



Apppear tv

XC5000/XC5100

Applications, Chassis & Modules

The XC5x00 platform

- Chassis alternatives
- Design philosophy

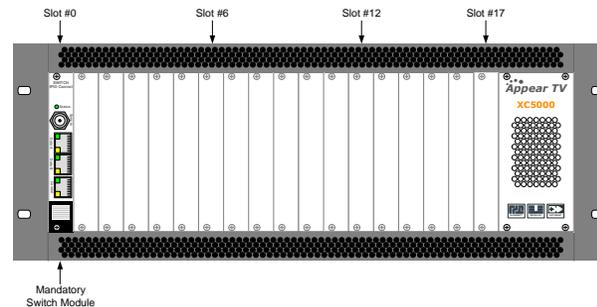
CHASSIS ALTERNATIVES

Main View

XC5000 – 4RU CHASSIS



Slots



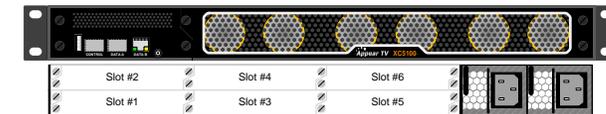
Capacity

16 + 2 board positions

Features

- WEB based configuration, SNMP Alarms, SOAP/XML interface
- Hot-swappable modules, power supplies and fans
- Dual power supply

XC5100 – 1RU CHASSIS

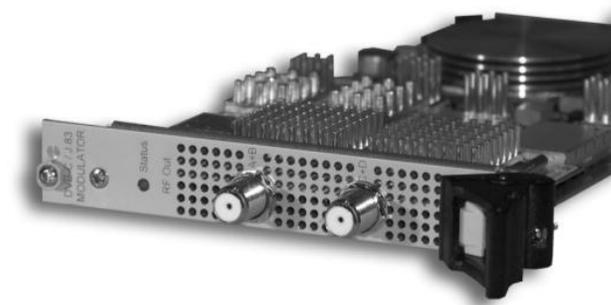


6+1 board positions

- WEB based configuration, SNMP Alarms, SOAP/XML interface
- Hot-swappable modules, power supplies and fans
- Switch module with Dual IP IO and MMI in front
- Dual power supply (optional)

DESIGN PHILOSOPHY

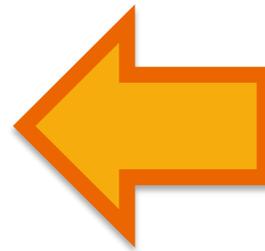
- ✓ Turn a box into a module



DESIGN PHILOSOPHY

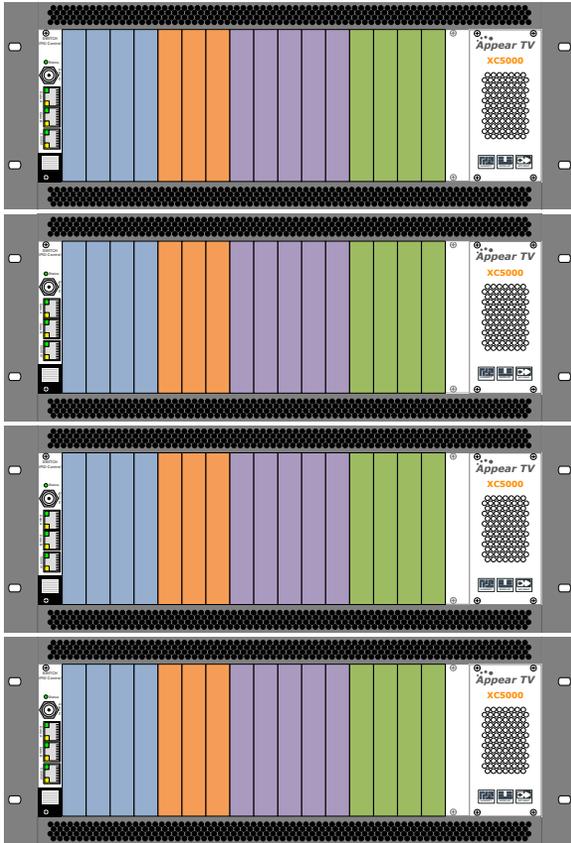
- ✓ Turn a box into a module
- ✓ Turn a rack into a chassis

HEAD-END IN A BOX!!



