

# UHD Professional Receiver Decoder

## MRD 6000



### OVERVIEW

The MRD 6000 is a new UHD receiver decoder platform built with the latest generation ASIC in order to deliver a reliable, cost-effective multiformat decoder. Perfect for applications such as monitoring, digital-turnaround, digital signage, hospitality and enterprise video delivery.

The MRD 6000 will decode HEVC/H.264/MPEG-2 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 MRD 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.

### 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/MPEG-2 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
- SDI, HDMI and composite outputs
  - 5x 3G-SDI ports
    - 4x3G-SDI for UHD output in four quadrant or 2SI
    - 1x3G-SDI for simultaneous 1080 output
  - HDMI 2.0a connector for UHD and HD outputs

# SPECIFICATIONS

## UHD Professional Receiver Decoder MRD 6000

### VIDEO DECODER

MRD 60002

#### Base Decoding (UHD/4K, HD, SD 4:2:0)

Video Profile/Levels: MPEG2 MP@HL  
H.264 up to HP@L4.2  
HEVC M10P@MT up to 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

#### Output Interfaces:

SD/HD/3G-SDI: Mirrored 5x 75Ω BNC  
SDI Format Support: 3G-SDI Level A  
Composite Video Output: 1x 75Ω BNC  
NTSC, PAL, SECAM  
Digital Video: 1x HDMI-2.0a Connector

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

Output Formats: 4096x2160p up to 60  
3840x2160 up to 60  
Output Interfaces: 4x 75Ω BNC, Quad Link  
SDI Link Modes: 4x HD panels or SMPTE 425-5  
interleaved (user selectable)  
1x 75Ω BNC HD down-convert

#### 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)  
Analog (Downmixed for 5.1 Sources)

#### Discrete Channel Audio Output License MRD 60851

Adds Output Formats: PCM (Decoded Discrete channels  
for 5.1 Sources)  
Analog (Decoded Discrete channels  
for 5.1 Sources)

#### 4x Service Audio Decode License MRD 60840

Additional Audio Services: 2 Services (Total of 4 Services)

#### Additional Base Video Features

Simultaneous SD Video Output License MRD 60601  
Enable Mirrored SD SDI Outputs: 2x 75Ω BNC

#### Video Overlay Support

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

#### Base Audio Output Features

AES Outputs: 4x 75Ω BNC  
Analog Outputs: 1x 15 pin D-Sub (4 Stereo Services)  
4x XLR Breakout Cable Available

4x BNC Breakout Cable Available  
Terminal Block Cable Available  
SDI Embedded Audio Output: 4 Audio Pairs SDI Embedded Audio

#### 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

#### Included Transport Stream Input/Output Features

ASI Input/Output: 2 x 75Ω BNC (selectable in/out)  
Supported Bitrate: 250 Kbps to 200 Mbps

#### BISS-1 Descrambling License MRD 60921

Supported Modes: Mode 0, Mode 1 with Session Word  
Mode E with SW and Injected ID  
Multi-BISS Support: Up to 12 Separate Keys with License

#### BISS-2/CA Descrambling License MRD 60922

Supported Modes: Mode 0, Mode 1 with Session Word  
Mode E with SW and Injected ID  
Mode CA with Injected Private Key  
Mode CA with Buried Private Key  
Multi-BISS Support: Up to 12 Separate Keys with License

#### DVB-CI Multi-Service License MRD 60991

With DVB-CI Module: Enables Multi-service Descrambling

#### PID/Service Filtering Output License MRD 60928

Filtering: 4 Independent TS (MPTS or SPTS)  
outputs 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 MRD 60992

#### DVB-CI DESCRAMBLING MODULE MRD 421

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

#### IP INPUT/OUTPUT MODULE MRD 127

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, RTP (with License)  
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

#### MPEG/IP FEC Output License MRD 60925

Additional Output Formats: RTP and Header Extensions  
SMPTE 2022/CoP3 FEC Supported

# SPECIFICATIONS CONTINUED

## UHD Professional Receiver Decoder MRD 6000

### DVB-S/S2 INPUT MODULE

MRD 116

Physical Interface:	4x 75Ω F-Type
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 MRD 60916

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

MRD 116A

Physical Interface:	4x 75Ω F-Type
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 MRD 60916

Additional Modulation Modes:	16/32/64APSK (All FEC Rates) VCM Demodulation Support Multistream Support (Single ISI)
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### 8VSB/QAM-B INPUT MODULE

MRD 101

Physical Interface:	75Ω F-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

### BROADCOM TURBOPSK RECEIVER MODULE MRD 111

Physical Interface:	1x 75Ω F-Type
Frequency Range:	950-2150 MHz
Symbol Rates:	1-30 MSps
DVB-S Modulation Modes:	QPSK (All FEC Rates)
TurboPSK Modulation Modes:	QPSK /8PSK (All FEC Rates)

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

MRD 115

Physical Interface:	1x 75Ω F-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)

### MANAGEMENT

Connector:	RJ-45 10/100 - Auto Negotiating
Protocols:	HTTP and SNMP
User Interfaces:	Full control via web GUI Full control via front panel
Automation Interfaces:	Full status and control via SNMP Configurable SNMP traps Web services API available Syslog message logging
Firmware Updates:	Via web GUI
Authentication:	Local Login, TACACS+

### DIMENSIONS/POWER

Height:	1 RU, 1.72" (44 mm)
Width:	1 RU, 17.2" (437 mm)
Depth:	14.6" (370 mm)
Power:	100-240 VAC 50/60 Hz
Supply Options:	Single AC Power Supply (MRD 60002 option) Dual AC Power Supply (MRD 60003 option)

### ENVIRONMENTAL CONDITIONS

Operating Temp:	0° to 50°C
Storage Temp:	-40°C to 65°C
Relative Operating Humidity:	<95% (non-condensing)