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HAIVISION

DATASHEET

HAIVISION
Makito X4 Rugged
ENCODER



Makito X4 Rugged Video Encoder

A compact, rugged, quad-input H.264 & HEVC video encoder for real-time delivery of motion imagery for ISR platforms.

ISR Encoding in a Rugged Package from Haivision Designed for the most demanding environments, the Makito X4 Rugged delivers high-quality, low latency AVC/H.264 and HEVC/H.265 video from analog and digital sources with resolutions up to 3840x2160p60 (4K UHD). Compliance with KLV and CoT metadata standards ensures that interoperability is achieved within a small form factor and all-weather MIL-STD-810G/DO-160 appliance.

Flexible Video from SD to 4K, Analog and Digital The Makito X4 Rugged offers the flexibility to ingest video from a broad range of video sensors. With its four BNC inputs the Makito X4 Rugged can accept up to four CVBS composite video sources, four 3G-SDI HD sources or a 12G-SDI input for encoding with resolutions up to 4K including in HDR.

Low Latency, High Quality Streaming The Makito X4 Rugged provides exceptional picture quality at very low bitrates with ultra low encode latency, making it ideal for real-time situational awareness. With support for HEVC, the Makito X4 Rugged provides increased quality at lower bit-rates compared to H.264, ensuring that downstream exploitation systems receive the best video possible, even over constrained IP networks, line of sight (LOS) and satellite links.

Maximum Processing Power With eight encoding cores capable of either H.264 or HEVC video compression at SD, HD and UHD resolutions, the Makito X4 Rugged can encode each input multiple times for dissemination to different downstream systems. For example, platforms can deliver a 6Mbps H.264 stream for LOS links and a 120kbps HEVC stream for SATCOM from the same input simultaneously.

KLV Metadata MISB-compliant Key-Length-Value (KLV) and Cursor-on-Target (CoT) metadata transport within an MPEG-2 transport stream ensures interoperability with downstream users. Real-time metadata, captured via serial, Ethernet, or SDI, may be transported using the MISB 0604 defined asynchronous or synchronous formats. Additionally, metadata filtering can optimize bandwidth utilization for video content.

SWaP Optimized The Makito X4 Rugged is a small, light-weight and low power consumption encoder, making it suitable for the most stringent size, weight, and power requirements in mobile or fixed platforms.

FEATURES	BENEFITS
HEVC & H.264 Encoding	Exceptional picture quality up to 4K and in HDR at low bitrates even over bandwidth constrained networks.
Ultra Low Latency	Respond in real-time to mission-critical video information.
Metadata Filtering	Enable low bitrate streaming through KLV filtering.
Dual Network Interfaces	Configurable separation of management and streaming networks as well as hitless failover over more than datalink.
Performance in a Compact Form-factor	Multi-channel encoding in a small, low power appliance which can be embedded within both mobile and fixed platforms.
Multi-bitrate Streaming	8 encoding cores and stream replication delivers the best video to the right viewers over any network.
NATO STANAG 4609 & MISB Compliant	Ensures interoperability amongst coalition forces and partners.
Fully Ruggedized	DO-160 / MIL-STD-810G / MIL-STD-1275E all weather design for airborne, ship and ground-based platforms.

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HAIVISION
Makito X4 Rugged
ENCODER

VIDEO INTERFACES
Multiple-format Quad BNC Input:
Composite NTSC/PAL/PAL-M (up to 4 inputs)
SD-SDI SMPTE 259M-C
HD-SDI SMPTE 292M
SMPTE 274M
SMPTE 296M
3G-SDI SMPTE 424M (Level A Only)
SMPTE 425M
SMPTE 425-5 (2SI and SQD)
6G-SDI SMPTE 2081 (1 input only)
12G-SDI SMPTE 2082 (1 input only)

VIDEO RESOLUTIONS*
3840x2160p 60/59.94/50/30/29.97/25 Hz
1920x1080p 60/59.94/50/30/29.97/25/24/23.98 Hz
1920x1080i 60/59.94/50 Hz
1280x720p 60/59.94/50/30/29.97/25 Hz
720x480/576i 60/59.94/50 Hz

VIDEO ENCODING
8-bit or 10-bit pixel depth
Chroma sub-sampling 4:2:0 or 4:2:2
BT.709 color space and WCG (BT.2020)
SDR and HDR - HLG or PQ (ST 2084)
Configurable Group of Picture (GOP) size
I, IP, IBP, IBBP, IBBBP, IBBBBP Framing
Bitrates from 32 Kbps up to 120 Mbps**
Configurable frame rate
Intra-refresh
Slice-based encoding
H.264/AVC Profiles:
MPEG-4 AVC part 10 / ISO/IEC 14496-10
Baseline, Main, High, High 10- Bit and High 4:2:2 10- Bit Profiles up to Level 5.2 (3840x2160p60) and lower intermediate levels
H.265/HEVC Profiles:
ISO/IEC 23008-2
Main, Main 10-Bit, Main 4:2:2 10- Bit Profiles up to Level 5.1 (3840x2160p60) and lower intermediate levels

