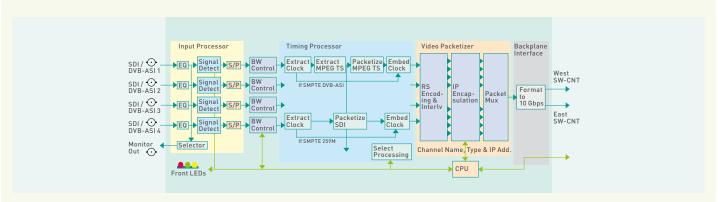
Rear Board Connectors

VTX-4S	
IN-SRV	ı
MAINTE	ı
ACT	ı
ERR	ı
POWER	ı
TEMP	
CLK-IN 1 2	ı
CLK 2	
1 2	
N 1 SD OASI	
N 2 SD CASI	
IN3	
SD ASI	
SD ASI BUFERRI	
BUFERR1	
BUFERR2	ı
BUFERR3	
BUF-ERR4	

Name	Condition to illuminate		
IN-SRV	Status Monitored		
MAINTE	Under Maintenance		
ACT	Normal Operation		
ERR	Board Failure Detected		
POWER	<ul> <li>Board Power Voltage Low (Warning)</li> </ul>		
TEMP	<ul> <li>Board Temperature High (Warning)</li> </ul>		
CLK-IN1/2	<ul><li>Unused</li></ul>		
CLK1/2	Unused		
IN 1~4 SD/ASI	IN1~4 Signal Type		
	SD: SD-SDI		
	ASI: DVB-ASI		
BUF-ERR1	DVB-ASI Buffer Overflow at IN1		
BUF-ERR2	DVB-ASI Buffer Overflow at IN2		
BUF-ERR3	DVB-ASI Buffer Overflow at IN3		
BUF-ERR4	DVB-ASI Buffer Overflow at IN4		

Front Panel LED

# MD8000-VTX-4S



Blockdiagram

## **SPECIFICATIONS**

INPUT	SD-SDI	D-SDI Format		625i (50 Hz) 525i (59.94 Hz)	
		Audio/ANC		Full VANC/HANC	
		Interface		SMPTE 259M	
	SDTI	Interface		SMPTE 305M	
	DVB-ASI	Format		MPEG2TS	
	All	Connectors		4x BNC Female	
		Impedance		75 ohm, unbalanced	
		Return Loss		15 dB or more (5 MHz – 270 MHz)	
		Max. Cable Length		200m for SDI, 100m for DVB-ASI (at 5C-2V coax cable)	
ACTIVE OUTPUT All	Signal Amplitude		800 mVp-p ± 10% (75 ohm Load)		
		Rise Time		0.4 – 1.5 ns (at 20% – 80% Amplitude)	
		Fall Time		0.4 – 1.5 ns (at 20% – 80% Amplitude)	
		ABS (Rise – Fall)		0.5 ns or less	
		Impedance		75 ohm, unbalanced	
		Return Loss		15 dB or more (5 MHz – 270 MHz)	
		DC Offset		0.0 V ± 0.5 V	
		Jitter	Timing	0.2 UI or less	
			Alignment	0.2 UI or less	

Specifications subject to change

**ORDER CODE** 

## **ORDERING INFORMATION**

SD/SDTI/DVB-ASI 4 Port uni-directional Video Module TX	MD801009	V-TX-4Sch-F
4 Port DVB-ASI Encoder Module TX with COP3 Encapsulation, FEC & ARP/GARP	MD801039	V-TX-4Sch-F(2022)

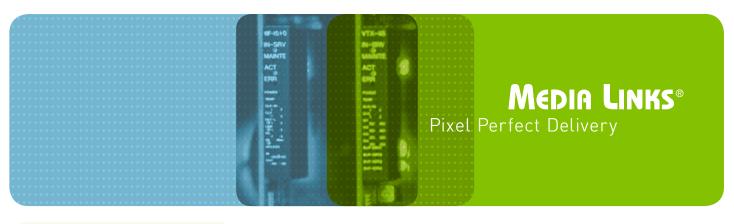
**ORDER NR** 

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002,

Röntgenstrasse 3 D-64291 Darmstadt Phone +1 860-206-9163 Phone +49 6151-9385-0 Fax +1 860-206-9165 Fax +49 6151-9385-35 info@medialinks.com info@medialinks.eu

Media Links Systems GmbH

MEDIA LINKS®



4 Port SD / SDTI / DVB-ASI Video Module Returns Video Feeds from the Wide Area Network to Local Interface

## **FUNCTIONS**

- External interface to SD/SDTI/DVB-ASI user circuit
- Internal electrical interface to MD8000 SW-CNT modules

#### **FEATURES**

- · Outputs 1-4 input signals
- DVB-ASI can operate in byte or burst mode
- · Granular bandwidth allocation

#### **APPLICATIONS**

- · Carrier Class Media Networks
- · High Performance Studio Interconnects
- Flawless Contribution Video Transport
- · Reliable Content Delivery Systems
- Integrated Live, Recorded and File-Based Communications

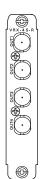
## MD8000-VRX-4S

# 4 Port SD/DVB-ASI Video Module RX

The VRX-4S board accepts Ethernet packets transferred from the SW-CNT and provides 4 unique video outputs. The 4 Ethernet streams can originate anywhere in the MD8000 network and can be SD-SDI, SDTI or DVB-ASI.

The VRX-4S provides robust Forward Error Correction (FEC) and Lossless/Hitless path protection switching for extremely robust signal transport. One to four channels of SD-SDI, SDTI or DVB-ASI signal can be provided from this module.

**DVB-ASI output signals are reconstructed** from the transparent Ethernet transport of MPEG2TS. Nulls within the ASI wrapper are re-inserted matching the original DVB-ASI signal.



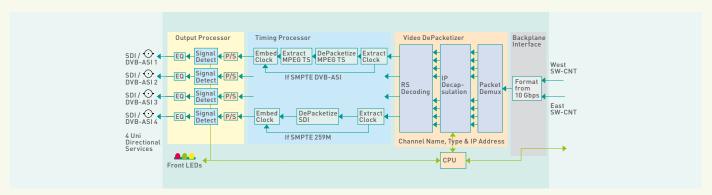
Name	Type	Discription
OUT1	BNC (75ohm)	SD-SDI or DVB-ASI Signal Output 1
OUT2	BNC (75ohm)	SD-SDI or DVB-ASI Signal Output 2
OUT3	BNC (75ohm)	SD-SDI or DVB-ASI Signal Output 3
OUT4	BNC (75ohm)	SD-SDI or DVB-ASI Signal Output 4

**Rear Board Connectors** 



Name	Condition to illuminate
IN-SRV	Status Monitored
MAINTE	Under Maintenance
ACT	Normal Operation
ERR	Board Failure Detected
POWER	Board Power Voltage Low (Warning)
TEMP	Board Temperature High (Warning)
CLK-IN1/2	<ul><li>Unused</li></ul>
CLK1/2	<ul><li>Unused</li></ul>
PKT-L1/2	Input stream of the selected channel
	1: Packet input from Line 1
	2: Packet input from Line 2
LINE1/2	SWCNT for the selected channel
	1: SWCNT #1; 2: SWCNT #2
RS-F/E	RS-F: Uncorrectable Error Detected
	RS-E: Correctable Error Detected
Hit/Man	Hit: Hitless Switching mode
	Man: Manual Switching mode
HITLESS	Hitless Switching can be enabled
OUT-SD/ASI	SD: SD-SDI Output
	ASI: DVB-ASI Output

# MD8000-VRX-4S



Blockdiagram

#### **SPECIFICATIONS**

ST ESTITION	<u> </u>			
OUTPUT	SD-SDI	Format		625i (50 Hz)
				525i (59.94 Hz)
		Audio/ANC		Full VANC/HANC
		Interface		SMPTE 259M
	SDTI	Interface		SMPTE 305M
	DVB-ASI	Format		MPEG2TS
	Max. Cable Length			200m for SDI, 100m for DVB-ASI (at 5C-2V coax cable)
	All	Signal Amplitude		800 mVp-p ± 10% (75 ohm Load)
		Rise Time		0.4 – 1.5 ns (at 20% – 80% Amplitude)
		Fall Time		0.4 – 1.5 ns (at 20% – 80% Amplitude)
		ABS (Rise – Fall)		0.5 ns or less
		Impedance		75 ohm, unbalanced
		Return Loss		15 dB or more (5 MHz – 270 MHz)
		DC Offset		0.0V ± 0.5V
		Jitter	Timing	0.2 UI or less
			Alignment	0.2 UI or less

Specifications subject to change

## ORDERING INFORMATION ORDER NR ORDER CODE

SD / SDTI / DVB-ASI 4 Port uni-directional Video Module RX	MD801010	V-RX-4Sch-F
4 Port DVB-ASI Decoder Module RX with COP3 Encapsulation, FEC & ARP/GARP	MD801040	V-RX-4Sch-F(2022)

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002, USA

Phone +1 860-206-9163 Fax +1 860-206-9165 info@medialinks.com Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany Phone +49 6151-9385-0 Fax +49 6151-9385-35

info@medialinks.eu

MEDIA LINKS®

Single Channel JPEG2000 Transmit / Receive Module for HD-SDI and SD-SDI Video Signals

## **FUNCTIONS**

- Dual Purpose SD-SDI or HD-SDI JPEG2000 Transmit / Receive
- Supports Uncompressed HD or SDI Direct Encapsulation
- Accepts DVB-ASI Burst and Byte Mode
- · Hitless Switch Protection

## **FEATURES**

- High Quality, Low Latency User-Selectable Compression Rates for SD-SDI and HD-SDI
- Uncompressed Audio Transmission up to 8 Channels AES and Ancillary Data

## **APPLICATIONS**

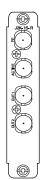
- Carrier Class Media Delivery Networks
- High Performance Studio Interconnects
- Flawless Contribution Video Transport
- Integrated Live, Recorded and File-Based Communications

## MD8000-JPEG

# JPEG2000 Transmit/Receive Video Module

**The MD8000-JPEG JPEG2000 video interface** supports multiple formats of SD-SDI and HD-SDI signals per the JPEG2000 ISO/IEC 15444-1 Annex A to produce extremely high video quality; JPEG2000 9/7 irreversible compression is employed for both HD-SDI and SD-SDI. The video format is YCrCb 4:2:2, 10 bit JPEG2000 Part 1 and the JPEG2000 encoder passes up to 16 uncompressed embedded audio channels along with the V-Ancillary data, time code and audio control.

