Datasheet

Selenio Network Processor

IP Media Processing Platform

Selenio™ Network Processor (SNP) is the industry's first fully network-attached media processing platform, supporting uncompressed HD and UHD, based on SMPTE ST 2110. This high-density, scalable platform enables media companies to perform video processing and conversion functions on standards-based IP networks using the SMPTE ST 2022-6 and ST 2110 standards.

SNP performs essential functions for any HD or UHD production or playout facility – SDI or IP based — including video format conversion, audio shuffling and management, HD/UHD up-down conversion, and High Dynamic Range (HDR) conversion and adjustment. SNP also provides a full-featured Production Multiviewer personality with HDR-aware pips onto UHD-resolution, HDR-capable displays.

SNP is optimized for UHD production in IP infrastructures with redundant 100-Gigabit data connections capable of delivering eight uncompressed UHD signals in each direction — improving overall efficiency and power-consumption, while preserving picture quality and system latency.

Paired with commercial of-the-shelf (COTS) Ethernet routing cores from typical IP vendors, SNP implements the core functions of an IP-based routing system, providing critical synchronizing and integration of signals into the production environment, ensuring interoperability with other ST2110 standards-compliant equipment.

Ideal for fast-paced mobile live production, SNP contains four integral processing blocks, each of which can be assigned a separate application depending on today's production requirements – serving one day as a multiviewer and a different day as extra utility converters, for example.

The multipurpose nature and quick-configuration capabilities of the SNP significantly reduces the amount of equipment required and enables production companies to respond to the specific needs of the current job, and then quickly reconfigure through software-based presets to tackle each day's assignments.

SMPTE ST 2110 AMWA Networked Media. Working. NMOS Ultra HD HDR

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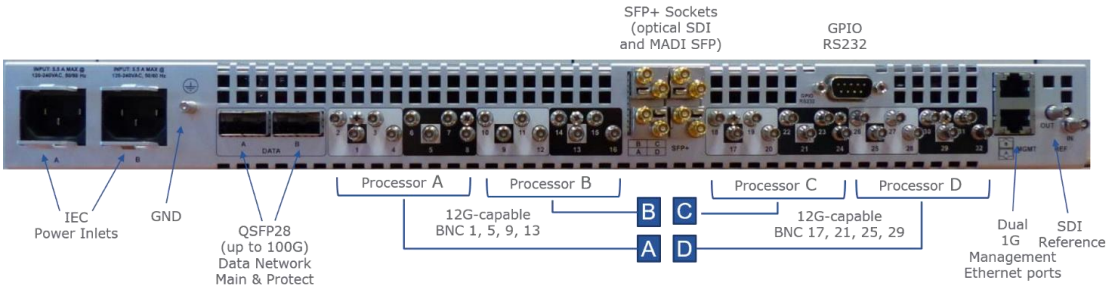
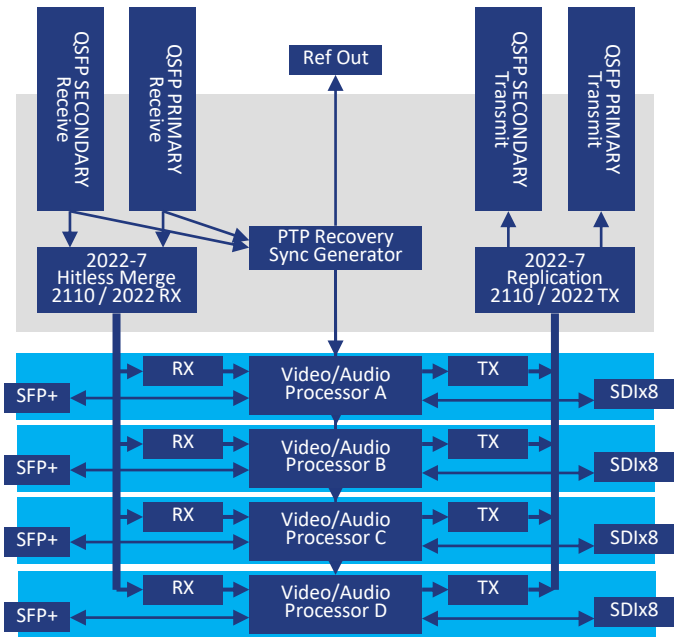
SNP Internal Architecture

Ideal for fast-paced mobile/live production, SNP features four internal processing blocks, each of which can be assigned a separate application depending on the day's needs.



