**Overview**

The Gearbox™ MF is a real time multichannel streamer, integrated RF receiver, and transcoder designed to receive satellite and terrestrial RF signals and transform them into streams that are best suited for today’s digital environments. It is designed to be scalable, easily adaptable, and field upgradeable to meet the needs of cable and IP network operators who are very comfortable with embedded Linux® based appliances. It relies on an Intel® 16 Core CPU as an accelerator. We have also optimized the transcode engine for reliability, efficiency, and flexibility.

The Gearbox MF is an MPEG-2 to H.264 transcoder or transcaler. It receives transport streams several ways and transcodes them to H.264 or optional H.265, and outputs them to an IP network. Resulting streams can be viewed with standard IP capable set-top boxes, streaming video, smart phones, or software clients such as VLC or JW Player. The Gearbox MF receives transport streams, demultiplexes the requested services and streams these services using UDP, RTP, RTMP, DASH, Adaptive streaming, or HTTP via IP networks as either IP multicast or IP unicast streams. The system transcodes individual streams into H.264 format up to a maximum individual bitrate of 15 Mbps.

The Gearbox MF selects all required PIDs and multiplexes the demultiplexed transport stream packets into IP packets.

The unit provides PID filtering of all unwanted traffic, increasing system performance and the number of channels which can be transmitted per unit.

Programs typically are forwarded (pushed) as transport stream packets via UDP or as RTP (real time protocol) payload (RFC 2250). Pushing can be either unicast or multicast. In addition to push, programs can be forwarded on request (pulled) using HTTP, HTTP Live, RTMP, DASH, etc.

**Applications**

- IPTV Unicasting, Multicasting, Streaming
- Telco TV ingest
- Hotels, Ships, Universities, Resorts feeds
- Streaming to designated VideoLAN VLC or similar clients, or to Roku®, Amino™, or other set-top boxes

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**Features**

- Inputs: Simultaneous choices from HD-SDI, SDI, DVB-S-S2, Encrypted DVB-S-S2, 8VSB, QAM (digital or analog), DVB-C, DVB-T+T2, DVB-ASI, ISDB-Tb, or GigE and IP (H.264, MPEG-2, VC-1, or optional H.265)
- Outputs: Simultaneous SDI, HD-SDI, IP, or ASI
- IP output protocols: UDP, RTP, RTMP (Open Flash), HTTP, with DLNA support
- Supports HLS (adaptive) for output to mobile devices
- Supports logo insertion, text overlay, and SCTE 35 compliant cue tone insertion ("ad markers") on outputs
- Performs AES-128 encryption
- Supports 50 HLS users natively. Optional built-in server supports 1,000 simultaneous HLS, DASH, and/or RTMP users.
- Supports NTSC or PAL
- Transcoding bit rates: .1 to 15 Mbps
- Creates simultaneous High, Medium, and Low bitrate streams
- Supports 1080i, 1080p, 720p, 576i, 480i, and 480p and any other broadcast or video format
- Simultaneous demodulation, transcoding, and encapsulation
- Transcodes up to 20 720p60 HD streams, or 13 1080i/p HD streams, or 52 SD streams from MPEG-2 to H.264, or vice-versa
- Optional H.265 transcodes are up 5 720p HD streams, or 3 1080i/p HD streams, or 20 SD streams from MPEG-2 or H.264 to H.265, or vice-versa
- SNMP, REST, SOAP support for remote management and monitoring
- Support for Variable Bit Rate (VBR) encoding maximizes adaptive streaming video quality and bandwidth efficiency
- Tested to work with Atlas™, Wowza®, and Adobe® Flash® media servers
- Tested to work with Akamai, Tulix, Verizon, etc. CDN’s
- Tested compatible with major brands of IP devices including Amino™, Roku®, Teleryg, Android™, and Apple iPad® and iPhone®
- Tested compatible with major brands of professional H.265, H.264, and MPEG-2 decoders and video servers
- Audio support: AAC, Embedded pass-through, MPEG-1 Layer II, optional MP3, and/or optional “SurCode for Dolby Digital” AC-3
- Settings are remembered when power cycled
- Based on embedded Linux®
- Remote GUI includes some scheduling
- Redundant power supply

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**Computer Modules, Inc.**

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www.dveo.com
Sample of GUIs

Options

- Optional transcoding to H.265
- 4:2:2 10 bit encoding
- Optional DOZER™ Automated UDP Packet Recovery protocol, enabling error-free video delivery over UDP. DOZER ensures smooth MPEG-2, H.264, and optional H.265 delivery through DVEO patented algorithms for automated packet recovery and re-ordering of out-of-sequence packets.
- Optional built-in “Mini Atlas” server supports 1,000+ simultaneous HLS, DASH, and/or RTMP users

Input/Outputs Example

- Transcodes up to 52 SD streams, or 20 720p60 streams, or 13 1080i or 1080p HD streams from MPEG-2 to H.264, or vice-versa.

Throughput

If you have five Mbps bandwidth Internet then you can only stream five one Mbps streams.