**Hitless Protection Switching** can be enabled for any of the signals transported by the MD8000-JPEG. This technology uses two identical output streams routed over separate paths to a single destination, where any errors on one stream can be avoided by immediately switching to the other stream. Forward Error Correction and Lossless/Hitless path protection switching are provided for extremely robust signal transport.



J2K-1S
IN-SRV
MAINTE
ACT
ERR
POWER
TEMP
CLK-IN
CLK 1 2 PKFL 2
1 2 LINE 1 2
RX F F
Hit Man HITLESS
UNITY FS-ON
HD SD
CERR THRU

- 1) Always OFF for Encoder
- 2) Currently not supported
- 3) Board can work as an Encoder or Decoder depending on the file downloaded

Name	Туре	Discription
IN	BNC (75ohm)	HD-SDI Input to TX
ACTIVE	BNC (75ohm)	HD-SDI Active Loop out TX
OUT1/2	BNC (75ohm)	HD-SDI Output from RX

#### Rear Board Connectors

Name	Condition to illuminate
IN-SRV	Status Monitored
MAINTE	Under Maintenance
ACT	Normal Operation
ERR	Board Failure Detected
POWER	Board Power Voltage Low (Warning)
TEMP	Board Temperature High (Warning)
CLK-IN1/2 <sup>2]</sup>	<ul><li>BB Sync signal present. Receiving from:</li><li>1: SWCNT #1; 2: SWCNT #2</li></ul>
CLK1/2 <sup>2</sup>	<ul><li>BB Sync signal selected. Using signal from:</li><li>1: SWCNT #1; 2: SWCNT #2</li></ul>
PKT-L1/2 <sup>1]</sup>	<ul> <li>Input stream of the selected channel. Packet input from:</li> <li>1: Line 1; 2: Line 2</li> </ul>
LINE1/2 <sup>1]</sup>	<ul> <li>SWCNT for the selected channel</li> <li>1: SWCNT #1; 2: SWCNT #2</li> </ul>
RX-F/E <sup>1]</sup>	<ul><li>RX-F: Uncorrectable Error Detected</li><li>RX-E: Correctable Error Detected</li></ul>
Hit/Man <sup>1)</sup>	<ul><li>Hit: Hitless Switching mode</li><li>Man: Manual Switching mode</li></ul>
HITLESS 1]	Hitless Switching can be enabled
UNITY 1), 2)	<ul> <li>H-Phase/V-Phase are set to standard values</li> </ul>
FS-0N 1], 2]	FS function enabled
HD/SD	<ul> <li>HD: Video input is HD-SDI</li> <li>SD: Video input is SD-SDI or DVB-ASI <sup>2)</sup></li> </ul>
CERR	<ul> <li>JPEG2000 Codec Error Detected</li> </ul>
THRU	Uncompressed Video Transport Mode
ENC <sup>3]</sup>	Board is working as an Encoder
DEC 3)	Board is working as Decoder

# MD8000-JPEG

## **SPECIFICATIONS**

Input Signal	HD-SDI	Format		1080i (50 Hz, 59.94 Hz, 60 Hz) 720p (50 Hz, 59.94 Hz, 60 Hz); SMPTE 292M	
	SD-SDI	Format		625i (50 Hz), 525i (59.94 Hz); SMPTE 259M	
	Connectors	Input, Active Ou	ıtput	1x BNC	
		Output Active Loop		1x BNC	
INPUT	HD-SDI	Return Loss		15 dB or more (5 MHz – 270 MHz)	
		Max. Cable Len	gth	200 m SD-SDI, 100 m DVB-ASI (at 5C-2V coax cable)	
	SD-SDI	Impedance		75 ohm, unbalanced	
		Return Loss		15 dB or more (5 MHz – 270 MHz)	
		Max. Cable Len	gth	200 m SD-SDI, 100 m DVB-ASI (at 5C-2V coax cable)	
OUTPUT/ACTIVE	HD-SDI	Signal Amplitud	de	800 mVp-p ± 10% (75 ohm Load)	
		Rise Time		Less than 270 ps (at 20% – 80% Amplitude)	
		Fall Time		270 ps (at 20% – 80% Amplitude)	
		Impedance		75 ohm, unbalanced	
		Return Loss		15 dB or more (5 MHz – 742.5 MHz)	
				10 dB or more (742.5 MHz – 1.485 GHz)	
		DC Offset		$0.0V \pm 0.5V$	
		Jitter	Timing	1 UI or less	
			Alignment	0.2 UI or less	
	SD-SDI	Signal Amplitud	de	800 mVp-p ± 10% (75 ohm Load)	
		Rise Time		0.4 – 1.5 ns (at 20% – 80% Amplitude)	
		Fall Time		0.4 – 1.5 ns (at 20% – 80% Amplitude)	
		ABS (Rise – Fal	l)	0.5 ns or less	
		Time Difference	9	Less than 0.5 ns	
		Impedance		75 ohm, unbalanced	
		Return Loss		15 dB or more (5 MHz – 270 MHz)	
		DC Offset		$0.0V \pm 0.5V$	
		Jitter	Timing	0.2 UI or less	
			Alignment	0.2 UI or less	
Compression		Code Stream		ISO/IEC 15444-1 Annex A	
		Video Format		YCrCb 4:2:2, 10 bit JPEG2000 Part 1	
		HDTV/SDTV		JPEG2000 9/7 Irreversible	
		V-ancillary		Pass-thru from 9 - 20 lines	
		Selectable AES	Audio	2, 4, 6, 8 [HD-SDI] / 1, 2, 3, 4 [SD-SDI]	
		Audio/Video de	lay	less than 2 ms	
Power Consumption		18 watts			

Specifications subject to change

## **ORDERING INFORMATION**

ORDERING INFORMATION	ORDER NR	ORDER CODE
SD/HD JPEG2000 Video Encoder with uncompressed pass through of SD/HD and DVB-ASI	MD801015	JPEG2K-ENC-1Sch-F-E
SD/HD JPEG2000 Video Decoder with uncompressed pass through of SD/HD and DVB-ASI	MD801016	JPEG2K-DEC-1Sch-F-E
SD/HD JPEG2000 Video Encoder with 2022-5/6 with electrical I/O, ARP/GARP (Layer3)	MD801031	J2K-ENC-1Sch-F-E(2022)
SD/HD JPEG2000 Video Decoder with 2022-5/6 with electrical I/O, ARP/GARP (Layer3)	MD801032	J2K-DEC-1Sch-F-E(2022)
SD/HD JPEG2000 Video Encoder with 2022-5/6 with electrical and optical I/O, ARP/GARP (Layer3)	MD801033	J2K-ENC-1Sch-F-0(2022)
SD/HD JPEG2000 Video Decoder with 2022-5/6 with electrical and optical I/O, ARP/GARP (Layer3)	MD801034	J2K-DEC-1Sch-F-0(2022)

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002,

Röntgenstrasse 3 D-64291 Darmstadt Phone +1 860-206-9163 Phone +49 6151-9385-0 Fax +1 860-206-9165 Fax +49 6151-9385-35 info@medialinks.com info@medialinks.eu

Media Links Systems GmbH

MEDIA LINKS®

Bi-Directional AES Audio Module Adapts Local Audio Feeds to the Wide Area Network via the MD8000 SW-CNT

#### **FUNCTIONS**

- External interface to AES user circuits
- · Electrical Interface
- · Transparent with Robust FEC
- · Hitless Path Failure Protection

#### **FEATURES**

- · 2 Bi-Directional Services
- · AES Unbalanced Interface
- · Coax Interface
- · Tx & Rx in one Module

#### **APPLICATIONS**

- · Carrier Class Media Networks
- High Performance Studio Interconnects
- Flawless Contribution Video Transport
- · Reliable Content Delivery Systems
- Integrated Live, Recorded and File-Based Communications

### MD8000-AIF-2S

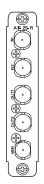
## 4 Port AES Audio Module

The AIF-2S module accepts two channels of AES audio, and encapsulates the signal into Ethernet frames with or without robust Forward Error Correction (FEC) and transfers them to the MD8000 SW-CNT modules.

Additionally, the AIF-2S module accepts Ethernet packets transferred from the SW-CNT and provides two unique audio outputs.

**User interface to the AIF-2S module is via coax cable.** Each AES stream can have a single or multiple unique destinations.

The AIF-2S provides robust Forward Error Correction (FEC) and Lossless/Hitless path protection switching for extremely robust signal transport.



Name	Туре	Discription
IN1	BNC (75ohm)	AES/EBU Audio Input 1
IN2	BNC (75ohm)	AES/EBU Audio Input 2
OUT1	BNC (75ohm)	AES/EBU Audio Output 1
OUT2	BNC (75ohm)	AES/EBU Audio Output 2
MON	BNC (75ohm)	AES/EBU Input Monitor

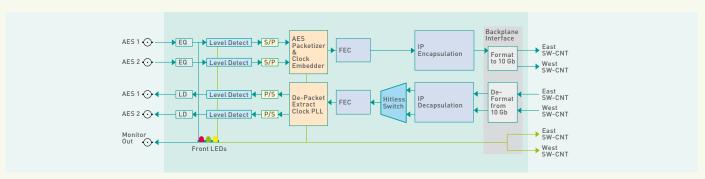
Rear Board Connectors



Name	Condition to illuminate
IN-SRV	Status Monitored
MAINTE	Under Maintenance
ACT	Normal Operation
ERR	Board Failure Detected
POWER	<ul> <li>Board Power Voltage Low (Warning)</li> </ul>
TEMP	<ul> <li>Board Temperature High (Warning)</li> </ul>
CLK-IN1/2	<ul><li>Unused</li></ul>
CLK1/2	<ul><li>Unused</li></ul>
PKT-L1/2	Input stream of the selected channel
	• 1: Packet input from Line 1
	<ul><li>2: Packet input from Line 2</li></ul>
LINE1/2 • SWCNT for the selected channel	
	1: SWCNT #1; 2: SWCNT #2
RX-F/E	<ul> <li>RX-F: Uncorrectable Error Detected</li> </ul>
	<ul> <li>RX-E: Correctable Error Detected</li> </ul>
Hit/Man	Hit: Hitless Switching mode
	<ul> <li>Man: Manual Switching mode</li> </ul>
HITLESS	Hitless Switching can be enabled
IN-CH	<ul> <li>Input Present at selected channel</li> </ul>
OUT-CH	Output Present at selected channel

