

1 + 1
SDI IN + SDI OUT,
DUPLEX**H.264 / HEVC**
HARDWARE ENCODE &
DECODE**< 1 s**
GLASS-TO-GLASS
LATENCY**IP transports**
UDP · RTP · SRT · RIST**WireGuard**
SECURE REMOTE
MANAGEMENT**Software-
defined**
COMMODITY INTEL ·
NO FPGA

The **1xx2** is a compact contribution/distribution codec for field and fixed deployments. A single box takes one **3G-SDI input**, encodes it in hardware to **H.264 or HEVC MPEG-TS** and delivers it over IP, while at the same time receiving an IP stream and decoding it back out to **3G-SDI**. Both directions run in parallel on one duplex Blackmagic DeckLink card. The unit is built for low-latency live contribution from the field. Transport is selectable per stream (UDP/RTP/SRT/RIST) and the box dials home over WireGuard for fully remote configuration from a central dashboard. It runs as software on the customer's existing Intel boxes, or on a Hornets Tech-supplied mini-unit.

VIDEO ENCODING (SDI → IP)

CODECS & OUTPUT PROFILES

H.264 / AVC	High profile · 8-bit 4:2:0 · hardware (Intel QSV)
H.265 / HEVC	Main · Main 10 · Main 4:2:2 10 · hardware (Intel QSV)
Rate control	True CBR (broadcast contribution), configurable up to 50 Mbps; typical 20 / 30 / 40 Mbps
GOP / latency	Short-GOP low-latency or long-GOP normal-quality (selectable, see below)
Container	MPEG-TS

RESOLUTIONS & FRAME RATES

1080i50 1080i59.94 1080p25 1080p30 1080p50
1080p60

Primary operating modes are 1080i50 and 1080p50. SDI input mode is **auto-detected**; the encoder re-locks automatically on an input format change or signal loss (bars-to-recovery ≈ 12 s). No up/down-scaling and no frame-rate conversion; output matches the input raster. **No 4K / UHD.**

VIDEO DECODING (IP → SDI)

- Receives H.264 / HEVC MPEG-TS over UDP · RTP · SRT · RIST and drives the **SDI output** in parallel with the encoder.
- Hardware-accelerated decode (Intel VA-API / Quick Sync): HEVC 4:2:0 8/10-bit and 4:2:2 10-bit on-box.
- Deinterlacing (e.g. 1080i50 → 1080p50) on the SDI output.
- Corrupt-packet-tolerant demux; embedded audio on the SDI output.

AUDIO

Codecs	AAC-LC · MPEG-1 L2 · Opus · Linear PCM (SMPTE 302M in MPEG-TS)
SDI channels	Up to 16 embedded channels captured
Bitrate	Per-stream configurable (compressed codecs); PCM is uncompressed

ENCODE FORMAT SUPPORT BY CHROMA AND BIT DEPTH

FORMAT	4:2:0	4:2:2
H.264 8-bit	✓	✗
H.264 10-bit	✗	✗
HEVC 8-bit	✓	✓ encode only
HEVC 10-bit	✓	✓

H.264 is 8-bit 4:2:0 only on all Intel hardware generations. HEVC 4:2:2 **8-bit** is encode-only (decode needs an external professional IRD); 4:2:2 **10-bit** encodes and decodes on-box. Real-time capability of the heaviest formats depends on the hardware platform (see the platform table).

LATENCY MODES (PER STREAM)

Low latency	Short GOP, no B-frames, < 1 s glass-to-glass (100–166 ms measured over LAN). Default mode, for live contribution.
Normal quality	Long GOP with B-frames and look-ahead: higher PSNR at the same bitrate, at the cost of added latency. For distribution.

INPUT PROFILES

Low latency	Small buffer, pairs with a short-GOP (low-latency) source. Around 150 ms.
Normal quality	Deep buffer for a clean join on long-GOP / B-frame sources, at the cost of 2–3 s standing latency.

