The Harmonic ProStream® X video stream processor and gateway leverages advances in IT infrastructure to provide best-in-class, high-performance stream processing for mission-critical broadcast, cable, satellite, IPTV and OTT delivery applications.

As the successor to the market-leading ProStream 9100 stream processor, the software-based ProStream X system allows users to leverage the versatility and agility of software-based infrastructure. The platform integrates 10-Gbps throughput with a variety of advanced video processing applications, including multiplexing, splicing, blackout switching and DVB CSA3 encryption. ProStream X also serves as a high-throughput video gateway featuring socket address flipping and ASI-to-IP conversion.

ProStream X runs on a 1-RU COTS Intel® server and pairs with the Harmonic Electra™ X2 advanced media processor to deliver a compact solution for encoding and distributing superior-quality IP and ASI video streams. This high-density architecture reduces the amount of rack space required to meet fluctuating stream processing requirements, helping operators reduce CAPEX and OPEX. High reliability and simplified serviceability result in an all-in-one-box experience for high-throughput stream processing at low TCO.

SD, HD and UHD formats, and MPEG-2, MPEG-4 AVC and HEVC codecs are all supported on ProStream X. A software-only version, ProStream XVM, is available for environments featuring the Electra XVM virtualized media processor.

Business Benefits

Scrambling
ProStream X integrates with major conditional access systems (CAS) and is the first stream processor to offer 128-bit DVB CSA3 encryption support, integrated and certified by Cisco and Irdeto, making it the most secure stream processing solution for distributing UHD broadcast services. DVB CSA2, AES and BISS fixed key scrambling are also supported, as well as trick mode for video on demand.

ProStream scrambling technology is known in the industry for its stability and high performance. The ProStream X platform can scramble any format of video, audio and data elementary stream (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 Flexstream™ IP (formerly DiviTrackIP™) option integrates statistical multiplexing and IP switching by connecting ProStream X systems with remote Harmonic Electra X2 encoders across a LAN or WAN, allowing any ProStream X in the network to efficiently manage the encoders’ statmux pools. ProStream X also supports regional statmux capability for the terrestrial market, allowing a single encoding instance to be part of multiple Flexstream IP pools. This capability answers the need to encode and generate regionalized TS’s with both common (shared) national and unique regional channels. The use of the regional statmux feature reduces the number of encoders required to support regionalized feeds and eliminates unnecessary national common program duplication.
Splicing
ProStream X supports both live-to-live and live-to-file splicing. Live-to-live splicing allows ProStream X to switch between main and alternative live feeds seamlessly, with no ETR 290 errors at output. In statmux applications that include switchover to an alternate program, the alternate program becomes part of the statmux VBR pool. Live-to-file splicing allows ProStream X to seamlessly insert a file, such as an advertisement, into a live feed. In statmux applications that include switchover to a file, ProStream X keeps the statmux pool complete and error free.

Digital Turnaround
With standard IP and DVB input and output interfaces, the ProStream X processor is easily incorporated into existing headend environments and supports multiple digital turnaround applications. The platform’s robust, extensible and highly scalable design supports MPEG remultiplexing, 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.

“Pay As You Grow” Scalability
As processing needs evolve, the ProStream X platform makes it easy to incrementally add or upgrade I/O modules and firmware licenses, simplifying scalability and extending the system’s value.

Technical Benefits
High-Throughput Video Processing
ProStream X offers the choice of quad 1-GbE, dual 10-GbE or ASI I/O. The high-throughput 10-GbE option supports up to 1,000 transport streams and 2,000 simultaneous multiplexing and scrambling services. Video gateway capabilities include socket address flipping, ASI-to-IP conversion and IP mirroring. The dual 10-GbE interfaces also reduce the number of required router ports and enable a simplified IP addressing scheme.

High Reliability, Simplified Serviceability
Maintenance on the ProStream X platform is simplified with hot-swappable fan assemblies and dual redundant power supplies. Changing of processors and I/O modules is quick and easy. These thoughtful serviceability features improve system reliability and reduce the chance for downtime, increasing the opportunity to generate revenue.

