

# 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+/AC-4/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 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+/AC-4/Dolby-E/ATMOS
- RTP/UDP MPEG/IP with FEC or hitless switching, satellite, Zixi, SRT, HLS, RTMP, ASI and file-based inputs
- SDI, IP, ASI output options
  - 12G-SDI, 4x3G-SDI and 3G-SDI
  - SMPTE 2110 25GB fiber

## 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  
 BT.601  
 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+/AC-4  
 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)

1x 12G-SDI, 4x 3G-SDI Output, 4xASI Input or 4x ASI Output Option MRD 70141  
 Ports:  
 1x 12G-SDI output with genlock,  
 1x ASI input  
 4x 3G-SDI output with genlock  
 4x independent 3G-SDI or ASI ports  
 5x 75-Ω HD-BNC  
 Physical layer:  
 DVB-ASI: EN50083-9  
 SD-SDI: SMPTE 259M  
 HD-SDI: SMPTE 292M  
 3G-SDI: SMPTE 424M  
 12G-SDI – SMPTE 2082  
 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)  
 Synchronization:  
 SMPTE 2059 (IEEE 1588 PTP)  
 Correction:  
 Hitless Switching (SMPTE 2022-7)

**INPUTS**

**MPEG/IP Inputs**

Physical Interface:  
 2x 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:  
 Addressing:  
 IGMP compatibility:  
 Per TS Bitrate:  
 1 to 7 TS Packets per IP Packet  
 Unicast or Multicast  
 Version 1, 2 & 3  
 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: 0.5-60 MSps with 8PSK/QPSK  
 0.5-60 MSps with 16APSK/32APSK  
 1-43 Msps with 64APSK and higher  
 QPSK (All FEC Rates)  
 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  
 Overcurrent & short circuit protection  
 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)

**OUTPUTS**

**MPEG/IP Outputs**

Physical Interface:  
 2x 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)  
 Output Format: UDP or RTP  
 IP Encapsulation: 1 to 7 TS Packets per IP Packet  
 Addressing: Unicast or Multicast  
 IGMP compatibility: Version 1, 2 & 3  
 Per TS Bitrate: bypass from input (manual bitrate settings  
 for RTMP and HLS inputs)

**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:  
 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*