The Sencore DMG 4100/4200 platform is a dedicated solution for high speed video networking, enhanced IP security, video distribution and contribution. Designed for near limitless capacity, extensive video awareness, enhanced security, operational simplicity and exceptionally high reliability, the platform redefines video delivery.

With IP network technology and infrastructure evolving, the distribution of video is changing. Dedicated coax-based SDI infrastructure are being replaced by transmission over standard IP-based networks. With 10G and 100G IP infrastructures available, broadcasters seek ways to use the added capacity, primarily for internal uncompressed or lightly compressed video contribution.

Specifically designed for IP-centric operations, the DMG 4100/4200 chassis has a significant video processing capacity. 10G bi-directional IP interfaces provide firewall-grade IP security at every connection node. Operating at a minimum internal throughput of 140G, the new backplane extends Sencore’s tradition of patented redundancy options. Service density can be defined up to 2,000 services in and out per module.

The DMG platform supports conversion of uncompressed video between legacy SDI and to/from SDI over IP with options to perform “light” compression/decompression using intra-codecs such as TICO and JPEG2000 or full encoding/decoding using AVC or HEVC. With backplane latency of less than 1ms, universal applicability for virtually any video application is ensured, as is the implementation of both current and future IP video standards, including VSF-TR03, VSF-TR04 and SMPTE2110.
CHASSIS

The DMG platform consists of a compact 1RU - DMG 4100 as well as a capacious 2RU - DMG 4200 option. Both chassis can be used independently, or in conjunction with Sencore’s widely deployed chassis. Built around an in-house developed, high capacity bus architecture that connects all modules, the DMG platform operates with dual hot-swappable power supplies, dual front-mounted control modules and six or twelve rear-mounted option slots. A -48VDC power supply option is available.

Dual control modules can optionally be fitted to either model, and will operate in active / active redundancy mode with redundant backplanes to provide seamless recovery from many critical fault scenarios. All option modules are interchangeable between the DMG 4100/4200.

The Control/Switch module and the Dual IP IO modules provide native 10G uni-directional and bi-directional port connectivity. The Control/Switch module for DMG 4200 has two additional 1G uni-directional ports. Seamless input and cloned output modes are supported. High data rate interfaces such as 25G, 40G and even 100G NICs will be added on selected future option modules when required (for example to support handling of uncompressed 4K and 8K services).

All modules are hot-swappable (including power supplies and fans). The new architecture provides freedom from system releases enabling different software versions to be used on modules: This allows new features to be delivered to customers sooner.

Service density can be defined up to 2,000 services in and out per module, while set-up and configuration is streamlined. By enabling the organization of services and multiplexes into several groups with a set of individually defined rules for each group, the operator can quickly apply changes to multiple services or multiplexes. Extensive search capabilities allow the operator to easily locate groups, services, etc.

FEATURES

2RU - DMG 4200
- Modular configuration with up to 12 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
- -48VDC

1RU - DMG 4100
- 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

2RU (DMG 4200)
19” × 2RU × 540 mm (440 × 88 × 540 mm) (w × h × d mm)

1RU (DMG 4100)
19” × 1RU × 540 mm (440 × 44 × 540 mm) (w × h × d mm)

The DMG 4200 and DMG 4100 use the same set of modules and same SW, although the Control/Switch module differs between the two.
The DMG platform 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:

HIGH SPEED
Multiple bi-directional 10G interfaces with the ability to route up to 140G of traffic internally.

DELAY
Low backplane latency (below 1ms) making overall contribution to delay negligible.

MPEG & NATIVE IP HANDLING
The ability to handle native IP, MPEG-2 TS with MPEG-DASH, MPEG-H MMT coming in future releases. Will also accommodate new standards not currently defined.

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.

MONITORING & CONTROL
A management system to control a potentially vast array of linear and on-demand service traffic effectively, as traditional IPTV / OTT worlds merge.

SDI TO IP
A high-density SDI input / output module supporting SMPTE 2022-6 and ASI with optional seamless TS packet switching.

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. Dual active - active control/switch module redundancy with internal seamless traffic switching can optionally be deployed within the chassis to make recovery from many critical errors totally seamless.
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 DMG platform maintains tight security on its control layer, supporting many advanced features encompassing Authentication, Authorization and Audit. Security is assured by Sencore’s own FPGA based IP packet forwarding mechanism and proprietary internal network structure.

