Datasheet

XC5000
XC5100

appear.net

Version 4.8

appear

SYSTEM OF CHOICE FOR PROFESSIONAL OPERATORS

Appear is dedicated to providing world class equipment that enable operators to deliver professional broadcast services at the highest possible quality. Our portfolio is built around modular platforms hosting a wide selection of interoperable modules that give unparalleled configuration possibilities. Through its clever and robust design, the integrated architecture offers superior reliability that can meet even the most demanding operator requirements.

A key feature of the products is the ability to accommodate customers preferred system architectures while reducing complexity. It is possible to build an entire broadcast system within a single chassis or distribute it between several discreet stages or distributed architectures. Appear's deep understanding of the market and close co-operation with operators in the design of products ensures the ability to provide optimal solutions for a wide array of fixed or wireless networks. Our philosophy greatly reduces the cost of ownership and ensures that operators can simultaneously handle legacy challenges and evolve through the introduction of brand new services.

Appear's XC5000 and XC5100 are our latest generation carrier grade platforms with 4RU and 1RU chassis options of unmatched power and versatility. There are no restrictions even for the most intensive processing requirement. Both units feature uprated dual-redundant and hot swappable power supplies, increased cooling, enhanced redundancy and a number of other features.

An advanced user friendly GUI offers an intuitive and comprehensive management of the many features of the system. The exhaustive multi-level alarm system, together with the easiness for integration to 3rd party management systems, enables full automatic control. The possibility of centralized monitoring simplifies deployment and streamlines maintenance.

Appear classifies its modules into different categories depending on the functionality. These include switching, input for content aggregation, compression, processing, output and decoding modules. All modules can be combined freely to provide the desired functionality. The latest innovations include the possibility to deliver and convert both analog and digital broadcast services, from point to point, or from point to multipoint and in any format to any screen.

«Complete solutions for every major broadcast segment››

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

AWARD WINNING REDUNDANCY

Appear's intelligent redundancy software provides seamless integration between broadcast equipment and IP networks. It protects every stage and provides automatic backup in case of service stream failure at input, protection from internal failures, and intermittent or permanent data losses within distribution networks without requiring complex control software.

Appear's redundancy solution is unique in being the only solution in the IP television market to take a holistic view of operation and network management. Redundancy configuration is simplified and automated, and operational routines are significantly reduced. The integrated redundancy solutions offer operators compelling quality of service benefits and improved network reliability. The individual elements of this integrated solution are further described below. For more detailed information please contact Appear.

Input redundancy

The Appear system is equipped with an advanced input redundancy switching mechanism. Any output service can be configured to have a backup service from a different input TS regardless of input type. Input switching can also be performed on TS level using 'input port redundancy'.

Redundancy switching can be set to automatic or manual. In automatic mode it is possible to choose from the following switching modes: Once (switch and stop), Floating or Reverting.

Seamless IP input redundancy (License)

The Appear Seamless IP Switch module makes it possible to achieve seamless IP input redundancy switching between two distribution networks. The Seamless IP Switch combines an innovative alignment technique
with a fast acting data switch making it possible to reconstruct a perfect outgoing stream even from two imperfect network feeds.

The Seamless IP Switch can regenerate the traffic received via two networks, so that both networks are used 100% of the time to back each other up. Using the data provided by both networks simultaneously, rather than just one, enables dramatic improvements in QoS.

Internal Redundancy (4RU chassis feature)

By using Appear's Internal Redundancy feature, all critical single points of failure in the 4RU chassis are eliminated. This clever mechanism facilitates configurations with redundant switch modules, redundant backplanes, redundant IP inputs, redundant MMI (i.e. management & control) as well as redundant power supplies. In case of input, switch or MMI failure, all output modules or decoder modules will switch backplane and log into the other MMI where it will receive the services from the backup inputs and switch.

By having 1+1 redundancy on inputs and switch modules, all components of the chassis are backed up, except for the decoder and output modules which normally handle a subset of the available channels. In case of failure of decoder or output modules, they can easily be hot-swapped, and the affected services will be up and running in seconds.

N+M redundancy (4RU chassis feature) (License)

The Appear self-managed N+M redundancy for encoding and transcoding provides a powerful option for broadcasters needing the economies of N+M compression redundancy without the expense, complexity and long term reliability concerns of a conventional NMS. Rather than relying on external PC hardware, Appear have integrated the redundancy control into the built in management system thus simplifying system configuration eliminating integration and operational issues between HW and management PC. It is the perfect method for creating the intelligent 'device islands' that are increasingly being favored by broadcasters when architecting new solutions.

