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.
**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**
Unequalled 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**: 1B 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, N, 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**: ENS5022/CISPR 22 Class A
  EN61000-3-3:1995
  FCC 47 CFR part 15 Class A
- **Immunity (Radiation)**: ENS50082-1:1997
  ENS50024
- **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

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**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
    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)