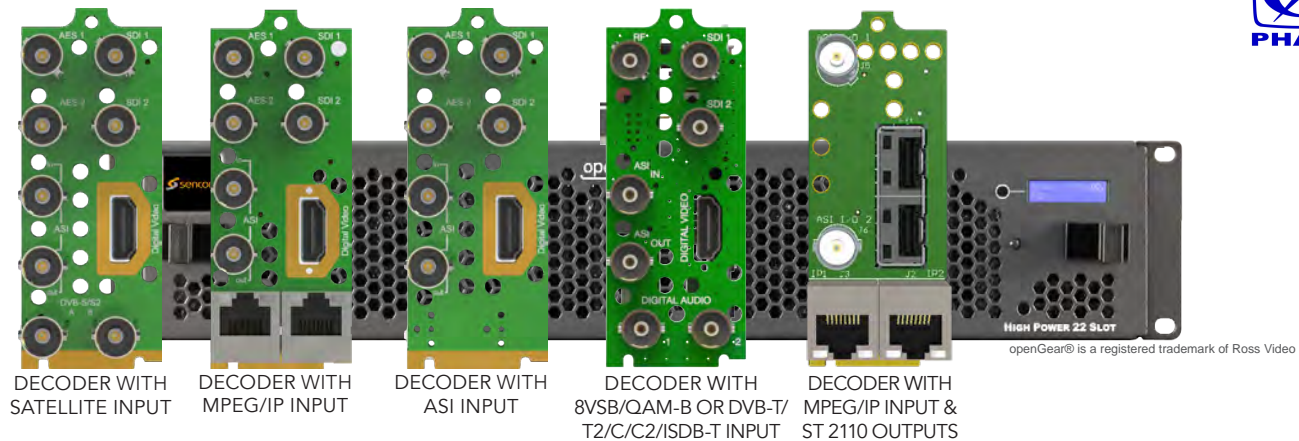


# UHD Professional Receiver Decoder Card

AG 6000



## OVERVIEW

The AG 6000 is a new UHD receiver decoder card for the openGear® form factor. Built with the latest generation ASIC to deliver a dense, cost-effective multiformat decoding solution. Perfect for applications such as monitoring, digital-turnaround, digital signage, hospitality and enterprise video delivery.

The AG 6000 will decode HEVC/H.264/MPEG2 and output UHD/HD/SD video with 4 audio services (8 audio channels) with all ancillary data required for professional video delivery networks. Input and output options include ASI, MPEG/IP, DVB/S/S2/S2X, QAM/VSB, DVB-T/T2, C/C2 and ISDB-T. Licenses and hardware options for descrambling include with BISS and dual DVB-CI CAM slots.

The AG 6000 maintains our long tradition of ease of use, with a straight-forward user interface and web APIs and backed by Sencore's best-in-class staff of ProCare support engineers. openGear® is a registered trademark of Ross Video

## APPLICATIONS

- Primary and Secondary distribution decode
  - UHD and HEVC natively supported, future proof for any application
  - Downscale incoming signals for re-encode
- Monitoring of UHD and 1080P60 signals
- UHD signage, hospitality and enterprise video

## KEY FEATURES

- Multiformat support to decode any stream
  - HEVC/H.264/MPEG2 up to 4:2:0 10-bit
  - Up to 8 channels of audio processing for MPEG1/2, AAC and Dolby AC3/AC3+
- Input and output options include ASI, MPEG/IP, DVB/S/S2/S2X, QAM/VSB, DVB-T/T2, C/C2 and ISDB-T
- ST 2110, SDI and HDMI output options
  - Dual SFP+ outputs for HD/SD ST 2110 output
  - 4x 3G-SDI for UHD output in four quadrant or 2SI
  - 2x 3G-SDI for dual 1080p60 output
  - HDMI 2.0a connector for UHD and HD output

# SPECIFICATIONS

## UHD Professional Receiver Decoder Card - AG 6000

### VIDEO DECODER CARD AG 60001, AG 60002 and AG 60003

<b>Base Decoding (UHD/4K, HD, SD 4:2:0)</b>	
Video Profile/Levels:	MPEG-2 MP@HL H.264 up to HP@L4.2 HEVC M10P, MT @ L5.1
Video ES Bitrates:	Up to 40 Mbps for UHD HEVC Up to 100 Mbps+ for H.264 & MPEG2
Frame Synchronization Modes:	PCR-Recovered Clock
Output Formats:	1920x1080p @ 50, 59.94, 60 1920x1080i @ 25, 29.97, 30 1920x1080p @ 23.97, 24, 25, 29.97, 30 1280x720p @ 50, 59.94, 60 720x576i @ 25 720x480i @ 29.97
<b>AG 60001 Output Interfaces:</b>	
SD/HD/3G-SDI:	Mirrored 2x 75Ω BNC
SDI Format Support:	3G-SDI Level A
Digital Video:	1x HDMI-2.0a Connector
<b>AG 60002 Output Interfaces:</b>	
SD/HD/3G-SDI:	4x 75Ω BNC
SDI Format Support:	3G-SDI Level A
<b>AG 60003 Output Interfaces:</b>	
Connectors:	2x 10GB SFP+ (MSA Compliant)
IP Encapsulation:	ST 2110-10 ST 2110-20 ST 2110-30 ST 2110-40 ST 2110-21 Type N (Narrow)
Packet Pacing:	ST 2059-2
PTP Synchronization:	ST 2022-7 Hitless Switching

### 4x3G-SDI Output for 4K/UHD Video Output License AG 60730

<i>Requires AG 60002 4x3G-SDI option.</i>	
Output Formats:	4096x2160p up to 60 3840x2160 up to 60
SDI Link Modes:	Four Quadrant, Two Sample Interleave (SMPTE 425-5)

### Base Audio Decoding Features

Number of Audio Services:	2 Standard, Up to 4 Available
Audio Codecs Supported:	Dolby Digital (AC-3) & Plus (EAC-3) AAC-LC, HE-AAC, & HE-AACv2 MPEG1L2 & MPEG2L2
Output Formats:	Digital Pass-through PCM (Downmixed for 5.1 Sources)

### Discrete Channel Audio Output License AG 60851

Adds Output Formats:	PCM (Decoded Discrete channels for 5.1 Sources)
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### 4x Service Audio Decode License AG 60840

Additional Audio Services:	2 Services (Total of 4 Services)
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### Base Audio Output Features

AES Outputs:	2x 75Ω BNC
SDI Embedded Audio Output:	4 Audio Pairs

### Included Transport Stream Input/Output Features

ASI Input/Output:	2x Bi-directional - 75Ω BNC
Supported Bitrate:	250 Kbps to 200 Mbps