The encoders and transcoders will be the only items within the chassis in N+M configuration. Everything else will be 1+1. This includes any input and output ports, all control and management functions, the backplane and the power supplies. Each 4RU chassis will be equipped with backup encoder or transcoder module(s) capable of providing module level replacement for any of the active encoders or transcoders within the chassis. Multiple redundancy groups can be combined in the chassis by automatically creating groups of encoders and transcoders. For encoding, the redundant control modules can drive a (HD)SDI video router directly

IP Output redundancy (License)

The IP output redundancy system presents a network with multiple sources from which it is possible to obtain the same service. Should the service
from one source be corrupted, the network can receive the service from another source. The redundancy solution is service based (multicast based) where the same service will be available for two or more sources. As long as all sources with the same channel have the same IP source address, the network will route just a single copy of the multicast stream forward to the receiver based on routing cost. In the event of a service issue within, or prior to, the Appear chassis, the IP output module exploits standard IP protocols to trigger external routers to switch to secondary sources. The "Monitor-in-out" functionality may be used for those networks not utilizing routing protocols.

Where full redundancy is not required, partial redundancy strategies can be implemented. Systems can be configured to provide full redundancy of only selected premium or 'must-carry' services. Operators can then choose not to replicate the input and descrambling functions of lower priority services, but still equip the chassis with multiple IP output modules to provide limited fault tolerance.

CHASSIS

Appear offers two different chassis: the 4RU XC5000 chassis which can hold 16 modules and the 1RU XC5100 chassis which can hold 6 modules. In addition, each of the chassis houses a switch and management module that can be equipped with dual IP I/Os. Both chassis variants have dual-redundant and hot swappable power supplies. Each unit with its hot swappable modules allows for various redundancy scenarios.

Any of the modules listed under the Input, Encoding/Transcoding, Processing, Output and Decoder sections can be combined into the same chassis. Only chassis space or total throughput will limit the number of modules that can be fitted. The chassis has been designed for a throughput of 850 Mbit/s of MPEG TS data and 250 services. In selected configurations, capacity can be increased to 1700 Mbit/s and 500 services (please contact Appear for more information).

The 4RU chassis has four independent fan modules that operate and are monitored independently. The four fan modules are identical and support hot-swap. The 1RU chassis has one preassembled fan module consisting of 6 fans. The fan module is hot-swappable as one complete module. The internal temperature is monitored and if a fan fails, the remaining fans will compensate by increasing the speed.

FEATURES

4RU - XC5000

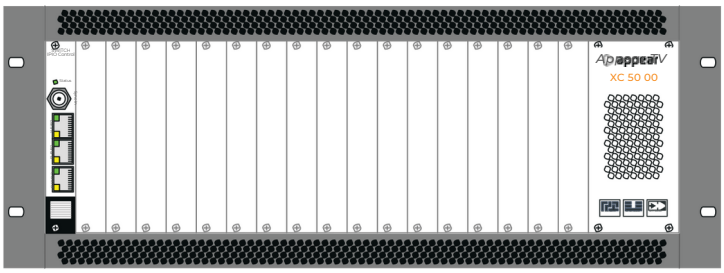
- Modular configuration with up to 16+2 board positions
- WEB based configuration, SNMP Alarms, SOAP/XML interface
- Forced air-cooling (front to back)
- Dual redundant hot-swappable power supply
- Remote reset of power
- 4 individually monitored hot-swappable fans
- Hot-swappable modules
- 100-240V AC or -48V DC power

1RU - XC5100

- Modular configuration with up to 6+1 board positions
- WEB based configuration, SNMP Alarms, SOAP/XML interface
- Forced air-cooling (front to back)
- Dual redundant hot-swappable power supply
- Remote reset of power
- Swappable fan module
- Hot-swappable modules
- 100-240V AC or -48V DC power

DIMENSIONS

4RU (XC5000)
440 ×177 ×400 (w × h × d mm)

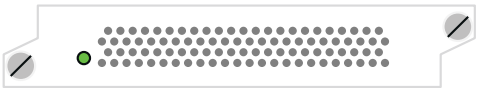


1RU (XC5100)
440 ×44 ×480 (w × h × d mm)

The XC5000 and XC5100 use the same set of modules and same SW, but the front plates are different.

The modules can therefore not be interchanged between XC5000 and XC5100.

Module plate for XC5000



Module plate for XC5100

«Hardware-managed redundancy for unbeatable speed and long-term reliability››

SWITCH MODULES

The switch module is used to enable MPEG traffic distribution within the chassis and provides the Man Machine Interface (MMI), enabling configuration and management of the chassis.

The XC5000 chassis has dedicated positions for the switch module in slot 0 with an optional (for selected configurations) redundant switch module in slot 17. The switch module can be equipped with two independent IP IO ports as an option. The XC5100 chassis provides an integrated switch module in the front with IP IO as standard. The switch module for XC5100 is functionally identical to the switch module used in the larger XC5000 chassis, but has a different hardware layout.

At least one switch module is required in all chassis. In addition to being the active part of the internal backplane, the switch module provides the central control and management interface. When equipped with two IP IO data ports, reception or streaming of MPEG compliant transport streams over UDP/RTP is supported by the module. Each port operates independently and can be configured as either IP in or IP out supporting full 850 Mbit/s TS data rate and up to 250 MPEG services. The switch module can be provided with either RJ45 connectors or SFP connectors on the two data ports. When equipped with two data ports, the module also includes a BNC port used for clock reference (Genlock). The switch module is hot-swappable for easy maintenance.