Control and Management
Processing on the ProStream X 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. An intuitive and user-friendly web-based GUI is also available.

World-Class Service and Support
Harmonic stands behind the ProStream X system 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.

ProStream X: The Heart of the Headend

[Diagram showing ProStream X integrating with other components like CAS, Electra X, Real-Time Encoders, Ad Server, Stream processing, IP gateway, Statistical multiplexing, Multiplexing, Scrambling, Splicing, Blackout switching]
SPECIFICATIONS

10-GBE IP I/O

Type: IEEE 802.3z
IP Ports: Four independent
Connectors: Four 1-GbE ports, RJ45 on board
PCI option card for two 10-GBE ports SFP (up to two cards per platform)
I/O Speed: Up to 10 Gbps
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: 1,000 sockets
Up to 10 Gb per platform (configuration dependent)
Maximum Bitrate per Socket: 300 Mbps
Addressing: Multicast
Management: IGMPv2/v3

ASI I/O

Type: ASI input/output
ASI Ports: Eight ports per card, up to two cards per platform
Connectors: Eight mini-DIN ports
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 213 Mbps per input or output

MANAGEMENT INTERFACES

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

SCRAMBLING

SCS: Internal
Standards: DVB common scrambling
Open CAS
DVB-CSA2, DVB-CSA3, AES-CBC, AES-NSA2 scrambling
AES descrambling
Fix Key scrambling and descrambling
CAS connections: Simultaneous connections to 30 different CA systems
BISS Encryption: Mode 1
Number of ECMs: 2,000 ECMs per platform

STATMUX CONTROL

Codes Supported: MPEG-2, MPEG-4 AVC, HEVC
Formats Supported: SD, HD, UHD, interlaced, progressive
Frame Rates Supported: PAL, NTSC

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: Extraction, injection, spooling, regeneration
Output Mirroring: Any to any
Advanced Stream Processing: Live-to-live splicing, live-to-file splicing, PID range

REDUNDANCY

Device: 1
Under NMX or stand-alone GUI management
Internal: Any-to-any input TS
TS output mirroring
Triggers: ETR 290

SYSTEM MANAGEMENT

NMX™ Digital Service Manager 7.6.2 or later
Stand-alone web user interface

PHYSICAL

Dimensions (W x H x D): 17.28 in x 1.7 in x 28 in (1 RU)
43.9 cm x 4.32 cm x 71.12 cm
Weight: 28.7 lbs/13 kg

POWER

Power Supplies: Dual redundant
Voltage: 90-132 V
180-264 V
Line Frequency: 47-63 Hz

ENVIRONMENTAL

Cooling: Six fans, hot-swappable
Operating Temperature:
ASHRAE Class A2: +50° to +95°F
+10° to +35°C
Continuous operation with max rate of change: 10°C/hr
Includes operation up to 40°F for up to 900 hrs/yr
Includes operation up to 45°C for up to 90 hrs/yr
ASHRAE Class A3
ASHRAE Class A4
Storage Temperature:
-40° to +158°F
-40° to +70°C
Safety Compliance:
UL60950-1/CSA 60950 (USA/Canada)
EN60950 (Europe)
IEC60950 (International)
CB Certificate & Report, IEC60950
CE-Low Voltage Directive 2006/95/EC (Europe)
AS/NZS 3548 Emissions (Australia/New Zealand)
BSMI CNS 13438 Emissions (Taiwan)
KC Certification (Korea)

Electromagnetic Compliance (Class A):
FCC /ICES-003 - Emissions (USA/Canada) Verification
CISPR 22 - Emissions (International)
CISPR 24 - Immunity (International)
EN55022 - Emissions (Europe)
EN55024 - Immunity (Europe)
CE-EMC Directive 2004/108 EC (Europe)
A5/NZS 3548 Emissions (Australia/New Zealand)
BSMI CNS 13438 Emissions (Taiwan)
KC Certification (Korea)
## ORDERING INFORMATION