### BISS Descrambling License AG 60921

Supported Modes:	Mode 1, Mode E, Injected ID
Multi-BISS Support:	Up to 12 Separate Keys

### Ancillary Data Support

SDI ANC Data Types:	Closed Captions (CEA-708) OP-47 (SMPTE RDD-08) SCTE 127 (SMPTE 2031) EN301775 (SMPTE 2031) SCTE 104
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### PID/Service Filtering License AG 60928

Filtering:	10 Independent TS (MPTS or SPTS created; output via IP or ASI)
Table Regeneration (MPEG Mode):	PAT regeneration
Table Pass-through (MPEG Mode):	PMT, CAT, NIT pass-through Table
Regeneration (DVB Mode):	PAT, SDT
Table Pass-through (DVB Mode):	PMT, CAT, NIT, EIT, RST, TDT, TOT

### SCTE 35 to SCTE 104/Relay Output License AG 60992

### DVB-S/S2 INPUT MODULE AG 116A

Physical Interface:	2x 75Ω BNC
Frequency Range:	950-2150 MHz
Symbol Rates:	1-45 MSps
DVB-S Modulation Modes:	QPSK (All FEC Rates)
DVB-S2 Modulation Modes:	QPSK/8PSK (All FEC Rates) 16/32APSK (with License)
LNB Power:	Off/13/14/18/19VDC @ 450mA
Control Tone Support:	22 kHz On/Off
Supported Roll-off Factors:	0.35, 0.25, 0.20, 0.15, 0.10, 0.05

### DVB-S2 Advanced Feature License AG 60916

Additional Modulation Modes:	16ASPK/32APSK (All FEC Rates) VCM Demodulation Support Multistream (Single ISI)
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### DVB-S/S2 INPUT MODULE WITH DVB-CI AG 137A

Physical Interface:	Adds one DVB-CI CAM Slot
Without Multi-Service License:	Descrambles Decoded Service Only
With Multi-Service License:	Number of Services limited by CAM

### DVB-CI Multi-Service Descrambling License AG 60991

With DVB-CI Capable Input:	Enables Multi-service Descrambling
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### IP INPUT/OUTPUT MODULE AG 127A

Physical Interface:	2x RJ45, 10/100/1000 Auto-Negotiate
Input Format:	UDP or RTP Constant Bitrate or Null-Stripped RTP Header Extensions Supported SMPTE 2022/CoP3 FEC Supported
Output Format:	UDP
MPE De-encapsulation:	Up to 2 PIDs Up to 60Mbps per MPE PID
Addressing:	Unicast or Multicast
IGMP compatibility:	Version 1, 2 & 3
Per TS Bitrate:	250 Kbps to 200 Mbps

### MPEG/IP FEC Output License AG 60925

Additional Output Formats:	RTP with SMPTE 2022/CoP3 FEC
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# SPECIFICATIONS

## UHD Professional Receiver Decoder Card - AG 6000

### 8VSB/QAM-B INPUT MODULE

AG 101A

Physical Interface:	1x 75Ω BNC-Type
Frequency Range:	50-1000 MHz
Sensitivity:	-34 to +40 dBmV (A74 Compliant)
8VSB Standard:	ATSC A/53E
8VSB Channel Plans:	Broadcast
QAM Standard:	ITU Annex B/SCTE DVS-031
QAM Channel Plans:	FCC, IRC, HRC
QAM Constellations:	QAM64, QAM256

### DVB-T/T2/C/C2/ISDB-T INPUT MODULE

AG 115A

Physical Interface:	1x 75Ω BNC-Type
Frequency Range:	42-1002 MHz
Bandwidth:	1.7MHz, 5 MHz, 6MHz, 7MHz, 8MHz
Constellations:	
DVB-T:	QPSK, QAM16, QAM64 (All FEC Rates)
DVB-T2:	QPSK, QAM16, QAM64, QAM256 (All FEC Rates)
DVB-C:	QAM16, QAM32, QAM64, QAM128, QAM256 (All FEC Rates)
DVB-C2:	QAM16, QAM64, QAM256, QAM1024, QAM4096 (All FEC Rates)
ISDB-T:	QPSK, QAM16, QAM64 (All FEC Rates)

### DVB-S/S2/S2X INPUT MODULE

AG 116B

Physical Interface:	2x 75Ω BNC
Frequency Range:	950-2150 MHz
Symbol Rates:	1-72 MSps with 8PSK/QPSK 1-60 Msps with 16APSK and higher
DVB-S Modulation Modes:	QPSK (All FEC Rates)
DVB-S2/S2X Modulation Modes:	QPSK/8PSK (All FEC Rates) 16/32/64APSK (with License)
LNB Power:	Off/13/14/18/19VDC @ 450mA
Control Tone Support:	22 kHz On/Off
Supported Roll-off Factors:	0.35, 0.25, 0.20, 0.15, 0.10, 0.05

### DVB-S2/S2X Advanced Feature License

AG 58916

Additional Modulation Modes:	16/32/64APSK (All FEC Rates) VCM Demodulation Support Multistream (Single ISI)
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### DVB-S/S2/S2X INPUT MODULE WITH DVB-CI

AG 137B

Physical Interface:	Adds two DVB-CI CAM Slots
Without Multi-Service License:	Descrambles Decoded Service Only
With Multi-Service License:	Number of Services limited by CAM
<b>DVB-CI Multi-Service Descrambling License</b>	<b>AG 60991</b>
With DVB-CI Capable Input:	Enables Multi-service Descrambling

### DVB-T/T2/C/C2/ISDB-T INPUT MODULE WITH DVB-CI

AG 115B

Physical Interface:	Adds one DVB-CI CAM Slot
Without Multi-Service License:	Descrambles Decoded Service Only
With Multi-Service License:	Number of Services limited by CAM
<b>DVB-CI Multi-Service Descrambling License</b>	<b>AG 60991</b>
With DVB-CI Capable Input:	Enables Multi-service Descrambling