The Switch IP IO MMI module can also be ordered to include a GPS receiver for terrestrial SFN applications. For the XC5000, this is a separate module that must be placed in slot 1, while for XC5100, it is an add-on module for the switch module. One SMA connector for connecting either a GPS antenna or a 1 PPS reference is then available. It is also possible to order without the GPS radio module so that it just provides a high stability oscillator providing locking to a 1 PPS or 10MHz reference signal.

SWITCH MODULES FOR XC5000

Switch Module with Management

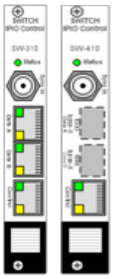
SW-200

- Gbit/s routing between modules in a chassis
- Enables WEB management
- 10/100/1000BaseT management port (RJ45)
- 1 slot wide

Switch Module with Management and IPIO

SW-301, SW-310 & SW-401, SW-410

- Gbit/s routing between modules in a chassis
- 2 × Gbit RJ45 or SFP input or output port for data
- Frame Synchronization input (genlock)
- Up to 850 Mbit/s TS rate per data port
- Supports UDP/RTP Multicast/Unicast
- Supports reception of MPTS and SPTS
- Supports streaming of MPTS and SPTS
- Supports seamless (hitless) input redundancy and cloned output
- Multiplexing on output with PSI/SI regeneration (license)
- Service filtering
- FEC encoding and decoding (license)
- Enables WEB management
- 10/100/1000 BaseT management port (RJ45)
- 1 slot wide



Clock Reference Module*

CK-100*

- GPS antenna input
- 1 pps input reference
- 10 MHz test output
- 1 pps test output
- 1 slot wide

* Please contact Appear for availability

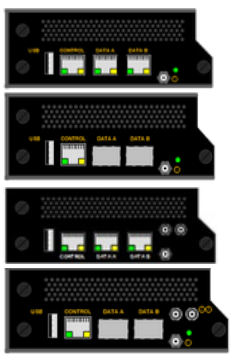
SWITCH MODULES FOR XC5100

Switch Module with Management

- Gbit/s routing between modules in a chassis
- Enables WEB management
- 10/100/1000BaseT management port (RJ45)

Switch Module with Management and Dual IPIO

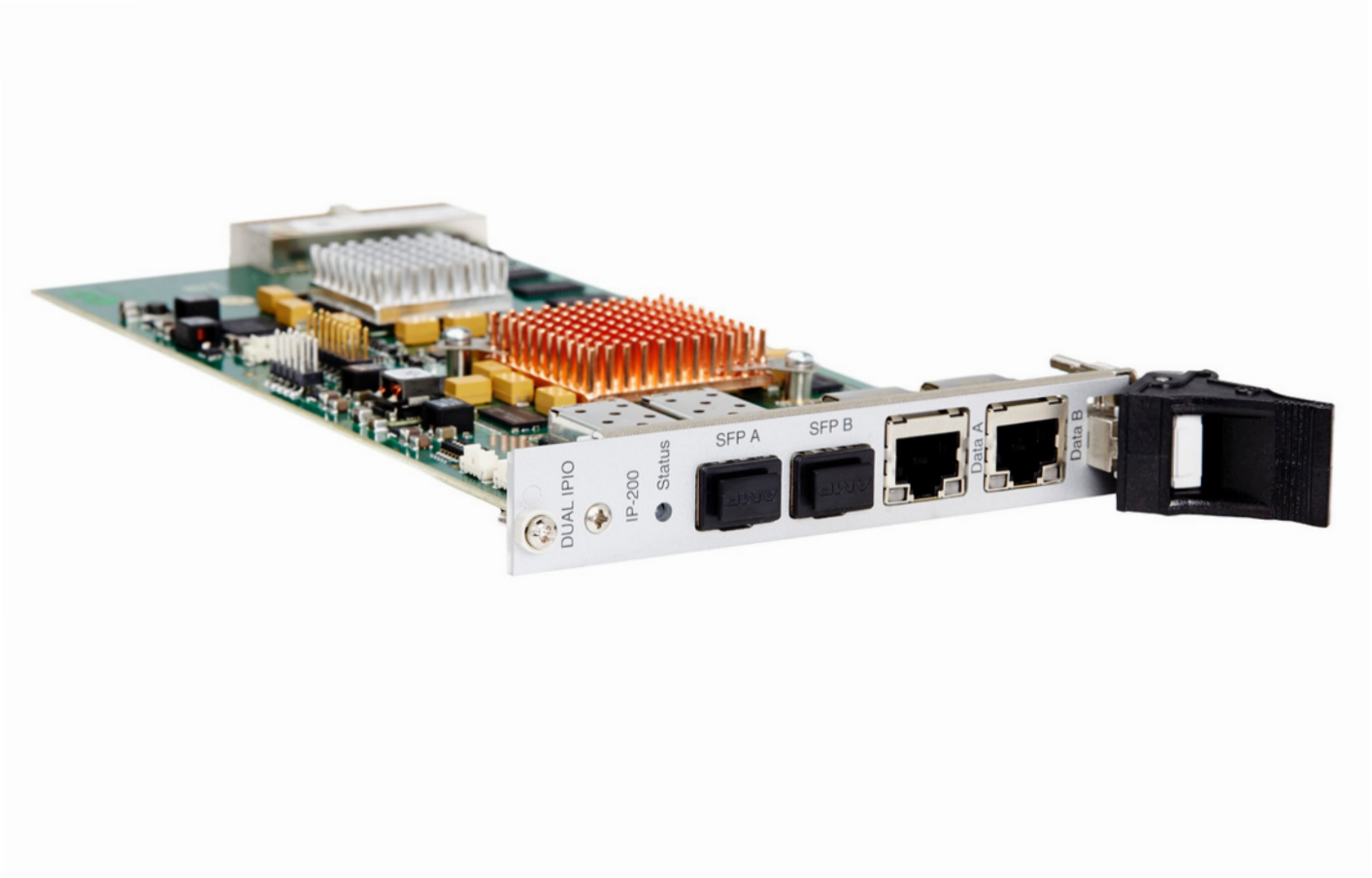
- Gbit/s routing between modules in a chassis
- 2 × Gbit RJ45 or SFP input or output port for data
- Frame Synchronization input (genlock)
- Up to 850 Mbit/s TS rate per data port
- Supports UDP/RTP Multicast/Unicast
- Supports reception of MPTS and SPTS
- Supports streaming of MPTS and SPTS
- Supports seamless (hitless) input redundancy and cloned output
- Multiplexing on output with PSI/SI regeneration (license)
- Service filtering
- FEC encoding and decoding (license)
- Enables WEB management
- 10/100/1000 BaseT management port (RJ45)
- Optional GPS Receiver