Video-centric features provided in the DMG 4000 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
- Encode and decode SMPTE 2022-1 supplementary FEC

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 input modules
- Mix and match card types freely, and add as many as you need

MODULES

Control/Switch
DMG 4100
Spec details per line card:
- Total capacity: 80 Gbps full duplex
- Blaine
- Interface: 10 Gbps routing between modules in a chassis
- Protocols: IPv4, IPv6, IGMP v2/v3 ICMP, ARP
- SFP+ (SFP+ 8G Ethernet)

DMG 4200
Spec details per line card:
- Total capacity: 140 Gbps full duplex
- Blaine
- Interface: 10 Gbps routing between modules in a chassis
- Protocols: IPv4, IPv6, IGMP v2/v3 ICMP, ARP
- SFP+ (SFP+ 8G Ethernet)

Dual 10G IP IO
Spec details per line card:
- Interface: 2× 1/10G Base-T Ethernet or SFP+
- Protocols: IPv4, IPv6, IGMP v2/v3, ICMP, ARP, 802.1Q (VLAN tag)

12G SDI/ASI IO
Spec details per line card:
- Interface: 8x HD BNC 75 Ohm (brakeout to BNC available) or 3x Video SFP+ (SFP+ or SFP must be selected at order)
- Video Format: 12G-SDI (SMPTE 2082) – two inputs only
- HD-SDI (SMPTE 292M)
- Data flow: Input or output (configurable)
- Traffic type: SDI or ASI (configurable)

HEVC Codec
Spec details per line card:
- Video Input Connectors: 8x HD BNC 75 Ohm (brakeout to BNC available)
- Video Input Format: 12G-SDI (SMPTE 2082) – two inputs only
- 4K-SDI (SMPTE 424M)
- Data flow: Input or output (configurable)

Scrambler
Spec details per line card:
- Scrambling algorithm: DVB-CSA v1 (48-bit)
- DVB-CSA v2 (64-bit)
- AES (128-bit)
- Entropy reduction: Yes for DVB-CSI v1 (Reduced to 48-bit)
- No for AES
### DMG 4100 Control/Switch module

**Switch fabric**
- Total capacity: 80 Gbps full duplex
- Bitrate: 10 Gbps routing between modules in a chassis
- Placement: Front loaded

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

**Operational mode**
- Seamless Input (SMPTET 2022-7)
- Cloned Output (SMPTET 2022-7)
- Seamless Input and Cloned Output (SMPTET 2022-7 Full Duplex)
- Single Input and Single Output (on separate interfaces)

**Seamless buffer size (network path differential)**
- Configurable up to 400ms

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

**Maximum input data rate per port**
- 1/10G

### DMG 4200 Control/Switch module

**Switch fabric**
- Total capacity: 140 Gbps full duplex
- Bitrate: 10 Gbps routing between modules in a chassis
- Placement: Front loaded

**Dataports Interface**
- 2x 1/10G Base-T Ethernet, 1G SFP or SFP+
- 2x 1G Base-T Ethernet

**Operational mode**
- Seamless Input (SMPTET 2022-7)
- Cloned Output (SMPTET 2022-7)
- Seamless Input and Cloned Output (SMPTET 2022-7 Full Duplex)
- Single Input and Single Output (on separate interfaces)

**Seamless buffer size (network path differential)**
- Configurable up to 400ms

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

**Maximum input data rate per port**
- 1/10G

### Control/Switch module (common for the DMG 4100 and 4200)

**Interface**
- 10/100/1000 Base-T Ethernet

**Built-in user interface**
- Web

**Protocols**
- IPv4, IPv6, HTTPS, SSH, ICMP, ARP
- SNMP for alarms, JASON for configuration and status (TBD)

**Generic traffic**

**Protocols**
- UDP, RTP, SMPTET 2022-6, SMPTET 2110
- VSF TR-03, VSF TR-04, AES67

**IP input de-jitter**
- Yes, based on RTP timestamps or CBR bitrate

**IP input de-jitter buffer size**
- Configurable up to 200ms

### MPEG TS Traffic

**Key reference specification**
- ISO/IEC 13818-1:2015, ETSI TS 102 034 V2.1.1
- ETSI TR 101 211 V1.9.1

**Protocols**
- UDP, RTP

**Forward Error Correction**
- SMPTE 2022-1 (licensed) - later release

**Transport stream**
- Single program (SPTS) and multi program (MPTS)

### Licensed Features
- Forward Error Correction (SMPTET 2022-1) - Later Release
- Seamless Input (SMPTET 2022-7)
- MTP TS multiplexing (MPTS output)
- Number of configured MPEG TS input streams
- OSFP output redundancy - Later Release

### Dual 10G IP IO module

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

**Operational mode**
- Seamless Input (SMPTET 2022-7)
- Cloned Output (SMPTET 2022-7)
- Seamless Input and Cloned Output (SMPTET 2022-7 Full Duplex)
- Single Input and Single Output (on separate interfaces)

**Seamless buffer size (network path differential)**
- Configurable up to 400ms

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

**Maximum input data rate per port**
- 1/10G

### Generic traffic

**Protocols**
- UDP, RTP, SMPTET 2022-6, SMPTET 2110
- VSF TR-03, VSF TR-04, AES67

**IP input de-jitter**
- Yes, based on RTP timestamps or CBR bitrate

**IP input de-jitter buffer size**
- Configurable up to 200ms

**Maximum number of streams per port**
- 2000 input and 2000 output streams

**Forward Error Correction**
- SMPTE 2022-1 (licensed) - later release

**Transport stream**
- Single program (SPTS) and multi program (MPTS)

**MPEG TS processing capacity**
- 60Gbps input and 66Gbps output

**Service filtering**
- Yes

**Video format**
- SMPTE-2, H.264, HEVC (Transport Stream)

**Multiplexing (MPTS output)**
- Yes

**PCR regeneration**
- Yes

**Tables Supported**
- MPEG PSI -> PAT, PMT
- DVB-Si -> SDT actual

### Licensed Features
- Forward Error Correction (SMPTET 2022-1) - Later Release
- Seamless Input (SMPTET 2022-7)
- MTP TS multiplexing (MPTS output)
- Number of configured MPEG TS input streams
- OSFP output redundancy - Later Release
## HEVC Codec