### MANAGEMENT

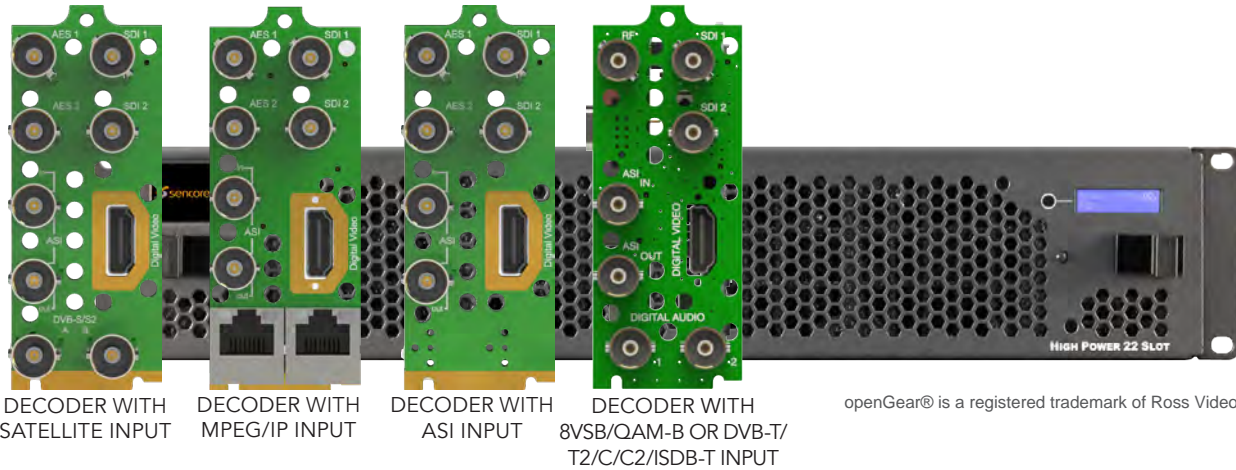
User Interfaces:	Full control via web GUI
Automation Interfaces:	SNMP status, control, traps Syslog alarm output HTTP Web services API

### ENVIRONMENTAL CONDITIONS

Power:	100-240 VAC 50/60 Hz Dual, Redundant Supply Available
Operating Temp:	0° to 50°C

# Advanced Receiver Decoder Card

AG 5800 openGear® Module



openGear® is a registered trademark of Ross Video

## OVERVIEW

The AG 5800 card-based receiver decoder provides an ideal solution for 4:2:2 video decoding where rack space is limited. The platform supports up to 10 decoder cards in the industry-standard 2RU openGear® OG-3 chassis.

With independent per-card GUIs and a full-featured satellite input with BISS and DVB-CI descrambling, the decoder is uniquely suited for applications in master control or occasional downlink facilities. Support for all MPEG-4 and MPEG 2 formats up to 10-bit 422 AVC, up to 16 audio channels in any common format, and tested interoperability with all major encoder vendors mean this is the last contribution decoder you'll ever need.

The AG 5800 is also a future-proof solution for multichannel primary distribution where video quality is at a premium. With the ability to upgrade to 4:2:2 or 1080p50/60 decoding in the future via a simple software license, the card is a safe choice for the long haul.

Add Sencore's tradition of receiver decoder design and best-in-class ProCare support, and the AG 5800 provides the most compelling value package in the industry.

## KEY FEATURES

- Unique dense design with per-card inputs and Web GUIs ideal for multi-user satellite receiver applications
- Shared software and feature-set with Sencore 1RU decoders ensure reliability and interoperability
- Latest generation decoding technology enables support for nearly any video feed
  - √ H.264 4:2:2 8-bit or 10-bit video
  - √ MPEG-2 4:2:2 8-bit video
  - √ MPEG-2 or H.264 4:2:0 video
  - √ Up to 100 Mbps of video data
- Up to 8 PIDs of audio decoding with support for all major audio formats
- Dual 3G/HD/SD-SDI auto-switching outputs
- ASI, IP, and satellite options
- Full complement of ancillary data output in ANC and VBI
- Full control, status, and alarm monitoring via SNMP

## APPLICATIONS

- **Decode and Descramble Up to 10 Satellite Feeds in 2RU**  
Pull in high-bitrate, high-quality 4:2:2 video feeds with up to 8 associated audio PIDs via DVB-S or S2. Decode to SDI for local production, editing, and eventually distribution.
- **Receive IP Video from Dedicated Fiber Connections**  
Decode backhaul video from long-haul IP connections. Decoder cards can be fitted with redundant Gigabit Ethernet inputs with automatic failover.
- **Create a Future-Proof Distribution Solution**  
Prepare for the inevitable transition to advanced technologies such as 1080p50/60, 4:2:2 10-bit AVC, 16/32APSK, with the industry's most future-proof, powerful decoder platform.



# SPECIFICATIONS

## Advanced Receiver Decoder Card AG 5800

### VIDEO DECODER CARD

AG 58021A

<b>Base Decoding (HD 4:2:0 and SD 4:2:2/4:2:0)</b>	
Additional Profile/Levels:	MPEG-2 MP@HL, 422P@ML H.264 up to HP@L4.2, Hi422P@L3.2
<b>4:2:2 HD Decoding License</b>	AG 58720
Additional Profile/Levels:	MPEG-2 422P@HL H.264 up to Hi422P@L4.2
<b>Additional Base Video Features</b>	
Video ES Bitrates:	CAVLC Entropy Coded - 100Mbps CABAC Entropy Coded - 80Mbps
Frame Synchronization Modes:	PCR-Recovered Clock Genlock Reference (with License)
Aspect Ratio Conversion	
Manual Selection:	Letterbox, Center-Cut, Anamorphic
Automatic Selection:	Follows AFD Codes
Output Formats:	1920x1080p @ 60 (with License) 1920x1080i @ 25, 29.97, 30 1920x1080p @ 23.97, 24, 25, 29.97, 30 1280x720p @ 50, 59.94, 60 720x576i @ 25 720x480i @ 29.97
Output Interfaces:	
SD/HD/3G-SDI:	2x 75Ω BNC
SDI Format Support:	Determined by Decode License
Digital Video:	1x HDMI-type Connector
<b>Genlock License</b>	AG 58701
Enables genlock synchronization:	Sourced by openGear® Frame
<b>1080p50/60 Video Output License</b>	AG 58740
Additional SDI Formats:	3G-SDI Level A
Additional Output Formats:	1920x1080p @ 50, 59.94, 60
<b>Video Overlay Support</b>	
Closed Caption Overlays:	CEA-608, CEA-708, or SCTE-20
DVB-Subtitle Overlays:	HD/SD with Auto Scaling (EN 300743)
<b>Base Audio Decoding Features</b>	
Number of Audio PIDs:	4 Standard, Up to 8 Available
Audio Codecs Supported:	Dolby Digital (AC-3) & Plus (EAC-3) AAC-LC, HE-AAC, & HE-AACv2 MPEG-1L2 & MPEG-2L2 Linear PCM & Dolby E (Pass-through)
Output Formats:	Digital Pass-through PCM 5.1 Channel Services Downmixed
Audio Delay/Advance:	Per Service, +100/-35 ms
<b>8 Service Audio Decode License</b>	AG 58880
Audio Decoding:	4 Additional PIDs (Total of 8)
<b>Base Audio Output Features</b>	
AES Outputs:	2x 75Ω BNC
SDI Embedded Audio Output:	8 Audio Pairs
<b>Included Transport Stream Input/Output Features</b>	
ASI Input/Output:	1x In, 1x Out - 75Ω BNC
Supported Bitrate:	250 Kbps to 200 Mbps
<b>BISS Descrambling License</b>	AG 58921
Supported Modes:	Mode 1, Mode E, Injected ID
Multi-BISS Support:	Up to 12 Separate Keys