MPEG INPUT MODULES

Appear has a wide range of input modules making it the most effective content aggregation solution on the market. An input module analyzes incoming transport streams and extracts selected MPEG services from the desired physical input interface (eg. ASI, IP, DVB-S/ S2, DVB-S/S2X, DVB-C, DVB-T/T2, ISDB-T and 8VSB). Each input module type is based on embedded hardware design offering high density and reliability. The ability to mix input types freely within a chassis enables multiple MPEG transport streams originating from a variety of sources to be received and processed in parallel. Received signals can be demodulated, de-multiplexed and distributed to other modules inside the chassis via the backplane.

A wide range of input modules are available including IP, ASI, DVB-S/S2, DVB-S/S2X, DVB-C, DVB-T/T2, ISDB-T and 8VSB. The chassis supports any combination of input modules limited only by available slot space. Each input module is designed to receive up to 850Mbit/s of MPEG TS rate or 250 services. In re-multiplexing mode, all services are de-multiplexed by the input module before passed onto the backplane. Unused services are blocked by the input module to avoid propagating them further, which increases efficiency. The full content of an input port can be mapped transparently to an output port with the option to perform PID filtering or service filtering.



INPUT MODULES

Dual IP IO

IP-200/IP-300

- 2 × Gbit RJ45 or SFP input port for data (or 1×in and 1×out)
- Up to 850 Mbit/s TS rate per data port
- Supports UDP/RTP Multicast/Unicast
- Supports reception of MPTS and SPTS
- Supports seamless (hitless) input redundancy
- Service filtering
- Supports FEC (SMPTE 2022) (license)
- Input analysis
- 1 slot wide

ASI Input

AI-110

- 4 × ASI inputs
- 4 × BNC connectors
- 213 Mbit/s Burst mode or 72 Mbit/s Spread mode per input
- Supports reception of MPTS and SPTS
- Service filtering
- Input analysis
- 1 slot wide

DVB-C Input

CR-200

- 16 x QAM receivers per module
- 1 F-type, 75 ohm female input port
  (all channels on one input cable)
- Standard EN 300 428, ITU-T J83 Annex A/B/C (CR-200)
- Frequency range 47 - 1000 MHz (CR-200)
- Service filtering
- Input analysis
- 1 slot wide

ISDB-T Input

TR-401

- 4 x ISDB-T receivers per module
- 1 F-type, 75 ohm female input port
  (all 4 channels on one input cable)
- Frequency range 47-860 MHz
- Service filtering
- Input analysis
- 1 slot wide

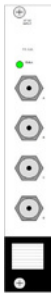
DVB-S/S2X Input

SR-120

- 4 × DVB-S/S2/S2X inputs, 1 F connector per input
- Satellite standards:
  - DVB-S EN 300 421
  - DVB-S2 EN 302 307 – 1
  - DVB-S2X EN 302 307 -2, Broadcast Services
- Frequency range 950 – 2150 MHz
- Constellation: QPSK, 8PSK, 16APSK, 32APSK
- Symbol rate:
  - DVB-S/S2/S2X: 1-45 MSym/s for QPSK, 8PSK, 16APSK
  - 1-39.9 MSym/s for 32-APSK
- FEC: According to EN300421 & EN302307
  part 1 & part 2 for Broadcast services
- Supports multistream reception
- Service filtering
- Input analysis
- 1 slots wide