Front Panel LED

## MD8000-AIF-2S



Blockdiagram

#### **SPECIFICATIONS**

Input	Impedance	75 ohm, unbalanced	AES-3id-1995
	Return Loss	25 dB or more (0.1 MHz – 6.144 MHz)	
	Connectors	2x BNC 75 ohm	
Output	Impedance	75 ohm, unbalanced	AES-3id-1995
	Return Loss	25 dB or more (0.1 MHz - 6.144 MHz)	
	Voltage	1.0 ± 0.2 V	
	DC Offset	0 ± 50 mV	
	Connectors	2x BNC 75 ohm	
Monitor Output	Connectors	BNC 75 ohm	
Delay		8.6 ms	End to end with or without FEC
Bandwidth		4.8 Mb	FEC Off

Specifications subject to change

ORDERING INFORMATION		ORDER NR	ORDER CODE	
	2 Port bi-directional AES/EBU Audio Interface Module	MD801007	AIF-2Sch-F	

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002, USA

Phone +1 860-206-9163 Fax +1 860-206-9165 info@medialinks.com Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany Phone +49 6151-9385-0 Fax +49 6151-9385-35 info@medialinks.eu

MEDIA LINKS®



Bi-Directional High Density AES Audio Module Adapts Local Audio Feeds to the Wide Area Network via the MD8000 SW-CNT

#### **FUNCTIONS**

- External interface to AES user circuits
- · Electrical Interface
- · Transparent with Robust FEC
- · Hitless Path Failure Protection

#### **FEATURES**

- · 4 Channel I/O
- · AES Unbalanced Interface
- · Coax Interface
- · Tx & Rx in one Module

#### **APPLICATIONS**

- · Carrier Class Media Networks
- High Performance Studio Interconnects
- Flawless Contribution Video Transport
- · Reliable Content Delivery Systems
- Integrated Live, Recorded and File-Based Communications

### MD8000-AIF-4S

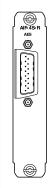
# 8 Port AES Audio Module

**The AIF-4S board accepts four channels of AES audio**, encapsulates each of the signals into Ethernet frames and transfers them to the MD8000 L2 SW-CNT modules. In addition, the AIF-4S board accepts Ethernet packets transferred from the SW-CNT and provides 4 unique AES audio outputs.

The AIF-4S can operate in one of two modes. Mode 1 allows independent encapsulation and addressing of each AES audio stream. Single AES streams can be sent to up to 4 destinations and received from up to 4 origination points.

**Mode 2** is provided for multi-channel applications like 5.1 audio. The AIF-4S can be configured to group 3 AES audio channels into a single Ethernet stream. This provides phase lock and equal latency for each of the channels. In this mode of operation, a single Ethernet stream is used for 3 AES signals and a second stream for the 4th AES signal. Mode settings can be applied uniquely to the transmitted and received signals.

The AIF-4S allows the sending of robust Forward Error Correction (FEC) and provides Lossless/Hitless path protection switching for extremely robust signal transport.



Name	Туре	Pin	Discription
AES	D-Sub (75ohm)	1	GND
		2	AES/EBU input channel 2
		3	AES/EBU input channel 1
		4	GND
		5	GND
		6	AES/EBU output channel 1
		7	AES/EBU output channel 4
		8	GND
		9	GND
		10	AES/EBU input channel 4
		11	AES/EBU input channel 3
		12	AES/EBU input monitor output
		13	AES/EBU output channel 2
		14	AES/EBU output channel 3
		15	GND

Rear Board Connectors

# MD8000-AIF-4S



Name	Condition to illuminate	
IN-SRV	Status Monitored	
MAINTE	Under Maintenance	
ACT	Normal Operation	
ERR	Board Failure Detected	
POWER	Board Power Voltage Low (Warning)	
TEMP	Board Temperature High (Warning)	
CLK-IN1/2	<ul><li>Unused</li></ul>	
CLK1/2	<ul><li>Unused</li></ul>	
PKT-L1/2	Input stream of the selected channel	
	1: Packet input from Line 1	
	2: Packet input from Line 2	
LINE1/2	SWCNT for the selected channel	
	1: SWCNT #1; 2: SWCNT #2	
RX-F/E	RX-F: Uncorrectable Error Detected	
	RX-E: Correctable Error Detected	
Hit/Man	Hit: Hitless Switching mode	
	<ul> <li>Man: Manual Switching mode</li> </ul>	
HITLESS	Hitless Switching can be enabled	
IN-CH	Input Present at selected channel	
OUT-CH	Output Present at selected channel	

Front Panel LED

#### **SPECIFICATIONS**

Input	Impedance	75 ohm, unbalanced	AES-3id-1995
	Return Loss	25 dB or more (0.1 MHz - 6.144 MHz)	
	Connectors	D-Sub	
Output	Impedance	75 ohm, unbalanced	AES-3id-1995
	Return Loss	25 dB or more (0.1 MHz - 6.144 MHz)	
	Voltage	1.0 ± 0.2 V	
	DC Offset	0 ± 50 mV	
	Connectors	D-Sub	
Monitor Output	Connectors	D-Sub	
Delay		8.6 ms	End to end with or without FEC
Bandwidth		4.8 Mb	FEC Off

Specifications subject to change

ORDERING INFORMATION	ORDER NR	ORDER CODE	
4 Port bi-directional AES/EBU Audio Interface Module	MD801030	AIF-4Sch-F	

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002, USA

Phone +1 860-206-9163 Fax +1 860-206-9165 info@medialinks.com Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany Phone +49 6151-9385-0 Fax +49 6151-9385-35 info@medialinks.eu

MEDIA LINKS®

Four Port Fast Ethernet Module Adapts Local 10/100 BaseT circuits to the Wide Area Network via the MD8000 SW-CNT

#### **FUNCTIONS**

- External interface to 10/100 BaseT user circuits
- · Electrical Interface
- · Transparent with Robust FEC
- · Hitless Path Failure Protection

#### **FEATURES**

- 4 fully Independent Ethernet Circuits
- · CAT5 Interface
- · Automatic Rate Negotiation

#### **APPLICATIONS**

- · LAN Extension
- · WAN Access Circuit
- Network Management and Telemetry
- · File Transfer

## MD8000-FE-4S

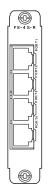
# 4 Port 10/100 BaseT Fast Ethernet Module

The FE-4S module accepts 1 – 4 10/100 BaseT signals, encapsulates them into Ethernet frames with or without robust Forward Error Correction (FEC) and transfers them to the MD8000 SW-CNT modules.

**Additionally, the FE-4S module accepts Ethernet packets** transferred from the SW-CNT and provides 1–4 unique 10/100 BaseT output signals.

Four completely independent bi-directional Ethernet channels ensure that data on the individual ports is kept separate, permitting operation at full wire speed rates with total isolation.

**All 4 ports support Full-Duplex/Auto-Negotiation.** Bandwidth for individual ports can be provisioned at the following rates: 1Mbps, 2.5Mbps, 5Mbps, 10Mbps, 20Mbps, 30Mbps, 40Mbps, 50Mbps, 75Mbps and 100Mbps.



FE-4S
IN-SRV
MAINTE
ACT
ERR
POWER
TEMP
LINK
100M/10M
PKT-L 2
LINE 0 1 0 2
RS F E
Hit Man
HITLESS
TX RX
BUF-ERR
•

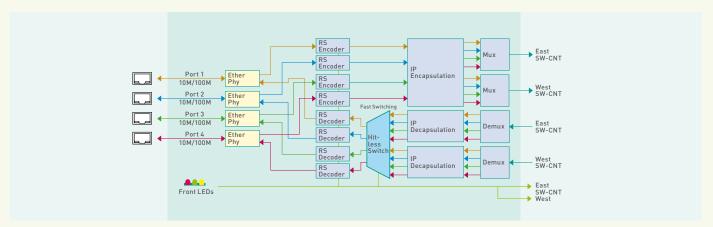
Name	Туре	Discription
PORT1~4	RJ-45	Ethernet In/Out ports 10BASE-T/100BASE-TX Auto Negotiation

#### Rear Board Connectors

Name	Condition to illuminate	
IN-SRV	Status Monitored	
MAINTE	Under Maintenance	
ACT	Normal Operation	
ERR	Board Failure Detected	
POWER	Board Power Voltage Low (Warning)	
TEMP	Board Temperature High (Warning)	
LINK	Link is established	
100M/10M	Linked at 10Mbps	
PKT-L1/2	Input stream of the selected channel	
	1: Packet input from Line 1	
	2: Packet input from Line 2	
LINE1/2	<ul> <li>SWCNT for the selected channel</li> </ul>	
	1: SWCNT #1; 2: SWCNT #2	
RS-F/E	RS-F: Uncorrectable Error Detected	
	RS-E: Correctable Error Detected	
Hit/Man	Hit: Hitless Switching mode	
	Man: Manual Switching mode	
HITLESS	Hitless Switching can be enabled	
TX/RX	TX: Transmitting frames	
	RX: Receiving frames	
BUF-ERR	Buffer Overflow	

Front Panel LED

# MD8000-FE-4S



Blockdiagram

#### **SPECIFICATIONS**

Ethernet	Data Rate	10 Mbps / 100 Mbps
	Access Method	CSMA/CD Full-Duplex
	Frame Structure	IEEE802.3ab
	Transmission Method Transmission Code	<10BASE-T> Transmission Method = Base Band Transmission Code = Manchester <100BASE-TX> Transmission Method = Base Band Transmission Code = 4B/5B+MTL-3
	Transmission Media	<10BASE-T> UTP CAT3 or higher <100BASE-TX> UTP CAT5 or higher
	Max Cable Length	100 m
Encapsulation	Network Protocol	IPv4
	Packet Size	1500 Bytes (Including the IP Header)

Specifications subject to change

ORDERING INFORMATION	ORDER NR	ORDER CODE
4 Port 10/100BT Fast Ethernet Module (4 duplex service)	MD801008	FE-4Sch-F

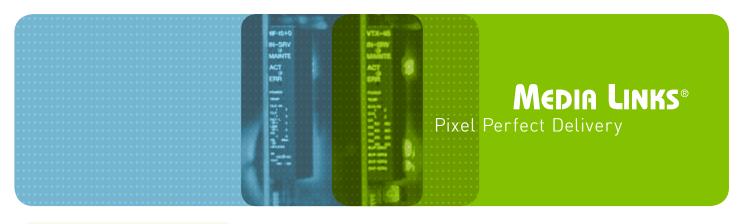
Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002,

Phone +1 860-206-9163 Fax +1 860-206-9165 info@medialinks.com

Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany Phone +49 6151-9385-0 Fax +49 6151-9385-35

info@medialinks.eu

MEDIA LINKS®



Two Port GbE Module
Adapts Local 10/100/1000
BaseT circuits to the Wide
Area Network via the
MD8000 SW-CNT

#### **FUNCTIONS**

- External interface to 10/100 BaseT user circuits
- · Optical Interface
- · Transparent with Robust FEC
- · Auto Protection Switchover < 50ms

#### **FEATURES**

- 2 Fully Independent Ethernet Circuits
- · Automatic Rate Negotiation

#### **APPLICATIONS**

- · LAN Extension
- · WAN Access Circuit
- Network Management and Telemetry
- · File Transfer

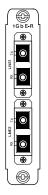
### MD8000-2GbE

## 2 Port 10/100/1000 BaseT Ethernet Line Module

The GbE-2ch module accepts one or two 10/100/1000 BaseT signals, provides rate policing and VLAN tagging and transfers them to the MD8000 SW-CNT modules. Additionally, the 2GbE module accepts Ethernet packets transferred from the SW-CNT and provides one or two unique 10/100/1000 BaseT output signals.

