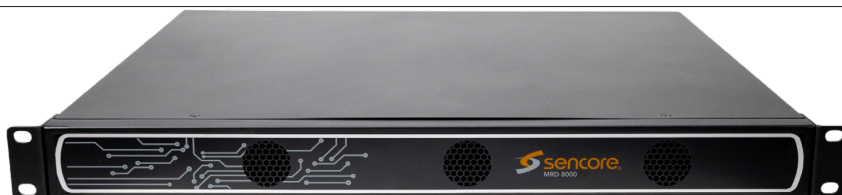# Accelerated Multichannel Receiver Decoder

MRD 8000

Sencore's latest receiver decoder utilizes a new hybrid GPU/software based platform to create a more cost-effective solution for a multichannel, multiformat, professional receiver decoder, and one that is primed for future AI enhancements. Flexibility is paramount in the broadcast market and the MRD 8000 is able to deliver. Decode HEVC/H.264/MPEG-2 up to 4K/UHD resolutions with support for 4:2:2 and 10-bit video, including HDR and WCG.

The MRD 8000 supports up to 8 services (16 channels) of audio processing for MPEG-1/2, AAC and Dolby AC3/AC3+/AC-4/Dolby-E/ATMOS. Multichannel decode allows the MRD 8000 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, and SMPTE 2110 via 25GB fiber. The MRD 8000 maintains a long tradition of ease of use, with a straight-forward user interface and web APIs, and it is backed by Sencore's legendary reliability and best-in-class staff of ProCare support engineers.

Key Features

- Multichannel decode of 4K/UHD and HD/SD streams
  - · Up to 4x HD/SD streams or 1x 4K/UHD streams per 1RU
- Multiformat support to decode any stream
  - · HEVC/H.264/MPEG-2 up to 4:2:2 10-bit with HDR/WCG signaling
  - · Up to 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

- Primary distribution with multichannel decode of 4x HD/SD or 1x 4K/UHD services per 1RU
- Contribution decode of 4:2:2 10-bit 4K/UHD with HDR/WCG
- Reference decoder for lab environments to decode and output in a variety of codecs and formats

SPECIFICATIONS

DECODER		MRD 80100
Video Decoding Features (4K/UHD/HD/SD 4:2:0)		
Channels	1x HD/SD 4:2:0 decode included MRD 80805 license adds 1x HD/SD 4:2:0 decode (max 3x for a total of 4) 4K/UHD decode requires and takes place of and 4x HD/SD decodes MRD 80806 license is bundle of 3x MRD 80805	
Max Video Profile/Levels:	MPEG-2 422P@HL H.264 up to Hi422P@L4.2 HEVC M422-10P@HT up to L5.1 *4:2:0 and 8-bit decode included *4:2:2 and/or 10-bit decode requires MRD 80810 license	
Video ES Bitrates:	Up to 80Mbps	
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) SMPTE 2031 VANC Passthrough (SMPTE 2038) VPID SCTE 104 (SMPTE 2010) *Requires MRD 80830 license
Audio Decoding Features	
Number of Audio Services:	4 audio services (8 audio channels) *Upgradeable to 8 audio services with MRD 80820 license
Audio Codecs Supported:	Dolby Digital AC-3/E-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)
Audio Output Features	
Embedded Audio Output:	4 audio pairs (8 audio channels) *Upgradeable to 8 audio pairs with MRD 80820 license

1x 12G-SDI, 4x 3G-SDI Output, 4xASI Input/Output Option — MRD 80141

Ports:	1x 12G-SDI output with genlock
	4x 3G-SDI outputs 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 80182

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)
NMOS:	With MRD 80860 license

INPUTS

MPEG/IP Inputs

Physical Interface:	2x 100/1000M Auto-Negotiate Base-T RJ45
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)

RTMP Input

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

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

SRT Input License — MRD 80850

Protocol and IP Range:	UDP, Unicast
Negotiation Modes:	Caller, Listener, Rendezvous
Latency:	20-8000ms, user configurable
Bitrate Range:	0.25 – 50 Mb/s
Decryption:	AES-128, AES-256
	10-79 UTF-8 characters
Packets/IP Frame:	Auto detect

Zixi Input License — MRD 80851

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

DVB-S/S2/S2X INPUT MODULE — MRD 80191

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
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 Ouputs

Physical Interface:	2x 100/1000M Auto-Negotiate Base-T RJ45
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)
Service/PID Filtering:	With MRD 80857 license
T2MI De-encapsulation:	With MRD 80858 license

BISS1/BISS2/Mode CA Descrambling License — MRD 80840

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

Connectors:	2x 100/1000M Auto-Negotiate Base-T RJ45 (Shared with MPEG-IP I/O ports)
	2x additional 100/1000M RJ45 ports available with MRD 80200 option
Protocols:	HTTP, HTTPS, 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:	1RU - 1.7x17.2x13.3 inches (LxWxD)
	1RU - 44x437x338 mm (LxWxD)
Power:	100-240 VAC 50/60 Hz
	Dual 150W Power Supplies Included
Operating Temperature:	0° to 50°C
Storage Temperature:	-40°C to 65°C
Operating Relative Humidty:	<95% non-condensing