Decoder note: on-box round-trip covers 4:2:0 (8/10-bit) and 4:2:2 10-bit. The 4:2:2 10-bit chain always runs a deep input profile (0.5 s buffer); glass-to-glass stays under 1 s. HEVC 4:2:2 8-bit is a non-standard profile and should be sent to an external professional IRD.

- Arbitrary channel → track mapping:** any SDI channel routes to any output audio track; a channel may feed several tracks.
- Multiple independent audio tracks per transport stream (mono / stereo / multichannel).
- PCM (SMPTE 302M) carries 2 / 4 / 6 / 8 channels per track; MP2 is mono/stereo.

TRANSPORT & NETWORK

Delivery protocol is selectable **per stream** in the UI. The encoder sends and the decoder receives, but for SRT and RIST the connection role (**caller / listener / rendezvous**) is independent: either side can initiate, so a codec behind NAT or on a cellular link can dial out to a listening peer, or wait to be reached.

PROTOCOL	RELIABILITY / SECURITY	CONFIGURABLE PARAMETERS
UDP	MPEG-TS, unicast or multicast; no ARQ	Destination / source IP + port, multicast egress interface, DSCP
RTP	MPEG-TS over RTP; no ARQ	Destination / source IP + port, egress interface, DSCP
SRT	ARQ retransmission; AES-128 / 192 / 256 encryption	Caller / listener / rendezvous, host, port, latency window, passphrase + key length, stream ID
RIST	ARQ; main-profile AES-128 / 256 encryption (simple profile also available)	Main / simple profile, caller / listener, host, port, recovery buffer, pre-shared key + cipher

QOS / DSCP MARKING

- Every **UDP / RTP** stream carries a configurable **DSCP** value (0–63), default **EF (46)**, with named presets (EF / CS4 / CS3 / AF41 / DF).
- Written into the IP header of every packet so a managed network can prioritise the stream. (SRT/RIST rely on their own ARQ instead, see Link resilience.)

LINK RESILIENCE

- **SRT and RIST recover lost packets in real time** via ARQ retransmission, giving resilient contribution over lossy or congested links without re-sending the whole stream.
- Per-link latency / recovery-buffer setting trades a little delay for loss recovery.

WAN-friendly by design. SRT and RIST carry their own retransmission and encryption for the public internet, while DSCP marking lets a managed network prioritise the stream under congestion. The two approaches complement each other and can be picked per link.

REMOTE MANAGEMENT & ACCESS

WIREGUARD DIAL-HOME

- The device establishes an **outbound** WireGuard tunnel to a central hub: no inbound ports, no NAT traversal, works on cellular/SIM links.
- Once connected, the box is **fully configurable** from the dashboard over the tunnel; media can also ride the same tunnel.
- The **private key never leaves the device**; keys are generated on-box and rotatable from the UI.
- The management tunnel survives service restarts and reboots.

CONTROL, MONITORING & UI

- **REST API** for every function (encoder and decoder lifecycle, configuration, status), fully scriptable.
- Central web **dashboard** plus a matching **on-device UI** (same origin, no hub required).
- Live status: input lock, uptime, bitrate, restart count, **thumbnail preview**, per-stream **event & process logs**.
- One-click **Start / Stop / Restart** per direction; **auto-start-on-boot** policy (saves metered data by sending only when the operator chooses).
- DeckLink card temperature and host CPU/GPU metrics surfaced in the UI.
- Access is **authenticated**: on-device login for the UI and a per-device API key for the dashboard, served over **HTTPS**.

HARDWARE PLATFORMS

The 1xx2 is **software on commodity hardware**, with no FPGA. Deploy it on a Hornets Tech-supplied mini-unit, or as software-only on the customer's existing Intel + DeckLink boxes. All platforms share the same codec feature set; they differ in headroom and, on newer silicon, additional codecs.