Along with powerful, IP-enabled video processing, SNP's application personalities offer all the capabilities required in today's complex production environments, including audio processing, color parametric controls and HD/1080p/UHD up-, down- and cross-conversion, as well as SDR/HDR adaptations and conversions required for integrating UHD and HD signals.

For SDR/HDR conversion applications, SNP supports SDR-709, SDR-2020, HLG, PQ, and SLOG3, including custom setting adjustments for artistic or director intent. The SDR/HDR processing includes outputting multiple versions for simultaneous distribution of the same content on multiple distribution platforms with differing requirements.



Advanced Audio Workflow Tools

In addition to complex video format conversions and HDR conversions, SNP also hosts a suite of advanced audio workflow tools. Audio can come into SNP through embedded audio on SDI, or through MADI, or through AES67/2110-30/2110-31 streams – up to 512 audio streams per SNP, with each stream capable of up to 16 channels of audio.

Audio signals can be groomed and shuffled for each program, and delay-tracked to the associated video signals for proper lip-sync with video. SNP also includes audio DSP cores and supports advanced upmix and downmix algorithms including a dynamically adaptive up/down mixer; loudness management algorithms, and more.

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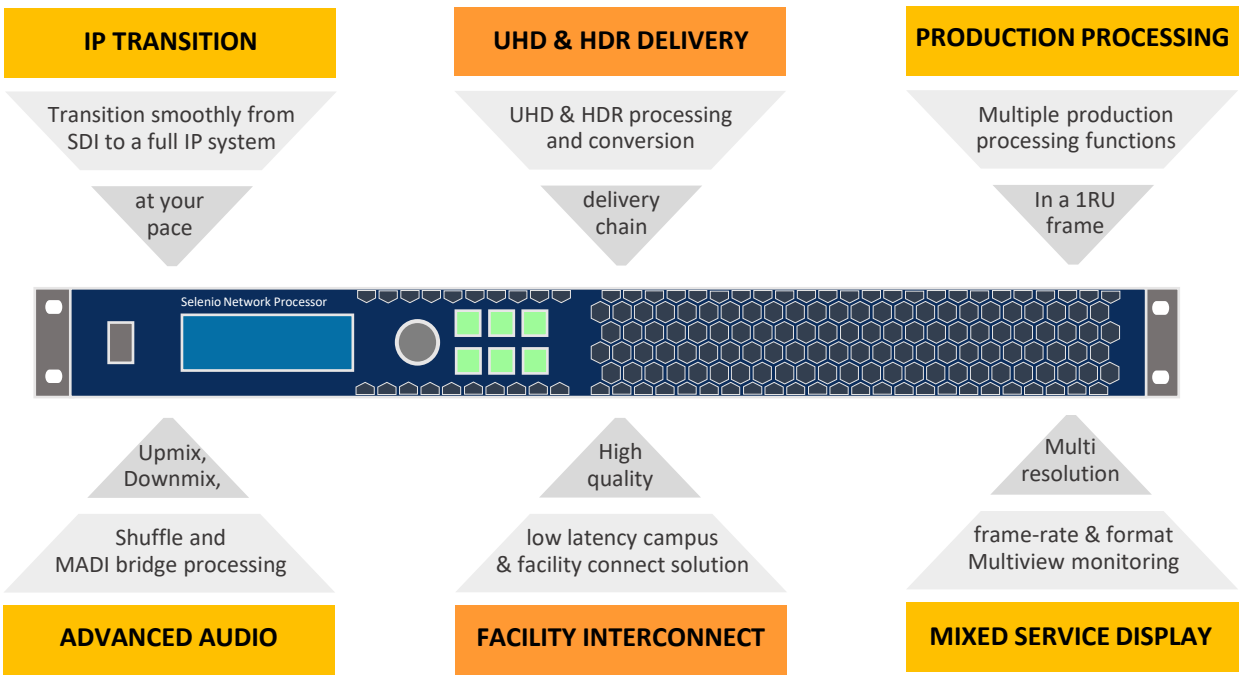
SNP APPLICATIONS

IP Gateways & Processors for IP-enabled Routing Systems (SDI Transitioning to IP)

SNP enables customers to build scalable, ST 2110 standards-based IP production and playout systems – meeting today's requirements and tomorrow's opportunities, while also integrating with existing systems and workflows through ST 2022-6 and SDI.