8VSB / ATSC 3.0

TR-500



- 4 × 8VSB Inputs
- 4 × F connectors
- Frequency range 50 - 860 MHz
- ASI monitoring port
- Service filtering
- 1 slots wide
- Support: ATCS 3.0*

*: will be available at a later time

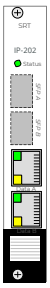
DVB-T/T2 Input

TR-210, TR-211

- 4 × DVB-T/T2 receivers per module.
- Input ports option:
  - 1 × F connector, signal is split and distributed internally
  - 4 × F connectors, one per demodulator
- Frequency range 47 - 862 MHz
- Carrier mode:
  - DVB-T: 2k, 8k
  - DVB-T2: 1k, 2k, 4k, 8k, 16k, 32k
- Modulation:
  - DVB-T: QPSK, 16QAM, 64QAM
  - DVB-T2: QPSK, 16QAM, 64QAM, 128QAM, 256QAM
- Service filtering on input
- Input analysis
- 1 slot wide

SRT

IP-202



- 2 × Gbit RJ45 or SFP ports for data (1×in and 1×out)
- Secure transmission over the Internet
  - Encryption algorithms: AES 128, AES 192, AES 256
- Reliable transmission over the Inter net
  - 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

UNIVERSAL ENCODER & TRANSCODER

Linear Broadcast
In order to optimize the performance of their networks, it is essential for professional broadcasters to deploy the latest advances in compression technology. Whether the aim is to add new channels to existing multiplexes or provide genuine video quality improvements, operators should always strive to utilize the best in class technology to offer superior viewing experience whilst improving bandwidth efficiency.

Appear has developed an encoding/transcoding solution providing leading class performance for video quality and channel density on a specifically designed module targeting a wide range of applications. This allows users to maintain the best possible quality of service in combination with low power consumption and integrated multi-level redundancy.

The immense computational power of the platform runs all-new and highly evolved encoding algorithms, boosting performance to the limit for both AVC and MPEG2 video. The highly programmable and flexible audio encoder offers high density per channel and includes Dolby® codecs, making this one of the most powerful encoder platforms on the market.

A brand new architecture offers full flexibility for configuration, with adaptable application modes. The Universal Encoder and Universal Transcoder module can operate in either a High Video Quality mode, or alternatively in high density broadcast mode. Channel density is significantly increased with a small adjustment in performance whilst Multiscreen mode enables operators to increase content reach to multiple media devices in the fixed and mobile domain.

The new second generation statistical multiplexing provides ultra-fast refresh rate from a multi-pass look-ahead design minimizing inherent latency. Mixed encoder/ transcoder populations can be used within the platform supporting several single or mixed format SD/HD statistical multiplexing groups so that low-bitrate encoding can be applied to specific services within any given group.
All new Universal Encoder/Transcoder modules can be used in new or existing XC5000 or XC5100 Series platforms and can work in combination with any other modules from Appear's comprehensive range.

Multiscreen (OTT):
Increased internet access together with more powerful computers, integrated TVs, tablets and mobile phones makes it possible for consumers to receive video content from broadcasters anywhere, at any time and on any screen. This introduces new challenges for content and network infrastructure providers who need to offer a wide range of different distribution formats with the best possible live video experience regardless of the distribution networks and viewing devices that are being used.

The latest innovative Universal Encoder/Transcoder running in Multiscreen mode from Appear enables broadcasters and IP network operators to provide high quality multiscreen services. The transcoder module supports MPEG-2/4 TS input and transcodes to multiformat MPEG-4 TS output with IDR alignment. The encoder module accepts SDI/HDSDI inputs directly, and encodes these into multiple profiles as a single pass, avoiding the need to concatenate compression stages which always causes inefficiencies and reduces VQ. The unique architecture delivers significant VQ and efficiency benefits for all real-time applications.

Appear now offers a truly optimized OTT solution capable of accepting any input signal format. These benefits are magnified further by a modular architecture that lets you fit encoding or transcoding options freely according to actual need. The Appear Multiscreen encoder/transcoder simultaneously prepares multiple signals from any source in any format for distribution to high definition televisions, high resolution computers and low resolution web and mobile devices.

The highly programmable functions include input service replication, resolution change, interlaced to progressive conversion, rescaling and key frame alignment. The end result provides key-frame aligned outputs in transport stream format with the required metadata to support either IPTV distribution directly, or interface with the customers preferred packagers to perform segmentation.
The proven ability to interface with several leading segmenters/originserver is another major feature of the Appear solution. It enables customers to freely create a best of breed solution, combining best in class compression with their choice of latest features such as targeted advertising and common encryption with MPEG DASH.

