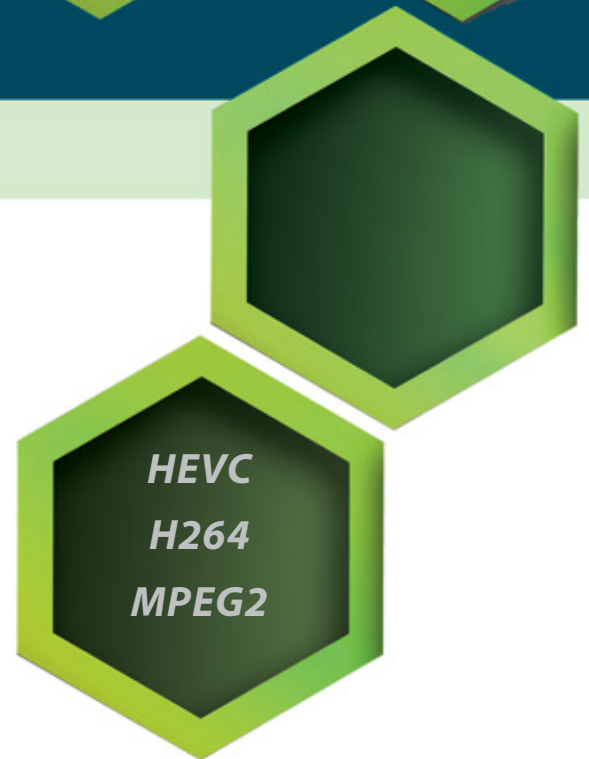




Comark Digital Services

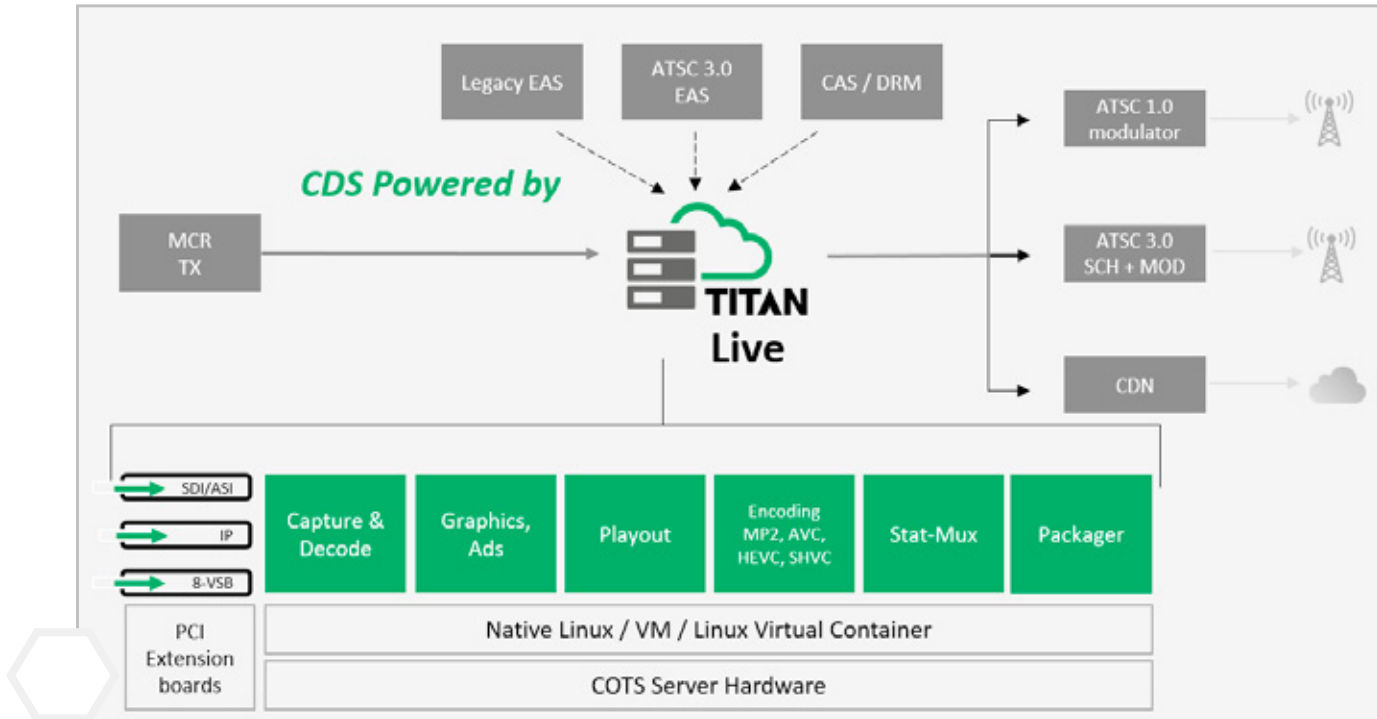
DTV ENCODING SOLUTIONS

- MAX VQ – MIN Bandwidth
- Mobile to UHD Resolutions
- Software Based
- ATSC 1.0 and 3.0
- OTA and OTT



CONVERGED SOLUTION FOR ATSC 1.0 AND ATSC 3.0

MPEG ENCODING SOLUTIONS are swiftly moving away from dedicated ASIC/hardware (1RU) based platforms to software (SW) solutions. SW encoding solutions are perfectly suited for Over-The-Air (OTA) terrestrial distribution and multi-screen delivery, as well as Linear and On Demand experiences.



Encoding System Block Diagram

POWERED BY TITAN LIVE, Comark Digital Services (CDS) offers a converged software-based platform for live video compression, stream processing, and control/management. The solution is flexible allowing for deployments via bare metal (1RU server), blade server, or virtualized in the cloud.