Many media companies are embarking on transformational changes, upgrading their SDI facilities to an IP interconnected architecture, with the benefits of shared equipment: economy, agility, flexibility and UHD/HDR readiness. Changing the entire facility to an IP-based technology infrastructure is no trivial matter – but Imagine brings the experience and the features to enable successful projects.

SNP is fully integrated with the Magellan™ Control System -- allowing media organizations to create a single logical routing system by consolidating existing SDI routers and equipment into a hybrid SDI/IP environment -- a cost-effective, self-paced transition to a full IP facility. As legacy equipment reaches its natural replacement cycle, any SNP units used as IP Gateways can be redeployed for other processing and multiviewer tasks with feature key upgrades.



SNP APPLICATIONS

UHD & HDR Conversion, Integration, Processing, and Delivery

SNP builds on Imagine's deep roots in the video processing and conversion industry – our processors powered the transition from SD to HD, and SNP continues that legacy into Ultra High-Definition (UHD) and High Dynamic Range (HDR), supporting single-stream ST 2110 UHD and 12G SDI.

The bulk of new consumer displays in the market today support UHD and HDR. The challenge is the processing, manipulation, and delivery of these UHD and HDR signals over the various stages of the broadcast delivery chain, as well as maintaining a flexible, expandable workflow that adapts to changing production requirements. The powerful SNP conversion personalities allow integration of legacy content, archive, and local HD footage into UHD/HDR productions, while also producing HD "downconverts" to satisfy the HD distribution even while transitioning to UHD.

SNP is optimized for UHD production at scale while minimizing space and power. Redundant 100-Gigabit data connections support 8x UHD each direction and integrate seamlessly with both 100G- and 400G-backbone switches. SNP's UHD and HDR conversion features have been trusted in major world sports events for several years, while preserving picture quality and creative intent through all combinations of HD, 1080P, and UHD resolution across SDR, HLG, PQ, and Slog3 systems – turning the signal you have into the signals you need.

Imagine leads the way with UHD and HDR over SMPTE ST 2110 -- the flexible approach. SNP and ST 2110 support today's and tomorrow's requirements, including UHD, HDR, and even 8k. SNP also supports 12G SDI electrical and optical interfaces, covering all the bases of UHD interoperability.

Flexible, "Soft-Modular" Production Signal Processing on a Common Multi-Functional Platform

In today's broadcast workflows, content is shot and delivered in more resolutions, frame rates and formats than ever before. Modern workflows now carry HD, 1080P, and UHD, in Standard Dynamic Range (SDR) and High Dynamic Range (HDR), creating a new level of color space and frame rate complexity and possible conversion needs. Often, live event requirements are not really finalized until the day of show.

Each compact SNP reduces operational complexity – by packing multiple processing functions into a single 1RU package with a shared 100G network connection. The specific processing personalities of each processing zone within an SNP can be changed for each production day, based on the needs of different events and applications.

SNP is a cost-effective, full-featured video and audio processor & synchronizer with the capability to ingest any common video format, SDI, 2022-6, or 2110, and transform it into any other – with full uncompressed picture quality and ultra-low latency.

For video format conversions, each 1RU processor can typically handle conversions of:

- up to 8 HD/UHD services -- 12G or 4-Wire 2SI/SQD, or IP, or mixed
- or up to 16 SD/HD/1080p services, over SDI or IP or mixed.