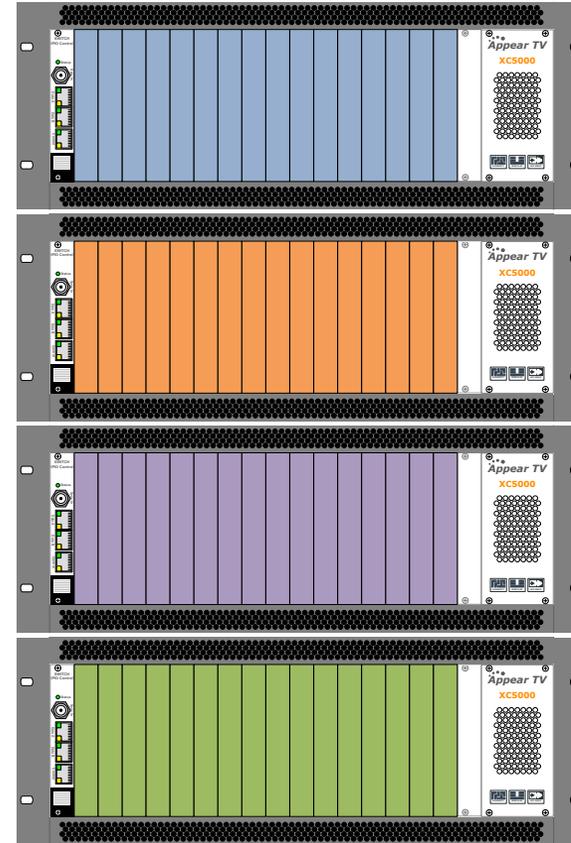
DESIGN PHILOSOPHY

Head-end in a box / integrated solution



Ideal for small/medium sized head-ends, regional sites & transmitters

Separate functionality per box

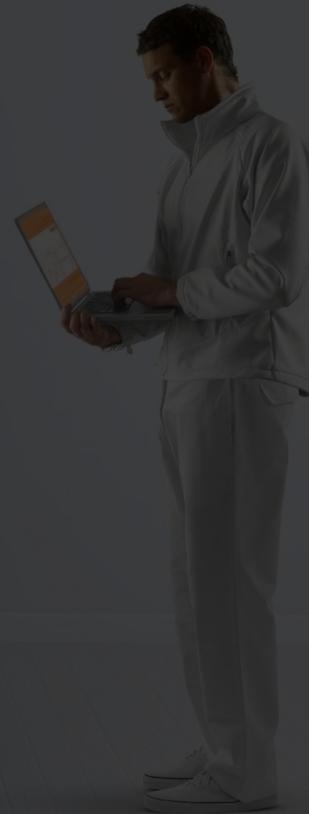
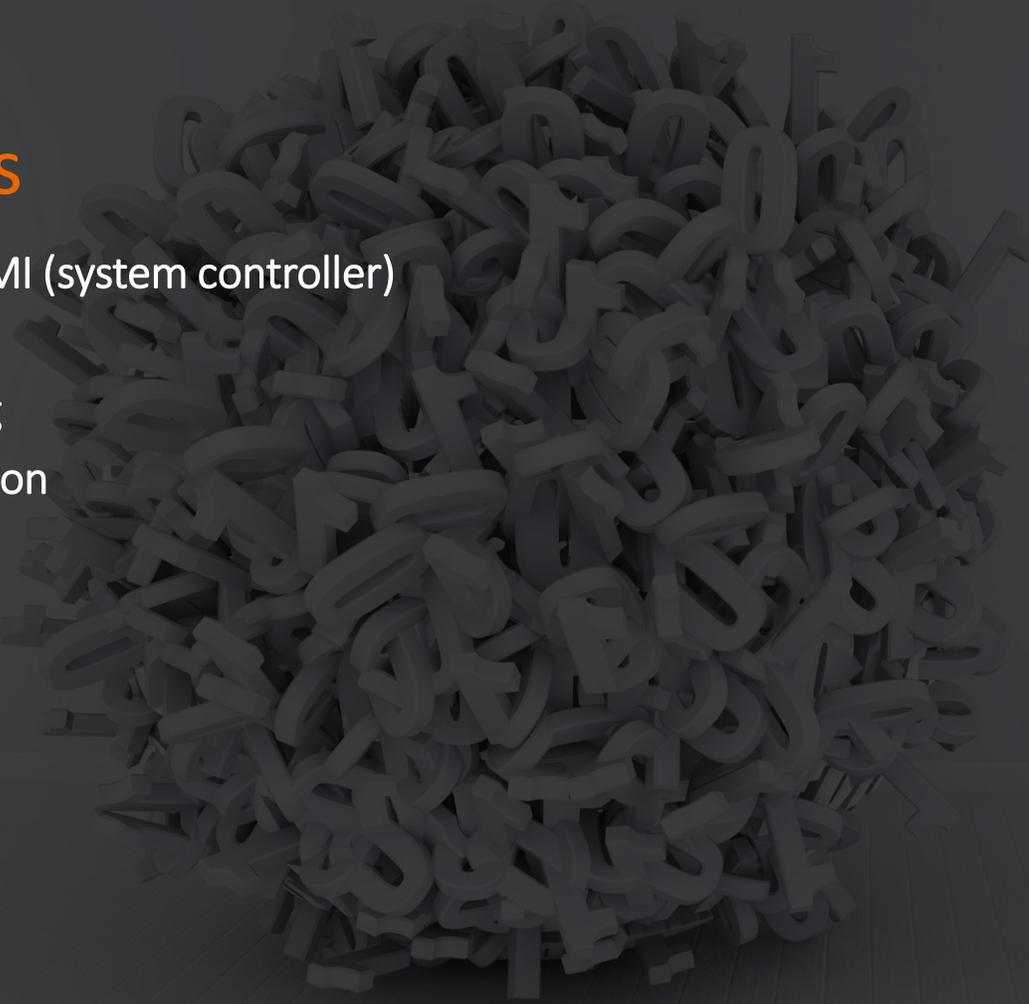


Ideal for large & 'living' systems

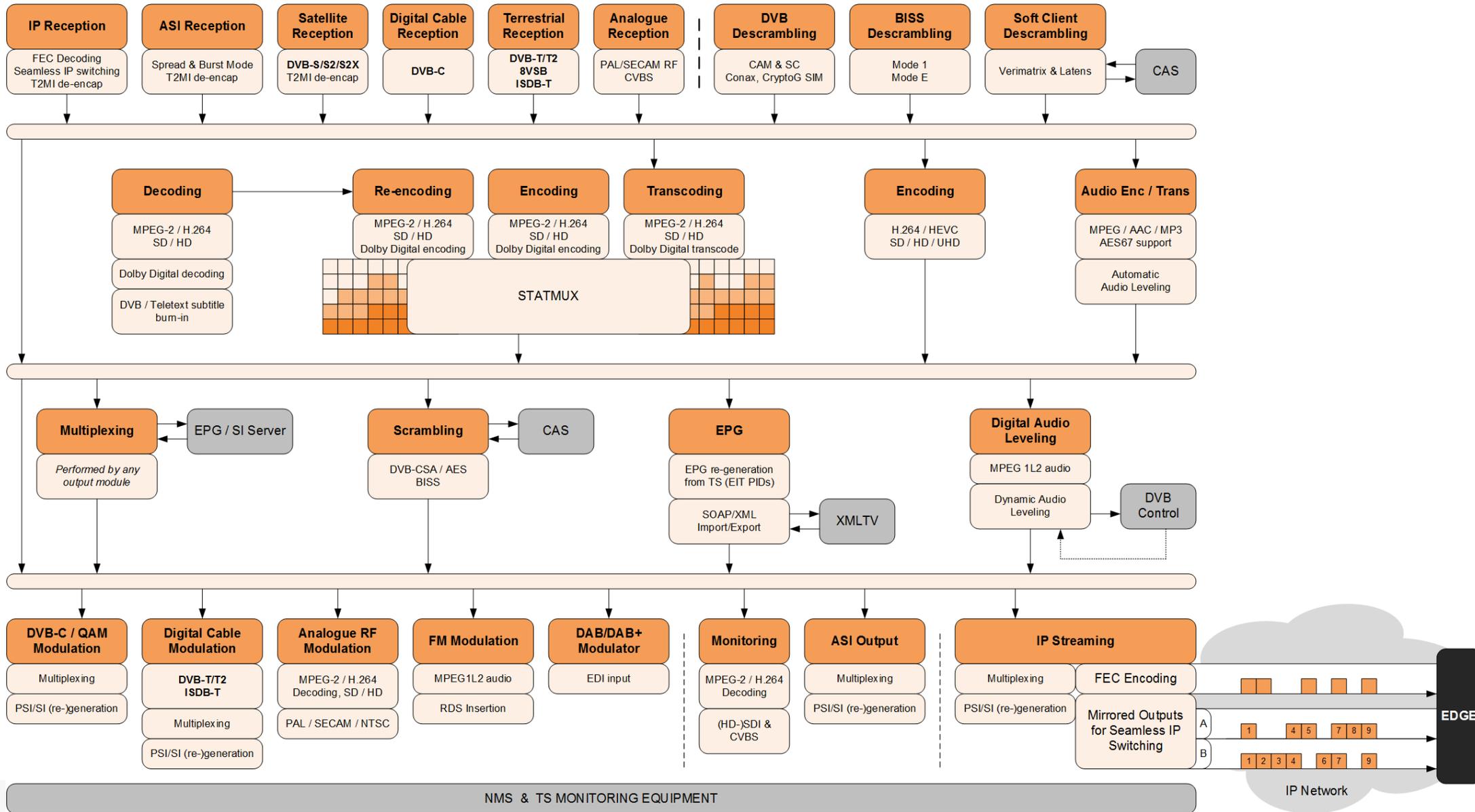
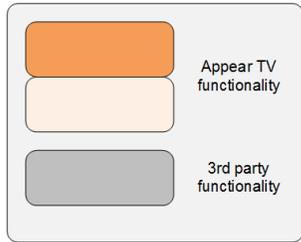


Modules

- Switch/MMI (system controller)
- Input
- Processing
- Compression
- Output
- Decoding



Example: IPTV & Cable TV Head-end – The Building Blocks



Modules: Switch/MMI (XC5000 – 4RU)

Switch module with Management

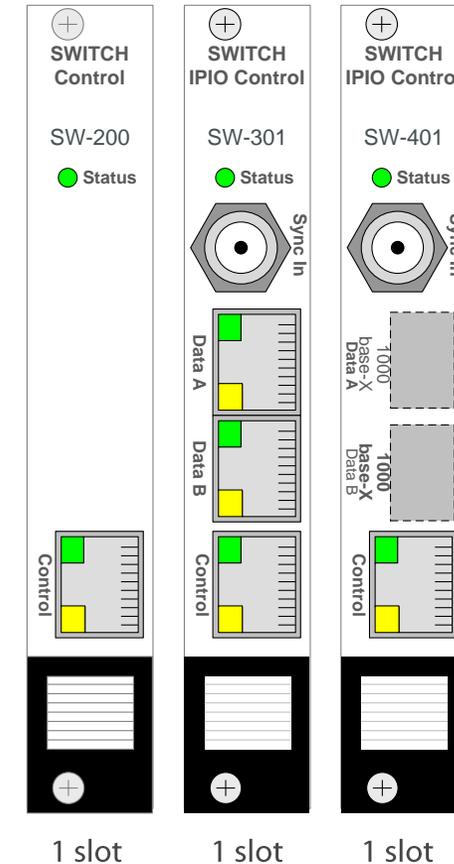
- Active part of backplane (star network)
- Built in management (MMI) function
- 1xRJ45 10/100/1000 BaseT Control port
- Compatible with all 4RU chassis