Ports Utilized

<table>
<thead>
<tr>
<th>Protocol</th>
<th>TCP Ports</th>
<th>UDP Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTTP</td>
<td>80, 8000, 8001, 8080,</td>
<td>1-65535 (out)</td>
</tr>
<tr>
<td>HTTPS</td>
<td>443</td>
<td></td>
</tr>
<tr>
<td>RTSP (input only)</td>
<td>554, 7070</td>
<td>6970-7170, 5005</td>
</tr>
<tr>
<td>RTMP</td>
<td>1935</td>
<td></td>
</tr>
<tr>
<td>RTP</td>
<td>6970-6999,</td>
<td>16384-32767</td>
</tr>
</tbody>
</table>

CDNs Tested With:

1. Akamai* 5. CDNetworks 9. Ustream*

*Certified

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IP Input and Output

**IP Input**
Input protocols: UDP, RTP, RTSP, HTTP, RTMP Live, RTMP (pushed from Flash server).
Supports NewTek™ ND™ input.

**IP Output**
Audio: AAC, Embedded pass-through, MPEG-1 Layer II, optional MP3, and/or optional “SurCode for Dolby Digital” AC-3
Ethernet: Two GigE, optional 10 GigE
Output protocols: UDP, RTP, RTMP (Open Flash), HTTP, with DLNA support
Type: IP multicast, IP-unicast with “wrappers”
Bit Rates: Multiple H.264 video streams at different bit rates (.1 to 15 mbps), resolutions, and protocols, wrappers, and containers.
Optional H.265: H.265 average bit rate supported. No constant or variable.
Quality: 8 bit encoding with 4:2:0 color sampling; optional 4:2:2
Video: NTSC or PAL
Latency: About 1.2 seconds (fixed)

Supported Resolutions

**Supported Resolutions – Input and Output**

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>1920 x 1080</th>
<th>1280 x 720</th>
<th>720 x 576</th>
<th>720 x 480</th>
<th>H.264 up</th>
</tr>
</thead>
<tbody>
<tr>
<td>SD in at 6 Mbps</td>
<td>720 x 480</td>
<td>704 x 480</td>
<td>640 x 480</td>
<td>480 x 320</td>
<td>320 x 240</td>
</tr>
<tr>
<td>HD inputs at 12 Mbps</td>
<td>720p</td>
<td>720p60</td>
<td>1080i</td>
<td>1080p</td>
<td>1080p up</td>
</tr>
<tr>
<td>H.264 In</td>
<td>480i</td>
<td>480i</td>
<td>480i</td>
<td>1080i</td>
<td>1080p</td>
</tr>
<tr>
<td>H.264 Out</td>
<td>SD out at 3 Mbps</td>
<td>HD outputs at 6 Mbps</td>
<td>HD outputs at 12 Mbps</td>
<td>HD outputs at 12 Mbps</td>
<td>Up to 13 streams</td>
</tr>
<tr>
<td>CPU &amp; Operating System</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OS</td>
<td>DVEO embedded Linux® on SSD</td>
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</tr>
</tbody>
</table>

Benchmarks – IP Output

**MPEG-2 In**
SD in at 6 Mbps
480i
HD inputs at 12 Mbps
720p
720p60 frames
1080i
1080p

**H.264 Out**
SD out at 3 Mbps
480i – Up to 52 streams
HD outputs at 6 Mbps
HD outputs at 12 Mbps
Up to 20 streams
Up to 13 streams
Up to 13 streams

**CPU & Operating System**
CPU: Intel® Xeon® 16 Core
OS: DVEO embedded Linux® on SSD

Physical & Power
Size – 3 RU high (W x H x D): 19 x 5.25 x 22.5 inches (48.26 x 13.34 x 64 cm)
Power Supply: 3U 760W – Redundant
Temperature Range: Operating: 0°C ~ +50°C on Full Load; Storage: -20°C ~ +70°C
Non-operating Humidity: 5% to 95% non-condensing
Weight: 39 lbs. (17.69 kg)
Conformities: UL, BSMI, CSA, FCC, CE, RoHS

Security
Ports security scanned to MIL requirements prior to shipment

Ad Insertion
SCTE Ad Marker insertion via RS232, USB, IP, Contact closures

Specifications

**DVB-C, QAM Input**
Modulation: DVB-C, Analog or Digital Clear QAM (Annex A, B, or C)
Inputs: RF from cable
Frequency range: 55 to 867 MHz
Maximum raw throughput: 200 Mbps

**8VSB (SMPTE 310M) Input**
Modulation: 8VSB (SMPTE 310M) – terrestrial digital or analog RF
Inputs: RF from antenna
Frequency range: 54 to 860 MHz
Maximum raw throughput: 200 Mbps

**DVB-S/S2 Input**
Modulation: DVB-S, DVB-S2
Inputs: L-Band, K-Band, Ku Band, etc.
Symbol rate: 1 to 45 MS/s
Frequency range: 950 to 2150 MHz
LNB control: 22 kHz, power H/V
Spectral inversion: ON/OFF
Maximum raw throughput: 200 Mbps

**DVB-T or DVB-T2 Input**
Modulation: DVB-T or DVB-T2 – terrestrial digital
Inputs: RF from antenna
Frequency range: 54 to 860 MHz
Maximum raw throughput: 200 Mbps

**ISDB-T/ISDB-Tb Input**
Modulation: ISDB-Tb
Inputs: RF from antenna
Output Bit Rates

**Output Bit Rates**
Bit Rates: Multiple H.264 and/or MPEG-2 video streams at different bit rates (.1 to 15 mbps)

**CPU & Operating System**
CPU: Intel® Xeon® 16 Core
OS: DVEO embedded Linux® on SSD

Physical & Power
Size – 3 RU high (W x H x D): 19 x 5.25 x 22.5 inches (48.26 x 13.34 x 64 cm)
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Ad Insertion
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Ordering Information

Gearbox MF

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