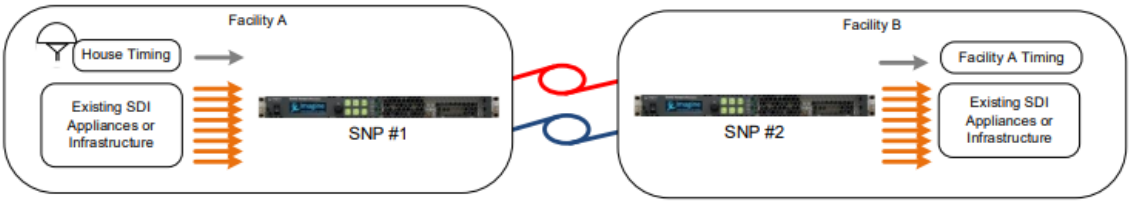
SNP APPLICATIONS

Facility Interconnection

Connecting campuses and facilities for a variety of workflows is a common networking challenge for broadcasters with studios on multiple floors / buildings, universities and houses of worship with multiple locations, and sports / entertainment venues. The rich variety of 100G optical components, and interoperability with fiber transport platforms at 100G tilt the balance away from traditional one-SDI-per-fiber approaches.

Some applications are utilizing existing "dark fiber" for interconnection, and the SNP platform's COTS optics approach allows choosing the right launch power and receiver sensitivity depending on the link conditions. Other projects may require conservation of paid-for bandwidth on public carrier networks — driving a need for production-grade compression to fit within the carrier offering. SNP rises to these multisite delivery challenges -- delivering high-quality, low-latency video, audio and metadata between campuses with a JPEG-XS solution that is powerful, simple, and easy to operate.

SNP is a powerful SDI-IP Gateway, providing basic uncompressed transport or advanced JPEG-XS transport at scale, synchronizing into the destination facility at each end. Within each 1RU platform SNP provides 32 1080p paths or 8 UHD paths, via dual 100G VLAN-tagged IP network interfaces – integrated into hitless redundant dark fiber spans, or into hitless-redundant carrier-provided networks.



Production Multiviewer -- Mixed Service Display and Monitoring

Each SNP production multiviewer (SNP-MV) processing section supports up to nine input signals at 1080p, 1080i, or 720p resolution. A smaller number of UHD input signals is also supported. The input signals can be received over IP using ST 2110 or ST 2022-6 or can be delivered to the SNP-MV over SDI.

Each input signal is scaled to the desired size and formatted into one of the two UHD-resolution display outputs — accompanied by tally lamps, borders, UMD text boxes, and other on-screen adornments. The input signal can also be mapped from its original color system (SDR-709, SDR-2020, or HDR) into the target display color system, including HDR and wide color gamut (WCG).

SNP-MV displays are always rendered at UHD resolution and can be rendered in SDR or HDR (HLG, PQ, or Slog3) color systems. A reduced-resolution copy in 1080p or 1080i is also created, and this copy can be mapped to the SDR-709 system even as the main display is in HDR.

The SNP-MV multiviewer is cost effective and feature competitive solution that can scale well with strong density and advanced feature sets.