Modules: Switch/MMI (XC5000 – 4RU)

Switch module with dual GBIP, Video Sync and Management

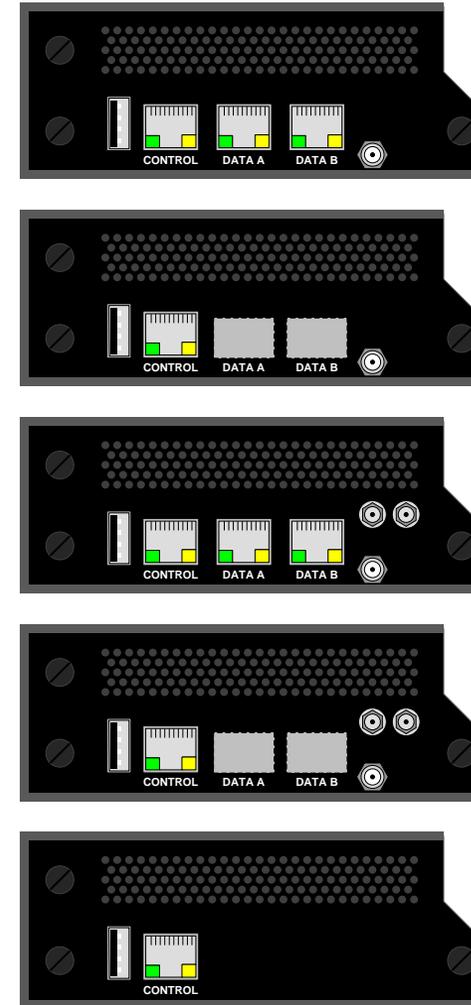
- Active part of backplane (star network)
- Built in management (MMI) function
- Ports for IP IO and Control:
 - 3xRJ45 10/100/1000 BaseT
 - 2xSFP + 1xRJ45 10/100/1000 BaseT (control port)
- Video Sync input for H-sync (BNC)
- IP Data ports configurable as:
 - Dual Gbit input
 - Seamless Gbit input
 - Dual Gbit output
 - Cloned Gbit output (identical traffic on port A and B)
- 1xGbit input + 1xGbit output
- Up to 850 Mbit/s per data port
- SMPTE 222 FEC support (option)
- IPv6 support
- Supports UDP/RTP Multicast/Unicast reception
- Supports reception of MPTS and SPTS
- Service filtering on input



Modules: Switch/MMI (XC5100 – 1RU)

Switch module with dual GBIP, Video Sync and Management

- Active part of backplane (star network)
- Built in management (MMI) function
- Ports for IP IO and Control:
 - 3xRJ45 10/100/1000 BaseT
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- Up to 850 Mbit/s per data port
- SMPTE 2022 FEC support (option)
- IPv6 support
- Supports UDP/RTP Multicast/Unicast reception
- Supports reception of MPTS and SPTS
- Service filtering on input
- Optional GPS/Reference clock for terrestrial SFN application

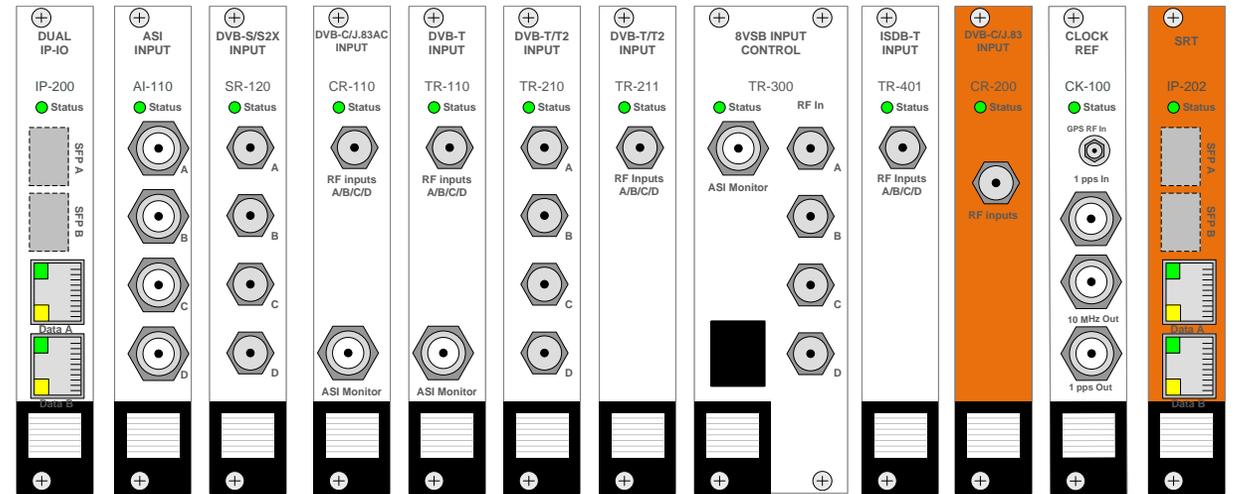


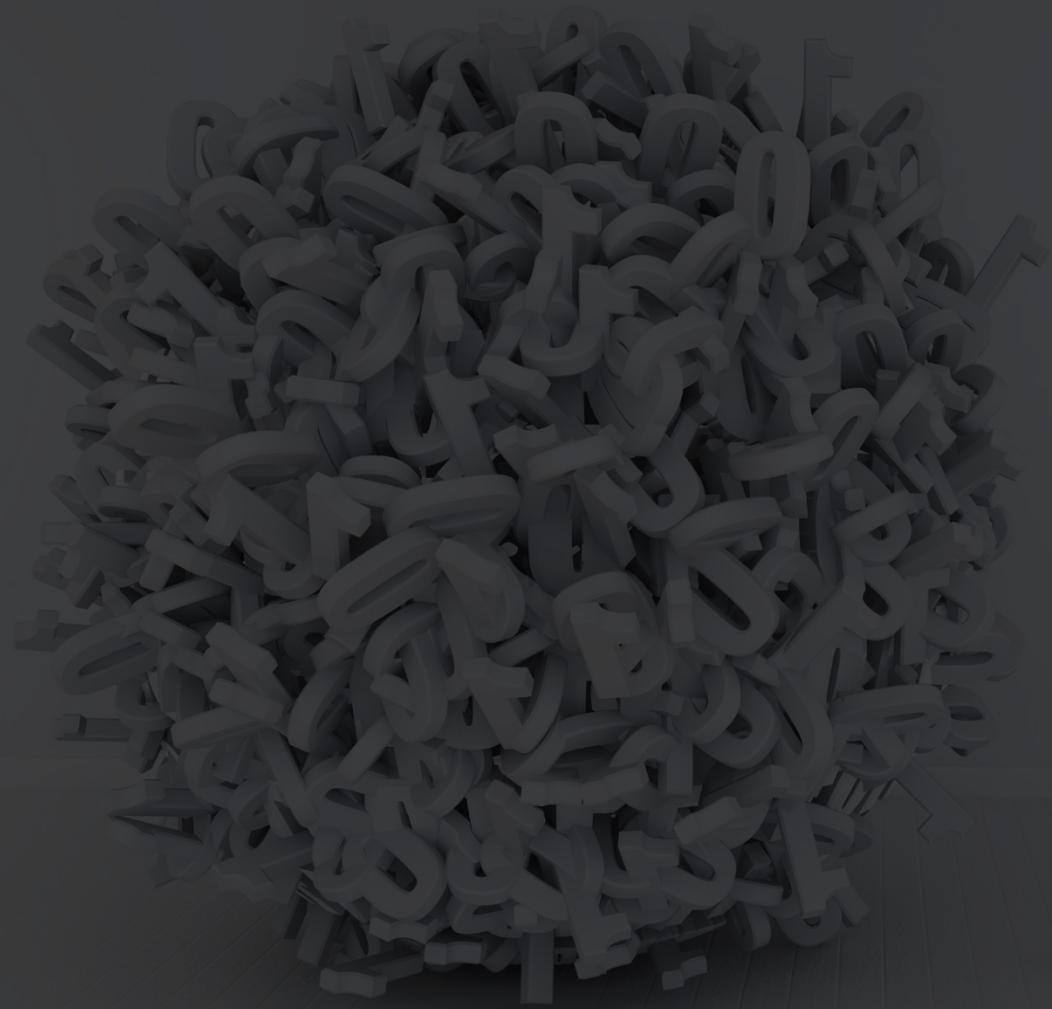
FRONT

Modules: Input

Input modules

- Dual IP IO modules
- ASI input module
- DVB-S/S2X input modules
- DVB-T input module
- DVB-T/T2 input modules
- DVB-C input module
- ISDB-T input module
- 8VSB input module
- Clock Reference module (for SFN support)
- 16 QAM input module
- SRT input module



