



Datasheet

# X10 DSNG

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appear.net  
Version 1.1



## **TAILOR-MADE SOLUTION FOR DSNG AND MOBILE PRODUCTION APPLICATIONS**

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The X10 DSNG is a tailor-made solution dedicated to digital satellite news gathering (DSNG) and supports encoding/decoding and satellite uplink/downlink in a single chassis. With increasing demands for live event coverage, the X10 DSNG is a compact, powerful solution that meets the very specific and challenging needs of DSNG and mobile production.

As DSNG vans have limited space, equipment size and power consumption, these are important factors for operators when selecting compact technology solutions. Appear's X10 DSNG gives operators all the functionality they need to support encoding/decoding and satellite uplink/downlink, all within a single chassis.

The X10 DSNG supports an array of compression technologies and protocols, is able to support the use of satellite and fibre delivery simultaneously and has built-in security and redundancy features to ensure all live broadcasts are not only secure, but reliable.

With a programmable interface that can be tuned and upgraded to support new video protocols as they are defined, the X10 DSNG is a solution that not only meets the needs of DSNG operators today, but will continue to support them for years to come.

**«Near limitless capacity,  
extensive video awareness,  
enhanced security,  
operational simplicity and  
exceptionally high reliability**





## CHASSIS

The X10 DSNG is a 1RU chassis built around an in-house developed, high-capacity bus architecture that connects all modules. The X10 DSNG operates with dual hot-swappable power supplies, front mounted control modules and six rear-mounted option slots.

The DSNG switch module is located in the front and comes as standard with dual IP IO, ASI IO and satellite reception. All option modules mounted in the rear are interchangeable between the X10 and X20 Platform (2 RU chassis). All modules are hot-swappable (including power supplies and fans). The new software architecture enables different software versions to run on different modules, allowing new functionalities to be delivered to customers faster.

The product can be fitted with a range of input, processing, and output modules that enable bridging between commonly used legacy video platforms and an all-IP infrastructure. With support for MPEG TS multiplexing. Advanced satellite modulation/demodulation and dense power efficient AVC/HEVC encoding/decoding all integrated into the same unit making the X10 DSNG ideal for DSNG applications. The Control/Switch module and the Dual IP IO modules provide native 10G uni-directional and bi-directional port connectivity between optional modules.

Service density can be defined up to 250 services in and out the DSNG module, while set-up and configuration is streamlined. The user interface offers multi-selection of channels or multiplexes enabling configuration changes on multiple flows with a minimum number of operations. Extensive search capabilities allow the operator to easily locate groups, services, etc.

## FEATURES

### 1RU - X10

- Modular configuration with up to 6 option slot boards
- WEB-based configuration, LED indicators on PS and modules
- Forced air-cooling (front to back)
- Dual redundant hot-swappable PS
- Hot-swappable modules
- 100-240 V AC, 50/60 Hz

## DIMENSIONS

### 1RU (X10)

19" x 1RU x 540 mm (440 x 44 x 540 mm) (w x h x d mm)



«Advanced architecture designed to save space, energy and resources»





«Designed to meet all challenges of mobile production today and tomorrow»

## HIGHLIGHTS

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The X10 DSNG has been developed to exploit new opportunities driven by the increasing deployment of ultra-high speed IP networks within all areas of broadcasting. Designed to meet all challenges that a full IP-based infrastructure presents, the platform features:

### **DELAY**

Low backplane latency (below 1ms) making overall contribution to delay negligible. Whenever delay buffers are required (such as IP de-jitter), buffer size and consequently delay is adjustable.

### **MPEG & NATIVE IP HANDLING**

The ability to handle all commonly used video protocols provides a future proof solution. The X10 DSNG is based on flexible programmable hardware, new standards not currently defined will be added when required.

### **AVC, HEVC, JPEG XS AND JPEG2000 COMPRESSION**

All common compression technologies used in professional broadcasting are supported, making the X10 DSNG adaptable to all operational requirements within contribution, remote production, video networking and distribution.

### **IP NETWORK SECURITY**

A video centric, cost-effective, easy to deploy, high-capacity firewall feature that can monitor and regenerate traffic as required.

### **CAPACITY**

Most modules support up to 4,000 (2,000 in and 2,000 out) streams / services per module and 10G of traffic. DSNG switch module support 128 (250 in and out) streams.