SELENIO NETWORK PROCESSOR (SNP) FEATURES SUMMARY

ST 2110-20 Video up to UHD resolution
ST 2110-30 PCM Audio up to 16 channels per stream
ST 2110-31 AES3 Transparent Transport, compatible with PCM and Non-PCM signals
ST 2110-40 VANC Data streaming including advanced filtering into 4 output streams per program
ST 2022-6 SDI over IP as an alternative video/audio/ANC input or output format
ST 2022-7 seamless protection switching of IP streams - for both 2110 and 2022-6
ST 2022-8 compliant timing of ST 2022-6 streams in ST 2110 systems
NMOS IS-04 registration and IS-05 device connection management support, integrated with many controllers
UHD over single ST 2110-20 streams proven compatible with UHD cameras and switchers from major vendors
UHD over 12G-SDI or Quad-link SDI (2SI and SQD)
HD/3G and UHD clean and quiet switching of IP streams through make-before-break technique
IP to SDI mode up to 32 paths in parallel for SD, HD and 1080p
SDI to IP mode up to 32 paths in parallel for SD, HD, and 1080p
IP to IP mode – for in-network signal processing and fully-reentrant multiviewer applications.
Frame synchronization to PTP with adjustable output phasing and delay on each program
Video proc amp, frame delay, and color correction in non-linear and linear/optical domains
Audio proc amp and delay adjustment on a per-mono-channel basis
4 independent processing blocks for various operations (synchronization, conversion, multiviewing, JPEG XS)
HD/3G/UHD up/down/cross conversion (licensed options)
HD Downsampled Proxy (a separate 1080i or 1080p ST 2110-20 stream) for each UHD signal (licensed option)
SDR/HDR (HLG, PQ, S-Log3) conversion, math-based, but also supporting 33-point cube LUT (licensed opt)
MADI Audio inputs and outputs (via optional MADI SFPs) (licensed option)
Audio embedding and de-embedding with full shuffle, between SDI, ST 2022-6, and ST 2110
Flexible channel support of audio IP streams – up to 16 streams per channel, up to 16 streams per program
Basic frame rate conversion (add/drop frame) in Conversion personality
Vertical and Horizontal bandwidth (Sharpness) controls in conversion applications
On screen display (text overlay) per-program for labeling in multi-channel setup environments
System Preset save/recall/import/export to a text-based file format
Black Burst (BB) output generated, synchronized to system PTP timing
Dual QSFP28 Ethernet supporting 100GbE, can integrate with 400G systems using DR/FR optics approach
32 HD-BNC (8 are 12G capable) connectors for SDI I/O
I/O Expansion via SFP (MADI, 3G coaxial and optical)
Redundant power supplies in single assembly or hot-swappable independent units
Front-serviceable main processing board and power supply
Secure https REST API for integration with major control systems

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INPUT SPECIFICATIONS 12G/3G/HD-SDI

Number of Inputs	32 (bi-directional port shared with output) (8 are 12G-capable)
Connector Type	HD-BNC
Standard	12G: SMPTE ST 2082-1 and Amendment 1 to SMPTE ST 2082-1 3G: SMPTE 424M (1080p50/59.94) HD: SMPTE 292M (1.485, 1.485/1.001 Gb/s)
Impedance	75Ω
Signal Level	800 mV ± 10%
Equalization	12G: Adaptive cable equalization for >164ft (50m) typical, of Belden 1694A coaxial cable 3G: Adaptive cable equalization for >426ft (130m) typical, of Belden 1694A coaxial cable HD: Adaptive cable equalization for >590ft (180m) typical, of Belden 1694A coaxial cable

OUTPUT SPECIFICATIONS 12G/3G/HD-SDI

Number of Outputs	Up to 32 (bi-directional port shared with input) (8 are 12G- capable)
Connector Type	(High-Density) HD-BNC
Standard	12G: SMPTE ST 2082-1 and Amendment 1 to SMPTE ST 2082-1 3G: SMPTE 424M (1080p50/59.94) HD: SMPTE 292M (1.485, 1.485/1.001 Gb/s)
Impedance	75Ω
Signal Level	800 mV ± 10%
DC Offset	0.0V ± 0.5 V
Rise and Fall Time	12G: <45 ps (20% to 80%) 3G: <135 ps (20% to 80%) HD: <270 ps (20% to 80%)
Overshoot	< 10% of amplitude (all outputs terminated)
Jitter	Timing jitter: 12G: <8 UI peak to peak 3G: <2 UI peak to peak HD: <1 UI peak to peak Alignment jitter: 12G: <0.3 UI peak to peak 3G: <0.3 UI peak to peak HD: <0.2 UI peak to peak

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INPUT / OUTPUT SPECIFICATIONS