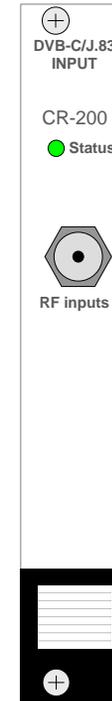


New modules!!

Modules: 16 QAM input module (NEW!!)

16 QAM input module

- Standard EN 300 428, ITU-T J83 annex A/B/C
- 16x QAM receivers per module
- 1 F-type, 75 ohm female input port
 - All 16 channels on one input cable
- Frequency range 47-1000 MHz
- Supports reception of MPTS and SPTS
- Service filtering on input
- 1 slot wide

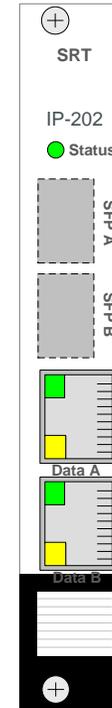


1 slot

Modules: SRT input module (NEW!!)

SRT module

- 2x Gbit RJ45 or SFP ports for data (1x input, 1x output)
- Secure transmission over the Internet
 - Encryption algorithms: AES 128, AES 192, AES 256
- Reliable transmission over the Internet
 - Retransmission mechanism on packet loss
 - Configurable latency buffer for retransmissions
- Two operational modes:
 - SRT input
 - SRT output
- Transmission modes: Caller, Listener and Rendezvous
- 35 Mbit/s throughput
 - Number of services limited by bandwidth
- 1 slot wide
- MMI Redundancy support



1 slot

SRT (Secure Reliable Transport)



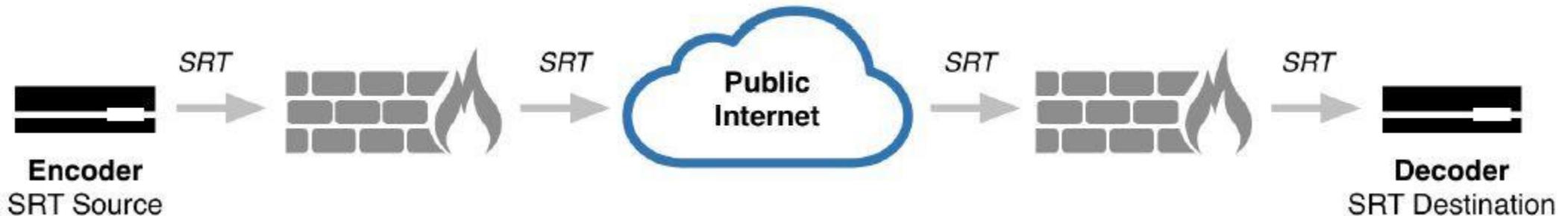
The SRT Alliance

Founded by Haivision and Wowza, is a commercially funded group dedicated to managing and supporting the open source implementation of SRT, a transport protocol for enabling the delivery of high-quality, low-latency video across the public Internet.

Secure - Encrypts video streams (AES 128/256)

Reliable - Recovers from severe packet loss

Transport - Dynamically adapts to changing network conditions

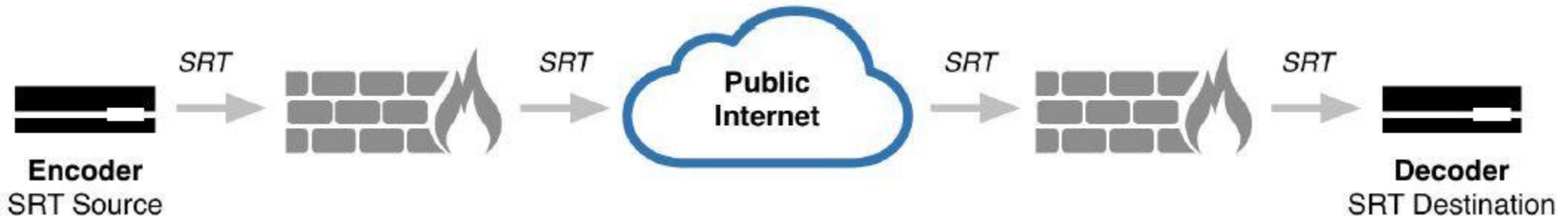


SRT (Secure Reliable Transport)



Secure Reliable Transport (SRT) is a transport technology that optimizes streaming performance across **unpredictable networks**, such as the **Internet**.

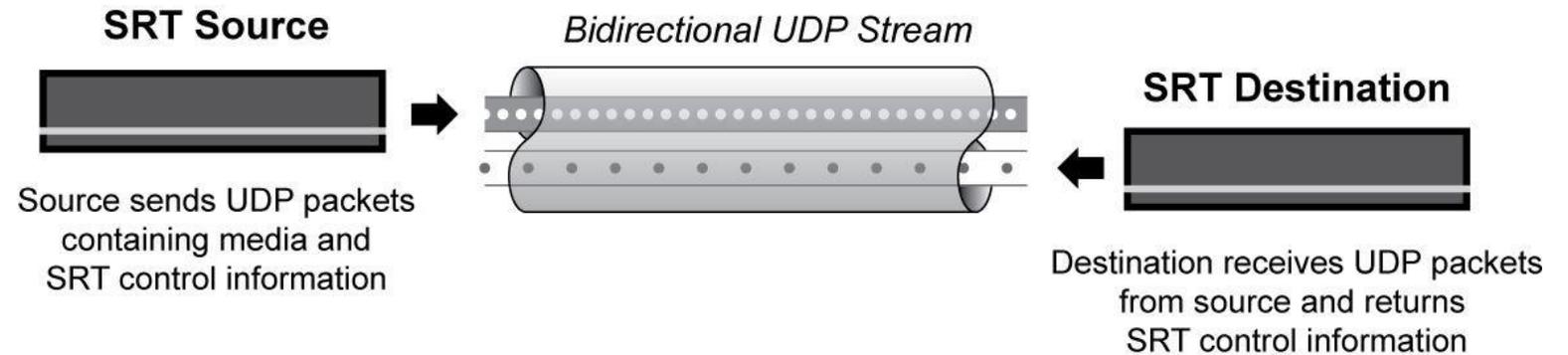
As audio/video packets are streamed from a source to a destination device, SRT detects and adapts to the real-time network conditions between the two endpoints. SRT helps compensate for **jitter** and **bandwidth fluctuations** due to congestion over noisy networks, such as the Internet. Its **error recovery** mechanism minimizes the packet loss typical of **Internet connections**.