### VIDEO DECODER CARD, CONTINUED

AG 58021

<b>Ancillary Data Support</b>	
SDI ANC Data Types:	AFD (SMPTE 2016) Closed Captions (CEA-708) OP-47 (SMPTE RDD-08) SMPTE RDD-11 VANC Passthrough (SMPTE 2038) SCTE 127 (SMPTE 2031) EN301775 (SMPTE 2031) Time Code (SMPTE 12M-2) Line 21 Captions (CEA-608) TVG2X, AMOL-48/96 (SCTE-127) Teletext/WSS/VPS (EN301775) Timecode in VBI (SMPTE 12M-1) <sup>5</sup>
VBI Waveforms (SDI/Composite):	
<b>SCTE 35 to SCTE 104 Output License</b>	AG 58992
<b>Cablelabs ESAM POIS Interface License</b>	AG 58993
<b>PID/Service Filtering License</b>	AG 58928
Filtering:	10 Independent TS (MPTS or SPTS created; output via IP or ASI)
Table Regeneration (MPEG Mode):	PAT regeneration
Table Pass-through (MPEG Mode):	PMT, CAT, NIT pass-through
Table Regeneration (DVB Mode):	PAT, SDT
Table Pass-through (DVB Mode):	PMT, CAT, NIT, EIT, RST, TDT, TOT
<b>DVB-S/S2 INPUT MODULE</b>	AG 116A
Physical Interface:	2x 75Ω BNC
Frequency Range:	950-2150 MHz
Symbol Rates:	1-45 MSps
DVB-S Modulation Modes:	QPSK (All FEC Rates)
DVB-S2 Modulation Modes:	QPSK/8PSK (All FEC Rates) 16/32APSK (with License) Off/13/14/18/19VDC @ 450mA
LNB Power:	22 kHz On/Off
Control Tone Support:	
Supported Roll-off Factors:	0.35, 0.25, 0.20, 0.15, 0.10, 0.05
<b>DVB-S2 Advanced Feature License</b>	AG 58916
Additional Modulation Modes:	16ASPK/32APSK (All FEC Rates) VCM Demodulation Support Multistream (Single ISI)
<b>DVB-S/S2 INPUT MODULE WITH DVB-CI</b>	AG 137A
Physical Interface:	Adds one DVB-CI CAM Slot
Without Multi-Service License:	Descrambles Decoded Service Only
With Multi-Service License:	Number of Services limited by CAM
<b>DVB-CI Multi-Service Descrambling License</b>	AG 58991
With DVB-CI Capable Input:	Enables Multi-service Descrambling
<b>IP INPUT/OUTPUT MODULE</b>	AG 127A
Physical Interface:	2x RJ45, 10/100/1000 Auto-Negotiate
Input Format:	UDP or RTP Constant Bitrate or Null-Stripped RTP Header Extensions Supported SMPTE 2022/CoP3 FEC Supported
Output Format:	UDP
MPE De-encapsulation:	Up to 2 PIDs Up to 60Mbps per MPE PID
Addressing:	Unicast or Multicast
IGMP compatibility:	Version 1, 2 & 3
Per TS Bitrate:	250 Kbps to 200 Mbps
<b>MPEG/IP FEC Output License</b>	AG 58925
Additional Output Formats:	RTP with SMPTE 2022/CoP3 FEC

# SPECIFICATIONS

## Advanced Receiver Decoder Card AG 5800

### 8VSB/QAM-B INPUT MODULE

AG 101A

Physical Interface:	1x 75Ω BNC-Type
Frequency Range:	50-1000 MHz
Sensitivity:	-34 to +40 dBmV (A74 Compliant)
8VSB Standard:	ATSC A/53E
8VSB Channel Plans:	Broadcast
QAM Standard:	ITU Annex B/SCTE DVS-031
QAM Channel Plans:	FCC, IRC, HRC
QAM Constellations:	QAM64, QAM256

### DVB-T/T2/C/C2/ISDB-T INPUT MODULE

AG 115A

Physical Interface:	1x 75Ω BNC-Type
Frequency Range:	42-1002 MHz
Bandwidth:	1.7MHz, 5 MHz, 6MHz, 7MHz, 8MHz
Constellations:	
DVB-T:	QPSK, QAM16, QAM64 (All FEC Rates)
DVB-T2:	QPSK, QAM16, QAM64, QAM256 (All FEC Rates)
DVB-C:	QAM16, QAM32, QAM64, QAM128, QAM256 (All FEC Rates)
DVB-C2:	QAM16, QAM64, QAM256, QAM1024, QAM4096 (All FEC Rates)
ISDB-T:	QPSK, QAM16, QAM64 (All FEC Rates)

### DVB-S/S2/S2X INPUT MODULE

AG 116B

Physical Interface:	2x 75Ω BNC
Frequency Range:	950-2150 MHz
Symbol Rates:	1-72 Msps with 8PSK/QPSK 1-60 Msps with 16APSK and higher
DVB-S Modulation Modes:	QPSK (All FEC Rates)
DVB-S2/S2X Modulation Modes:	QPSK/8PSK (All FEC Rates) 16/32/64APSK (with License)
LNB Power:	Off/13/14/18/19VDC @ 450mA
Control Tone Support:	22 kHz On/Off
Supported Roll-off Factors:	0.35, 0.25, 0.20, 0.15, 0.10, 0.05

### DVB-S2/S2X Advanced Feature License

AG 58916

Additional Modulation Modes:	16/32/64APSK (All FEC Rates) VCM Demodulation Support Multistream (Single ISI)
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### DVB-S/S2/S2X INPUT MODULE WITH DVB-CI

AG 137B

Physical Interface:	Adds two DVB-CI CAM Slots
Without Multi-Service License:	Descrambles Decoded Service Only
With Multi-Service License:	Number of Services limited by CAM

### DVB-CI Multi-Service Descrambling License

AG 58991

With DVB-CI Capable Input:	Enables Multi-service Descrambling
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### DVB-T/T2/C/C2/ISDB-T INPUT MODULE WITH DVB-CI