QSFP28 (Media Network Interfaces) SPECIFICATIONS	
Standard	SFF-8665 and SFF-8636. Electrically compliant with IEEE802.3bm chip-to-module 100 Gb/s four-lane Attachment Unit Interface (CAUI-4) standard.
Connector	2x hot pluggable QSFP28 MSA form factor (targeted for 100 Gigabit Ethernet)
Voltage	3.3V
Power consumption	<4.5W typical. Individual per type used
Case operating temperature	0°C to 70°C range
SFP (BASEBAND I/O EXPANSION) SPECIFICATIONS	
Standard	SFF-8431 and SFF-8432
Connector Quad Cage	hot pluggable SFP+ non-MSA form factor
Voltage	3.3V
Power consumption	<2W per device. Individual per type used
Case operating temperature	Individual per type used range
MANAGEMENT CONTROL	
Number of Connectors	2
Connector Type	RJ-45 Type 10/100/1000 Base-T Ethernet as defined by IEEE 802.3-2008 Note: Shielded (screened) Ethernet cable (CAT6A) should be used. LACP Bonding is supported for resiliency of the management network connection.
ENVIRONMENTAL	
Temperature	The operating temperature of the SNP is 32°F to 86°F (0°C to 30°C) with relative humidity of 10% to 90% non-condensing. The non-operating temperature is -20 to 70 degrees C.
DIMENSIONS	Note: SNP requires at least 2.5 in. (6.3 cm) of space behind the unit for cooling and cabling. Rear rail-extension supports and a cable lacing bar are provided.
Height:	1RU or 1.75 in.
Width:	17.5 in. (44.45 cm) without ears, 19 in. (48.3 cm) with ears for rack mounting
Depth:	23 3/8 in. (59.4 cm) from front rail to back of box (including connectors but not cables) No more than 1.5 inches from front rail to absolute front of installed unit (including screws and pushbuttons)
POWER CONSUMPTION	Two independent, load-sharing power supplies. Two IEC C14 power inlets, one for each power supply.
Input voltage	100 to 240 VAC Operating range
Frequency	50 to 60 Hz Operating 47 to 63 Hz
Inrush current	At 264 VAC, at 25°C cold start, 15Apk typical
Efficiency	Typical 93% @230VAC
Power factor	At 240 VAC, full load, typical 0.98
Harmonic distortion	Complies with the requirements of EN61000-3-2
Power consumption	<350 watts total, as measured across both AC mains cords
Maximum input current	4.5 A per input
Heat dissipation	367 W worst-case

ORDERING INFORMATION

HARDWARE ORDERING INFORMATION	
SNP-PLATFORM-4A	SNP Platform Base – Hardware REV A – 4 Application Processors, Central. ST2110/2022-6/2022-7 Interface. Requires additional Software keys (SNP-PSX-xxx) for any functionality. Redundant, Hot-Swappable Power Supplies.