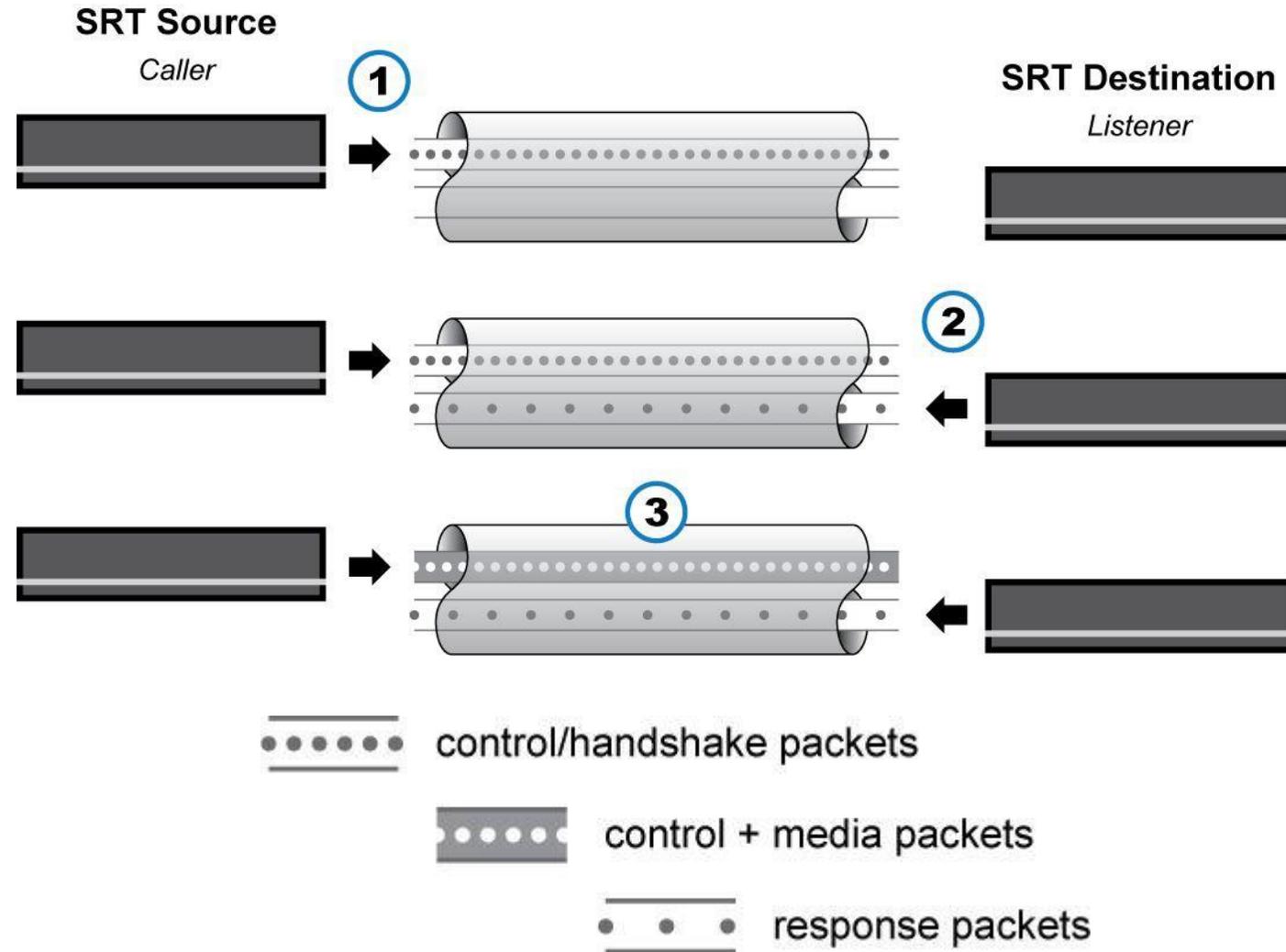


Basic SRT Concepts

- Open Source
- Bi-directional UDP traffic
- Constant exchange of control information between the two endpoints, including “keep alive” packets (if needed) approximately every 10 ms, which enable SRT streams to be automatically restored after a connection loss.



SRT: Caller, Listener and Rendezvous



SRT: Implementation



Service Components Scrambling Transport **SRT Settings** EMM HbbTV Apps PSI

SRT Settings

SRT Mode	Caller
IPv4/IPv6 Address	239.255.1.5
Source Port	1238
Destination Port	1234

Receive latency: 120 ms
Payloadsize packets/frame: 7

Encryption

Encryption	AES 256
Passphrase	

Transmission data

Peer latency	0 ms
Nakreport	<input checked="" type="checkbox"/>
Packet drop allowed	<input checked="" type="checkbox"/>

Advanced

TTL	64
Overhead bandwidth	25 %

Output Redundancy Activate to enable output redundancy

Source

Port

Name	
PSI Mode	DVB

Connection

SRT Mode	Listener
Destination Port	9999

SRT Settings

Encryption Mode	Off
Receive Latency	1000 ms
Packet drop allowed	<input checked="" type="checkbox"/>
Nakreport	<input checked="" type="checkbox"/>