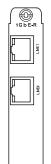
Two completely independent bi-directional GbE channels ensure that data on the individual ports is kept separate, permitting operation at full wire speed rates with total isolation. Both ports support Auto-Negotiation.

The GbE-2ch board has two modes of operation; transparent or port tagging mode. Both modes handle packets up to Jumbo frames (up to 9022 bytes in length including headers and FCS). Port tagging is utilized for point to point connections with path failover protection. Transparent mode is used for multiple point WAN connections. In addition the GbE-2ch board provides input filtering and rate policing to guarantee that data cannot impact video traffic. Either optical or electrical rear boards can be used for the GbE-2ch line module.



Name	Type	Discription
LINE1 TX	SC	1Gbps Ethernet Output 1
LINE1 RX	SC	1Gbps Ethernet Input 1
LINE2 TX	SC	1Gbps Ethernet Output 2
LINE2 RX	SC	1Gbps Ethernet Input 2

Optical Rear Board Connectors



Name	Туре	Discription
LINE1	RJ-45	1Gbps Ethernet In/Out 2
LINE2	RJ-45	1Gbps Ethernet In/Out 2

Electrical Rear Board Connectors

# MD8000-2GbE

#### **SPECIFICATIONS**

Parameter 1		10GBASE-LX (10 km)	10GBASE-LH (40 km)	10GBASE-LZ (80 km)	
Transport Media		Single mode Fiber			
No. of fibers used		2 (1 for In and 1 for Out)			
Connector Type	Connector Type		SC		
Data Rate		1.250 Gbps			
Wave Lenght		1310 nm	1310 nm		
Input	Max	-3.0 dBm	-3.0 dBm	-3.0 dBm	
Level	Min	– 19.9 dBm	- 20.0 dBm	- 24.0 dBm	
Output Level	Max	-3.0 dBm	0.0 dBm	0.0 dBm	
	Min	– 11.5 dBm	-4.0 dBm	+5.2 dBm	
Transmission Spee	d	1 Gbps			
Access Method		CSMA/CD Full-Duplex			
Frame Structure		IEEE802.3ab			
Transmission Media		<1000BASE-T> UTP CAT5e or higher			
Transmission Coding		1000 BaseT: 8B1Q4 10/100 Base			
Max. Cable Length		100 m			
	No. of fibers used Connector Type Data Rate Wave Lenght Input Level Output Level Transmission Spee Access Method Frame Structure Transmission Medi Transmission Codi	No. of fibers used  Connector Type  Data Rate  Wave Lenght  Input Level  Min  Output Level  Min  Transmission Speed  Access Method  Frame Structure  Transmission Coding	Transport Media         SIngle mode Fiber           No. of fibers used         2 (1 for In and 1 for Out)           Connector Type         SC           Data Rate         1.250 Gbps           Wave Lenght         1310 nm           Input Level         Max         −3.0 dBm           Level         Min         −19.9 dBm           Output Level         Max         −3.0 dBm           Level         Min         −11.5 dBm           Transmission Speed         1 Gbps           Access Method         CSMA/CD Full-Duplex           Frame Structure         IEEE802.3ab           Transmission Media         <1000BASE-T> UTP CATS           Transmission Coding         1000 BaseT: 8B1Q4 10/1	Transport Media         SIngle mode Fiber           No. of fibers used         2 (1 for In and 1 for Out)           Connector Type         SC           Data Rate         1.250 Gbps           Wave Lenght         1310 nm           Input Level         Max         −3.0 dBm         −3.0 dBm           Level         Min         −19.9 dBm         −20.0 dBm           Output Level         Max         −3.0 dBm         0.0 dBm           Level         Min         −11.5 dBm         −4.0 dBm           Transmission Speed         1 Gbps           Access Method         CSMA/CD Full-Duplex           Frame Structure         IEEE802.3ab           Transmission Media         <1000 BaseT: 8B1Q4 10/100 Base	

Specifications subject to change

ORDER NR ORDER CODE

#### **ORDERING INFORMATION**

2 Port 10/100/1000BT Line Module with Optical Rear Panel, w/o Optics	MD801029	1GEther-2Sch-F(no Opt) Opt interface
2 Port 10/100/1000BT Line Module with Electrical Rear Panel	MD801029	1GEther-2Sch-F(no Opt) Ele interface

#### **OPTICAL PLUG-INS [SFP]**

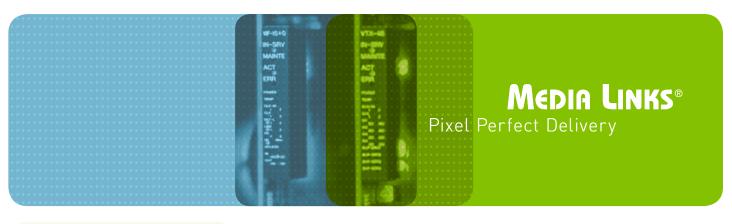
1 Gb SFP Optical Module, 1310 nm, 10 km, ROHS, Digital Diagnostics	SFP-1310-1G10
1 Gb SFP Optical Module, 1310 nm, 40 km, ROHS, Digital Diagnostics	SFP-1310-1G40
1 Gb SFP Optical Module, 1550 nm, 80 km, ROHS, Digital Diagnostics	SFP-1550-1G80
1 Gb SFP Optical Module, 1550 nm, 120 km, ROHS, Digital Diagnostics	SFP-1550-1G120

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002, USA

Phone +1 860-206-9163 Fax +1 860-206-9165 info@medialinks.com Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany Phone +49 6151-9385-0 Fax +49 6151-9385-35

info@medialinks.eu

MEDIA LINKS®



Eight Port E1/T1 Module Adapts Local E1 or T1 circuits to the Wide Area Network via the **MD8000 SW-CNT** 

#### **FUNCTIONS**

- · External interface to E1 or T1 user circuits
- · Clear Channel Transport
- · Transparent with Robust FEC
- · Hitless Path Failure Protection

#### **FEATURES**

- · 4 Independent Circuits 2x E1 or T1
- · RJ45 Connector Interface

#### **APPLICATIONS**

- · LAN Extension
- · WAN Access Circuit
- · Network Management and Telemetry
- · File Transfer

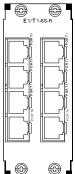
## MD8000-E1/T1-8S

## 8 Port E1/T1 Line Module

The T1/E1 module can be configured to provide either local T1 or E1 interface. 8 local interface ports are provided. The module encapsulates each pair of local transmit interfaces into Ethernet frames with or without robust Forward Error Correction (FEC) and transfers them to the MD8000 SW-CNT modules.

Additionally, the E1/T1-8S module accepts 4 Ethernet streams transferred from the SW-CNT and provides 8 E1/T1 signals to the output connectors.

The module provides uni-directional control of 8 E1/T1 services over the WAN. Two E1/T1 services are encapsulated into a single Ethernet stream in order to minimize delay and maximize bandwidth efficiency. The paired E1/T1 signals must be connected to the same destination.



FOR THE PROBLEM	FORT THE PERSON TO THE PERSON
•	<b>+</b>
E1/T1 &	S

E1/T1 8S	l
IN-SRV	l
MAINTE	l
ACT	l
ERR	l
POWER	l
TEMP	l
CLK-IN 1 2	ı
CLK	l
1 2 PKTL 1 2	l
LINE	l
1 0 2 RX	l
F E	ı
Hit Man	ı
HITLESS	l
SYNC S	l
RDI LOF	l
P-AIS AIS	l
1-AID AIS	l
	ı

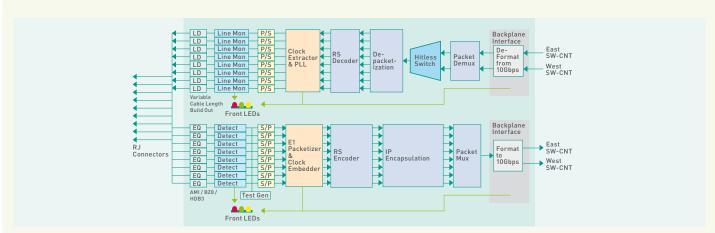
Name	Туре	Discription
PORT1~8	RJ-45	E1 or T1 signal Input/Output

#### Rear Board Connectors

Name	Condition to illuminate	
IN-SRV	Status Monitored	
MAINTE	Under Maintenance	
ACT	Normal Operation	
ERR	Board Failure Detected	
POWER	Board Power Voltage Low (Warning)	
TEMP	Board Temperature High (Warning)	
CLK-IN1/2	<ul><li>Unused</li></ul>	
CLK1/2	<ul><li>Unused</li></ul>	
PKT-L1/2	Input stream of the selected channel	
	1: Packet input from Line 1	
	2: Packet input from Line 2	
LINE1/2	SWCNT for the selected channel	
	1: SWCNT #1; 2: SWCNT #2	
RX-F/E	RX-F: Uncorrectable Error Detected	
	RX-E: Correctable Error Detected	
Hit/Man	Hit: Hitless Switching mode	
	Man: Manual Switching mode	
HITLESS	Hitless Switching can be enabled	
SYNC/LOS	SYNC: Signal synchronized	
	LOS: Loss of Signal detected	
RDI/LOF	RDI: Remote defect (RDI) detected	
	LOF: Loss of Frame detected	
P-AIS/AIS	P-AIS: Path AIS detected	
	AIS: Alarm Indication Signal detected	