### Interfaces
- 8x HD BNC 75 Ohm (brakeout to BNC available)

### Density
- 2xUHD / 1xUHD + 4xFHD/HD/SD / 8xFHD/HD/SD

### Video Format
- HEVC Profiles and Max Level: Main@Level 5.1, Main10@Level 5.1, Main422@Level 5.1
- AVC Profiles and Max Level: Main@Level 4.2, High@Level 4.2, High10@Level 4.2, High422@Level 4.2
- MPEG2 Profiles and Levels: MP@HL

### Video Input Resolutions
- 3840x2160p60/59.94/50/29.94/25 (Quad 3G SDI or 12G SDI)
- 1920x1080p60/59.94/50/29.94/25
- 1080x1080p or 720x576p
- 1280x720p

### Video PreProcessing
- Noise Reduction, Deinterlacing

### Normal Delay Mode
- 150 ms

### Video Scaling
- Horizontal Rescale
- 3900 to 2880 or 2560
- 2680 to 1920 or 1600
- 1920 to 1440
- 1280 to 960 or 640
- 720 to 640

### Vertical Rescale
- 2680 to 1920 or 1600
- 1280 to 960 or 640
- 720 to 576

### HDR Handling
- HLG / PQ

### Color Gamut Signalling
- ITU BT.470 (SD), ITU BT.709 (HD), ITU BT.2020/SMPTE ST2036-1 (WCG)

### Audio Input
- Embedded in SDI
- Up to 8 x 2.0 per Video Input

### Audio Compression
- MPEG1 Layer2
- AAC-LC
- HE-AACv1/v2
- Dolby Digital
- Dolby Digital Plus
- Dolby AC-4 (Density for AC-4 estimated to be up to 4 x 2.0 tracks per video input.)
- Dolby E
- MPEG H (xHE-AAC)

### Audio Compressible
- Audio Encode Density
- Up to 2x x 2.0 Encodes per module, freely distributable
- Dolby E in Dolby Digital/Dolby Digital Plus
- Dolby Digital/Dolby Digital Plus/Dolby E/PCM

### Ancillary Data and VBI
- TBD
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<th><strong>Scrambler</strong></th>
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| **Scrambling** | Scrambling algorithm | : DVB-CSA v1 (48-bit)  
DVB-CSA v2 (64-bit)  
AES (128-bit)  
Entropy reduction | : Yes for DVB-CSA v1 (Reduced to 48-bit)  
No for AES  
AES mode of operation | : ATIS IIF Default Scrambling Algorithm (IDSA)  
DVB Common IPTV Software-oriented Scrambling Algorithm (CISSA)  
Irdeto AES-GBC1 |  
PVR support (trick mode) | : PES header in clear (leave a number of packets in clear after PES header)  
MPEG TS processing capacity | : 66 Gbit/s  
Number of services per scrambler card | : 2000  
Video format | : MPEG-2, H.264, HEVC (Transport Stream)  
Number of CA systems | : 4 (8 in future release)  
Maximum number ECM | : 16000  
EMM insertion | : Yes  
EIS support | : Yes  
Tables Supported | : CAT generation  
**Licensed Features** | Number of scrambled services |  
Number of CA systems |  
PES header in clear (PVR trick mode) |  |

| **Chassis** |  |  |
| Physical dimensions | DMG 4100 chassis | : 19” × 1RU × 540 mm (440 × 44 × 540 mm)  
DMG 4200 chassis | : 19” × 2RU × 540 mm (440 × 88 × 540 mm)  
Module slots | Number of switch modules (front) | : 1 or 2 active – active)  
DMG 4100 Number of modules (rear) | : 6  
DMG 4200 Number of modules (rear) | : 12  
Hot swap support | : Yes  
Power supply | Power rating DMG 4100 | : 750 W  
Power rating DMG 4200 | Max Load |  
Redundancy |  
Monitoring |  
Cooling | DMG 4100 chassis |  
DMG 4200 chassis |  
Airflow direction | : Single fan tray with 6 fans  
Hot swap support | : Single fan tray with 5 fans  
Environmental Conditions | Operational conditions |  
Temperature  
Humidity | : 0 to +40 °C  
5–95% (non-condensing) |  
Storage | Temperature  
Humidity | : -20 to +70 °C  
5–95% (non-condensing) |  
Safety standards | Electric safety  
EMC | : IEC 60950-1  
EN 55032, EN55024, EN61000-3-2,  
EN61000-3-3, FCC CFR 47 Part 15 |  
RoHS  
WEEE | : Compliant  
Compliant |  |