ProStream® 9100

HIGH-DENSITY STREAM PROCESSOR



The latest evolution of Harmonic's market-leading ProStream® stream processing platform, the high-density ProStream 9100 is an ideal solution for multiplexing, scrambling, descrambling and statistical multiplexing of SD and HD MPEG video.

The compact 1-RU system delivers the flexibility to support any-to-any remultiplexing, DVB-ASI and AES scrambling, digital turnaround, linear ad splicing — and a wide variety of video processing applications. By adding the optional high-performance ACE® transcoding card, the ProStream 9100 also supports complex transcoding applications for the delivery of both broadcast and next-generation multiscreen services.

ProStream 9100 includes five rear panel slots for supporting DVB-ASI and IP (Gigabit Ethernet) I/O cards, as well as 8VSB input, in any combination. Two IP 100Base-T Ethernet interfaces are available for connection to conditional access systems (CAS), as well as to the management network. Through the CAS IP interface, the ProStream 9100 communicates with entitlement control message generators (ECMGs) and entitlement management message generators (EMMGs) for exchange of control words, ECMs and EMMs.

High Performance, Highly Versatile

With its ultrahigh-density architecture, the ProStream 9100 dramatically reduces the amount of rack space required to meet growing processing requirements. System flexibility and workflow versatility are achieved with modular audio/video processing modules and high-capacity IP processing cards. Low power consumption, high reliability and simplified serviceability result in a best-in-class, multiformat platform that offers superior video quality and reduces OPEX.

High-performance data throughput is a cornerstone function of the ProStream 9100. The platform's enhanced GbE I/O modules deliver up to 2 Gb of IP throughput for the multiplexing, scrambling and descrambling of up to 500 transport streams and services. Ideal applications for the ProStream 9100 include:

- ASI and IP DVB-CSA and IPTV AES scrambling
- Bulk descrambling
- IP networking of broadcast video
- ASI and IP mirroring
- ASI, IP and 8VSB remultiplexing of any service from any input to any output
- MPEG-2 transport stream over RTP/UDP for IP output
- Digital program insertion for splicing and local ad insertion
- Flextream IP statmux control
- DVB-EIT/PSIP table regeneration
- Slate insertion for service disruption message
- Emergency Alert System (EAS) compliance

HIGHLIGHTS

- Compact, modular 1-RU chassis with five IOM slots
- IP and DVB-ASI I/O, 8VSB input
- Multiplexing and scrambling of up to 500 simultaneous SD and HD broadcast services
- Flextream IP statistical multiplexing with remote distributed encoders
- Linear ad splicing into MPEG-2, MPEG-4 AVC and HEVC SD/HD video streams
- Advanced remultiplexing
- DVB and AES scrambling algorithms
- Dual power supplies
- Controlled via NMX Digital Service Manager and stand-alone web GUI

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Marketing Benefits

Digital Turnaround

With standard IP, DVB-ASI and 8VSB input and output interfaces, the ProStream 9100 processor is easily incorporated into existing headend environments and supports any digital turnaround architecture. The platform's robust, extensible and highly scalable design supports diverse MPEG remultiplexing functions, including PID remapping, prioritizing and filtering, insertion and generation of PSI/SI tables, and PID multicast. Device, port, socket and service redundancy are supported, as well as multiple IP sockets for MPTS and SPTS applications. The compact platform not only reduces rack space and power requirements, but also simplifies network infrastructure while delivering a high-availability solution.

Linear Ad Splicing

Linear ad splicing, or digital program insertion, on ProStream 9100 enables the frame-accurate insertion of local and regional ads directly into live-to-air MPEG-2, MPEG-4 AVC and HEVC SD/HD transport streams. With this capability, broadcasters and service providers can increase average revenue per user by offering their advertisers the ability to reach differentiated viewers with targeted ads.

Ad splicing is a licensed feature for ProStream 9100 systems outfitted with a quad GbE I/O card. The powerful capability enables broadcasters to implement advanced advertising capabilities without needing to purchase a stand-alone, box-level splicing solution, saving them money while simultaneously opening up new revenue streams. In addition, by eliminating the need to decode signals to insert ads, workflows are optimized and video quality is maintained at the highest possible level.

Conditional Access

The ProStream 9100 processor's industry-leading SimulCrypt Synchronizer (SCS) core supports DVB SimulCrypt versions 1, 2 and 3, and allows for the simultaneous connection of up to 30 different CAS. The platform also supports AES encryption technologies for scrambling and descrambling applications.