Dejitter

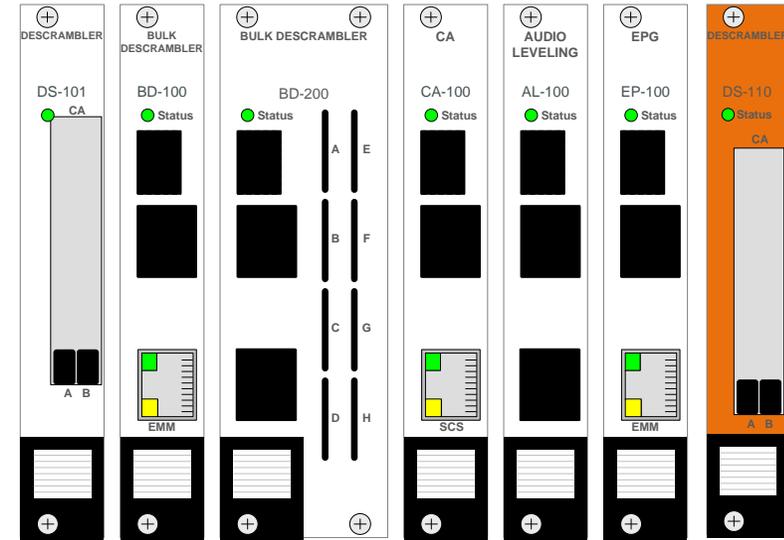
Destination

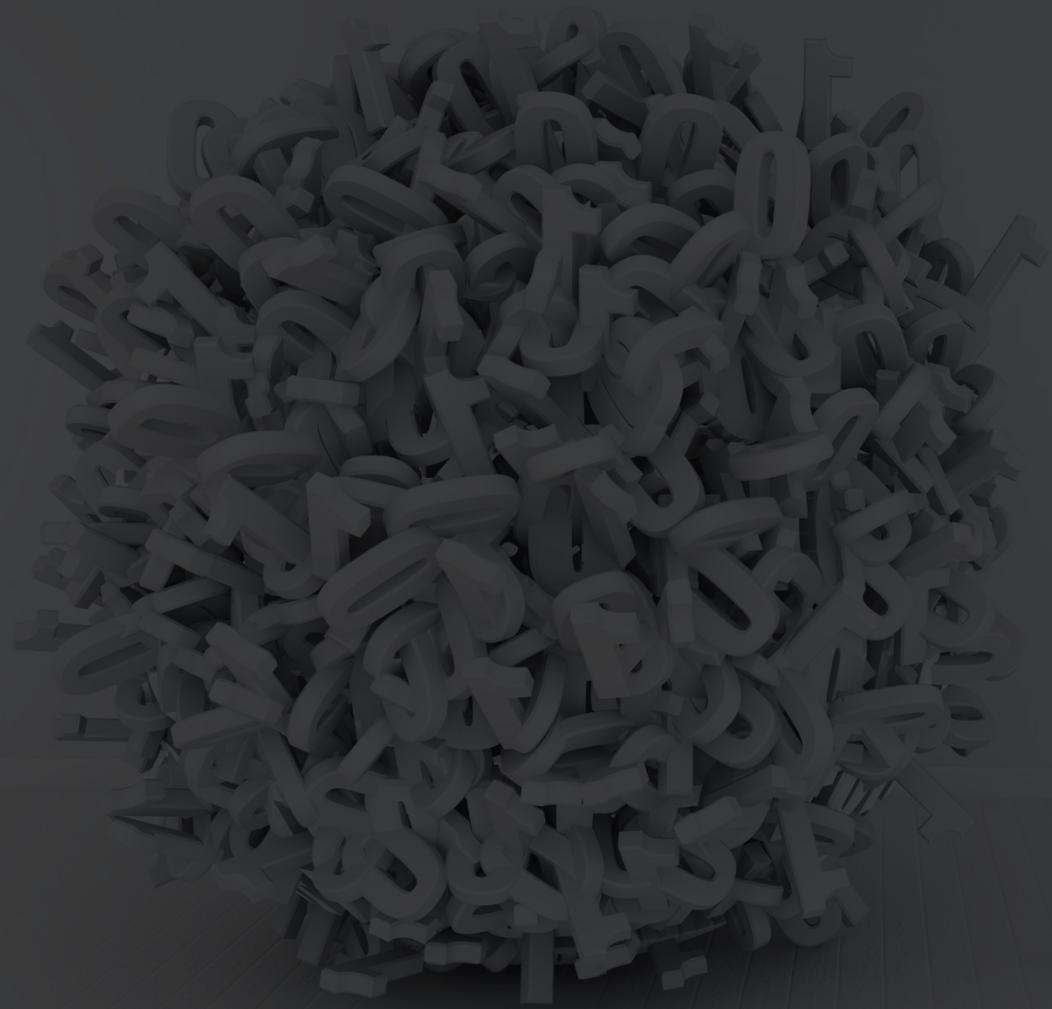
Apply Cancel OK

Modules: Processing

Processing modules

- Dual Descrambling module
- Bulk Descrambling module
- SIM Bulk Descrambler
- Scrambling module
- Digital Audio Leveling module
- EPG Re-generation module
- Descrambler gen. 2 module



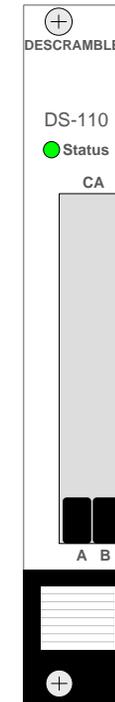


New module!!

Modules: Descrambler gen. 2 (NEW!!)

Descrambler gen. 2

- 2 × DVB Common interface
- Number of services limited by CAM (depends on CAM type/manufacturer)
 - Tested successfully with CAM up to 32 services
- Multiplexing support before CAM
 - Single CAM can descramble from multiple input sources
- 100 Mbit/s throughput per CAM
- Transparent mode descrambling (for monitoring purpose)
- Support for all major CA systems and CAMs
- 1 slot wide
- MMI Redundancy support

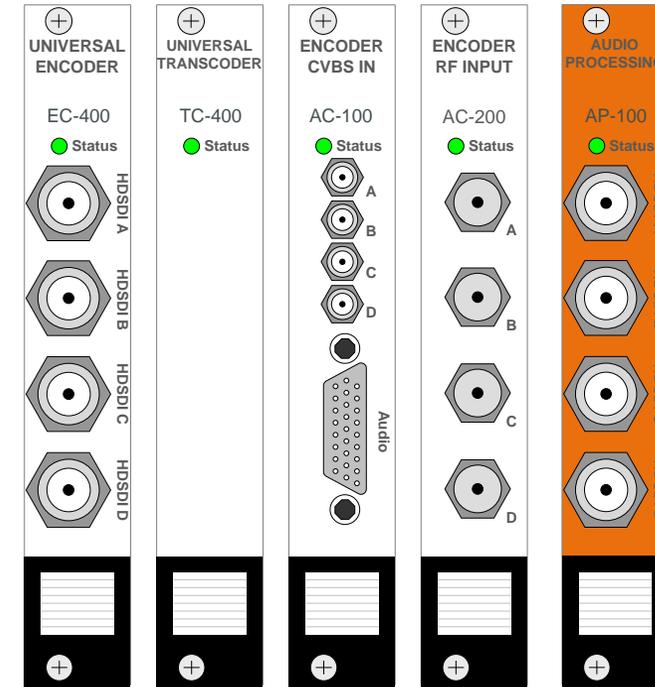


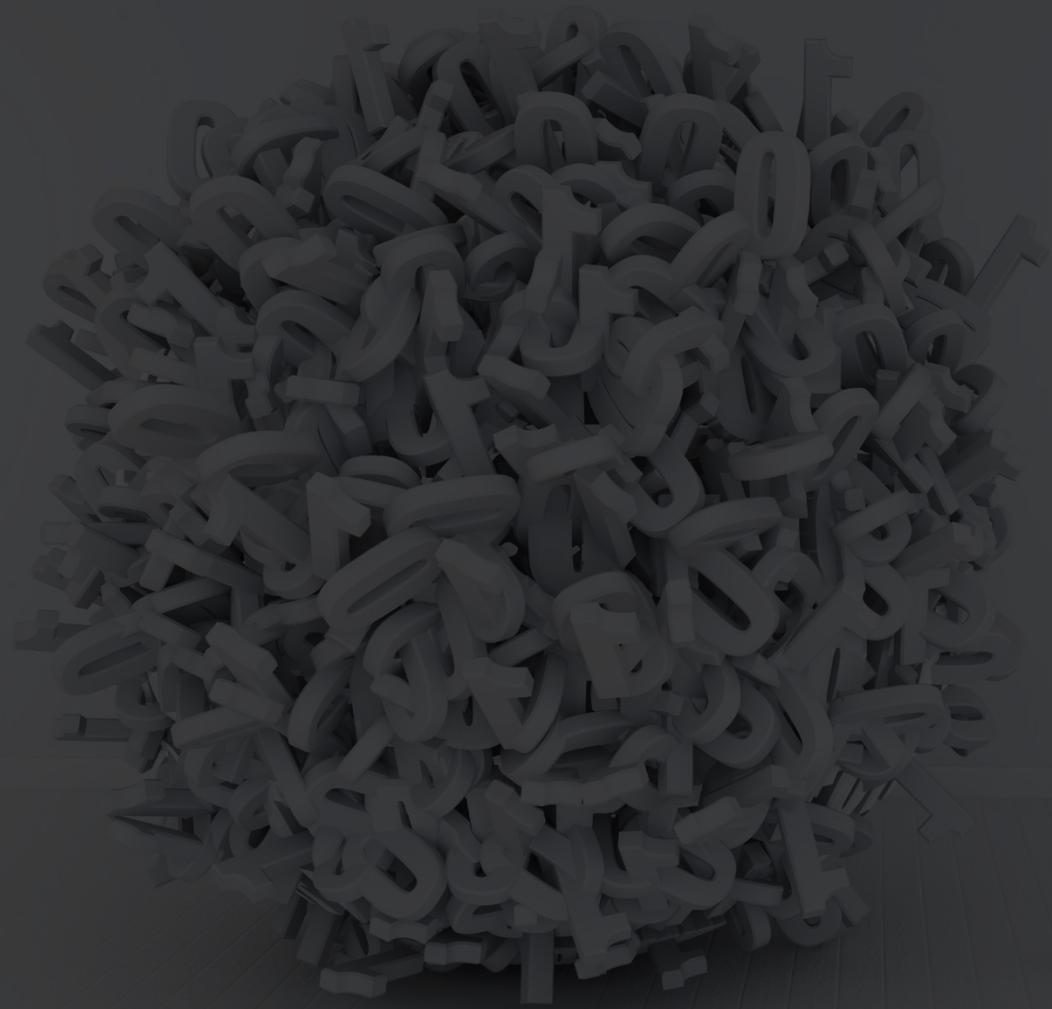
1 slot

Modules: Compression

Encoding/Transcoding modules

- MPEG-2/4 HD/SD Encoder module with HD-SDI inputs (and AES audio option)
- MPEG-2/4 SD Encoder module with analogue composite inputs
- MPEG-2/4 SD Encoder module with RF inputs
- Universal Encoder
- MPEG-2/4 HD/SD Transcoder module
- Universal Transcoder
- Audio Processor



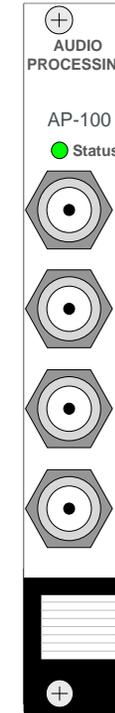


New module!!