AG 115B

Physical Interface:	Adds one DVB-CI CAM Slot
Without Multi-Service License:	Descrambles Decoded Service Only
With Multi-Service License:	Number of Services limited by CAM

### DVB-CI Multi-Service Descrambling License

AG 58991

With DVB-CI Capable Input:	Enables Multi-service Descrambling
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### MANAGEMENT

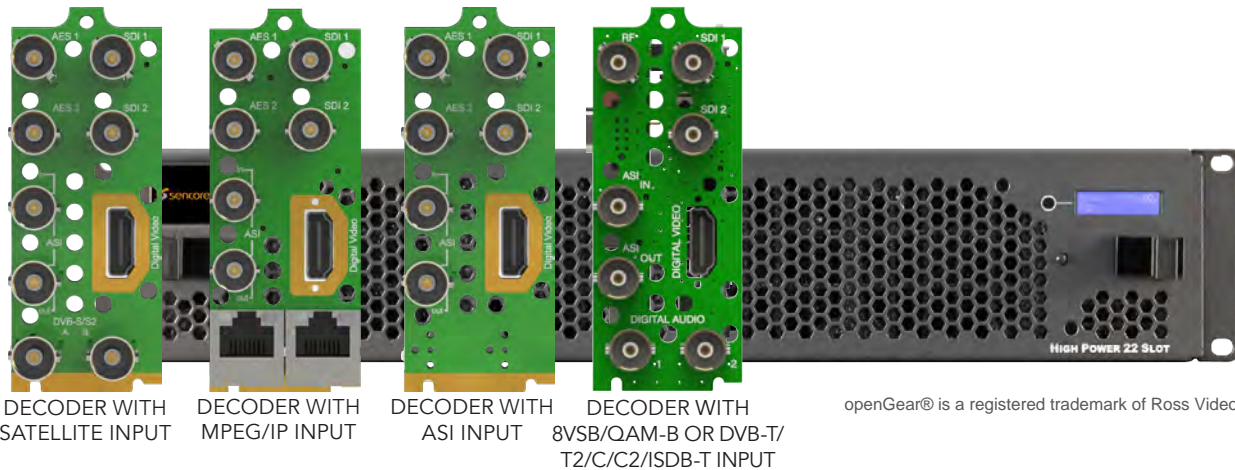
User Interfaces:	Full control via web GUI
Automation Interfaces:	SNMP status, control, traps Syslog alarm output HTTP Web services API

### ENVIRONMENTAL CONDITIONS

Power:	100-240 VAC 50/60 Hz Dual, Redundant Supply Available
Operating Temp:	0° to 50°C

# Receiver Decoder Card

AG 4400 openGear® Module



openGear® is a registered trademark of Ross Video

## OVERVIEW

The new AG 4400 card-based receiver decoder provides an ideal solution for high-quality video decoding where rack space is at a premium. The platform supports up to 10 H.264/MPEG2 decoder cards in a 2RU OG-3 frame.

The product supports decoding MPEG2 or H.264 video, as well as up to four audio PIDs. The audio decoding capability is the perfect solution for video distributors looking to meet upcoming descriptive video requirements, while continuing to support surround, stereo, and SAP services.

The AG 4400 receiver decoder card offers satellite, IP, ASI, and 8VSB/QAM-B and DVB-T/T2/C/C2/ISDB-T inputs for flexible installation into a variety of video delivery systems. Optional integrated DVB-CI descrambling, as well as BISS-1/E capabilities, makes the AG 4400 a powerful solution for receiving feeds from primary distribution.

When combined with versatile IP input/output capabilities, a full complement of ancillary data support, and tested interoperability with all major encode vendors, the AG 4400 is an ideal solution for high-density re-encode or monitoring.

In addition, the decoder benefits from Sencore's tradition of receiver decoder design and is backed by best-in-class ProCare support.

## KEY FEATURES

- Intuitive, straightforward web interface
- Extensive automation support via SNMP status, configuration, and traps, HTTP-based APIs, and Syslog
- Shared software and feature-set with Sencore 1RU decoders ensure reliability and interoperability
- Support for All Common Video Formats
  - √ MPEG2 or H.264, HD or SD video
  - √ Codecs auto-detected and switchable on-the-fly
- Up to 4 services of audio decoding or SDI pass-through with support for all major audio formats
- Dual SDI auto-switching outputs
- Built-in ASI I/O for maximum value and flexibility
- Available IP, 8VSB/QAM-B, DVB-T/T2/C/C2/ISDB-T and satellite inputs
- Full complement of ancillary data output in ANC and VBI
- Closed-caption or auto-scaling subtitle overlays for monitoring or burn-in applications
- Full control, status, and alarm monitoring via SNMP

## APPLICATIONS

- **Monitor Multi-channel Distribution Installations**  
Create a real-time monitoring system to feed an SDI matrix or power a multi-viewer with minimal rack-space and power consumption. Time-tested, professional grade decode engine handles any video feed.
- **Decode Multiple Channels for Re-encoding**  
Reduce the footprint of existing decode/re-encode infrastructure without reinventing the entire system. Redundant SDI outputs with a full complement of ancillary data interoperate with any encoder.

# SPECIFICATIONS

## Receiver Decoder Card AG 4400

### AVAILABLE VIDEO DECODER MODULES

AG 44021A ASI I/O, SDI Outputs, Discrete Audio, Genlock Support  
AG 44020A ASI, SDI Outputs, Discrete Audio

### COMMON VIDEO DECODER FEATURES

#### Base Decoding (SD 4:2:0)

Additional Profile/Levels: MPEG2 MP@ML  
H.264 up to MP@L3

#### HD Decoding License

Additional Profile/Levels: MPEG2 MP@HL AG 44710  
H.264 up to HP@L4.2

#### Additional Base Video Features

Frame Synchronization Modes: PCR-Recovered Clock  
Genlock Reference (AG 44021 Only)

#### Aspect Ratio Conversion

Manual Selection: Letterbox, Center-Cut, Anamorphic  
Automatic Selection: Follows AFD Codes

#### Output Formats:

1920x1080i @ 25, 29.97, 30  
1920x1080p @ 23.97, 24, 25, 29.97, 30  
1280x720p @ 50, 59.94, 60  
720x576i @ 25  
720x480i @ 29.97

#### Output Interfaces:

SD/HD-SDI: 2x 75Ω BNC  
Digital Video: 1x HDMI-type Connector

#### Video Overlay Support

Closed Caption Overlays: CEA-608, CEA-708, or SCTE-20  
DVB-Subtitle Overlays: HD/SD with Auto Scaling (EN 300743)