### PLATFORM

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>PRM-X-21-AC-FF</td>
<td>ProStream X G2 stream processing platform with AC dual PSU</td>
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<tr>
<td>PRM-X-21-DC-FF</td>
<td>ProStream X G2 stream processing platform with DC dual PSU</td>
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<tr>
<td>PRM-X-DUAL-10GBE</td>
<td>ProStream X G2 stream processing platform with dual-port 10-Gbe optical NIC with SFP+</td>
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<tr>
<td>PRM-X-OCTO-ASI</td>
<td>ProStream X optional ASI card, with up to eight ASI I/O ports</td>
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<td>FW-PRM-X-BASE</td>
<td>ProStream X base license</td>
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<tr>
<td>FW-PRM-X-LAB</td>
<td>ProStream X firmware license for lab license</td>
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<tr>
<td>FW-PRM-X-DEMO</td>
<td>ProStream X firmware license for all functions for 90-day demo usage, for none commercial use only</td>
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<tr>
<td>FW-PRM-X-SPARE</td>
<td>ProStream X cold spare firmware license for all ProStream functions, 30 days, one per chassis</td>
</tr>
<tr>
<td>FW-PRM-X-DEVICE-REDUNDANCY</td>
<td>ProStream X stand-alone device redundancy firmware license, one per chassis required</td>
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### SCRAMBLING

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<tr>
<td>FW-PRM-X-DVB-CSAv3-CW</td>
<td>ProStream X DVB CSA3 scrambling firmware license, one per service required</td>
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<tr>
<td>FW-PRM-X-DVB-CW</td>
<td>ProStream X DVB SCR firmware license, one per service required</td>
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<tr>
<td>FW-PRM-X-BISS-FIX-SRV</td>
<td>ProStream X BISS fixed key firmware license, one per service required</td>
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<tr>
<td>FW-PRM-X-AES-CW</td>
<td>ProStream X AES SCR firmware license, one per service required</td>
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<tr>
<td>FW-PRM-X-SCR-FIX-SRV</td>
<td>ProStream X fixed key firmware license, one per service required</td>
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<tr>
<td>FW-PRM-X-SELC-SCR</td>
<td>ProStream X Selective Encryption firmware license, one per service required</td>
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<tr>
<td>FW-PRM-X-SELC-EHP</td>
<td>ProStream X Encryption Hacking Prevention scrambling firmware license, one per service required</td>
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### MULTIPLEXING

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<tbody>
<tr>
<td>FW-PRM-X-DT-POOL</td>
<td>ProStream X firmware license for statmux control; one Flexstream IP (DiviTrackIP) license per pool</td>
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<tr>
<td>FW-PRM-X-SLATE-SRV</td>
<td>ProStream X firmware license for Slate Insertion; one per service required</td>
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<tr>
<td>FW-PRM-X-EAS-SRV</td>
<td>ProStream X firmware license for Emergency Alert System; one per service required</td>
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<tr>
<td>FW-PRM-X-FEC-TS</td>
<td>ProStream X FEC firmware license; one per transport stream required</td>
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<tr>
<td>FW-PRM-X-DT-REGIONAL-SRV</td>
<td>ProStream X firmware license for sharing common services between regional statmux pools; license is per one duplicate of the common services</td>
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<tr>
<td>FW-PRM-X-ESAM</td>
<td>ProStream X ESAM interface firmware license, one per service required</td>
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### HIGH THROUGHPUT

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<th>Part Number</th>
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<tr>
<td>FW-PRM-X-2G-GATEWAY</td>
<td>ProStream X 2-Gbps throughput firmware license</td>
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### SPLICING

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<tbody>
<tr>
<td>FW-PRM-X-SRV-SUB</td>
<td>ProStream X Splicing Service Substitution firmware license, one per service required</td>
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