ENCODING/TRANSCODING MODULES

Universal Transcoder - Multiscreen (OTT)

TC-400

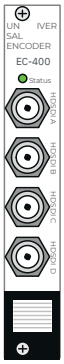
- Transcodes up to four services into multiple profiles
- Transcodes single service into 4 HD or 28 sub SD profiles
- Profile range from 1920×1080p to 240×180p*
- Resolution conversion
- Frame rate reduction
- GOP alignment
- Audio transcoding
- 1 slot wide

*For complete list of available profiles, please contact Appear TV

Universal Encoder - Multiscreen (OTT)

EC-400

- Encodes up to four services into multiple profiles
- 4xSDI or 2xHDSDI input with embedded audio
- Supports an extensive range of resolutions and frame-rates from full 720p60/50 HD down to 144p15/12.5
- Resolution conversion
- Dynamic Encoder GOP Control Modes
- Key frame alignment
- Audio encoding
- 1 slot wide



Universal Transcoder – High VQ Broadcast

TC-400

- Transcodes up to:
  - -1 HD with PIP
  - -2 SD with PIP
- Full decode and re-encode
- Optional H.264 4:2:2 8bit/ 10bit decoding
- Resolution conversion
- MPEG-1, AAC and Dolby® audio transcoding
- Component pass-through
- Operates in 3 different Encoder Rate Control modes:
  - Constant Bit Rate (CBR)
  - Capped Variable Bit Rate (CVBR)
  - Statistical Multiplexing
- Automatic Audio Levelling
  - Service Loudness
- 1 slot wide

Universal Encoder - High VQ Broadcast

EC-400

- Encodes 1 HD or 2 SD into MPEG-2 or MPEG-4
- SDI/HDSDI input with embedded audio
- 2 BNC, 75 ohm female input ports (plus 2 unused BNC)
- Operates in three encoder rate control modes:
  - Constant Bit Rate (CBR)
  - Capped Variable Bit Rate (CVBR)
  - Statistical Multiplexing
- Resolution conversion
- Picture in Picture
- Logo insertion
- Advanced audio encoding with support for all common audio codecs
- Automatic Audio Levelling
  - Service Loudness
- 1 slot wide

Universal Transcoder - Dense Broadcast

TC-400

- Transcodes up to:
  - 4 HD with PIP
  - 12 SD with PIP
  - 16 SD no PIP
- Full decode and re-encode
- Audio transcoding
- Component pass-through
- Operates in 3 different Encoder Rate Control modes:
  - Constant Bit Rate (CBR)
  - Capped Variable Bit Rate (CVBR)
  - Statistical Multiplexing
- Mediaroom approved
- Automatic Audio Levelling
  - Service Loudness
- 1 slot wide

Universal Encoder – Dense Broadcast

EC-400

- Encodes 4 HD or 4 SD into MPEG-2 or MPEG-4
- SDI/HDSDI input with embedded audio
- 4 BNC, 75 ohm female input ports
- Operates in three encoder rate control modes:
  - Constant Bit Rate (CBR)
  - Capped Variable Bit Rate (CVBR)
  - Statistical Multiplexing
- Resolution conversion
- Picture in Picture
- Logo insertion
- Advanced audio encoding with support for all common audio codecs
- Automatic Audio Levelling
  - Service Loudness
- 1 slot wide

PROCESSING MODULES

Descrambling and Scrambling

Appear provides two types of descramblers: CAM-based (DVB-Common Interface) and bulk descrambling. The CAM based descrambler module is integrated with professional CAM modules from vendors such as SMIT, SmarDTV, Aston etc. and supports descrambling of up to 10 services per CAM. The bulk descrambler is aimed at software-based CA systems or CA vendors open for an embedded integration. It is used for the descrambling of multiple services protected by one or more CA systems and offers very high descrambling density of up to 250 services per module, making it an efficient, space and energy saving solution. The scrambler module supports both DVB CSA and all common flavors of AES scrambling algorithms. The scrambler module is fully simulcrypt compliant and has been integrated with all major CA vendors.

EPG and audio leveling

The Electronic Program Guide (EPG) module allows a network operator to receive several channel bouquets from multiple sources and reuse the existing EPG information. The EPG will receive EIT tables from any available input automatically and filter out unused services and re-generate the EIT schedule to reflect the current channel lineup for the selected network. For channels without EPG information on air, the information can be imported via a dedicated IP interface using XMLTV format.

Appear's audio leveling simplifies the process of changing the audio levels of hundreds of channels by eliminating the need to decode and re-encode these TV and radio channels prior to transmitting them. The solution lets operators tune the audio level of up to 250 audio tracks individually, within the MPEG domain. The audio leveling module supports MPEG-1 layer 1 or 2 audio with an adjustment range of ±30dB.

PROCESSING MODULES

Bulk Descrambler

BD-100

- Descrambles up to 250 services (850 Mbit/s)
- Integrated with soft clients for ECM handling (no smart card required)
- Support for both DVB-CA and AES descrambling
- Integrated with Verimatrix (ViewRight client version 4.3) and Latens
- BISS descrambling
- 1 slot wide

SIM Bulk Descrambler

BD-200

- Descrambles up to 250 services (850 Mbit/s)
- Smart Card based descrambling (SIM)
- 16 SIM readers; 8 in front and 8 behind the front
- Support for both DVB-CA and AES descrambling
- Integrated with Conax and Cryptoguard
- BISS descrambling
- 2 slot wide