Fully integrated with all leading CAS vendors and compliant with widely implemented industry protocols, ProStream scrambling technology is known in the industry for its stability and high performance. The ProStream 9100 platform can scramble any format of video, audio and data elementary streams (e.g., MPEG-2, MPEG-4 AVC, HEVC, AC-3, AAC, HE-AAC), as well as multiplex MPEG TS. The solution easily integrates into existing architectures, and reduces cost and complexity by eliminating the need for multiple devices in distributed cable, satellite or telecom networks.

Statistical Multiplexing

Harmonic's Flextream™ IP (formerly DiviTrackIP™) option integrates statistical multiplexing and IP switching by connecting ProStream 9100 units with remote Harmonic Electra™ encoders across a LAN or WAN, allowing any ProStream in the network to efficiently manage the encoders' statmux pools. Support is available for up to 100 statmux services per platform, with configuration limits of 64 services per statmux pool, 14 pools per platform, and three pools within a single transport stream. The ProStream 9100 also supports regional statmux capability for the terrestrial market, allowing a single encoder to be part of multiple Flextream IP pools. This capability answers the need to encode and generate regionalized TS's with both common (shared) national and unique regional channels, and reduces the number of encoders required to support regionalized feeds and eliminates unneccessary national common program duplication.

IP Distribution

As major cable and telco MSOs migrate to centralized content aggregation, the ProStream 9100 platform offers a reliable solution for MPEG distribution over IP. The system supports bulk scrambling and descrambling, and enables secured content distribution by acting as the scrambler at the central headend and the edge descrambler at remote headends.

Technical Benefits

High-Throughput IP Processing

The ProStream 9100 offers the choice of either dual or quad GbE input. The latter option provides an input line rate of 4 Gb and up to 2 Gb of high throughput processing, supporting up to 500 simultaneous multiplexing and scrambling services. Two integrated 10-GbE interfaces reduce the number of router ports required and enable a simplified IP addressing scheme. Separate modules are available for ASI and 8VSB input.

Flexible Multiplexing

A complete range of IP, ASI and 8VSB remultiplexing functionality is supported by the ProStream 9100 processor, including DVB-EIT and PSIP table regeneration, PCR generation, transport stream and port mirroring, and PID prioritization.

High Reliability, Simplified Serviceability

Maintenance on the ProStream 9100 platform is simplified with hot-swappable fan assemblies and dual redundant power supplies. Changing of processors and I/O modules is also quick and easy. These thoughtful serviceability features improve system reliability and reduce the chance for down time — increasing the ability to generate revenue.

"Pay As You Grow" Scalability

As processing needs evolve, the ProStream 9100 platform makes it easy to incrementally add or upgrade I/O modules and firmware licenses, simplifying scalability and extending the system's value.

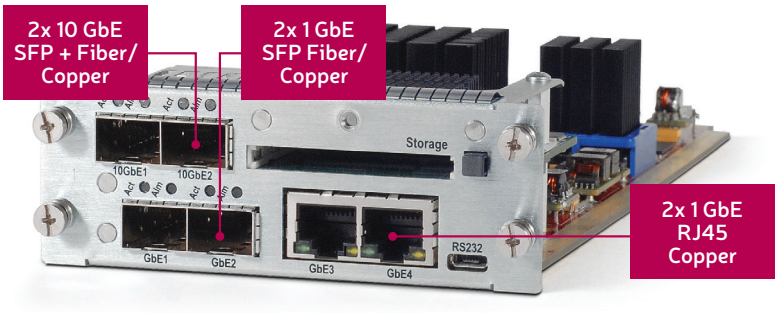
Control and Management

Processing on the ProStream 9100 is easily configured and controlled with Harmonic's NMX™ Digital Service Manager video management system, a service-oriented solution for mass configuring, monitoring and automated redundancy in centralized or distributed architectures. ProStream 9100 also features an intuitive and user-friendly web-based GUI.

World-Class Service and Support

Harmonic stands behind the ProStream 9100 stream processor — and all of its products — with comprehensive service and support programs, including system design, service deployment, technical support and network maintenance. World-class service plans and a global network of flexible and responsive support professionals help ensure your ability to deliver outstanding "anytime, anywhere, any-device" customer experiences.

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The optional Quad GbE I/O module in ProStream 9100 delivers up to 2 Gb of IP throughput.