PLATFORM		COMPUTE	NOTES	
Hornets Tech N150 unit		Intel N150 · 4× E-core · Xe-LP 24-EU iGPU · ~6 W	Offered field unit. Validated duplex at 1080p50 for H.264 and HEVC 4:2:0 (8/10-bit), incl. HEVC 4:2:2 10-bit at the full 50 Mbps.	
Hornets Tech N200 unit		Intel N200 · 4× E-core · Xe-LP 32-EU iGPU	Larger 32-EU iGPU → more duplex headroom; same validated duplex set incl. HEVC 4:2:2 10-bit at 50 Mbps.	
Customer i7 box (software-only)		Intel i7 + UHD-class iGPU + DeckLink SDI Micro M.2	Reuses an existing fleet: same codec set, more CPU budget for software paths (e.g. future JPEG-XS).	
Arrow Lake / Arc-class (high-end)		e.g. Core Ultra + Arc 130T · dual media engines	Large duplex headroom, adds AV1 hardware encode; no package-power tuning needed. 4:2:2 path validated per unit.	
SDI I/O	Blackmagic DeckLink SDI Micro (M.2) · HD/3G-SDI (1080p50/60 capable) · 1× in + 1× out, simultaneous duplex		Memory	16 GB RAM
			OS	Linux
Acceleration	Intel Quick Sync (QSV) encode · VA-API decode, both on the integrated GPU			

Software-only deployments are validated first. Which codecs, chroma formats and bit depths a box can run, and whether the heaviest formats stay real-time under simultaneous encode and decode, depends on its **Intel iGPU generation**. Stability of the heaviest decode paths also depends on the exact kernel and GPU-driver versions, so before the 1xx2 is deployed on customer-supplied hardware, Hornets Tech validates that specific unit to confirm which capabilities in this datasheet it can actually sustain. The Hornets Tech N150 / N200 units ship pre-validated, with the OS, kernel and GPU-driver stack **pinned to the exact versions the validation ran on**.

STANDARDS & INTEROPERABILITY

Video	H.264 / AVC (ITU-T H.264) · H.265 / HEVC (ITU-T H.265, incl. RExt 4:2:2)	Transport	UDP · RTP (RFC 3550) · SRT (Haivision) · RIST (VSF TR-06, main & simple)
Audio	AAC-LC · MPEG-1 Layer II · Opus (RFC 6716) · Linear PCM (SMPTE 302M)	QoS	DiffServ / DSCP (RFC 2474)
Container	MPEG-TS (ISO/IEC 13818-1)	Management	WireGuard VPN · REST/HTTP API · web dashboard

CAPABILITY SUMMARY

SUPPORTED

- Simultaneous 1× SDI encode + 1× SDI decode on one box
- H.264 High 8-bit 4:2:0
- HEVC 4:2:0 8/10-bit (Main / Main 10)
- HEVC 4:2:2 10-bit (encode + on-box decode)
- Up to 1080p60, 1080i50 / 1080p50 primary
- UDP · RTP · SRT · RIST, per-stream selectable
- SRT/RIST AES encryption + caller/listener roles
- 16-ch audio, arbitrary channel→track mapping
- AAC · MP2 · Opus · PCM (SMPTE 302M)
- DSCP/QoS marking (UDP/RTP); low-latency & quality modes
- WireGuard dial-home + full remote config

NOT SUPPORTED / OUT OF SCOPE

- 4K / UHD
- HDR
- H.264 10-bit or 4:2:2 (any Intel HW)
- On-box decode of HEVC 4:2:2 **8-bit**
- Up/down-scaling & frame-rate conversion
- Audio gain / processing
- JPEG-XS roadmap
- NDI roadmap
- Dual-path / hitless redundancy
- Ancillary-data passthrough & camera control

Open to customisation. The 1xx2 is a software-defined platform, so much of what is not listed here can be added or tuned in software, and capability trade-offs are configurable; dropping simultaneous decode, for example, frees headroom for heavier encode formats. If a deployment needs something the current build does not cover, contact us to discuss it.

All capabilities listed are validated on the referenced Intel platforms. Real-time performance of the heaviest formats is platform-dependent; contact Hornets Tech to confirm a specific hardware target for your workload.