Front Panel LED

# MD8000-E1/T1-8S



Blockdiagram

#### **SPECIFICATIONS**

Parameter		E1	T1
Bit Rate		2.048 Mbps ± 130 ppm	1.544 Mbps ± 200 bps
Signal Format		AMI or HDB3 line coding	AMI or B8ZS line coding
Input	Level	0.5 to 3V peak	12.6 to 17.9 dBm
	Line Build Out	0 to 199.6 m., automatic	0 to 655 ft, automatic
	Impedance	120 ohm ± 5%, balanced	100 ohm, balanced
Output	Level	2 to 3 V peak	17.5 ± 1 dB
	Pulse Waveform	CCITT (ITU) G.703	ANSI T1.102
	Line Build Out	0 to 199.6 m., automatic	0 to 655 ft, selectable
	Impedance	120 ohm ± 5%, balanced	100 ohm, balanced
Jitter Tolerance		CCITT (ITU) G.823	Bellcore TR-TSY-000499
Delay		7 ms end to end with or without FEC	7 ms end to end with or without FEC
Bandwidth		4 Mb	3 Mb
Connector		RJ-45	RJ-45

Specifications subject to change

ORDERING INFORMATION		ORDER NR	ORDER CODE
Dual Wide 8 Port bi-directional E1 (8 duplex services) - occupi	es two slots	MD801005	E1/T1-8Sch-F

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002,

Phone +1 860-206-9163 Fax +1 860-206-9165 info@medialinks.com Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany Phone +49 6151-9385-0 Fax +49 6151-9385-35

info@medialinks.eu

MEDIA LINKS®

Two Port Module Adapts
Local STM1 or OC3 circuits
to the Wide Area Network
via the MD8000 SW-CNT

#### **FUNCTIONS**

- External interface to STM1/ 0C3 user circuits
- · Optical Interface
- · Transparent with Robust FEC
- · Hitless Path Failure Protection

#### **FEATURES**

- 2 Fully Independent STM1/ 0C3 Circuits
- · Automatic Rate Negotiation

#### **APPLICATIONS**

- · Telephony Network Extension
- · Compressed Video Transport

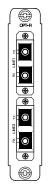
## MD8000-2STM1-L 2 Port STM1/0C3 Line Module

transported STM1/OC3 signals.

The 2 port STM1/0C3 module accepts one or two STM1/0C3 signals, encapsulates them into Ethernet frames with or without robust Forward Error Correction (FEC) and transfers them to the MD8000 SW-CNT modules.

Additionally, the 2 port STM1 module accepts Ethernet packets transferred from the SW-CNT and provides one or two unique STM1/0C3 output signals.

Two completely independent bi-directional STM1/OC3 channels ensure that data on the individual ports is kept separate, permitting operation with total isolation. Media Links Lossless Hitless fiber failover protection switching is also available for the





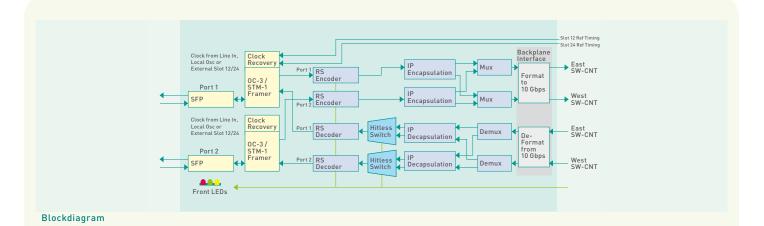
Name	Туре	Discription
LINE1 TX	SC	SDH/SONET Output 1
LINE1 RX	SC	SDH/SONET Input 1
LINE2 TX	SC	SDH/SONET Output 2
LINE2 RX	SC	SDH/SONET Input 2

Rear Board Connectors

Name	Condition to illuminate
IN-SRV	Status Monitored
MAINTE	Under Maintenance
ACT	Normal Operation
ERR	Board Failure Detected
POWER	Board Power Voltage Low (Warning)
TEMP	Board Temperature High (Warning)
CLK-IN1/2	Clock Source Present. Receiving from:
	• 1: SWCNT#1; 2: SWCNT#2
CLK1/2	<ul><li>Unused</li></ul>
PKT-L1/2	Input stream of the selected channel
	1: Packet input from Line 1
	• 2: Packet input from Line 2
LINE1/2	SWCNT for the selected channel
	• 1: SWCNT #1; 2: SWCNT #2
RS-F/E	<ul> <li>RS-F: Uncorrectable Error Detected</li> </ul>
	RS-E: Correctable Error Detected
Hit/Man	Hit: Hitless Switching mode
	Man: Manual Switching mode
HITLESS	<ul> <li>Hitless Switching can be enabled</li> </ul>
TX/RX	TX: Signal synchronized
	RX: Loss of Signal detected
LOS/LOF	LOS: Loss of Signal detected
	<ul><li>LOF: Loss of Frame detected</li></ul>
AIS-L/RDI-L	AIS-L: Path Alarm Signal detected
	<ul> <li>RDI-L: Remote Defect Indication detected</li> </ul>

Front Panel LED

# MD8000-2STM1-L



#### **SPECIFICATIONS**

Parameter			-LX (15 km)
Physical	Transport Media		Single mode Fiber
Characteristics	No. of core wires used	d	2 (1 for In and 1 for Out)
	Connector Type		SC
Optical	Data Rate		155.52 Mbps
Characteristics	Wave Length		1310 nm
	Input	Max	-3.0 dBm
	Level	Min	-19.9 dBm
	Output	Max	-3.0 dBm
	Level	Min	-11.5 dBm

Specifications subject to change

ORDERI	NG INFOR	RMATION
--------	----------	---------

Dual Port STM-1	clear	channel Line	Card	w/n Ontics

|--|

#### **ORDER CODE**

rd, w/o Optics MD801025 STM1-2Sch-F(no opt)	
---	--

#### **OPTICAL PLUG-IN [SFP]**

OC3 / STM1 SFP Transceiver Optics: 1310 nm, 15 km Optical Budget	SFP1310-155-15

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002, USA

Phone +1 860-206-9163 Fax +1 860-206-9165 info@medialinks.com Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany Phone +49 6151-9385-0 Fax +49 6151-9385-35

info@medialinks.eu

MEDIA LINKS®

Interfaces User Ethernet packets to the MD8000 Transport Network

#### **FUNCTIONS**

- · External interface to User circuits
- · Transparent or Q in Q Tunneling
- · Auto Protection Switchover <50ms

#### **FEATURES**

- VLAN Overwrite for ingress and egress streams
- · Single Mode XFP Optics
- · Supports Jumbo Frames

#### **APPLICATIONS**

- · High Speed LAN Extension
- High Performance Studio Interconnects
- Flawless Contribution Video Transport
- · Reliable Content Delivery Systems
- Integrated Live, Recorded and File-Based Communications

### MD8000-10GbE-1Sch

# 10GigE LAN Line Module



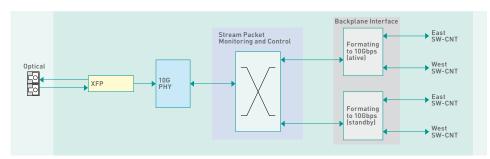
Front Card Rear Card

**The MD8000-10GbE-1Sch Line Module** is a single port high capacity service card for applications where 10 Gigabit Ethernet density is required for user side data traffic. The 10GbE Line card provides efficiency for single port ingestion into the MD8000 platform for flexible distribution across multiple network links.

**VLAN tagging with protection switching** and VLAN pass-through with static provisioning are supported for maximum flexibility in network planning. Auto-protection switching for data traffic to automatically switch between the primary and back-up path.

**VLAN Overwrite** allows the VLAN tags to be changed on ingress and egress of the 10GbE line module.

**The 10GigE LAN Line Module** accepts small form factor pluggable [XFP] optics to support optical budgets of 300 meters, 10km, 40km and 80km and DWDM networks up to 80km.



Blockdiagram

# MD8000-10GbE-1Sch

#### **SPECIFICATIONS**

Parameter			-SR (300 m)	-LR (10 km)	-ER (40 km)	-ZR (80 km)	
Physical	'		Multi mode Fiber	Single mode Fiber	Single mode Fiber		
Characteristics			2 (1 for In and 1 for Out)				
			SC				
Optical	Data Rate  Wave Length  Input Max		10.3125 Gbps				
Characteristics			840 – 860 nm	1260 – 1355 nm	1530 – 1565 nm		
			– 1.0 dBm	+0.5dBm	– 1.0 dBm	- 7.0 dBm	
	Level	Min	-9.9 dBm	– 14.4 dBm	– 15.8 dBm	-24.0 dBm	
	Output	Мах	– 1.0 dBm	+ 0.5 dBm	+ 4.0 dBm	+ 4.0 dBm	
	Level	Min	-7.3 dBm	-8.2 dBm	– 4.7 dBm	0.0 dBm	

Specifications subject to change

#### **ORDERING INFORMATION**

ORDER NR. ORDER CODE

10GigE LAN Line Module with Rear Panel w/o Optics	MD801053	MD8000-10GbE-1Sch
---	----------	-------------------

#### **OPTICAL PLUG-INS [XFP]**

10GbE XFP Optical Module, 850nm, 300m, ROHS, Digital Diagnostics	XFP-850-300
10GbE, OC-192, STM-64 XFP Optical Module, 1310nm, 10km, ROHS, Digital Diagnostics	XFP-1310-10
10GbE, OC-192, STM-64 XFP Optical Module, 1550nm, 40km, ROHS, Digital Diagnostics	XFP-1550-80
10GbE, OC-192, STM-64 XFP Optical Module, DWDM, 80km	XFP-DWDM-80-XX
XX for ITU Channel Number, ROHS, Digital Diagnostics	

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002, USA

Phone +1 860-206-9163 Fax +1 860-206-9165 info@medialinks.com Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany Phone +49 6151-9385-0 Fax +49 6151-9385-35 info@medialinks.eu

MEDIA LINKS®



#### 4 Port HD/SD/DVB-ASI Universal Video RX Module

#### **FUNCTIONS**

- External interface to HD/SD/DVB-ASI user circuit
- Internal electrical interface to MD8000 SWCNT modules

#### **FEATURES**

- · 3G-SDI/1080P
- · 3D Dual-Link Supported
- · DVB-ASI Byte or Burst mode
- · ETR290 Performance Monitoring
- Multi-format Signal Generator with ID
- · Optical or Electrical Interfaces
- · SMPTE 2022 1/2 & 5/6
- · Hitless Switching

#### **APPLICATIONS**

- · Carrier Class Media Networks
- High Performance Studio Interconnects
- Flawless Contribution
   Video Transport
- · Reliable Content Delivery Systems
- Integrated Live, Recorded and File-Based Communications

## MD8000-UVRX-2022

# 4 Port 3G HD/SD/DVB-ASI Video Module



Front Card

The MD8000-UVRX-2022 board accepts Ethernet packets transferred from the SWCNT and provides 4 unique video outputs. The 4 Ethernet streams can originate anywhere in the MD8000 network and can be 3D dual-link, 3G-SDI, HD-SDI, HD-SDI, SD-SDI, SDTI and/or DVB-ASI.