Modules: Audio Processor (NEW!!)

Audio Processor

- Two operational modes (one module can only operate in one mode at a time):
 - Encoding
 - Encodes up to 32 stereo channels
 - 4x SDI/HDSDI input with embedded audio (8 stereo per input)
 - AES67 input via backplane
 - Transcoding
 - Transcodes up to 32 stereo channels
 - TS input via backplane
 - Maintain PCR/PTS synchronization to video

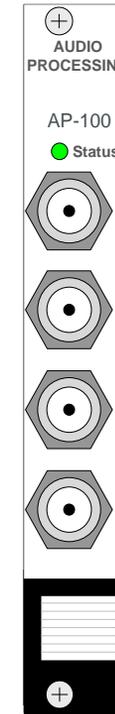


1 slot

Modules: Audio Processor (NEW!!)

Audio Processor

- Decoding formats (transcoder mode only)
 - MPEG1-Layer 2
 - AAC-LC
 - HE-AACv1/2
 - **Dolby Digital / Dolby Digital Plus**
- Encoding formats
 - MPEG1-Layer 2
 - AAC-LC
 - HE-AACv1/2
 - MP3
 - **Dolby Digital / Dolby Digital Plus**
- Audio Channel Modes :
 - Stereo
 - Mono
- Audio Level Adjustment ; +6/-10dB
- Automatic Audio Levelling – Service Loudness
- 1 slot wide

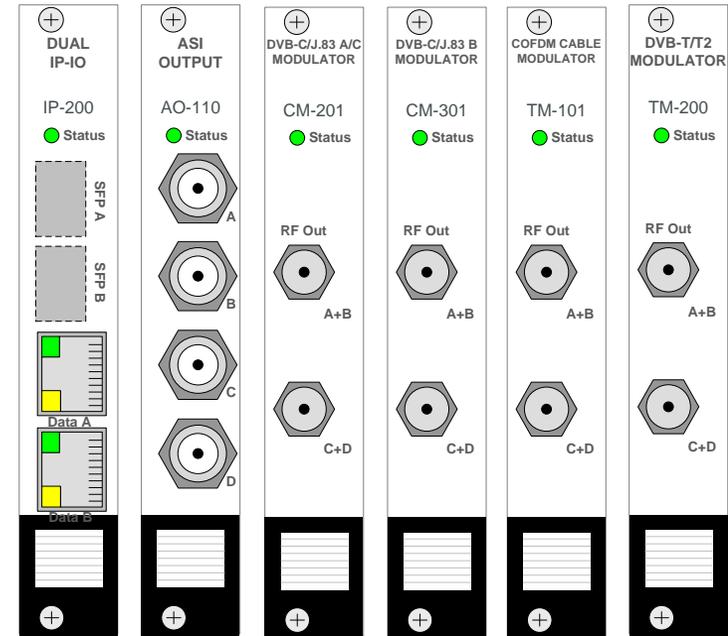


1 slot

Modules: Output

Output modules

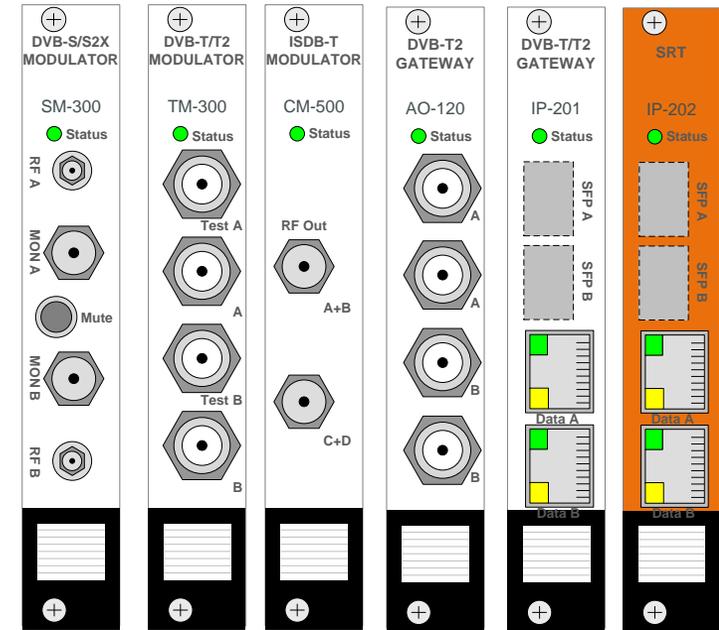
- Dual IP IO modules
- ASI output module with multiplexing
- QAM (Annex A/C & B) output module with multiplexing
- COFDM-for-cable output module with multiplexing
- DVB-T/T2 output module with multiplexing