#### Base Audio Decoding Features

Number of Audio PIDs: 2 Standard, Up to 4 Available  
Audio Codecs Supported: Dolby Digital (AC-3) & Plus (EAC-3)  
AAC-LC, HE-AAC, & HE-AACv2  
MPEG-1L2 & MPEG2L2  
Linear PCM & Dolby E (Pass-through)  
Output Formats: Digital Pass-through  
PCM (Downmixed for 5.1 Sources)  
Audio Delay/Advance: Per Service, +100/-35 ms

#### 4 Service Audio Decode License

Additional Audio PIDs: 2 PIDs (Total of 4 PIDs) AG 44840

#### Discrete Channel Audio Output License

For 5.1 Sources: Output Individual Channel Pairs AG 44851

#### Base Audio Output Features

AES Outputs: 2x 75Ω BNC  
SDI Embedded Audio Output: 4 Audio Pairs

#### Ancillary Data Support

SDI ANC Data Types: AFD (SMPTE 2016)  
Closed Captions (CEA-708)  
OP-47 (SMPTE RDD-08)  
SMPTE RDD-11  
VANC Passthrough (SMPTE 2038)  
SCTE 127 (SMPTE 2031)  
EN301775 (SMPTE 2031)  
Time Code (SMPTE 12M-2)  
VBI Waveforms (SDI/Composite): Line 21 Captions (CEA-608)  
TVG2X, AMOL-48/96 (SCTE-127)  
Teletext/WSS/VPS (EN301775)  
Timecode in VBI (SMPTE 12M-1)<sup>5</sup>

### COMMON VIDEO DECODER FEATURES, CONTINUED

SCTE 35 to SCTE 104 Output License AG 44992  
Cablelabs ESAM POIS Interface License AG 44993

#### Included Transport Stream Input/Output Features

ASI Input/Output: 1x In, 1x Out - 75Ω BNC  
Supported Bitrate: 250 Kbps to 200 Mbps

#### BISS Descrambling License

Supported Modes: Mode 1, Mode E, Injected ID AG 44921  
Multi-BISS Support: Up to 12 Separate Keys

#### PID/Service Filtering License

Filtering: 10 Independent TS (MPTS or SPTS  
created; output via IP or ASI) AG 44928

Table Regeneration (DVB Mode): PAT regeneration  
Table Pass-through (DVB Mode): PMT, CAT, NIT pass-through Table  
Regeneration (DVB Mode): PAT, SDT  
Table Pass-through (DVB Mode): PMT, CAT, NIT, EIT, RST, TDT, TOT

### DVB-S/S2 INPUT MODULE

AG 116A

Physical Interface: 2x 75Ω BNC  
Frequency Range: 950-2150 MHz  
Symbol Rates: 1-45 MSps  
DVB-S Modulation Modes: QPSK (All FEC Rates)  
DVB-S2 Modulation Modes: QPSK/8PSK (All FEC Rates)  
16/32APSK (with License)  
LNB Power: Off/13/14/18/19VDC @ 450mA  
Control Tone Support: 22 kHz On/Off  
Supported Roll-off Factors: 0.35, 0.25, 0.20, 0.15, 0.10, 0.05

#### DVB-S2 Advanced Feature License

Additional Modulation Modes: 16ASPK/32APSK (All FEC Rates) AG 44916  
VCM Demodulation Support  
Multistream (Single ISI)

### DVB-S/S2 INPUT MODULE WITH DVB-CI

AG 137A

Physical Interface: Adds one DVB-CI CAM Slot  
Without Multi-Service License: Descrambles Decoded Service Only  
With Multi-Service License: Number of Services limited by CAM

#### DVB-CI Multi-Service Descrambling License

With DVB-CI Capable Input: Enables Multi-service Descrambling AG 44991

### 8VSB/QAM-B INPUT MODULE

AG 101A

Physical Interface: 1x 75Ω BNC  
Frequency Range: 50-1000 MHz  
Sensitivity: -34 to +40 dBmV (A74 Compliant)  
8VSB Standard: ATSC A/53E  
8VSB Channel Plans: Broadcast  
QAM Standard: ITU Annex B/SCTE DVS-031  
QAM Channel Plans: FCC, IRC, HRC  
QAM Constellations: QAM64, QAM256



# SPECIFICATIONS

## Receiver Decoder Card AG 4400

### IP INPUT/OUTPUT MODULE

AG 127A

Physical Interface: 2x RJ45, 10/100/1000 Auto-Negotiate  
Input Format: UDP or RTP  
Constant Bitrate or Null-Stripped  
RTP Header Extensions Supported  
SMPTE 2022/CoP3 FEC Supported  
Output Format: UDP  
MPE De-encapsulation: Up to 2 PIDs  
Up to 60 Mbps per MPE PID  
Addressing: Unicast or Multicast  
IGMP compatibility: Version 1, 2 & 3  
Per TS Bitrate: 250 Kbps to 200 Mbps

**MPEG/IP FEC Output License** AG 44925  
Additional Output Formats: RTP with SMPTE 2022/CoP3 FEC

### DVB-T/T2/C/C2/ISDB-T INPUT MODULE

AG 115A

Physical Interface: 1x 75Ω BNC  
Frequency Range: 42-1002 MHz  
Bandwidth: 1.7MHz, 5 MHz, 6MHz, 7MHz, 8MHz  
Constellations:  
DVB-T: QPSK, QAM16, QAM64 (All FEC Rates)  
DVB-T2: QPSK, QAM16, QAM64, QAM256 (All FEC Rates)  
DVB-C: QAM16, QAM32, QAM64, QAM128, QAM256 (All FEC Rates)  
DVB-C2: QAM16, QAM64, QAM256, QAM1024, QAM4096 (All FEC Rates)  
ISDB-T: QPSK, QAM16, QAM64 (All FEC Rates)

### DVB-S/S2/S2X INPUT MODULE

AG 116B

Physical Interface: 2x 75Ω BNC  
Frequency Range: 950-2150 MHz  
Symbol Rates: 1-72 MSps with 8PSK/QPSK  
1-60 Msps with 16APSK and higher  
DVB-S Modulation Modes: QPSK (All FEC Rates)  
DVB-S2/S2X Modulation Modes: QPSK/8PSK (All FEC Rates)  
16/32/64APSK (with License)  
LNB Power: Off/13/14/18/19VDC @ 450mA  
Control Tone Support: 22 kHz On/Off  
Supported Roll-off Factors: 0.35, 0.25, 0.20, 0.15, 0.10, 0.05

**DVB-S2/S2X Advanced Feature License** AG 44916  
Additional Modulation Modes: 16/32/64APSK (All FEC Rates)  
VCM Demodulation Support  
Multistream (Single ISI)