### **MONITORING & CONTROL**

A built-in management system to control a potentially vast array of broadcast contribution applications effectively. A wide range of external monitoring and control options including SNMP, Syslog & Prometheus support.

### **ACCESS CONTROL**

A new standard of access control, user management and IP security to secure access to critical network devices. A user account with four different access levels can be defined per user.

### **REDUNDANCY**

Designed to be as reliable and failsafe as possible, even when used stand-alone. The uniquely efficient, built for purpose hardware design is engineered for high reliability and stability. Should an internal failure take place, a range of redundancy options can take effect to keep the chassis fully operational.

## ENHANCED SECURITY

There are typically multiple locations within a modern broadcasting environment necessitating secure video interfaces between sites, especially when implemented using public networks. The high level of security needed must protect the different sites from outside attacks as well as protect the integrity of video transmission itself. Being a fully operational video firewall, the X10 DSNG maintains tight security on its control layer, supporting many advanced features encompassing Authentication, Authorisation and Audit. Security is assured by Appear's own FPGA based IP packet forwarding mechanism and proprietary internal network structure.

### Video-centric features provided in the X series include:

- Multicast forwarding (IGMP join and forward)
- Inspect and forward MPEG-2 TS packets (deep layer 5/6 packet inspection)
- De-multiplex MPEG-2 TS streams
- Encryption and decryption of video data
- Seamless network protection according to SMPTE 2022-7

## OVERVIEW

- Modular
- Scalable
- Compact with multiple inputs/ outputs per module
- Advanced input analysis and status information
- Easy to configure from one common web GUI interface
- Hot swappable
- Wide range of optional modules
- Mix and match card types freely, and add as many as you need

## FEATURES

### Xpanel - Web GUI Contribution app

- One panel/screen UI controlling the whole chain/operation
- Requires at least one SDI Encoder module and one Satellite Modulator module to create a contribution chain
- BISS and BISS CA encryption
- IP and ASI ports for flexibility and interfacing with 3rd parties



## MODULES

### Control/Switch with Dual 1G IP IO, Sat. RX and ASI IO X10

Total capacity : 80 Gbps full duplex  
 Bitrate backbone : 1x 100/1G Management port, RJ45 Interface  
 : 2x 1G IP IO, SFP  
 : 1x 1G RJ45 (for tunneling IP data from SFP ports)  
 : 1x DVB-S/S2X RX, F 75 Ohm, L-band (950 - 2150 MHz)  
 : 2x ASI IO, HD BNC 75 Ohm  
 : 1x Genlock, HD BNC 75 Ohm

IP data encapsulation : TS over UDP/RTP  
 : AES67, 802.1Q (VLAN tag)

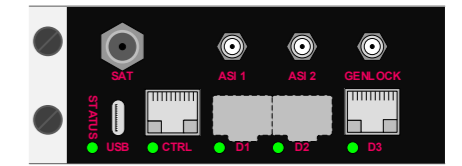
Satellite demodulation : QPSK, 8PSK, 16APSK, 32 APSK. 1 to 45 MBaud (1-39.9 Msym/s for 32-APSK)

ASI IO : 188/204 byte TS - spread and burst mode

Scrambling/descrambling : BISS2 Mode 1/E, BISS CA  
 TS Processing\*\* : De-multiplexing, Multiplexing, Service and PIDfiltering, PSI/SI re-generation\*

Clock Options : Free running, PTP, GenLock

\*\*Functionality will depend on SW image installed. Two images are available: one for full featured Ip transmission with limited IP reception functionality on 1G IP ports and one image for full featured reception with limited IP transmission functionality on 1G IP ports.



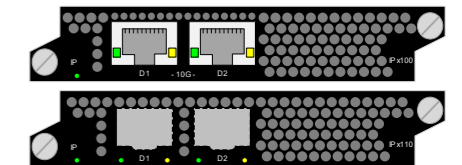
### Dual 10G IP IO

Interface : 2 1/10G Base-T Ethernet or 1G SFP/10G SFP+ (Base-T or SFP must be selected at order)

Protocols : IPv4, IPv6, IGMP v2/v3, ICMP, ARP, 802.1Q (VLAN tag)

Data encapsulation : TS over UDP/RTP, SDI over SMPTE 2022-6 / SMPTE 2110, AES67, L2TP (Output), SRT, Zixi

TS Processing : De-multiplexing, Multiplexing, Service and PIDfiltering, PSI/SI re-generation