The MD8000-UVRX-2022 provides robust Forward Error Correction (FEC) and Lossless/Hitless path protection switching for extremely robust signal transport. Multiple format outputs supported simultaneously.

**DVB-ASI output signals are reconstructed** from the transparent Ethernet transport of MPEG2TS Null packets and are re-inserted within the ASI wrapper at the destination matching the original DVB-ASI input signal.

**The MD8000-UVRX-2022** provides TR101-ETR290 performance monitoring and real time analysis of each DVB-ASI stream.







Optical Rear Board Connectors

# MD8000-UVRX-2022

#### **SPECIFICATIONS**

Output	SD-SDI	Format	625i, 725P, 1080I, 1080P (50 Hz)		
	HD-SDI		525i, 725P, 1080I, 1080P (59.94 Hz)		
		Audio/ANC	Full VANC/HANC		
		Interface	SMPTE 259M, SMPTE 292M, SMPTE 424M		
	HD-SDTI/SDTI	Interface	SMPTE 305M, SMPTE 348M		
	DVB-ASI	Format MPEG2TS			
	Max. Cable Length	HD-SDI	70m		
		SDI	200m		
		DVB-ASI	100m (Belden 1694A)		
	All	Amplitude	800 mVp-p ± 10% (75 ohm Load)		
		Rise Time	0.4 – 1.5 ns (at 20% – 80% Amplitude)		
		Fall Time	0.4 – 1.5 ns (at 20% – 80% Amplitude)		
		ABS (Rise-Fall)	0.5 ns or less		
		Impedance	75 ohm, unbalanced		
		Return Loss	15 dB or more (5~270 MHz)		
			10 dB or more (742.5 MHz – 1.485 GHz)		
			> 10 dB (2.97 GHz)		
		DC offset	0.0 V ± 0.5 V		
		Jitter	Timing	0.2UI or less	
			Alignment	0.2UI or less	

Specifications subject to change

**ORDER CODE** 

#### **ORDERING INFORMATION**

Universal 4 port Video Receiver - Supports transparent HD-1080P (2 Ports), HD-SDI, SD-SDI and DVB-ASI. – Includes electrical rear connector panel	MD801055	MD8000-UVRX-2022-C
Universal 4 port Video Receiver - Supports transparent HD-1080P (2 Ports), HD-SDI, SD-SDI	MD801055	MD8000-UVRX-2022-0
and DVB-ASI. – Includes rear connector panel with four SFP cages, SFP's not included		

ORDER NR.

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002,

Röntgenstrasse 3 D-64291 Darmstadt Phone +49 6151-9385-0 Phone +1 860-206-9163 Fax +49 6151-9385-35 Fax +1 860-206-9165 info@medialinks.com info@medialinks.eu

Media Links Systems GmbH

MEDIA LINKS®



4 Port HD/SD/DVB-ASI Universal JPEG2000 RX Module

#### **FUNCTIONS**

- · JPEG2000 Decoding
- External interface to HD/SD/DVB-ASI user circuit
- Internal electrical interface to MD8000 SWCNT modules

#### **FEATURES**

- 3G-SDI/1080P
- · 3D Dual-Link Supported
- · DVB-ASI Byte or Burst mode
- · ETR290 Performance Monitoring
- Multi-format Signal Generator with ID
- · Optical or Electrical Interfaces
- · SMPTE 2022 1/2 & 5/6
- · Hitless Switching

#### **APPLICATIONS**

- · Carrier Class Media Networks
- High Performance Studio Interconnects
- Flawless Contribution
   Video Transport
- · Reliable Content Delivery Systems
- Integrated Live, Recorded and File-Based Communications

# MD8000-UVRX-J2K-2022

# 4 Port 3G HD/SD/DVB-ASI JPEG2000 Video Module



Front Card

**The MD8000-UVRX-J2K-2022 board accepts Ethernet** packets transferred from the SWCNT and provides 4 unique video outputs. The 4 Ethernet streams can originate anywhere in the MD8000 network and can be 3D dual-link, 3G-SDI, HD-SDI, SD-SDI, SDTI and/or DVB-ASI.

JPEG2000 De-Compression per the ISO/IEC 1544-1 Annex A to produce extremely high video quality at 4:2:2 10 bit JPEG2000 part 1. The Decoder will pass up to 16 uncompressed audio channels along with the V-Ancillary data and time code.

The MD8000-UVRX-J2K-2022 provides robust Forward Error Correction (FEC) and Lossless/Hitless path protection switching for extremely robust signal transport. One to four channels of 3D dual-link, 3G-SDI, HD-SDI, HD-SDI, SD-SDI, SDTI and/or DVB-ASI signals are supported in this module.

**DVB-ASI output signals** are reconstructed from the transparent Ethernet transport of MPEG2TS. Null packets and are re-inserted within the ASI wrapper at the destination matching the original DVB-ASI input signal.

**The MD8000-UVRX-J2K-2022** provides TR101-ETR290 performance monitoring and real time analysis of each DVB-ASI stream.



**Electrical Rear Board Connectors** 



Optical Rear Board Connectors

# MD8000-UVRX-J2K-2022

#### **SPECIFICATIONS**

Output	SD-SDI	Format	625i, 725P, 1080I, 1080P	(50 Hz)
HD-SDI	HD-SDI		525i, 725P, 1080I, 1080P (59.94 Hz)	
		Audio/ANC	Full VANC/HANC	
		Interface	SMPTE 259M, SMPTE 29	2M, SMPTE 424M
	HD-SDTI/SDTI	Interface	SMPTE 305M, SMPTE 34	8M
	DVB-ASI	Format	MPEG2TS	
	Max. Cable Length	HD-SDI	70m	
		SDI	200m	
		DVB-ASI	100m (Belden 1694A)	
All	All	Amplitude	800 mVp-p ± 10% (75 ohm Load)	
		Rise Time	0.4 – 1.5 ns (at 20% – 80% Amplitude)	
		Fall Time	0.4 – 1.5 ns (at 20% – 80% Amplitude)	
		ABS (Rise-Fall)	0.5 ns or less	
		Impedance	75 ohm, unbalanced	
		Return Loss	15 dB or more (5 ~270 MHz)	
			10 dB or more (742.5 MHz – 1.485 GHz)	
			> 10 dB (2.97 GHz)	
		DC offset	0.0 V ± 0.5 V	
		Jitter	Timing	0.2UI or less
			Alignment	0.2UI or less

Specifications subject to change

#### **ORDERING INFORMATION**

ORDERING INFORMATION	ORDER NR.	ORDER CODE
Universal 4 port Video Receiver - Supports transparent HD-1080P (2 Ports), HD-SDI, SD-SDI	MD801059	MD8000-UVRX-J2K-2022-C
and DVB-ASI. Supports JPEG2000 Decoding for HD-1080P, HD-SDI and SD-SDI.		
Includes electrical rear connector panel		
Universal 4 port Video Receiver - Supports transparent HD-1080P (2 Ports), HD-SDI, SD-SDI	MD801059	MD8000-UVRX-J2K-2022-0
and DVB-ASI. Supports JPEG2000 Decoding for HD-1080P, HD-SDI and SD-SDI.		
Includes rear connector panel with four SFP cages, SFP's not included		

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002, Phone +1 860-206-9163

Fax +1 860-206-9165 info@medialinks.com Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Phone +49 6151-9385-0 Fax +49 6151-9385-35 info@medialinks.eu

MEDIA LINKS®



#### 4 Port HD/SD/DVB-ASI Universal Video TX Module

#### **FUNCTIONS**

- External interface to HD/SD/DVB-ASI user circuit
- Internal electrical interface to MD8000 SWCNT modules

#### **FEATURES**

- · 3G-SDI/1080P
- · 3D Dual-Link Supported
- · DVB-ASI Byte or Burst mode
- · Auto-Sensing
- · ETR290 Performance Monitoring
- Multi-format Signal Generator with ID
- · Optical or Electrical Interfaces
- · SMPTE 2022 1/2 & 5/6
- · Hitless Switching

#### **APPLICATIONS**

- · Carrier Class Media Networks
- High Performance Studio Interconnects
- Flawless Contribution
   Video Transport
- · Reliable Content Delivery Systems
- Integrated Live, Recorded and File-Based Communications

## MD8000-UVTX-2022

# 4 Port 3G HD/SD/DVB-ASI Video Module



Front Card

**MD8000-UVTX-2022** transmitter board accepts up to four 3D dual-link, 3G-SDI, HD-SDI, HD-SDI, SDTI and/or DVB-ASI inputs. It encapsulates and distributes the signals across a non-blocking Layer 2 switch fabric, where signal replication is supported over multiple 1GbE, 10GbE and/or OC-192/48/12/3 network interfaces.

**Four Auto-Sensing inputs** are provided with one monitor output. In addition to uncompressed HD-SDI, HD-SDTI, SDI or SDTI, CBR (Constant Bit Rate) DVB-ASI signals in either Byte or Burst mode, can be accepted by the UVTX-2022 as electrical or optical inputs. Multiple format inputs supported simultaneously.