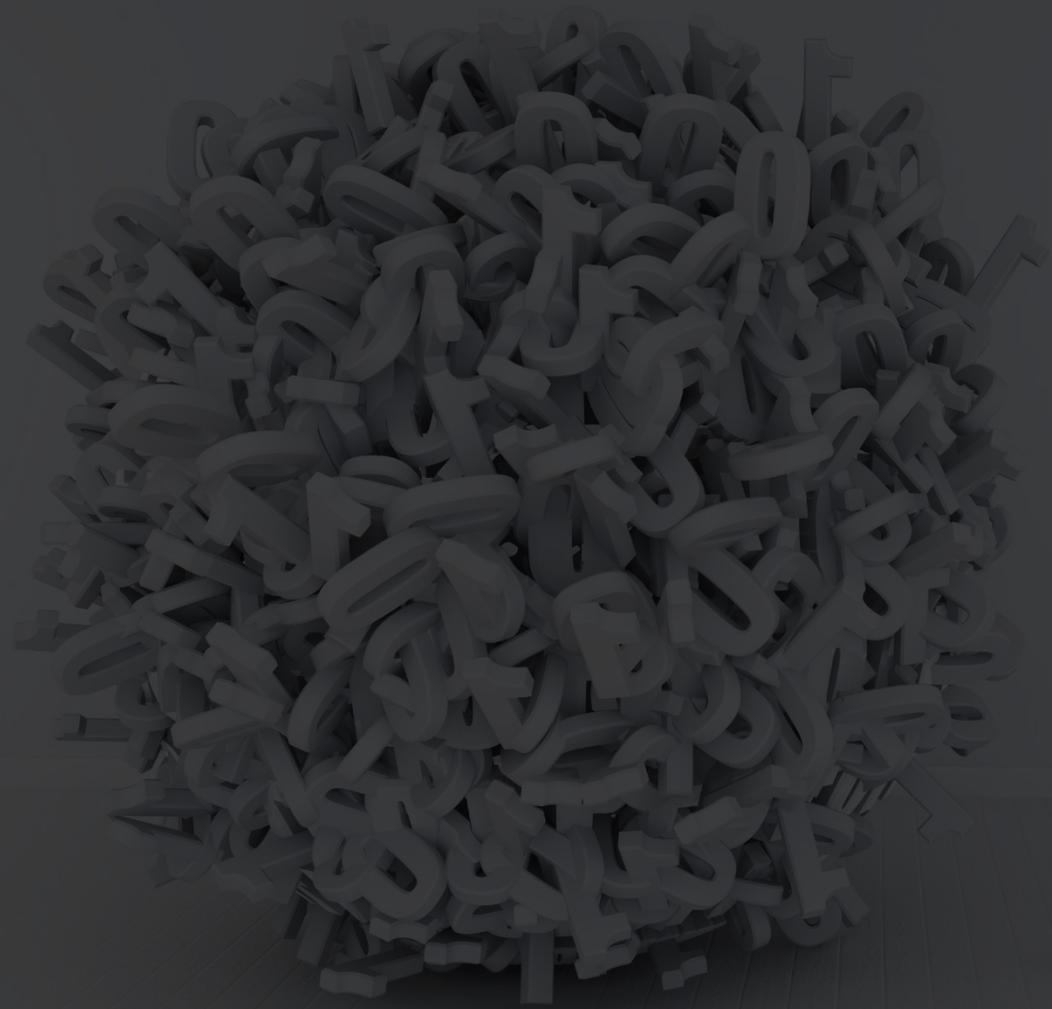


Modules: Output

Output modules

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- ASI output module with multiplexing
- QAM (Annex A/C & B) output module with multiplexing
- COFDM-for-cable output module with multiplexing
- DVB-T/T2 output module with multiplexing
- DVB-S/S2X output module with multiplexing
- ISDB-T output module with multiplexing
- DVB-T2 Gateway (IP or ASI) with multiplexing
- MIP Inserter/DVB-T Gateway (IP or ASI) with multiplexing
- **SRT output module**



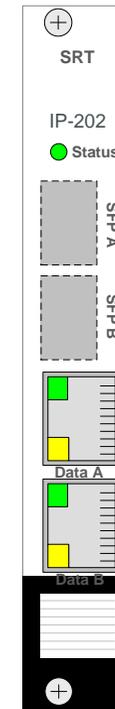


New module!!

Modules: SRT output module (NEW!!)

SRT module

- 2x Gbit RJ45 or SFP ports for data (1x input, 1x output)
- Secure transmission over the Internet
 - Encryption algorithms: AES 128, AES 192, AES 256
- Reliable transmission over the Internet
 - Retransmission mechanism on packet loss
 - Configurable latency buffer for retransmissions
- Two operational modes:
 - SRT input
 - SRT output
- Transmission modes: Caller, Listener and Rendezvous
- 35 Mbit/s throughput
 - Number of services limited by bandwidth
- 1 slot wide
- MMI Redundancy support



1 slot

Modules: MPEG Output

Common for all MPEG Output modules

- Transmission of up to 250 services (500 for Dual IP IO; 250 per port)
- Support SPTS and MPTS output
- Full Multiplexing support per output port
- Transparent and semi transparent pass through supported
- PSI/SI regeneration and insertion

Edit Settings

Service Components Scrambling Processing Transport Port Settings EMM EPG HbbTV Apps PSI

Service Name: Das Erste HD Keep original
Service ID: 10301 Keep original
Provider: Keep original
Service type: Original Keep original
Priority: High
Monitor port: off

Input Redundancy Backup source: None
Switching mode: Off

Descrambling Descrambler: off
Alt. CAM mode: Descrambler not selected

EIT Signaling in SDT Present Following: Auto
Schedule: Auto

Apply Cancel

Default Stream Properties IP Address: 239.25.30.208 Port: 1234 Component mode: auto all Scrambler: off ECM: off Service Type: 0 RTP: 7 Time to live: 7 MPEG packets/frame: 7 SPTS Enabled: Auto SID:

Inputs

- Slot:1 Input:0 Services:3
 - * Auto First Service
 - * Auto All Services
 - 416 TLC Norge
 - 417 TLC Sverige
 - 418 TLC Danmark
- Slot:2 Input:A Services:32
- Slot:2 Input:B Services:0
- Slot:2 Input:C Services:4
- Slot:2 Input:D Services:13

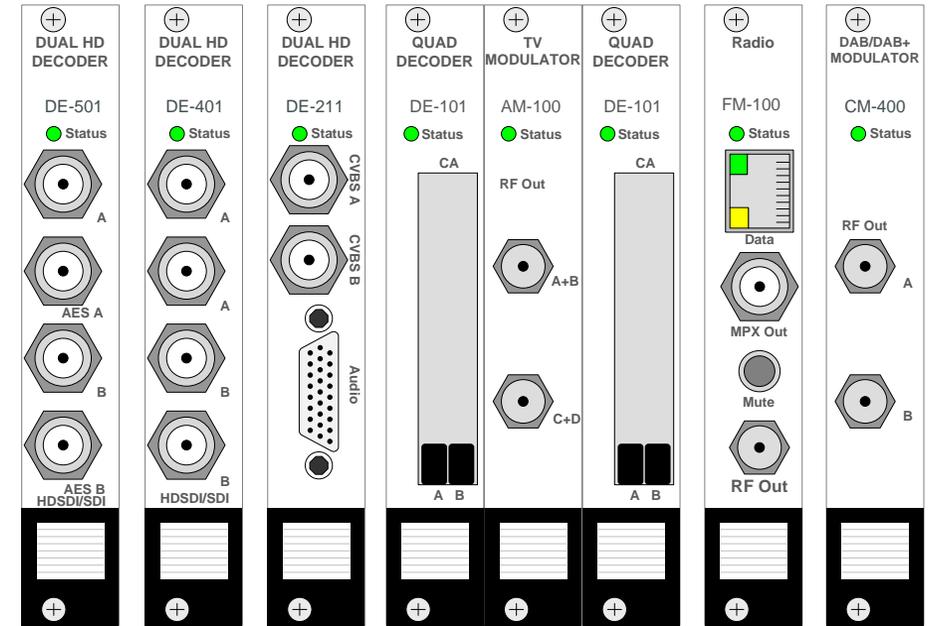
Output(16) Add MPTS...

- [1111:201] 239.30.24.201:1234
 - TLC Danmark(2:D:418)
 - TLC Norge(2:D:416)
 - TLC Sverige(2:D:417)
- 232.30.24.211:1234 TLC Norge(1:0:416)
- 232.30.24.212:1234 TLC Sverige(1:0:417)
- 232.30.24.213:1234 TLC Danmark(1:0:418)
- 232.30.25.102:1234 NRK2(1:1:1502)
- 239.25.30.207:1234 Das Erste HD(2:C:10301)

Modules: Decoding

Decoding modules

- MPEG-2/4 SD/HD Dual Decoder modules with HD-SDI (and AES) outputs
- MPEG-2/4 SD/HD Dual Decoder module with composite output
- MPEG-2/4 SD/HD Decoder modules with RF modulation and up-conversion
- FM Radio module with RDS
- DAB/DAB+ Modulator module



Redundancy



REDUNDANCY

Input

- Any service can have a backup service from a different input port regardless of input type
- Input port-based redundancy also supported
- No external management required

Seamless IP Input

- Seamless input redundancy switching on IP
- Requires two independent active network feeds to receiver site
- Protects against network packet loss
- Provides 100% FEC; dramatically improving QOS

Internal

- Input (network), switch, management and backplane redundancy
- Modules can switch to second backplane and receive services from backup network/input module
- Automatic or manual switching
- Ideal for IP-to-RF applications

REDUNDANCY

N+M in Enc/Transc

- 1+1 redundancy on IP input, IP output and management
- Internal 1+1 redundancy on switch and backplane
- N+M redundancy on Encoder and Transcoder modules
- Automatic or manual switching
- No external management required

N+M with external NMS

- Appear TV SOAP XML interface
- SNMP Alarm MIB
- Require 3rd party mgmt. system

Cold Spares

- Easy due to hot-swap modules
- Automatic reconfiguration

REDUNDANCY

1+1 IP Output: OSPF

- OSPF routing protocol for service based redundancy switching
- Automatic 1+1 redundancy: No need for NMS
- Enables site redundancy

1+1 IP Output: Monitor In-Out

- Monitor In-out → Automatic
- Back-to-back connection
- Simplicity

1+1 RF Output

- 1+1 redundancy on ASI, DVB-S/S2, DVB-T/T2 and QAM out
- DEV relay switch is integrated and controlled by WEB GUI

THANK YOU!