SNP-PLATFORM-2AU	SNP Platform BASE – Hardware REV A – 2 Application Processors, can be upgraded to 4. Central ST2110/2022-6/2022-7 Interface. Requires additional Software keys (SNP-PSX-xxx) for any functionality. Redundant, Hot-Swappable Power Supplies.
SNP-PLAT-UPG-2A4A	SNP Platform upgrade key - adds 2 Application Processors to an existing SNP-PLATFORM-2AU
SNP-PLATFORM-4XL	SNP Platform BASE - HW Rev A - XL package with 64X HDBNC I/O - 4 application processors, central ST2110 IP interfaces. Includes operating software suitable for installation and configuration. Requires additional Software keys (SNP-PSX-xxx) for additional functionality. Redundant, Hot-Swappable Power Supplies.
SNP-HW-SSD64GU	SNP Hardware Upgrade Kit - 64 Gbyte SSD (replaces existing drive inside unit). Kit includes preformatted 64G Solid State Drive and installation instructions.
SNP-HW-MCLPNL	SNP Hardware Control Panel (Desktop) for Master Control Lite (MCL) personality
100G QSFP PART NUMBERS	
OP+QSFP+TRMM+100G	100GB/S QSFP28 SR4, MTP/MPO Optical connector, 70 m with OM3 and 100 m with OM4.
OP+100G+CWDM4+2K	100G QSFP28 CWDM4, 2 km, over SMF.
OP+QSFP+100G+10K	100GB/S QSFP28 LR4, LC Optical connector, 10 km with SMF.
OP+100G+LANWDM+40K	100G QSFP28 LAN WDM, 30 km (40 km with FEC) over SMF.
OP+QSFP+DR+100G	100GB/S QSFP28 DR PAM4, 1310NM, FEC, LC OPTICAL CONNECTOR, 500M WITH SMF (COMPATIBLE WITH 400G-DR4)
OP+QSFP+FR+100G	100GB/S QSFP28 FR PAM4, 1310NM, FEC, LC OPTICAL CONNECTOR, 2KM WITH SMF (COMPATIBLE WITH 400G-XDR4)
OP+QSFP+100G+BIDI	100GB/S QSFP28 SR4 BIDI, LC OPTICAL CONNECTOR, 100M OVER OM4 MMF
MADI SFP and Coaxial 1080p PART NUMBERS	
SFP+MADI+2RX	MADI Coaxial Dual Receiver, Non-MSA, HD-BNC
SFP+MADI+2TX	MADI Coaxial Dual Transmitter, Non-MSA, HD-BNC
SFP+2ETX	SFP Series: Dual-channel HD-BNC outputs of SD/HD/3G (re-clocked output)
SFP+2ERX	SFP Series: Dual-channel HD-BNC inputs of SD/HD/3G (re-clocked output)
12G SDI and 12G OPTICAL PART NUMBER	
OP+SFP+RR+12G	12G/6G/3G/HD/SD-SDI UHD video SFP, optical, dual receiver, non-MSA, LC, re-clocked
OP+SFP+TT+12G	12G/6G/3G/HD/SD-SDI UHD video SFP, optical, dual transmitter, non-MSA, LC, re-clocked
SFP+2ETX+12G	12G/6G/3G/HD/SD-SDI UHD VIDEO SFP, COAXIAL, dual transmitter, non-MSA, HD-BNC, re-clocked
SFP+2ERX+12G	12G/6G/3G/HD/SD-SDI UHD VIDEO SFP, COAXIAL, DUAL RECEIVER, NON-MSA, HD-BNC, re-clocked
SFP+2ERX+12G+CAB	12G/6G/3G/HD/SD-SDI UHD VIDEO SFP, DUAL RECEIVER, NON-MSA, HD-BNC ON A 5IN CABLE, RECLOCKED
SFP+2ETX+12G+CAB	12G/6G/3G/HD/SD-SDI UHD VIDEO SFP, DUAL TRANSMITTER, NON-MSA, HD-BNC ON A 5IN CABLE, RECLOCKED