**SMPTE 425 Dual Link supported** for transport of 3D content, Level A 3D-HD-SDI and Level B 3D-3G-SDI.

**The MD8000-UVTX-2022 provides TR101-ETR290** performance monitoring and real time analysis of each DVB-ASI stream.

Hitless Switching supported for redundant path protection. Each encapsulated video service (HD/SD/DVB-ASI) can have a unique destination or multiple destinations in the network.



**Electrical Rear Board Connectors** 



Optical Rear Board Connectors

# MD8000-UVTX-2022

#### **SPECIFICATIONS**

Input	SD-SDI	Format	625i, 725P, 1080I, 1080P (50 Hz)	
HD-SDI			525i, 725P, 1080I, 1080P (59.94 Hz)	
		Audio/ANC	Full VANC/HANC	
		Interface	SMPTE 259M, SMPTE 292M, SMPTE 424M	
	HD-SDTI/SDTI	Interface	SMPTE 305M, SMPTE 348M	
	DVB-ASI	Format	MPEG2TS	
	Connectors		4x BNC Female, 4x SFP interface	
	Impedance		75 ohm, unbalanced	
	Return Loss		15 dB or more (5~270 MHz)	
	Max. Cable Length	SDI	200m	
		DVB-ASI	100m (Belden 1694A)	
Active Output	All	Amplitude	800 mVp-p ± 10% (75 ohm Load)	
		Rise Time	0.4 – 1.5 ns (at 20% – 80% Amplitude)	
		Fall Time	0.4 – 1.5 ns (at 20% – 80% Amplitude)	
		ABS (Rise-Fall)	0.5 ns or less	
		Impedance	75 ohm, unbalanced	
		Return Loss	15 dB or more (5~270 MHz)	
			10 dB or more (742.5 MHz – 1.485 GHz)	
			> 10 dB (2.97 GHz)	
		DC offset	0.0 V ± 0.5 V	
		Jitter	Timing 0.2UI or less	
			Alignment 0.2UI or less	

Specifications subject to change

**ORDER CODE** 

#### **ORDERING INFORMATION**

Universal 4 port Video Transmitter - Supports transparent HD-1080P (2 Ports), HD-SDI, SD-SDI and DVB-ASI. – Includes electrical rear connector panel	MD801054	MD8000-UVTX-2022-C
Universal 4 port Video Transmitter - Supports transparent HD-1080P (2 Ports), HD-SDI, SD-SDI	MD801054	MD8000-UVTX-2022-0
and DVB-ASI. – Includes rear connector panel with four SFP cages, SFP's not included		

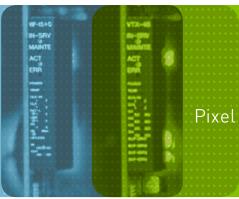
ORDER NR.

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002, USA

Phone +1 860-206-9163 Fax +1 860-206-9165 info@medialinks.com Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany Phone +49 6151-9385-0 Fax +49 6151-9385-35

info@medialinks.eu

MEDIA LINKS®



# MEDIA LINKS® Pixel Perfect Delivery

4 Port HD/SD/DVB-ASI Universal JPEG2000 TX Module

#### **FUNCTIONS**

- · JPEG2000 Encoding
- External interface to HD/SD/DVB-ASI user circuit
- Internal electrical interface to MD8000 SWCNT modules

#### **FEATURES**

- · 3G-SDI/1080P
- · 3D Dual-Link Supported
- · DVB-ASI Byte or Burst mode
- · Auto-Sensing
- · ETR290 Performance Monitoring
- Multi-format Signal Generator with ID
- · Optical or Electrical Interfaces
- · SMPTE 2022 1/2 & 5/6
- · Hitless Switching

#### **APPLICATIONS**

- · Carrier Class Media Networks
- High Performance Studio Interconnects
- Flawless Contribution
   Video Transport
- · Reliable Content Delivery Systems
- Integrated Live, Recorded and File-Based Communications

### MD8000-UVTX-J2K-2022

# 4 Port 3G HD/SD/DVB-ASI JPEG2000 Video Module



Front Card

MD8000-UVTX-J2K-2022 transmitter board accepts up to four 3D dual-link, 3G-SDI, HD-SDI, HD-SDI, SDTI and/or DVB-ASI inputs. Using JPEG2000 compression, it encapsulates and distributes the signals across a non-blocking Layer 2 switch fabric, where signal replication is supported over multiple 1GbE, 10GbE and/or OC-192/48/12/3 network interfaces.

**Four Auto-Sensing inputs** (Electrical or Optical) are provided with one monitor output. Multiple format inputs supported simultaneously.

JPEG2000 Compression per the ISO/IEC 1544-1 Annex A to produce extremely high video quality at 4:2:2 10 bit JPEG2000 part 1. The Encoder will pass up to 16 uncompressed audio channels along with the V-Ancillary data and time code.

**Compression rates for SD** from 24 Mbs to 100 Mbs, HD-SDI from 75 Mbs to 250 Mbs, 3G-SDI from 100 Mbs to 500 Mbs, 3D-HD-SDI from 150 Mbs to 500 Mbs, and 3D-3G-SDI from 200 Mbs to 1000 Mbs.

**SMPTE 425 Dual Link supported** for transport of 3D content, Level A 3D-HD-SDI and Level B 3D-3G-SDI.

**The MD8000-UVTX-J2K-2022** provides TR101-ETR290 performance monitoring and real time analysis of each DVB-ASI stream.

**Hitless Switching supported** for redundant path protection. Each encapsulated video service (HD/SD/DVB-ASI) can have a unique destination or multiple destinations in the network.





Optical Rear Board Connectors

# MD8000-UVTX-J2K-2022

#### **SPECIFICATIONS**

Input	HD-SDI	Format	625i, 725P, 1080I, 1080P (50 Hz)	
SD-SDI		525i, 725P, 1080I, 1080P (59.94 Hz)		
		Audio/ANC	Full VANC / HANC	
		Interface	SMPTE 259M, SMPTE 292M, SMPTE 424M	
	HD-SDTI/SDTI	Interface	SMPTE 305M, SMPTE 348M	
	DVB-ASI	Format	MPEG2TS	
	Connectors		4x BNC Female, 4x SFP interface	
	Impedance		75 ohm, unbalanced	
	Return Loss		15 dB or more (5~270 MHz)	
	Max. Cable Length	SDI	200m	
		DVB-ASI	100m (Belden 1694A)	
Active Output All	All	Amplitude	800 mVp-p $\pm$ 10% (75 ohm Load)	
		Rise Time	0.4 – 1.5 ns (at 20% – 80% Amplitude)	
		Fall Time	0.4 – 1.5 ns (at 20% – 80% Amplitude)	
		ABS (Rise-Fall)	0.5 ns or less	
		Impedance	75 ohm, unbalanced	
		Return Loss	15 dB or more (5~270 MHz)	
			10 dB or more (742.5 MHz – 1.485 GHz)	
			> 10 dB (2.97 GHz)	
	DC offset	0.0 V ± 0.5 V		
		Jitter	Timing 0.2UI or less	
			Alignment 0.2UI or less	

Specifications subject to change

**ORDER CODE** 

#### **ORDERING INFORMATION**

Universal 4 port Video Transmitter - Supports transparent HD-1080P (2 Ports), HD-SDI, SD-SDI	MD801058	MD8000-UVTX-J2K-2022-C
and DVB-ASI. Supports JPEG2000 Encoding for HD-1080P, HD-SDI and SD-SDI.		
Includes electrical rear connector panel		
Universal 4 port Video Transmitter - Supports transparent HD-1080P (2 Ports), HD-SDI, SD-SDI	MD801058	MD8000-UVTX-J2K-2022-0
and DVB-ASI. Supports JPEG2000 Encoding for HD-1080P, HD-SDI and SD-SDI.		
Includes rear connector panel with four SFP cages, SFP's not included		

ORDER NR.

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002, USA Phone +1 860-206-9163

Fax +1 860-206-9165 info@medialinks.com

Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany Phone +49 6151-9385-0 Fax +49 6151-9385-35 info@medialinks.eu

MEDIA LINKS®



# MEDIA LINKS®

#### Stream processing

#### **FUNCTIONS**

- · Transport high-bit-rate stream over low-bit-rate trunk interfaces (link aggregation)
- · Up to 4 circuits can be bundled into one virtual circuit for stream transportation
- · Transport of up to 16 streams over up to 4 separate networks
- · Efficiently use given bandwidths with stream-by-stream priority control

#### **FEATURES**

- · Transportation modes tunneling, Q-in-Q and overwrite supported
- · Distribution algorithms round robin and priority order supported
- · Transmit or Receive capability

#### **APPLICATIONS**

- · Carrier Class Media Networks
- · High Performance Studio Interconnects
- · Flawless Contribution Video Transport
- · Reliable Content Delivery Systems
- · Integrated Live, Recorded and File-Based Communications

### MD8000-SPU-BULK

## Chokai **Bulk Module**



Front Card

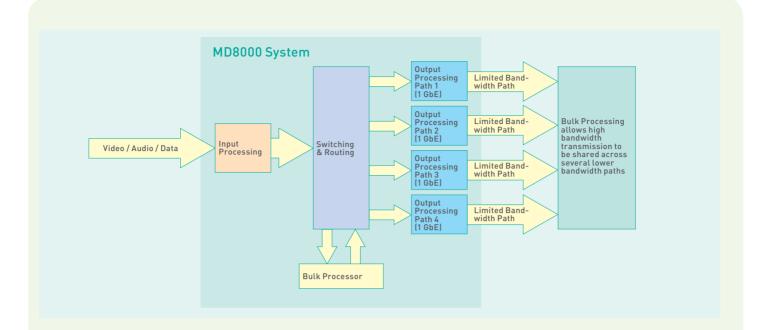
In some cases the end to end network may not provide the functionality to provide the robust service end to end and an intermediate stream processor is required. MD8000 "Chokai" series cards will allow addition of various functions to IP packets transported by the MD8000 system while working in an intermediate layer between the Line and Trunk cards.

MD8000-SPU-BULK provides functionality to transport high bitrate streams over multiple low bandwidth trunk interfaces. Service feeds are divided to up to 4 trunk network links to enable to MD8000 to send the services over low bandwidth networks. The divided services are bundled to virtual circuits in the source device and enable the destination device to reconstruct the original services of the incoming circuits (link aggregation).