Scrambler

CA-100

- DVB CA compliant scrambling (CSA) and AES compliant scrambling
- Scrambles up to 250 services, maximum 850 Mbit/s
- Supports scrambling of MPEG-2, MPEG-4 and HEVC
- DVB Simulcrypt compliant
- 10/100/1000BaseT IP interface towards CA system (RJ45)
- Handles up to 250 ECMs
- 1 slot wide

Descrambler

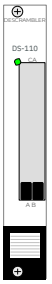
DS-101

- 2 × DVB Common interface
- Descrambling of 10 services per CAM (depends on common interface)
- Support for all major CA systems and CAMs
- 1 slot wide

Descrambler Gen. 2

DS-110

- 2 × DVB Common interface
- Number of services limited by CAM
  - 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

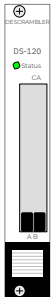


Pro Descrambler

DS-120

- 2 × DVB Common interface for Sky/NDS ProCAMs
- Number of services limited by CAM
- Multiplexing support before CAM
  - Single CAM can descramble from multiple input sources
- 100 Mbit/s throughput per CAM
- Transparent mode descrambling (for monitoring purpose)
- 1 slot wide

** Special approval required. Please contact Appear TV.*



EPG

EP-200

- Re-generation of EIT schedule on selected output ports
- Gathers EIT information from all input ports
- EPG data is filtered and regenerated to reflect new channelplan
- Supports multiple of networks
- Configurable play out rate with prioritization
- Configurable period to be played out
- EPG synchronization between multiple ATV units
- 1 slot wide

Audio Processor

AP-100

- Two operational modes: Audio Encoder and Audio Transcoder
- Audio Encoder: Encodes up to 32 stereo channels
  - 4x SDI/HD-SDI input with embedded audio
  - 4x BNC, 75 Ohm female input ports
  - 8 stereo audio tracks per SDI/HD-SDI feed
  - AES67 input support via backplane
- Audio Transcoder: Transcodes up to 32 stereo channels
  - MPEG-TS input via backplane
  - Maintain PCR/PTS synchronization to video
- Audio codec support: MPEG1L2, AAC-LC, HE-AAC v1, HE-AAC v2 and Dolby Digital/Dolby Digital Plus
- Audio channel modes: Stereo and Mono
- Audio Level Adjustment , +6/-10dB
- Automatic Audio Levelling: Service Loudness (not supported for Dolby)
- 1 slot wide

MPEG OUTPUT MODULES

Appear offers a large number of different output modules that can be used in various applications. All output modules have powerful MPEG multiplexing and PSI/SI/PSIP capabilities to enable operators to maximize the potential of their network. Each output module has been designed to support 850 Mbit/s transport stream data-rate and 250 services.

IP and ASI output
The IP output module is a high capacity module with full multiplexing and PSI/SI regeneration targeted at linear broadcasting. The IP output modules support any combination of MPTS and SPTS as long as the total number of services is less than 250 and the total transport stream bit-rate is less than 850 Mbit/s. Each output port supports IPv4, IPv6, source specific multicast, generation of FEC according to SMPTE 2022 and Appear's unique IP output redundancy solution.

For legacy systems an ASI output module with 4 independent ASI outputs is available. Each ASI output supports up to 213 Mbit/s in burst mode or 72 Mbit/s in spread (byte) mode.

Modulated output
All Appear's modulated output modules are based on a full digital modulation and up-conversion architecture developed in house to provide the best possible output quality. Appear TV's leading edge DVB-T/T2 modulator is fully frequency agile for terrestrial transmitters, MMDS systems or for DVB-T/T2 modulation into cable networks. This high density modulator is capable of producing up to 4 DVB-T or 2 DVB-T2 modulated channels, offering more throughput and improved error resiliency. For terrestrial operation, the modulator supports SFN with either MIP TS or T2MI as input .

Appear's advanced DVB-S/S2/S2x modulator is a fully frequency agile modulator aimed at modulating SD/HD services on to satellite. This high density modulator is capable of producing up to 2 DVB-S or DVB-S2 modulated channels. The solution offers broadcasters a higher rack density and lower power consumption, compared to alternative solutions and comes with advanced functionality like pre-compensation. The DVB-S/S2/S2x modulator is available in two different output configurations: IF or L-band.

Appear's compact QAM solution generates 16 QAM frequencies for cable networks. The module supports both full re-multiplexing and transparent mapping with optional NIT replacement and PID/Service blocking making it one of the most versatile QAM modulation solutions for linear broadcasting on the market. Appear's QAM solution is ideal for regional cable head-ends where additional processing are required like service filtering, local re-multiplexing, local encoding, SI regeneration, EPG regeneration, etc.

Terrestrial GW solutions
The gateway module transforms an Appear chassis into a complete solution for DVB-T and T2. It combines the MPEG multiplexing, PSI/SI generation and gateway roles into a single module. Combining this with modules to perform encoding, transcoding and scrambling enables a unique integrated head-end design eliminating the need for a traditional multiple box approach with the added complexity. The Appear gateway module supports DVB-T with MIP timestamp insertion or DVB-T2 T2MI encapsulation with SFN timestamps together with multi PLP support. The terrestrial gateway module is available with ASI or IP outputs and can support up to 4 separate gateways per module (2 on ASI out). Integrated redundancy schemes are available to go beyond what is commonly available today and provide seamless protection of the distribution chain as well as the SFN network.