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ORDERING INFORMATION CONTINUED

HDMI SFP PART NUMBER	
SFP+HDMI+OUT	SFP SERIES: SD/HD to HDMI transmitter SFP (non-MSA) with type D to A cable
SFP+HDMI20+OUT+CAB	12G/3G/HD-SDI to HDMI 2.0 transmitter SFP with 8 audio Ch, (non-MSA) with type D to A cable
Application Processor License Keys	
SNP-PSK-SYNC	SNP Platform Software Key - enables SYNC or REMAP AP Personalities supporting eight (8) 1080P or two (2) UHD Frame Synchronizers, or supporting two UHD SQD/2SI REMAP functions. One Key per AP. (MAX 4 PER SNP) HDR Conversion or HD Proxy require additional related keys.
SNP-PSK-2CONVUHD	SNP Platform Software Key – enables DUAL-CONV AP personality, supporting two UHD conversions on one AP (Max 4 per SNP). HDR Conversion or HD Downscale outputs require additional keys. This Key alternately enables QUAD-3GCONV personality.
SNP-PSK-4CONV3G	SNP Platform Software Key – enables QUAD-3GCONV AP personality, supporting four 1080P conversions on one AP (Max 4 keys per SNP). HDR Conversion requires additional related key.
SNP-PSK-MV	SNP Platform Software Key – enables MV (and MV-PORT) AP Personalities supporting two Landscape (or one portrait) UHD-output multiviewer. HD downscale output is included (does not require the PSKDOWNHD key). One Key per multiviewer AP. (MAX 4 PER SNP). HDR Conversion requires additional HDR key.
SNP-PSK-JXSE	SNP Platform Software Key - enables JXSE AP personality, supporting eight 1080p or two 2160p JPEG XS Encodes to ST2110-22 output (Max 4 keys per SNP). HD Proxy requires additional related key.
SNP-PSK-JXSD	SNP Platform Software Key - enables JXSD AP personality, supporting eight 1080p or two 2160p JPEG XS Decodes from ST2110-22 input (Max 4 keys per SNP). HD Proxy requires additional related key.
SNP-PSK-MCL	SNP Platform Software Key - enables 1080P Master Control Branding personality, supports AB inputs, Background Mixer, 3x KeyFill inputs, 4x internal graphics on one AP (Max 4 per SNP). HDR aware.
SNP-PSK-MCLU	SNP Platform Software Key - enables 2160P Master Control Branding personality, supports AB inputs, Background Mixer, 2x internal graphics on one AP (Max 4 per SNP). HDR aware. This key also enables SNP-PSK-MCL functionality. External Key/Fill requires adjacent PSK-SYNC processor(s). HD Proxy requires additional related key.
Application Processor Add-on Feature Keys	
SNP-PSK-ACO	SNP Add-On Feature Key - Adds 4xHD or 1xUHD Automatic Change-Over Switching feature to one Sync AP. Max 4 per SNP.
SNP-PSK-HDR	SNP Add-On Feature Key – Adds HDR Conversion and Adjustment to Sync, Remap, MV, Dual-Conversion, or Quad-Conversion AP. Max 4 per SNP.
SNP-PSK-DOWNHD	SNP Add-On Feature Key – Adds output of two HD-Downscaled streams to Sync, Remap, JXSE, JXSD, or Dual-Conversion AP. Max 4 per SNP.
SNP-PSK-MADIEXP	SNP Add-On Feature Key – Adds 128 additional audio channels to Sync or Remap AP. Max 4 per SNP. MADI SFPs sold separately.
SNP-PSK-ADVAUD	SNP Add-On Feature Key – Enables Advanced Audio Processing (One per SNP). Requires Additional keys for specific audio processing algorithms.
Advanced Audio Processing Algorithm Keys	
SNP-ASK-DEE	SNP Audio Software Key - Enables one Dolby E® Encoding Process. Fixed (Selectable) Metadata.
SNP-ASK-DED	SNP Audio Software Key - Enables one Dolby E® Decoding Process.
SNP-ASK-DTOKEN	SNP Audio Software Key – Algorithm tokens (credits) towards DTS algorithms such as Upmix, Downmix, Multimerge, and Loudness Control. Consult user manual for number of tokens required

Note: Pooled/shared licenses (up to four per type) can be applied to any processor within the same SNP unit. The license keys are issued to the serial number of the SNP unit.
Note: Dolby E® is a Trademark of Dolby Laboratories.

ORDERING INFORMATION CONTINUED

FIELD-REPLACEABLE SPARES and UPGRADES	
SNP-MAIN-PCB-ASSY	SNP field-replaceable spare main PCB assembly; same part number for both SNP-GW-3GX32 and SNP-GW-3GX32-HSQF frames.
SNP-350W-ACPS-ASSY	SNP field-replaceable spare redundant 350W AC power supply assembly for SNP-GW-3GX32 frames (this assembly contains both power supplies) (Limited Supply Status)
SNP-400W-ACPS-HS	SNP field-replaceable single hot-swappable 400 W AC power supply for SNP-GW-3GX32-HS-QF (two per SNP).
SNP-FPNL-HS-HQF	SNP field-replaceable spare front panel assembly with access door and quiet fans for both SNP-GW-3GX32 and SNP-GW3GX32-HS-QF frames.
SNP-SPARE-FPFAN	Replacement Fan for SNP Front Panel. Compatible with 3GX32-HS-QF and 3GX32-HS-HQF models. This fan is an internal part and should be replaced by a competent technician following factory-provided instructions. Each SNP includes four of this fan component.
SNP-SPARE-BBFAN	Replacement Fan for SNP BB FPGA. This fan is an internal part and should be replaced by a competent technician following factory-provided instructions. Each SNP includes four pcs of this fan component.
SNP-SPARE-IPFAN	Replacement Fan for SNP IP FPGA. This fan is an internal part and should be replaced by a competent technician following factory-provided instructions. Each SNP includes one of this fan component.
SNP-HW-SSD64GU	SNP Hardware Upgrade Kit - 64 Gbyte SSD (replaces existing drive inside unit). Kit includes preformatted 64G Solid State Drive and installation instructions.

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