** interlaced shown in fields per second*
*** bitrate depends on configuration*

AUDIO INTERFACES
Embedded Audio:
SD-SDI SMPTE 272M
HD/3G-SDI SMPTE 299M
Analog Audio Input:
Unbalanced Stereo

AUDIO ENCODING
Compression Standard:
MPEG-2 AAC-LC ISO/IEC 13818-7
MPEG-4 AAC-LC ISO/IEC 14496-3
Audio Channels:
64 (32 stereo pairs) embedded audio inputs
1 stereo or mono analog input
Bit Rates:
From 4 to 576 kbps per audio pair**
Frequency Response:
From 20 Hz to 22 kHz

METADATA
Input Metadata:
CoT to KLV conversion
KLV or CoT over serial RS-232/422
KLV or CoT over UDP
KLV over SDI (SMPTE 336)
SMPTE 336M compliant
MISB 0601.10 compliant
MISB 0604.2 compliant
SMPTE 12M Timecode
SMPTE 334-1/2 closed captioning
SCTE 104 insertion markers
Output Metadata:
Asynchronous & synchronous modes as per MISB 0604.2
High precision timecode insertion as per MISB 0604.2
KLV Metadata Processing (SMPTE 336, MISB 0601, 0102 and 0605 support)
SCTE 35 insertion markers

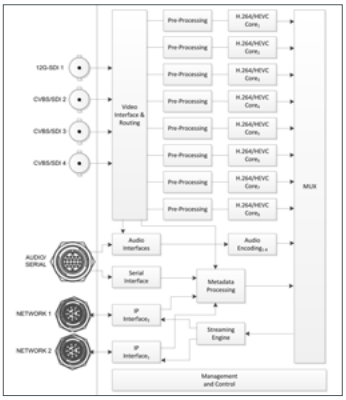
STANDARD COMPLIANCE
MIL-STD-810G
MIL-STD-461G
MIL-STD-1275E
MIL-STD-704F
RTCA-DO-160
STANAG 4609

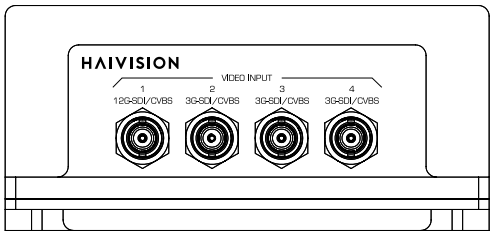
IP NETWORK INTERFACES
Standard:
Dual Ethernet 10/100/1000 Base-T, auto-detect, Half/Full-duplex
Unicast streaming (IPv4 & IPv6)
Multicast streaming (IGMPv3 & IPv6)
Path Redundancy – SRT across multiple networks
AVC/H.264 Protocols:
MPEG Transport Stream
Secure Reliable Transport (SRT)
TS over SRT, UDP or RTP
RTSP/RTP
HEVC/H.265 Protocols:
MPEG Transport Stream
Secure Reliable Transport (SRT)
TS over SRT, UDP or RTP
RTSP/RTP

MANAGEMENT INTERFACES
Standard:
RS-232
Ethernet (IPv4 & IPv6)
Management:
HTTPS (web browser)
Haivision EMS and Haivision Hub
Command line over SSH/Telnet/RS-232
SFTP/TFTP/SCP
SNMP v3

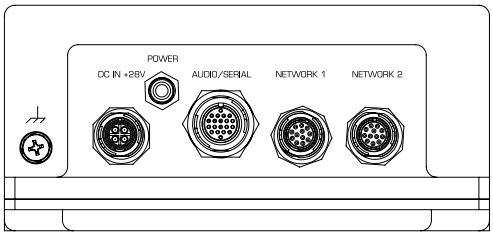
SIZE, WEIGHT, POWER
Dimensions:
68mm H x 146.2mm W x 185.7mm D
(2.675" H x 5.755" W x 7.31" D)
Weight:
1.93 kg (4.25 lbs)
Power:
28 VDC Nominal, 25W
Temperature:
Operating: -40° to 71°C (-40° to 160°F)
Non-operating: -45° to 85°C (-49° to 185°F)
Humidity: 0-100% condensing

Software Version: 1.7





Front



Back

Makito X4 Rugged Product Portfolio & Ordering Information **

Makito X4 Rugged 4K UHD Video Encoder w/ Metadata	**S-MX4E-R-SDI4-ISR-UHD**	Makito X4 Rugged encoder with four inputs; up to 3840x2160p60; 8x AVC/H.264 or HEVC/H.265 encoding engines; with KLV metadata.
Makito X4 Rugged HD Video Encoder w/ Metadata	**S-MX4E-R-SDI4-ISR**	Makito X4 Rugged encoder with four inputs; up to 1920x1080p60; 8x AVC/H.264 or HEVC/H.265 encoding engines; with KLV metadata.
Makito X4 UHD - upgrade	**SWO-MX4-UHD**	Software license option - Upgrade from HD to 4K UHD
HDR License	**SWO-MX4-HDR**	Software license option – Support HLG and PQ (ST 2084) transfer function

** For complete pricing and ordering, contact us at sales@haivision.com or your certified Haivision reseller.

DoDIN APL Certified

Makito X4 Rugged is on the Department of Defense Information Network Approved Product List (DoDIN APL) under tracking number **2118301**.

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