### DVB-S/S2/S2X INPUT MODULE WITH DVB-CI

AG 137B

Physical Interface: Adds two DVB-CI CAM Slots  
Without Multi-Service License: Descrambles Decoded Service Only  
With Multi-Service License: Number of Services limited by CAM

**DVB-CI Multi-Service Descrambling License** AG 44991  
With DVB-CI Capable Input: Enables Multi-service Descrambling

### DVB-T/T2/C/C2/ISDB-T INPUT MODULE WITH DVB-CI

AG 115B

Physical Interface: Adds one DVB-CI CAM Slot  
Without Multi-Service License: Descrambles Decoded Service Only  
With Multi-Service License: Number of Services limited by CAM

**DVB-CI Multi-Service Descrambling License** AG 44991  
With DVB-CI Capable Input: Enables Multi-service Descrambling

### MANAGEMENT

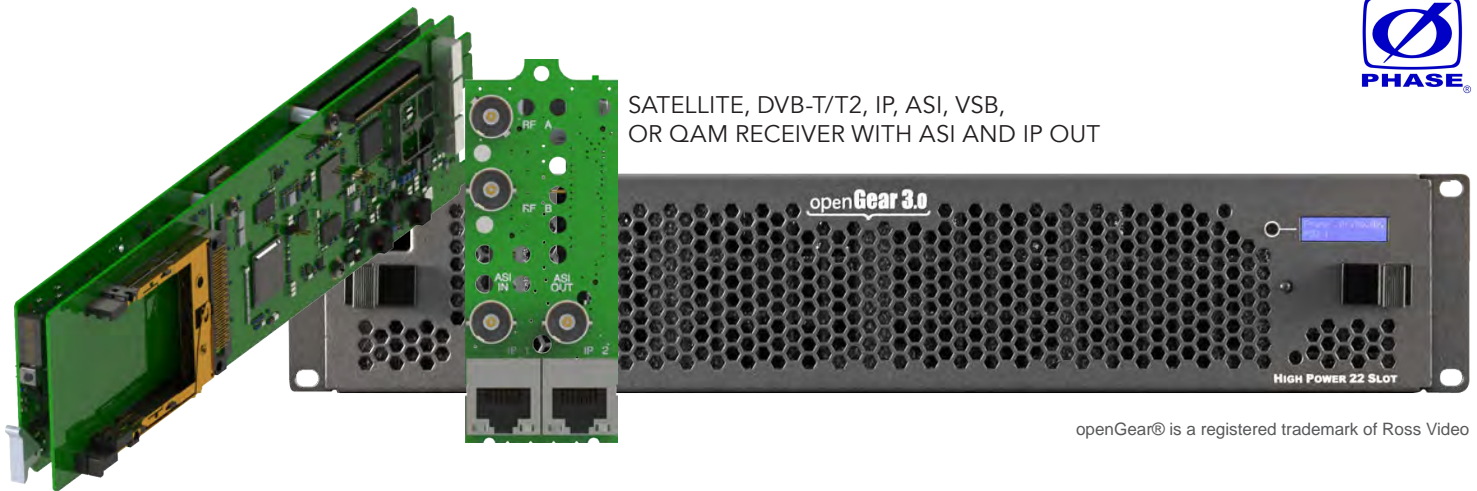
User Interfaces: Full control via web GUI  
Automation Interfaces: SNMP status, control, traps  
Syslog alarm output  
HTTP Web services API  
Remote in-band control with CMD 4000

### ENVIRONMENTAL CONDITIONS

Power: 100-240 VAC 50/60 Hz  
Dual, Redundant Supply Available  
Operating Temp: 0° to 50°C

# Receiver Card

AG 2600 openGear® Module



SATELLITE, DVB-T/T2, IP, ASI, VSB,  
OR QAM RECEIVER WITH ASI AND IP OUT

openGear® is a registered trademark of Ross Video

## OVERVIEW

The AG 2600 receiver card leverages the DVB-S2, IP, 8VSB/QAM-B, DVB-T/T2/C/C2/ISDB-T, dual DVB-CI, and ASI designs from Sencore's newest receiver decoder cards to provide a cost effective multi-channel reception and descrambling platform.

The card integrates into the industry-standard 2RU openGear® OG-3 frame, supporting up to 10 receiver/descrambler pairs per chassis. The AG 2600 is also configurable without the DVB-CI option, and with an optional BISS descrambling support, so it can be matched to any reception infrastructure.

The product is ideal for providing satellite or terrestrial feeds for IP network distribution or integrated transcode infrastructure. Optional PID filtering on the IP output can generate up to 10 MPTS or SPTS outputs from an MPTS input.

Finally, the receiver can be configured with ASI and IP interfaces only for simple turn-around, descrambling, and filtering operations.

Hot swappable cards provide for effortless system expansion, while full SNMP and syslog interfaces and an HTTP-based API support quick and easy integration into multichannel systems. For individual operators, the product features an easy to use web GUI that will be immediately familiar to users of previous Sencore IRDs.

## KEY FEATURES

- Extensive automation support via SNMP status, configuration, and traps, HTTP-based APIs, and Syslog
- Shared software and feature-set with Sencore 1RU receivers ensure reliability and interoperability
- Built-in ASI and IP I/O for maximum flexibility
- Available RF and descrambling modules:
  - √ DVB-S/S2 Interface with Optional Dual DVB-CI
  - √ DVB-T/T2/C/C2/ISDB-T Interface
  - √ 8VSB/QAM-B Receiver Designed for A74
  - √ Codecs auto-detected and switchable on-the-fly
- Failover between any two inputs
- Dual, mirrored TS over IP transmission
- Built-in BISS Mode 1, Mode E, and Multi-key
- Intuitive, straightforward web interface

## APPLICATIONS

- **Satellite Reception and Descrambling**  
Receive up to ten transponders in 2RU and descramble via dual DVB-CI slots or BISS 1/E. Generate IP and ASI outputs of the full transport stream or a filtered subset.
- **Ingest Feeds for Linear OTT Transcoding**  
Generate up to 10 SPTS multicasts from an incoming distribution feed for downstream, server-based transcoding systems.
- **Capture Local Terrestrial Channels for Backhaul**  
Receive 8VSB signals and output as IP for fiber backhaul to a remote site. Filter the broadcast stream to transmit only HD or SD services.
- **Convert between ASI and IP**  
Connect old and new broadcast equipment while performing simple transport manipulation such as filtering or descrambling.