OUTPUT MODULES

Dual IP IO

IP-200/IP-300

- 2 × Gbit output port for data (or 1×in and 1×out)
- 10/100/1000BaseT (RJ45) or SFP output
- Up to 850 Mbit/s per data port TS
- Supports UDP/RTP Multicast/Unicast
- Supports streaming of MPTS and SPTS
- Supports cloned output
- Supports multiplexing and transparent pass-through
- PSI/SI/PSIP regeneration
- Supports FEC (SMPTE 2022) (license)
- 1 slot wide

ASI Output

AO-110

- 4 × ASI outputs
- 4 × BNC connectors
- 213 Mbit/s Burst mode or 72 Mbit/s Spread mode per output
- 4 different multiplexed outputs
- Supports multiplexing and transparent pass-through
- PSI/SI/PSIP regeneration
- 1 slot wide

DVB-S/S2X modulator

SM-300

- 2 DVB-S/S2/S2x modulated carriers per module
- Output connectors:
  - -IF › 1 × 75Ω F connector + 1 × 50Ω SMA for monitoring per output
  - -L-band › 1 × 50Ω SMA connector + 1 × 75Ω F for monitoring per output
- Satellite standards:
  - -DVB-S EN 300 421
  - -DVB-S2 EN 302 307 – 1
  - -DVB-S2X EN 302 307 -2, Broadcast Services
- Output options:
  - -IF › 50-200 MHz
  - -L-band › 950-2150 MHz
- Modulation:
  - -DVB-S › QPSK
  - -DVB-S2X › QPSK, 8-PSK, 16/32/64/128/256-APSK
- Symbol rate: 0.1-68 Mbaud
- 24V DC and 10MHz reference output
- DVB Carrier ID, NIT Carrier ID
- Linear static precorrection
- Supports multiplexing and transparent pass-through

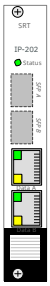
QAM Modulator

CM-201, CM-301, CM-210, CM-310

- 16 QAM modulators, 4 and 4 paired
- 2 × 75 Ω RF output (EN/IEC 60728-5) - F connector
- Full digital modulation and up-conversion
- DOCSIS 3.0 RF compliant
- 16 / 32 / 64 / 128 / 256 QAM modulation
- Frequency range of 47 – 1000 MHz
- Supports multiplexing and transparent pass-through
- PSI/SI/PSIP regeneration
- ITU-TJ83. Annex A/B/C
- 1 slot wide

SRT

IP-202



- 2 × Gbit RJ45 or SFP ports for data (1×in and 1×out)
- Secure transmission over the Internet
  - Encryption algorithms: AES 128, AES 192, AES 256
- Reliable transmission over the Inter net
  - 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

ISDB-T Modulator

CM-500

- 8 ISDB-T modulated carriers per module
- 2 × 75 Ω RF output - F connector
- Full digital modulation and up-conversion
- DOCSIS 3.0 RF compliant
- QPSK, 16QAM, 64 QAM modulation
- Frequency range of 47 – 862 MHz
- Supports multiplexing and transparent pass-through
- PSI/SI/PSIP regeneration
- Relevant Standards:
  - ARIB STD-B31
  - ARIB STD-B10
- 1 slot wide

DVB-T2 GW

IP-201

- IP out: 10/100/1000 BaseT (RJ45) or SFP output on IP
- Supports DVB-T MIP insertion and DVB-T2 T2MI generation
- 4 independent gateways per module (2 for T2MI on ASI out)
- Supports up to 240 PLPs
- Regionalization options
- PAPR and MISO support
- Full (Re-)multiplexing support (per PLP)
- PSI/SI regeneration
- Supports SMPTE 2022 FEC (license)
- 1 slot wide

DECODER

A key feature of Appear platforms is the ability to use a common hardware platform to deliver high quality analog and digital TV services simultaneously. The SDI/HDSDI outputs and optional AES/EBU audio outputs are ideal for downlink and rebroadcast, or for monitoring purposes.

DECODER MODULES

Dual MPEG-2/4 Decoder with SDI/HDSDI Output

DE-401

- 2 decoders per module
- 2 × BNC with SDI/HDSDI outputs per decoder
- MPEG2 and MPEG4 (H264) SD and HD
- Frame Synchronization (Genlock) support (HW option)
- Dolby® Digital Plus (HW option)
  - Dolby® Digital and Dolby® Digital Plus decoding, Downmix from 5.1 to 2.0 (Lo/Ro & Lt/Rt), Compression Modes (Line & RF)
  - Conversion Dolby® Digital Plus to Dolby® Digital
- VBI re-insertion (WSS, WST/EBU Teletext, VPS, VITS)
- VANC re-insertion (WSS, Teletext, VPS, DPI, AFD, EBU Subtitles)
- DVB and EBU subtitling
- 1 slot wide

HI-DENSITY

MODULAR

HOT - SWAP

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