- ✓ High Video Quality (VQ) – High Density
- ✓ Pure CPU solution, Linux, Windows, VM
- ✓ Mobile to UHD resolutions support
- ✓ HEVC, H264, MPEG2
- ✓ Low-latency Mode
- ✓ Audio levelling (CALM)
- ✓ Channel branding – logo insertion
- ✓ Optimized statistical MUX over IP
- ✓ Flexible redundancy, 1+1, N+1, N+M

ATSC 1.0: See immediate improvements to existing OTA signals with higher VQ and improved bandwidth usage, especially in channel share scenarios.

- 3HD and 3SD in a single 19.4Mbps OTA RF channel
- Integrated Stat-MUX

ATSC 3.0: Software encoding licenses are per input and are “all inclusive”. This single CAPEX model provides unlimited output formats and allows for a seamless upgrade from ATSC 1.0 to ATSC 3.0.

- SD/HD and UHDp60 resolutions
- UHD, HDR, SHVC for ATSC 3.0
- DASH, MMT packagers included

CDN: The all inclusive model offers a complete distribution solution for both main screens and multi-screen applications, including CDN and OTT.

- Live program distribution
- Time-shifted viewing
- Live-to-VOD

KEY BENEFITS

- **SW solution provides flexibility with 1RU server, blade server, VM**
- **Advanced encoding yields the highest VQ with the lowest bit rate**
- **Future-Proof architecture easily scales from ATSC 1.0 to ATSC 3.0**
- **Encoder licenses are licensed per input with unlimited output format**
- **High availability with 1+1, N+1, and N+M redundancy options**
- **IP Optimized Platform Maximizes Technology Evolution**

ENCODING SPECIFICATIONS

Video Compression

- MPEG2 MP@HL, MP@ML
- H264 HP@L4.2, MP@L4.1; 4:2:0/4:2:2 10-bit
- HEVC Main10@L5.1 (UHD)

Resolutions

- UHD 3840 x 2160
- HD 1080 x (1920, 1440, 1280, 960), 720 x (1280, 960, 640)
- SD NTSC 480 x (720, 704, 640, 544, 528, 480, 352)
- PAL 576 x (720, 704, 544, 528, 480, 352)

Frame rates

- Progressive 59.94, 50, 29.97, 25
- Interlaced 29.97, 25

Encoding bit rate

- Up to 50Mbps
- CBR, Capped VBR, Statmuxed VBR
- Audio Compression formats
- MPEG-1 Layer II
- AAC-LC, AAC-HEv1/v2
- Dolby® Digital, Dolby® Digital Plus
- Sampling frequency: 32, 44.1, 48 KHz
- Dolby® Digital, Dolby® Digital Plus, Dolby-E Passthru

INPUT INTERFACES

TS/IP Input

- UDP/RTP (IGMPv3 multicast, unicast)
- MPEG-2 TS (SPTS/MPTS)
- Video decoding: MPEG-2/MPEG-4 AVC
- Audio decoding: MPEG-1 Layer II, AAC-LC, AAC-HE v1/v2, Dolby Digital, Dolby Digital+, Dolby-E

SDI Input

- 8x 3G-SDI Mini BNC (SMPTE-424M and SMPTE 425, Level A or Level B)
- Audio embedded in SDI

RTMP Input

MULTIPLEXER

- Grooming and remultiplexing
- Stream routing any input – any output
- PID filtering/remapping

OUTPUT INTERFACES

TS/IP

- UDP, RTP (IGMPv3 multicast, unicast)
- ST2022-1/2 (any FEC dimensions)
- Up to 256 SPTS/MPTS, 1 GB per physical connector

TS/DVB-ASI*

- MPEG2-TS, 188 or 204 bytes
- Up to 256 SPTS/MPTS, 210 mbps per physical connector
- 4 GbE ports, additional 1 GbE/10GbE ports can be added through extension cards

AUTOMATION INTERFACES

Metadata/VBI

- VPS, VPI, VITC, ATC, SMPTE2031

Digital Program Insertion

- SCTE 35 pass through
- SCTE35 insertion via SCTE104 triggers
- ESAM (SCC API)

CDN INTEGRATION

- Akamai certified
- Compatible with leading CDN's

PACKAGER

- UDP/RTP
- MPEG-2 TS (SPTS & MPTS)
- Apple® HTTP Live Streaming
- Microsoft® Smooth Streaming (fragmented MP4 PIFF format)
- RTMP
- DASH ISO Streaming format
- HDS
- Multi-bitrate TS (ATS with EBP)

CONFIGURATION AND MANAGEMENT

- HTML Web Graphic User Interface
- SNMP (MIB v2c) with remote SNMP supervisor
- Northbound REST API
- N+1 Redundancy management via AMS

*Contact Comark for availability



Corporate Office in Southwick, MA

HITACHI-COMARK OVERVIEW

High performance, award-winning **TV transmitters** backed by more than 45 years of leadership in both inductive output tube (IOT) and solid-state broadcasting, and multi-media products and technologies: **Hitachi Kokusai Electric Comark LLC** provides concrete solutions for the demands of today's global TV broadcast industry.

Hitachi Kokusai Electric Comark LLC

104 Feeding Hills Road
Southwick, MA 01077, U.S.A.
Tel: (413) 998-1100
Fax: (413) 998-1178
Toll Free Tel: (800) 288-8364
Sales@ComarkTV.com
Customer Service E-mail:
Support@ComarkTV.com

www.ComarkTV.com