# SPECIFICATIONS

## Receiver Card AG 2600

### AVAILABLE BASE MODULES

AG 26000A	Processing Card with Built-in ASI I/O
AG 26027A	Processing Card with Built-in ASI I/O and Dual Gigabit Ethernet Ports

### ASI INPUT/OUTPUT

ASI Input:	1x 75Ω BNC
ASI Output:	1x 75Ω BNC
Supported Bitrate:	250 Kbps to 200 Mbps

### IP INPUT/OUTPUT (IF EQUIPPED)

Physical Interface:	2x RJ45, 10/100/1000 Auto-Negotiate
Input Format:	2x UDP or RTP Streams Constant Bitrate or Null-Stripped RTP Header Extensions Supported SMPTE 2022/CoP3 FEC Supported
Output Format:	10x UDP Streams
MPE De-encapsulation:	Up to 2 PIDs Up to 60 Mbps per MPE PID
IP Encapsulation:	1 to 7 TS Packets per IP Packet
Addressing:	Unicast or Multicast
IGMP compatibility:	Version 1, 2 & 3
Per TS Bitrate:	250 Kbps to 200 Mbps

<b>MPEG/IP FEC Output License</b>	AG 26925
Additional Output Formats:	Adds RTP & SMPTE 2022/CoP3 FEC on 2x Transmit Instances

### OPTIONAL BASE MODULE FUNCTIONALITY

<b>BISS Descrambling License</b>	AG 26921
Supported Modes:	Mode 1, Mode E, Injected ID
Multi-BISS Support:	Up to 12 Separate Keys

<b>PID/Service Filtering License</b>	AG 26928
Filtering:	10 Independent TS (MPTS or SPTS) created; output via IP or ASI

Table Regeneration (DVB Mode):	PAT regeneration
Table Pass-through (DVB Mode):	PMT, CAT, NIT pass-through
Table Regeneration (DVB Mode):	PAT, SDT
Table Pass-through (DVB Mode):	PMT, CAT, NIT, EIT, RST, TDT, TOT

### DVB-S/S2 INPUT MODULE

 AG 26116A

Physical Interface:	2x 75Ω BNC
Frequency Range:	950-2150 MHz
Symbol Rates:	1-45 Msps
DVB-S Modulation Modes:	QPSK (All FEC Rates)
DVB-S2 Modulation Modes:	QPSK/8PSK (All FEC Rates) 16/32APSK (with License)
LNB Power:	Off/13/14/18/19VDC @ 450mA
Control Tone Support:	22 kHz On/Off
Supported Roll-off Factors:	0.35, 0.25, 0.20, 0.15, 0.10, 0.05

<b>DVB-S2 Advanced Feature License</b>	AG 26916
Additional Modulation Modes:	16/32/64APSK (All FEC Rates) VCM Demodulation Support Multistream (Single ISI)

### DVB-S/S2 INPUT MODULE WITH DVB-CI

 AG 26137A

Physical Interface:	Adds two DVB-CI CAM Slots
Without Multi-Service License:	Descrambles Decoded Service Only
With Multi-Service License:	Number of Services limited by CAM
<b>DVB-CI Multi-Service Descrambling License</b>	AG 26991
With DVB-CI Capable Input:	Enables Multi-service Descrambling

### DVB-S/S2/S2X INPUT MODULE

 AG 26116B

Physical Interface:	2x 75Ω BNC
Frequency Range:	950-2150 MHz
Symbol Rates:	1-72 Msps with 8PSK/QPSK 1-60 Msps with 16APSK and higher
DVB-S Modulation Modes:	QPSK (All FEC Rates)
DVB-S2/S2X Modulation Modes:	QPSK/8PSK (All FEC Rates) 16/32/64APSK (with License)
LNB Power:	Off/13/14/18/19VDC @ 450mA
Control Tone Support:	22 kHz On/Off
Supported Roll-off Factors:	0.35, 0.25, 0.20, 0.15, 0.10, 0.05

<b>DVB-S2/S2X Advanced Feature License</b>	AG 26916
Additional Modulation Modes:	16/32/64APSK (All FEC Rates) VCM Demodulation Support Multistream (Single ISI)

### DVB-S/S2/S2X INPUT MODULE WITH DVB-CI

 AG 26137B

Physical Interface:	Adds two DVB-CI CAM Slots
Without Multi-Service License:	Descrambles Decoded Service Only
With Multi-Service License:	Number of Services limited by CAM
<b>DVB-CI Multi-Service Descrambling License</b>	AG 26991
With DVB-CI Capable Input:	Enables Multi-service Descrambling

### 8VSB/QAM-B INPUT MODULE

 AG 26101A

Physical Interface:	1x 75Ω BNC
Frequency Range:	50-1000 MHz
Sensitivity:	-34 to +40 dBmV (A74 Compliant)
8VSB Standard:	ATSC A/53E
8VSB Channel Plans:	Broadcast
QAM Standard:	ITU Annex B/SCTE DVS-031
QAM Channel Plans:	FCC, IRC, HRC
QAM Constellations:	QAM64, QAM256

### DVB-T/T2/C/C2/ISDB-T INPUT MODULE

 AG 26115A

Physical Interface:	1x 75Ω F-Type
Frequency Range:	42-1002 MHz
Bandwidth:	1.7MHz, 5 MHz, 6MHz, 7MHz, 8MHz
Constellations:	QPSK, QAM16, QAM64 (All FEC Rates)
DVB-T:	QPSK, QAM16, QAM64, QAM256 (All FEC Rates)
DVB-T2:	QPSK, QAM16, QAM64, QAM256 (All FEC Rates)
DVB-C:	QAM16, QAM32, QAM64, QAM128, QAM256 (All FEC Rates)
DVB-C2:	QAM16, QAM64, QAM256, QAM1024, QAM4096 (All FEC Rates)
ISDB-T:	QPSK, QAM16, QAM64 (All FEC Rates)

## SPECIFICATIONS

### Receiver Card AG 2600

#### DVB-T/T2/C/C2/ISDB-T INPUT MODULE WITH DVB-CI

AG 26115B

Physical Interface: Adds one DVB-CI CAM Slot  
Without Multi-Service License: Descrambles Decoded Service Only  
With Multi-Service License: Number of Services limited by CAM

#### DVB-CI Multi-Service Descrambling License AG 26991

With DVB-CI Capable Input: Enables Multi-service Descrambling

#### MANAGEMENT

User Interfaces: Full control via web GUI  
Automation Interfaces: SNMP status, control, traps  
Syslog alarm output  
HTTP Web services API

#### ENVIRONMENTAL CONDITIONS

Power: 100-240 VAC 50/60 Hz  
Dual, Redundant Supply Available  
Operating Temp: 0° to 50°C