The MD8000-SPU-BULK board supports two distribution algorithms, which are Round robin and Priority order. The Round robin algorithm evenly uses all paths. Since the load is spread over all the paths, high speed transportation of large volume file data will be efficiently performed. The Priority order algorithm uses paths in the order of their priority. This algorithm also allows flexible network operations such as application dependent path selection or preferential use of a high speed circuit.

The MD8000-SPU-BULK board can Bulk transport up to 16 filtered streams over up to 4 separate network paths (lines).

## MD8000-SPU-BULK



#### **SPECIFICATIONS**

Front Board	Dimensions	H: 113 mm W: 17 mm D: 367 mm	
	Weight	0.6 kg or less	
Power consumption		25 VA or less	
In/Out interfaces		Interfaces with MD8000 series BUS and SWCNT Boards	
Max no. filtered Input streams		Up to 16	
Max no. of Bulk paths (Bulk trunk lines)		Up to 4	
Total transportation capacity		Up to 10 Gbps	
Support network layers		Layer2 or Layer3 (ARP/GARP)	
Flow-in capacity		10 Gbps für input and reception	
Flow-out capacity		10 Gbps for output and transmission	
Distribution algorithms		Round robin: Use all paths evenly	
		Priority order: Use paths in order of priority	
Transportation modes		Tunneling: RTP-encapsulation	
		Header translation (Q-in-Q): VLAN Tag nesting	
		Header translation (Overwrite): VLAN ID modification	
Redundancy modes		Singe / Class B / Class C / Class_J	

Specifications subject to change

**ORDER CODE** 

#### ORDERING INFORMATION ORDER NR.

Chokai Stream Bulk Module	MD804002-G000	MD8000-CHP-BULK

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002,

Phone +1 860-206-9163 Fax +1 860-206-9165 info@medialinks.com Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany

Phone +49 6151-9385-0 Fax +49 6151-9385-35 info@medialinks.eu MEDIA LINKS®



# MEDIA LINKS®

#### **Stream Replication**

#### **FUNCTIONS**

- · Replication and Hitless switching
- · Hitless protection of any service inside MD8000 system
- · Up to 16 streams replicated to 32 streams or 32 streams switched to 16 streams
- · Ethernet Layer2 / Layer3 compatible

#### **FEATURES**

- · Stream Replication & Switching
- · Transmit or Receive Stream Selection
- · Transmit or Receive Stream Error Check
- · Link Modes
- · Tunneling Mode
- · Header Translation Mode
- · IP Host setting

#### **APPLICATIONS**

- · Carrier Class Media Networks
- · High Performance Studio Interconnects
- · Flawless Contribution Video Transport
- · Reliable Content Delivery Systems
- · Integrated Live, Recorded and File-Based Communications

## MD8000-SPU-HITLESS

# Chokai **Replication Module**



Front Card

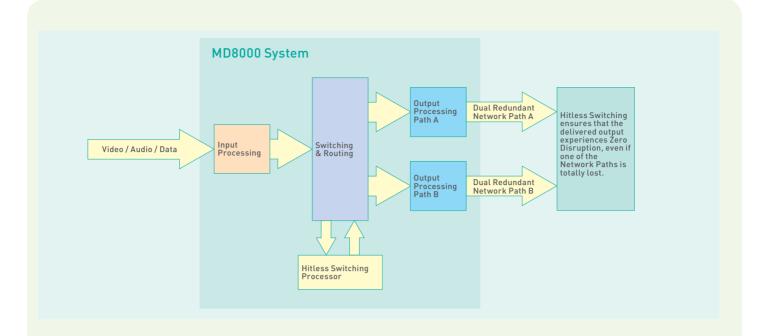
In some cases the end to end network may not provide the functionality to provide the robust service end to end and an intermediate stream processor is required. MD8000 "Chokai" series cards will allow addition of various functions to IP packets transported by the MD8000 system while working in an intermediate layer between the Line and Trunk cards.

MD8000-SPU-HITLESS provides a packet-level hitless switching function to any types of signal streams handled by the MD8000 series systems by taking an incoming unicast stream at any point in an MD8000 network and replicating it to the network.

By the replication of unprotected streams these are brought to a hitless protected level with the Chokai replication module.

The Chokai replication module is capable of protecting up to 16 streams replicating them to 32 streams (16 redundant pairs) on the network.

## MD8000-SPU-HITLESS



#### **SPECIFICATIONS**

Front Board	Dimensions	H: 113 mm W: 17 mm D: 367 mm	
	Weight	0.6 kg or less	
Power consumption		25 VA or less	
In/Out interfaces		Interfaces with MD8000 series BUS and SWCNT Boards	
Max no. Input streams to enable for Packet-level Hitless-Switching		Up to 16	
Max no. of duplicate streams		Up to 32 (16 x 2)	
Max no. of output streams		Up to 16	
Support network layers		Layer2 or Layer3 (ARP/GARP)	
Flow-in capacity		10 Gbps für input and reception	
Flow-out capacity		10 Gbps for output and transmission	
Redundancy modes		Singe / Class B / Class C / Class_J	

Specifications subject to change

#### ORDERING INFORMATION ORDER NR. ORDER CODE

Chokai Stream Bulk Module	MD804001-G000	MD8000-SPU-HITLESS

Media Links, INC 1294 Blue Hills Avenue, Bloomfield, CT 06002,

Phone +1 860-206-9163 Fax +1 860-206-9165 info@medialinks.com Media Links Systems GmbH Röntgenstrasse 3 D-64291 Darmstadt Germany Phone +49 6151-9385-0

Phone +49 6151-9385-0 Fax +49 6151-9385-35 info@medialinks.eu MEDIA LINKS®

# MD8000 BLOCK DIAGRAMS

## **TRUNK BOARDS:**

<u> 10GbE</u>	> T01

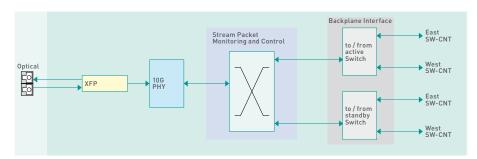
## **LINE BOARDS:**

EINE BOARDS.	
VIF	> L01
VTX-4S	> L02
VRX-4S	> L03
AIF-2S	> L05
AIF-4S	> L06
FE-4S	> L07
2GbE	> L08
E1/T1-8S	> L09
2STM1-L	> L10
10GbF-1Sch	> L11

# 10GigE LAN TRUNK MODULE

## MD8000-10GbE

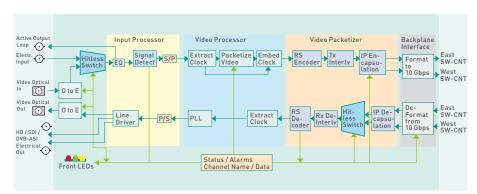
> T01



#### HD/SD/DVB-ASI VIDEO MODULE

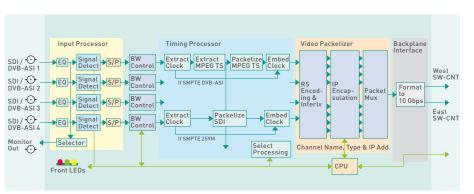
## **MD8000-VIF**

> L01



# 4 PORT SD/SDTI/DVB-ASI VIDEO MODULE

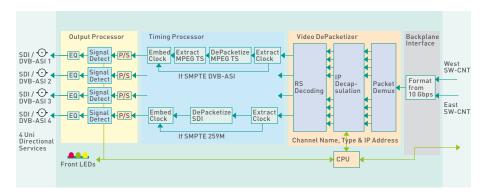
## MD8000-VTX-4S



#### 4 PORT SD/SDTI/DVB-ASI VIDEO MODULE

## MD8000-VRX-4S

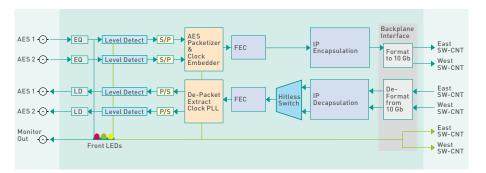
> L03



# 4 PORT / 2 SERVICES AES AUDIO MODULE

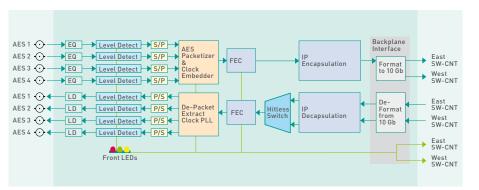
### MD8000-AIF-2S

> L05



# 8 PORT / 4 SERVICES AES AUDIO MODULE

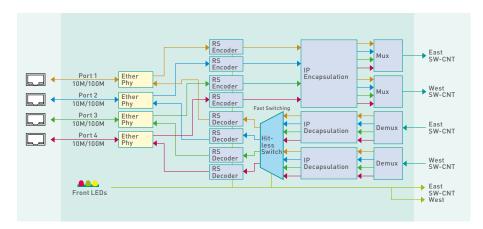
## MD8000-AIF-4S



#### 4 PORT 10/100 BaseT FAST ETHERNET MODULE

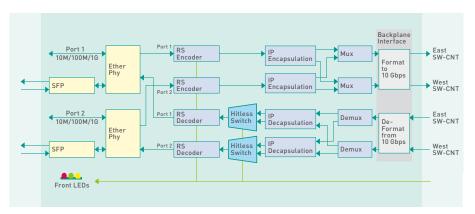
## MD8000-FE-4S

> L07



#### \_2 PORT 10 / 100 / 1000 BaseT ETHERNET LINE MODULE

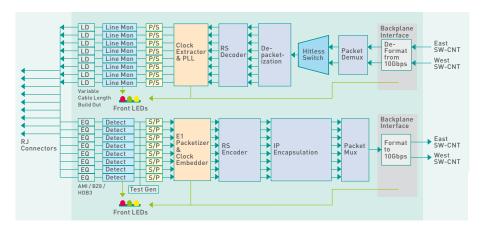
## MD8000-2GbE



#### 8 PORT E1/T1 LINE MODULE

## MD8000-E1/T1-8S

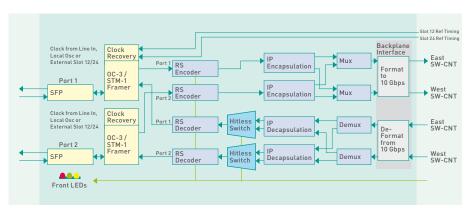
> L09



#### 2 PORT STM-1/OC-3 LINE MODULE

## MD8000-2STM1-L

> L10



#### 10 GIGE LAN LINE MODULE

## MD8000-10GbE-1Sch