### DVB-S/S2X Modulator

Number of modulators : 2  
 Interface per modulator : 1x SMA 50 Ohm output, 1x SMA 50 Ohm monitoring output, 1x SMA 50 Ohm input (redundancy)

Redundancy (optional) : Relay switch on output for each modulator

Satellite standards : DVB-S EN 300 421, DVB-S2 EN 302 307 - 1, DVB-S2X EN 302 307 - 2 Broadcast Services

Frequency range : IF and L-band (950 - 2150 MHz)

Modulation : QPSK, 8PSK, 16APSK, 32APSK, 64 APSK, 128 APSK, 256 APSK

Symbol rate : Up to 72 Mbaud

Descrambling : BISS 1 Mode 1/E, BISS2 Mode 1/E, BISS CA

TS Processing : Multiplexing, PSI/SI re-generation



### HEVC Encoder ECx110, ECx210

Video Input connectors : 8x HD BNC 75 Ohm or 2x QSFP (10GbE, 25GbE or 40GbE)

Number of Services : 2x UHD, 8xFHD, HD, SD

Video Input format : 12G-SDI (SMPTE 2082)

: 3G-SDI (SMPTE 424M)

: HD-SDI (SMPTE 292M)

: SD-SDI (SMPTE 259M)

Data encapsulation : SDI over SMPTE 2022-6

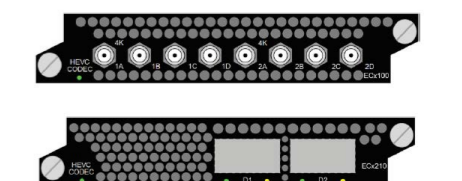
: SDI over SMPTE 2110 with PTP

Codecs : AVC and HEVC

Resolutions : SD, HD, FHD, UHD (UHD only on HEVC)

Encoding mode : 8/10 bit, 4:2:0/4:2:2, Standard/Low delay/Ultra low delay

Audio leveling : Long-term and short-term loudness leveling, peak limiting



# SPECIFICATIONS

## CONTROL/SWITCH MODULE – SWx300

Switch fabric	Total capacity	: 80 Gbps full duplex
	Bitrate	: 10 Gbps routing between modules in a chassis
	Interface	: 2x1G IP IO, SFP
Operational modes		: 1x 1G RJ45 (for tunnelling IP data from SFP ports)
	Software images	: IP TX SW image

## Control/Switch module – Common features

Dataports	Operational mode	: Cloned Output (SMPTE 2022-7) TX SW image only for SWx300 : Single Input and Single Output (on separate interfaces)
	Protocols	: IPv4, IPv6, IGMP v2/v3, ICMP, ARP, 802.1Q (VLAN tag including PCP priority), DSCP (IP Priority flag)
	IO Data Rate	: 10Gbps Bi-directional for SWx300
Control Interface	Interface	: 10/100/1000 Base-T Ethernet
	Built-in user interface	: Web (HTTPS)
	Protocols	: IPv4, IPv6, HTTPS, SSH, ICMP, ARP, LLDP External interface
Processing	Protocols SWx300	: UDP, RTP, : Multicast, Unicast
	Processing capacity	: 1 Gbps Bi-directional
	Scrambling/Descrambling	: BISS2 Mode 1/E : BISS CA
MPEG TS	Key reference specification	: ISO/IEC 13818-1:2015, ETSI TS 102 034 V2.1.1 SMPTE 2022-2, ETSI TR 101 211 V1.9.1
	Protocols	: UDP, RTP : Multicast, Unicast
	IP input de-jitter	: Yes, based on PCR timestamps
	IP input de-jitter buffer size	: Configurable up to 1500ms
	Maximum number of streams per port	: 250 IP streams on inputs, 250 IP streams on output
	Forward Error Correction	: SMPTE 2022-1
	Transport stream	: Single program (SPTS) and multi program (MPTS)
	MPEG TS processing capacity	: 850Mbps Bi-directional
	Service filtering	: Yes
	Video formats	: MPEG-2, AVC, HEVC, JPEG XS, JPEG2000 (in MPEG2-TS)
	Multiplexing (MPTS output)	: Yes, (TX SW image only for SWx300)
	PCR regeneration	: Yes (TX SW image only for SWx300)
	Tables Supported	: MPEG PSI (PAT, CAT, PMT), DVB SI (SDT actual)
	PSI/SI Table Regeneration	: Yes, based on input and operations performed
	Clock Options	Chassis synchronisation
Licensed		Features Forward Error Correction (SMPTE 2022-1) MPEG TS multiplexing (MPTS output) TS input analysis BISS2 mode 1/E scrambling/descrambling (per TS) BISS CA scrambling/descrambling (per service or TS)

