

ProStream® 1000

STREAM PROCESSING PLATFORM FOR MULTIPLEXING AND SCRAMBLING



Designed to address the increasing demand for advanced video and audio services, Harmonic's award-winning ProStream® 1000 stream processing platform is an ideal solution for multiplexing, scrambling, re-encoding and statistical multiplexing of MPEG stream.

The ProStream 1000 is a modular 1-RU system with five rear panel slots which can be populated with ASI or IP (Gigabit Ethernet) cards. With its standard IP and DVB-ASI input and output interfaces, the ProStream 1000 can be easily incorporated in any existing headend environment and support any digital turnaround architecture. The ProStream 1000's robust, extensible and highly scalable design supports MPEG remultiplexing functionality, including PID remapping, prioritizing and filtering, insertion and generation of PSI/SI tables, PID multicast and port, socket and service redundancy as well multiple IP sockets containing MPTS and SPTS. This configuration not only reduces rack space and power requirements, but also simplifies network infrastructure while delivering a high-availability solution.

Three IP 100Base-T Ethernet interfaces are available for connection to the conditional access system (CAS) as well as to the management and control network. Through the CAS IP interface the ProStream 1000 communicates with the ECMGs and EMMGs for exchange of control words, ECMs and EMMs.

Conditional Access

The ProStream's industry-leading SimulCrypt Synchronizer core (SCS) supports DVB SimulCrypt versions 1, 2 and 3, and allows for the simultaneous connection of up to 30 different CAS from different vendors. The ProStream 1000 also supports AES encryption technologies for scrambling and de-scrambling applications.

Fully integrated with all leading CAS vendors and compliant with widely implemented industry protocols, the ProStream 1000 scrambling technology is known in the industry for its stability, and high performance.

The ProStream 1000 IP and ASI scrambling technology is designed to multiplex, re-encode SD MPEG-2 and scramble any format of video, audio and data elementary streams (e.g. MPEG-2, MPEG-4 AVC, AC-3, AAC, AACPlus). The solution easily integrates into existing or new architectures, and reduces cost and complexity by eliminating the need for multiple devices or software-based IP scrambling solutions in distributed cable, satellite or telecom networks.

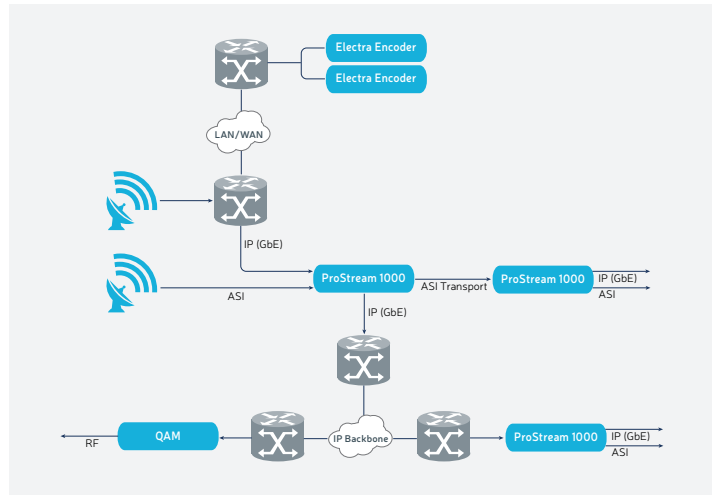
Statistical Multiplexing

A DiviTrackIP™ engine enable the ProStream 1000 to support statistic multiplexing over LAN and WAN networks, including support for up to 64 services per statistically multiplexed pool and support for up to 16 pools per platform and three pools within a single transport stream.

By employing the VBR re-encoding technology, the "statmux in a box" DiviTrackMX™ engine enables the ProStream 1000 to increase bandwidth efficiency with minimum effect on video quality.

