

# Multichannel Multiformat Receiver Decoder

MRD 7000



Sencore’s latest receiver decoder utilizes a new software based platform to create a multichannel, multiformat professional receiver decoder. Staying agile is paramount in today’s market and the MRD 7000 is able to deliver. Decode HEVC/H.264/MPEG2 up to 4K/UHD resolutions at high bitrate with support for 4:2:2 10-bit video including HDR and WCG.

The MRD 7000 supports up to 8 services (16 channels) of audio processing for MPEG1/2, AAC and Dolby AC3/AC3+/Dolby E/ATMOS. Multichannel decode allows the MRD 7000 to process up to 4x HD services or 1x UHD service in a 1RU chassis. Output options include 4x3G-SDI (two sample interleave & four quadrant), 12G-SDI, HDMI 2.0B and SMPTE 2110 via 10GB or 25GB fiber. The MRD 7000 maintains a 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.

## Key Features

- Multichannel decode of UHD and HD streams
  - 4x HD streams or 1x UHD streams per 1RU
- Multiformat support to decode any stream
  - HEVC/H.264/MPEG2 up to 4:2:2 10-bit with HDR/WCG signaling
  - 16 channels of audio processing for MPEG1/2, AAC and Dolby AC3/AC3+/Dolby-E/ATMOS
- RTP/UDP MPEG/IP with FEC or hitless switching, satellite, Zixi, SRT, HLS, RTMP, ASI and file-based inputs
- SDI, IP and HDMI output options
  - 12G-SDI, 4x3G-SDI and 3G-SDI
  - SMPTE 2110 10GB and 25GB fiber
  - HDMI 2.0B

## Applications

- Contribution decode of high-bitrate 4K/UHD HEVC with HDR/WCG
- Primary distribution with multichannel decode of 4x HD or 1x UHD services per 1RU
- Reference decoder for lab environments to decode and output in a variety of codecs and formats

## SPECIFICATIONS

### VIDEO DECODER

MRD 7000

Base Decoding (4K/UHD/HD/SD 4:2:2/4:2:0)  
 Video Profile/Levels: MPEG-2 422P@HL  
 H.264 up to Hi422P@L4.2  
 HEVC M422-10P@HT up to L5.1  
 JPEG2000, Tier 2 up to 200Mbps  
 Video ES Bitrates: Up to 160Mbps, hardware dependent  
 Output Formats: 3840x2160 @ 23.98, 24, 25, 29.97, 30, 50, 59.94, 60  
 1920x1080p @ 23.97, 24, 25, 29.97, 30, 50, 59.94, 60  
 1920x1080i @ 25, 29.97, 30  
 1280x720p @ 50, 59.94, 60  
 720x576i @ 25  
 720x480i @ 29.97  
 HDR & WCG Support: HLG (ARIB.B67)  
 HDR10 (PQ10)  
 Color Gamut Support: BT.709  
 BT.2020  
 ANC Data Types: HDR metadata (SMPTE 2108)  
 Closed Captions (CEA-708)

OP-47 (SMPTE RDD-08)  
 SCTE 104 (SMPTE 2010)  
 SMPTE 2031  
 VANC Passthrough (SMPTE 2038)  
 VPID

### Base Audio Decoding Features

Number of Audio Services: 8 audio services (16 audio channels)  
 Audio Codecs Supported: Dolby Digital AC-3/AC-3+/Dolby E/ATMOS  
 AAC-LC, HE-AAC, & HE-AACv2  
 MPEG-1L2 & MPEG-2L2  
 Output Formats: Digital Pass-through  
 PCM (Downmixed for 5.1 Sources)

### Base Audio Output Features

Embedded Audio Output: 8 Audio Pairs (16 audio channels)

### 12G-SDI and HDMI 2.0 Output Option

MRD 70130

Ports: 1x 12G-SDI input, 75-Ω BNC  
 1x ASI Input, 75-Ω BNC  
 1x HDMI 2.0B output, 75-Ω BNC  
 1x Genlock port, HDMI type A

Physical layer: DVB-ASI: EN50083-9  
 HD-SDI: SMPTE 292M  
 3G-SDI: SMPTE 424M  
 6G-SDI: SMPTE 2081  
 12G-SDI: SMPTE 2082

4x 3G-SDI Output or 4xASI Input Option **MRD 70141**  
 Ports: 4x 3G-SDI or ASI inputs (user configurable), 75-Ω HD-BNC  
 1x Genlock Input, 75-Ω HD-BNC

Physical layer: DVB-ASI: EN50083-9  
 SD-SDI: SMPTE 259M  
 HD-SDI: SMPTE 292M  
 3G-SDI: SMPTE 424M  
 4K multi-link SMPTE 425-5

SMPTE 2110 Output Options **MRD 70120 & MRD 70180**  
 Standards: SMPTE 2110-10  
 SMPTE 2110-20  
 SMPTE 2110-21  
 SMPTE 2110-30  
 SMPTE 2110-40