## DVB-S/S2X INPUT

Connectors	Number of connectors	: 1, F female 75Ω
	Max number of transponders	: 1
	Input level	: -75 to -20 dBm (16 APSK, 9/10 code rate)
	Frequency range	: 950 – 2150MHz
	Spectrum inversion	: Auto
Demodulation	LNB signaling	: 22kHz continuous tone and 0/13/18V DC, max 400mA
	Standards	: DVB-S/S2/S2x
	FEC frame size	: Normal, Short
	Roll off	: 0.05 – 0.35
	DVB-S constellation	: QPSK
Processing	DVB-S2X constellation	: QPSK, 8PSK, 16APSK, 32 APSK
	Symbol rates	: 1-45Msym/s (1-39.9 Msym/s for 32-APSK)
	Number of MPEG services	: 64
	Descrambling	: BISS2 Mode 1/E, BISS CA – TX SW image only
	Service filtering	: Yes
Input analysis	: Yes	

## HEVC Codec – ECx110, ECx210

### HEVC Codec – Encoder Mode

Video Processing	Density Modes	: 2x UHD / 1x UHD + 4x FHD, HD, SD / 8x FHD/HD/SD
	HEVC Compression, Profiles and Max Level	: Main@Level 5.1 : Main10@Level 5.1 : Main422@Level 5.1
	AVC Compression, Profiles and Max Level	: Main@Level 4.2 : High@Level 4.2 : High10@Level 4.2 : High422@Level 4.2
	Resolutions	: 3840x2160p60/59.94/50/30/29.97/25 : 1920x1080p60/59.94/50 : 1920x1080i29.97/25 : 1280x720p60/59.94/50 : 720x576i25 : 720x480i29.97
	Color Space Handling	: Passthru
	HDR Signalling	: Passthru of PQ10, HDR10 and HLG
	Encode latency modes	: Normal – approx. 1800ms : Low – approx. 1000ms (AVC), 600ms (HEVC) : Ultra Low – approx. 400ms (AVC, GDR, Only pass thru audio) See separate specification for HEVC Ultra Low Latency mode
	Rate control modes	: CBR
	GOP Control	: Dynamic, Static, IBP, IP or I
	Colorimetry	: SDR, PQ10, HDR10, HLG
	Audio Processing Encode	: MPEG1 Layer2 (Stereo) : AAC LC (Stereo and 5.1) : HE-AACv1 (Stereo and 5.1) : HE-AACv2 (Stereo) : Dolby Digital (Stereo and 5.1)** : Dolby Digital Plus (Stereo, 5.1 and 7.1)**
	Transcode	: Dolby E to any of above codecs**
	Passthrough	: Dolby Digital** : Dolby Digital Plus** : Dolby E** : Dolby ED2** : PCM
	Capacity per channel	: 8 x 2.0 audios in MPEG-1 Layer2, AAC-LC, HE-AACv1 or Dolby Digital (AC-3) : 6 x 2.0 audios in HE-AACv2 or Dolby Digital Plus (E-AC-3). : 4 x 2.0 Dolby E 2.0/5.1/7.1 transcodes to any other codec : 7 x DD/DD+ passthrough : 5 x Dolby E passthrough : 5.1 counts as three 2.0, 7.1 counts as 4 2.0
Audio Leveling	Audio Level Adjustment	: +6/-10dB (1dB steps)
	Audio Lip Sync Adjustment	: -200/+500ms
	Long Term Loudness Levelling	: EBU-R128 / ATSC A/85
	Short Term Loudness Levelling	: EBU-R128 / ATSC A/85
	Peak Loudness Levelling	: Limits sample peaks based on the configured threshold
Licensed Features	AVC Encoding SD	
	AVC Encoding SD/HD	
	AVC/HEVC Encoding SD	
	AVC/HEVC Encoding SD/HD	
	AVC/HEVC Encoding SD/HD/UHD	
	Low Delay Encoding	
	Ultra low delay	