HIGHLIGHTS

- Compact, modular 1-RU system with 5 I/O slots
- Up to 2 Gigabit Ethernet (GbE) I/O modules, 2 independent GbE ports per module
- Up to 5 ASI I/O modules, 4 ASI ports per card
- ASI/IP scrambling and mirroring
- Integrated scrambling technology, the fifth generation of Harmonic's scrambling solution based on 14 years of expertise
- DVB and AES scrambling algorithm
- Internal EIS for SCG configuration
- ASI and IP remultiplexing of any service from any input to any output
- MPEG-2 TS or RTP/UDP over IP output
- Controlled via NMX Digital Service Manager™ and standalone web interface
- Forward error correction
- Slate insertion for service disruption message
- MPEG-2 SD re-encoding
- Digital program insertion for splicing and local ad insertion
- Statistical multiplexing
- Deterministic remultiplexing for distribution and local program replacement in DVB-T SFN distribution
- DVB-EIT/PSIP table regeneration



Standard Configuration

IP Distribution

As major cable and telco MSOs migrate to centralized content aggregation, the ProStream 1000 offers a solution for MPEG distribution over IP. The ProStream 1000 supports bulk scrambling and de-scrambling and enables secured content distribution by acting as the scrambler at the central headend and the edge descrambler at remote headends.

Controlled by Harmonic's distribution management system DMS, the ProStream 1000 enables blackout switching applications for different sites and zones.

SFN Distribution

Unequaled performance and highly accurate bit-rate control enable the ProStream 1000 to distribute MPEG traffic for single frequency networks (SFN) from one central headend, over an IP network, to multiple remote DBT-T SFN headends.

The ProStream 1000 utilizes unique deterministic SFN remultiplexing (DSR) technology for dramatic reduction of distribution network bandwidth with regional program replacement in DVB-T SFN broadcast. By using the DSR, the local regional programs are synchronously included in the SFN multiplex at each transmitting site, avoiding the need for full multiplex regional retransmission.

Management

Through a local management interface Harmonic's NMX Digital Service Manager™ controls the primary and backup ProStream units in a redundant architecture. Together with NMX, the ProStream supports 1:1, N:1 and N:M redundancy schemes.

Stand Alone GUI

ProStream 1000 is controlled via intuitive and user friendly GUI. The GUI is HTML-based and supported by Microsoft Internet Explorer.

Benefits

- Multi-functional stream processing – The operator can use the ProStream 1000 for a variety of stream processing manipulations such as multiplexing, scrambling, digital encoding and statistical multiplexing over IP networks.
- Flexibility – All IP and ASI conversion options are natively supported, and the system delivers outstanding multiplexing and scrambling performance.
- Support for all-IP infrastructure – The ProStream platform's native IP interface seamlessly integrates into scalable, low-cost IP networks.
- Network management – Harmonic's NMX Digital Service Manager simplifies mass configuring, monitoring and automated redundancy in both centralized and distributed architectures.

Applications

- DVB scrambling
- IPTV scrambling
- IP networking of broadcast video
- Advanced remultiplexing
- Digital turnaround
- Centralized and remote statistical multiplexing

SPECIFICATIONS

GIGABIT ETHERNET CARD

Type	Gigabit Ethernet 802.3z
IP Ports	2 independent ports
Connector	2 x SFP (Multi Mode, Single Mode, Copper)
I/O Speed	1 x 1000 Mbps per port
IP Encapsulation	MPEG TS over UDP/IP/MAC 1 to 7 TS/ IP
MPEG Format	188 B per TS
MPEG TS	MPTS and SPTS
I/O Processing	Up to 128 Sockets. Up to 520 Mbps per card
Maximum bit-rate per socket	80 Mbps
Addressing	Unicast and Multicast
Management	IGMPv1, IGMPv2, IGMPv3, ARP, ICMP
Forward Error Correction	SMPTE 2021-1 and SMPTE 2021-2

ASI IO CARD

Type	ASI Input/ Output
Connector	4 x BNC, 75Ω
I/O Direction	Configurable, Input or Output, per port
MPEG Format	188/204 B per TS
I/O Processing	1 MPTS/SPTS per port. Up to 180Mbps per port
ASI I/O Ports	4 to 20 (Each ASI card has 4 ports)