SPECIFICATIONS

DUAL GBE I/O CARD

Type	IEEE 802.3z
IP Ports	Two independent
Connectors	Two 1 GbE SFP (multi mode, single mode, copper)
I/O Speed	1,000 Mbps per port
IP Encapsulation	MPEG TS over UDP/IP/MAC/RTP/HRTP 1 to 7 TS/IP
MPEG Format	188 B per TS
MPEG Transport Streams	MPTS and SPTS
I/O Processing	250 sockets 500 Mbps per card
Maximum Bitrate per Socket	140 Mbps
Addressing	Multicast, unicast
Management	IGMPv1, IGMPv2, IGMPv3, ARP, ICMP
Forward Error Correction	SMPTE 2021-1 and SMPTE 2021-2

QUAD GBE I/O CARD

Type	IEEE 802.3z
IP Ports	Four independent
Connectors	Two 1-GbE SFP (multi mode, single mode, copper) Two 1-GbE RJ45 One 10-GbE SFP+
I/O Speed	1,000 Mbps line rate input per port
IP Encapsulation	MPEG TS over UDP/IP/MAC 1 to 7 TS/IP
MPEG Format	188 B per TS
MPEG Transport Streams	MPTS and SPTS
I/O Processing	500 sockets Up to 2 Gb per card
Maximum Bitrate per Socket	300 Mbps
Addressing	Multicast
Management	IGMPv1, IGMPv2, IGMPv3, ARP, ICMP

DVB-ASI I/O CARD

Type	ASI input/output
Connectors	Four BNC, 75 Ω
I/O Direction	Configurable, input or output, per port
MPEG Format	188/204 B per TS
I/O Processing	One MPTS/SPTS per port Up to 210 Mbps per input port Up to 187 Mbps per output port
ASI I/O Ports	4-20 (each card has four ports)

8VSB INPUT CARD

Type	8VSB for ATSC reception
Connectors	Four F, 75 Ω
I/O Direction	Input
MPEG Format	188 B per TS
I/O Processing	One MPTS per port Up to 19.39 Mbps per port
8VSB Input Ports	Four per card (up to four cards)
Tuner Channels	2-59
Packet Error Rate Threshold	0-12,892 packets per second
Signal Quality Threshold	0.0-27.0 dB

MANAGEMENT INTERFACES

Ethernet	1000Base-TX
Connectors	Two RJ45 (1 management, 1 CAS)

SCRAMBLING

SCS	Internal
Standards	DVB common scrambling Open CAS DVB SimulCrypt v1 and v2 AES-CBC, AES-NSA2 scrambling algorithms AES descrambling Fix Key scrambling and descrambling Selective encryption for VOD
CAS connections	Simultaneous connections to 30 different CA systems
BISS Encryption	Mode 1
Number of ECMs	700 ECMs per platform

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SPECIFICATIONS

REMULTIPLEXING

Routing	Any input to any output
PID	Remapping, filtering, multicasting
PID Multicasting	Any input PID can be multicasted to multiple TS outputs with different remapping and processing (different CW, if scrambled)
PSI/SI, PSIP	Extraction, injection, spooling, regeneration
Output Mirroring	Any to any (ASI/IP to ASI/IP)
Advanced Stream Processing	Intelligent service substitution, PID prioritization, PCR generation, PID range

REDUNDANCY

Device	1:1 N:1 N:M Under NMX or stand-alone GUI management
Internal	Service Any-to-any input TS I/O port IP port mirroring TS output mirroring
Triggers	ETR290

SYSTEM MANAGEMENT

NMX™ Digital Service Manager
Stand-alone web user interface

POWER

Power Supply	Optional dual supplies
Input Voltage Range	85-264 VAC 42-60 VDC
Line Frequency	47-63 Hz
Power Consumption	Up to 200 W

PHYSICAL

Dimensions (W x H x D)	19 in x 1.75 in x 27 in (1 RU) 48.26 cm x 4.45 cm x 68.69 cm
Weight	32 lbs/14.5 kg

ENVIRONMENTAL

Cooling	Eight fans, temperature controlled air flow front to right side
Operating Temperature	+32° to +122° F 0° to +50° C
Storage Temperature	-4° to + 176° F -20° to +80° C
Operating Humidity	<95% non-condensing
Electromagnetic Compliance	FCC Part 15 Class A CE Mark (EN 55022 Class A and EN 50082-1:1997)
Safety	UL 1950 and cUL C22.2#950 EN 60950 Directive 2011/65/EU RoHS2

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