## HEVC Codec – Decoder Mode

### HEVC Codec – Decoder Mode

Video Processing	Density Modes	: 2x UHD / 1x UHD + 2x FHD, HD, SD / 4x FHD/HD/SD
	HEVC Decoder, Profiles and Max Level	: Main@Level 5.1 : Main10@Level 5.1 : Main422@Level 5.1
	AVC Decoder, Profiles and Max Level	: Main@Level 4.2 : High@Level 4.2 : High10@Level 4.2 : High422@Level 4.2
	MPEG-2 Decoder, Profiles and Max Level	: MPEG2 MP@ML/HL (4:2:0 8 bit)
	Resolutions	: 3840x2160p60/59.94/50/30/29.97/25 : 1920x1080p60/59.94/50 : 1920x1080i29.97/25 : 1280x720p60/59.94/50 : 720x576i25 : 720x480i29.97
	Maximum input bitrate	: 100Mbps per UHD or FHD/HD/SD pair
Audio Processing	Decode	: MPEG1 Layer2 : AAC LC : HE-AACv1/v2 : Dolby Digital (2.0/5.1) / Dolby Digital Plus (2.0/5.1/7.1)** : Dolby E**
	Passthrough	: Dolby Digital** : Dolby Digital Plus** : Dolby E** : Dolby ED2** : PCM
	Capacity	: 32x 2.0 decodes freely distributable* : Up to 8x Decodes per UHD/FHD/HD : Up to 4x Decodes per SD
Ancillary Data	EN301775 Teletext to OP-47	
	ST2038 PID de-encapsulation to SDI	
	VITC Source	: Extracted from HEVC or AVC SEI
	VITC Output	: SMPTE 12M-2
Other	Clock Recovery Modes	: Locked to PCR in video : Video alignment : GenLock : Input Redundancy – near seamless switching between any two defined inputs.
Licensed Features	AVC Decoding SD	
	AVC Decoding SD/HD	
	AVC/HEVC Decoding SD	
	AVC/HEVC Decoding SD/HD	
	AVC/HEVC Decoding SD/HD/UHD	
	4:2:2 Decoding	
	Extra stereo audio decoding (8 stereo audio default)	
	Dolby Digital / Dolby Digital Plus decoding (per service)**	
	Dolby E decoding (per service)**	
	4:2:2 Encoding	
	Extra stereo audio encoding (8 stereo audio default)	
	Dolby Digital / Dolby Digital Plus encoding (per service)**	
	Dolby E decoding (per service)**	
	Long term loudness	
	Short term loudness, includes support for long term	
	Peak loudness limiter, includes long and short term loudness	
	: BISS 1 Mode 1	

## DVB-S/S2X MODULATOR – SMx100

Interfaces	Number of modulated carriers	: 2	
	Outputs connectors	: 50Ω SMA + 50Ω SMA monitor per output	
	Backup connectors	: 50Ω SMA per main output	
DVB-S Coding and Modulation	Constellation	: QPSK	
	FEC rates	: , 2/3, , 5/6, 7/8	
	Symbol rate	: 0.1 – 72MBd	
	Roll off	: 0.05 – 0.35	
DVB-S2x Coding and Modulation	Constellation	: QPSK – 256-APSK	
	Modulation mode	: CCM	
	FEC rates	: All	
	Frame length	: Short, Normal	
	PL scrambling	: Configurable Gold index or root	
	Symbol rate	: 0.1 – 72MBd	
	Roll off	: 0.05 – 0.35	
	IF	Frequency range	: 70 – 200MHz
		Frequency accuracy	: 1.5ppm
		Output level	: -15 to 0dBm
		Output level accuracy	: 0.5dB
		Output level setting accuracy	: 1.0dB
		In-band flatness	: 0.1dB (typical)
Return loss		: >18dB	
Spurious signal related		: < -65dBc/4kHz (typical) @5dBm, 256kBd	
Spurious neighbour transponder related		: < -50dBc/4kHz (typical) @0dBm	
Spurious non-signal related		: < -80dBc/4kHz (typical) @5dBm	
Monitor port level		: -20dB relative to main output	
L-band		Frequency range	: 950 – 2150MHz
		Frequency accuracy	: 1.5ppm
	Output level	: -40 to 7dBm	
	Output level accuracy	: 0.5dB	
	Output level setting accuracy	: 1.0dB	
	In-band flatness	: 0.2 dB (typical)	
	Return loss	: >14dB	
	Spurious signal related	: < -65dBc/4kHz (typical) @5dBm, 256kBd	
	Spurious neighbour transponder related	: < -50dBc/4kHz (typical) @0dBm	
	Spurious non-signal related	: < -80dBc/4kHz (typical) @5dBm	
	Monitor port level	: -30dB relative to main output	
	Transport Stream	Scrambling	: BISS 1 Mode 1/E : BISS 2 Mode 1/E : BISS CA
		Multiplexing	: Yes
PID mapping:		: Manual mapping of unreferenced PIDs	
PCR regeneration		: Yes	
Tables Supported		: MPEG PSI (PAT, CAT, PMT), DVB SI (SDT actual)	
PSI/SI Table Regeneration		: Yes, based on input and operations performed	
Output redundancy		: Automatic mute or switch to RF backup on error.	
Reverting or “switch once” mode			
DC output		: 24V, max 500mA	
10MHz reference output		: 0dBm +- 2dB	
Carrier ID		: DVB	
Precorrection		: Static linear gain and group delay	
Licensed Features		Number of DVB-S outputs	
	Number of DVB-S2 outputs		
	Number of DVB-S2x outputs		
	Precorrection		
	Carrier ID		
	BISS/2 Mode 1/E scrambling (per TS)		
	BISS CA scrambling (per service or TS)		
	Output redundancy		
	24V DC and 10MHz reference output		