MANAGEMENT INTERFACES

Ethernet	100BaseTX
Connector	3 * RJ-45 (1 Management, 1 CAS and 1 not used)

REMULTIPLEXING

Routing	Any Input to Any Output
Redundancy	1:1, N:M, HHP Input Service Redundancy Socket Redundancy IP Port Redundancy
PID	Re-mapping, Filtering, Multicasting
PID Multicasting	Any Input PID can be multicasting to multiple TS outputs with different remapping and processing (different CW if scrambled)
PSI/SI, PSIP	Extraction, Injection, Spooling
Output Mirroring	Any to any (ASI/IP to ASI/IP)
Advanced Stream Processing	Intelligent Service Substitution, PID Prioritization, PCR Generation, PID range

COMPLIANCE/REGULATORY

Emission	EN55022/CISPR 22 Class A EN61000-3-2:1995 = A1:1997 + A2:1998 EN61000-3-3:1995 FCC 47 CFR part 15 Class A
Immunity (Radiation)	EN50082-1:1997 EN55024
UL/ ES (Electrical Safety)	EMC compliant to EU directive 89/336/EEC and 47 DFR part 15, subpart B Safety compliant to low voltage directive 72/23/EEC and 50083-1 standard EN 60950 (EC) UL 60950 (USA/ Canada)
RHOS	DIRECTIVE 2002/95/EC

RE-ENCODING

Re-Encoding	Full Decoding and Encoding Up to 64 MPEG-2 SD services
Video Re-Encoding (CBR/VBR) 4:2:0	MPEG-2 MP@ML
Aspect Ratios	4:3 and 16:9
SD Resolution and Frame Rates	625 Lines (PAL) – 50Hz 720 X 576 @ 25Hz 704 X 576 @ 25Hz 544 X 576 @ 25Hz 528 X 576 @ 25Hz 480 X 576 @ 25Hz 352 X 576 @ 25Hz
	525 Lines (NTSC) – 60Hz 720 X 480 @ 29.97Hz 704 X 480 @ 29.97Hz 544 X 480 @ 29.97Hz 528 X 480 @ 29.97Hz 480 X 480 @ 29.97Hz 352 X 480 @ 29.97Hz
IP Encapsulation	Audio pass-thru and synchronization with processed video streams (lip sync)
VBI and Data PIDs	VBI and Data PIDs pass-thru
Video Input Bit-rate SD MPEG-2	0.5 Mbps – 15 Mbps
VBR Video Output Bit-rate (DiviTrackMX) SD	0.5 Mbps – 15 Mbps
Video Output Bit-rate (CBR) SD MPEG-2	1 Mbps – 15 Mbps

SCRAMBLING

SCS	Internal
Standards	DVB Common Scrambling Open CAS DVB Simulcrypt Version 3. Stream Server Divicom 1.4 AES-CBC, AES-NSA2 Scrambling algorithms
CAS connections	Simultaneous connections to 30 different Conditional Access Systems from different CA vendors
Number of ECMs	900 ECMs per platform

MANAGEMENT

NMS	Control Harmonic NMX Digital Service Manager
Stand Alone GUI	Web browser

POWER/PHYSICAL

Input Voltage	85-264 VAC -48 VDC
Line frequency	47-63 Hz
Cooling	Inhale: Front Exhale/ Exhaust: Right
Power Consumption	110W – 220W
Rack Space	1-RU
Dimensions (W x H x D)	19 in x 1.75 in x 24 in 48.26 cm x 4.45 cm x 60.69 cm

ENVIRONMENTAL

Operating Temperature	32° to 113° F / 0° to 45° C
Storage Temperature	-40° to +158° F / -40° to 70° C
Relative Humidity	0 to 95% non-condensing
Operating Altitude	Up to 15,000 feet (4,572 meters)
Storage Altitude	Up to 40,000 feet (12,192 meters)