Connectors: 2x 25GB MSA compliant SFP28 connectors (MRD 70180 only)  
 2x 10GB MSA compliant SFP+ connectors (MRD 70120 only)

Synchronization: SMPTE 2059 (IEEE 1588 PTP)  
 Correction: Hitless Switching (SMPTE 2022-7)

**INPUTS**

MPEG/IP Inputs  
 Physical Interface: 2x 100/1000 Auto-Negotiate Base-T RJ45 for MRD 70020  
 2x 1000 Auto-Negotiate Base RJ45 for MRD 70081 (100M Auto Negotiate support with MRD70200 installed)

Input Format: UDP or RTP  
 Constant Bitrate or Null-Stripped  
 RTP Header Extensions Supported  
 Correction: Hitless Switching (SMPTE 2022-7)  
 SMPTE 2022/CoP3 FEC Supported

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

File Inputs  
 File Types: Transport streams (.ts, .trp)

SRT Input License **MRD 70750**  
 Protocol and IP Range: UDP, Unicast  
 Negotiation Modes: Caller, Listener, Rendezvous  
 Latency: 20-8000ms, user configurable  
 Bitrate Range: .25 – 50 Mb/s  
 Decryption: AES-128, AES-256  
 10-79 UTF-8 characters  
 Packets/IP Frame: Auto detect

Zixi Input License **MRD 70751**  
 Protocol and IP range: UDP, unicast  
 Mode: Connect or pull mode, to Broadcaster  
 Latency: 30-10000ms, user configurable  
 Bitrate range: 1-50 Mb/s  
 FEC overhead: 0-50% of content bitrate  
 Decryption: AES-128, AES-192, AES-256  
 10-79 UTF-8 characters  
 Packets/IP frame: Auto detect

RTMP Input License **MRD 70753**  
 Protocol and IP Range: TCP, Unicast  
 Payload: MP4, FLV containing h.264 video and AAC  
 or MP3 audio  
 Modes: Pull  
 Bitrate Range: 0.25 – 50 Mbps

HLS Input License **MRD 70754**  
 Protocol and IP Range: HTTP, HTTPS, TCP, Unicast  
 Payload: Chunked transport stream  
 Modes: Pull  
 Profile Reception: Single profile selection  
 Bitrate Range: 0.25 – 50 Mbps  
 Decryption: AES-128  
 Packets/IP Frame: 1-7 MPEG Packets/IP Frame

DVB-S/S2/S2X INPUT MODULE **MRD 70191**  
 Physical Interface: 4x 75Ω F-Type  
 Frequency Range: 950-2150 MHz  
 Symbol Rates: 1-72 MSps with 8PSK/QPSK  
 1-60 MSps with 16APSK/32APSK  
 1-43 MspS with 64APSK and higher\*

DVB-S Modulation Modes: QPSK (All FEC Rates)  
 DVB-S2 Modulation Modes: QPSK/8PSK/16APSK/32APSK (All FEC Rates)

DVB-S2X Modulation Modes\*: 64APSK/64APSKL/128APSK/256APSK/256APSK-L (All FEC Rates)

DVB-S2X Frame Length\*: Long and Short frames  
 LNB Power: Off/13/14/18/19VDC @ 500mA

Control Tone Support: 22 kHz On/Off  
 Supported Roll-off Factors: 0.35, 0.25, 0.20, 0.15, 0.10, 0.05

Additional Modulation Modes: ACM Demodulation Support\*  
 VCM Demodulation Support  
 Multistream Support (Single ISI)

*\*roadmap features*

BISS1/BISS2/Mode CA Descrambling License **MRD 70740**  
 BISS 1: Mode 0  
 Mode 1 with Session Word  
 Mode E with Session Word and Injected ID

BISS 2: Mode 0  
 Mode 1 with Session Word  
 Mode E with Session Word and Injected ID  
 Mode CA with Public Key and Injected Private Key  
 Mode CA with Public Key and Buried Private Key

Compatibility Standards: DVB-CSA1  
 DVB-CISSA  
 AES-128  
 RSA-2048

Maximum TS bitrate: 200 Mb/s  
 Number of stored keys: Up to 12 keys  
 Number of descrambled services: No limitation to number of services descrambled per key

**MANAGEMENT**

Connector: 100/1000 Auto-Negotiate Base-T RJ45 for MRD 70020  
 1000 Auto-Negotiate Base RJ45 for MRD 70081 (100M Auto Negotiate support with MRD70200 installed)

Protocols: HTTP and SNMP  
 User Interfaces: Full control via web GUI  
 Automation Interfaces: Full status and control via SNMP  
 Configurable SNMP traps  
 Restful API  
 Syslog message logging  
 Firmware Updates: Via web GUI

*Physical dimensions and operating conditions dependent on hardware selection*