## DUAL 10G IP IO MODULE – IPx100, IPx110

Dataports	Interface	: 2 1/10G Base-T Ethernet or 1G SFP/10G SFP+ (Base-T or SFP must be selected at order)
	Operational modes	: Seamless Input (SMPTE 2022-7) : Cloned Output (SMPTE 2022-7) : Seamless Input and Cloned Output (SMPTE 2022-7 Full Duplex) : Single Input and Single Output (on separate interfaces) : Exclusive output (if D1 has link D2 is muted, D3 has link D4 is muted) : TS over SRT : TS over Zixi
Processing	Seamless buffer size (network path differential)	: Configurable up to 400ms
	Protocols	: IPv4, IPv6, IGMP v2/v3, ICMP, ARP, 802.1Q (VLAN tag including PCP priority), DSCP (IP Priority flag)
SRT	IO Data Rate	: 1/10Gbps Bi-directional
	Protocols	: UDP, RTP, SMPTE 2022-6, SMPTE 2110 VSF TR-03, VSF TR-04, AES67, L2TPv3 (Tx only)
Zixi	IP input de-jitter	: Yes, based on RTP timestamps or CBR bitrate
	IP input de-jitter buffer size	: Configurable up to 1500ms
MPEG TS	Maximum number of streams per port	: 2000 input and 2000 output streams
	Processing capacity	: 10 Gbps Bi-directional
Additional features	Modes	: Caller/Listener/Rendezvous
	Scrambling	: AES
	Capacity	: Up to 32 flows, 100 Mbps per flow, 200Mbps total
	Modes	: “Connect” to/from Broadcaster
	Scrambling	: AES
	Capacity	: Up to 32 flows, 100 Mbps per flow, 200Mbps total
	FEC	: Yes
	Key reference specification	: ISO/IEC 13818-1:2015, ETSI TS 102 034 V2.1.1 : SMPTE 2022-2, ETSI TR 101 211 V1.9.1
	Protocols	: UDP, RTP : Multicast, Unicast
	IP input de-jitter	: Yes, based on PCR timestamps or CBR bitrate
	IP input de-jitter buffer size	: Configurable up to 1500ms
	Maximum number of streams per port	: 2000 input and 2000 output streams
	Forward Error Correction	: SMPTE 2022-1
Transport stream	: Single program (SPTS) and multi program (MPTS)	
MPEG TS processing capacity	: 6Gbps Bi-directional	
Maximum per-TS bitrate	: 3 Gbps	
Service filtering	: Yes	
Video formats	: MPEG-2, AVC, HEVC, JPEG XS, JPEG2000 (in MPEG2-TS)	
Licensed Features	Multiplexing (MPTS output)	: Yes
	PCR regeneration	: Yes
	Tables Supported	: MPEG PSI (PAT, CAT, PMT), DVB SI (SDT actual)
Additional features	PSI/SI Table Regeneration	: Yes, based on input and operations performed





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