The MCM-9000 provides a complete monitoring solution for all the transmission layers starting from the TS packet header all the way down to the encoded video content and quality. In addition, MCM-9000 creates a visual mosaic from the monitored services with rich data overlay, supplying the operator with a strong tool for error detection and alerting.

The created mosaic is an HD or UHD video stream, encoded and transmitted as 2110-21 and standard H.264/H.265 SPTS – enabling remote monitoring, mobile devices access and very flexible installation topology.

The device monitors complete ETR-101-290 compliance with a rich variety of properties: video freeze, black video, audio silence, audio levels, color space, resolution change, service bitrate, PMT structure and more.

**FEATURES**

- Flexible deployment, due to the unique mosaic over SPTS. Mosaic streaming over regular LAN/WAN network is available.
- High density solution; concurrent monitoring of up to 300 services per server.
- Simultaneous, real-time analysis of all sources on all channels
- Unique alarm trigger settings for individual channels or groups of channels
- Source recording, triggered by any of the event detection rules
- On screen Tally, UMD’s, DVB subtitling, Teletext subtitles, ID3 subtitling and Closed-captions rendering

**PRODUCT DETAILS**

The MCM-9000 provides three levels of monitoring: transport level monitoring based on ETR-101-290 compliance, content level monitoring, and template based monitoring for detection of configuration changes in the monitored stream.

**Analysis**

Transport layer monitoring: ETR-101-290, ATSC A/78A
Video content monitoring: freeze frame, black frame
Audio content monitoring: audio levels, audio Silence
Subtitles content monitoring: display and validity

**Stream Capture**

Automatic stream capture on error or external trigger

**Data Traffic Monitoring and Logging**

Logging of individual PIDs and service bitrates
Interval based statistics trap generation

**SPECIFICATIONS**

** Supported Video Compression Formats**

MPEG-2 Video ........................................ up to MP@5.1
H.264 Video ........................................... up to Hi@4.1
HEVC Video ............................................ up to MP@5.1
JPEG2000 TR-01 ..................................... up to 200mbps
Color Space .................. YUV420, YUV422, YUV422-10bit

**Audio Layer Analysis**

Audio codec ............ MPEG2 / AAC / HE-AAC / A-52 / AES67
Audio channel mode ...................................... 1 / 1+1 / 2 / 5.1
Loudness monitoring... EBU-R-128/ITU-1770-3/ATSC A/85
Silence detection .... Mono, stereo, dual mono, surround
Clipping detection ................ User adjustable threshold

**Video Layer Analysis**

Video codec ... MPEG2 / H.264 / HEVC / UNCOMPRESSED
Video encoding ........................................ Level and profile
Video resolution .............. 480i, 576i, 1080i, 1080p, UHD
Video aspect ratio .................. 4:3 / 16:9
Video frame rate .......... 25 / 29.97 / 30 / 50 / 59.94 / 60
Video content ................. Black / Freeze / Black with logo
Video quality .................. Blocking detection

**Signaling Analysis**

SCTE-35/104 ................................................. XML & Binary
Transport Protocols
Multicast & Unicast... TS over UDP
TS over RTP, TS over HTTP
HLS/MPEG-DASH... TS over HLS/ MPEG-DASH
RTMP... PUSH & PULL
SMPTE-2022-6/7... RTP over UDP
ST-2110... RTP over UDP

Scrambling Analysis
Scrambling verification
Crypto period measurement
ECM/EMM existence tests
ECM Private data change notification
DVB Simulcrypt AES-ECB descrambling
HLS AES descrambling

Mosaic Layouts
User defined layouts, 1-100 channels per layout
Layout editor - via embedded web browser Round-Robin
and Panellty Box (CED) layout displays
Up to 32 audio streams loudness display per service
Overlay display of errors, Tally, UMB’s, events and
DVB/Teletext/CC/ID3 subtitling overlay, encoded as
standard HD or UHD service (Multicast SPTS and HLS)
Selectable encoding H.264 /H.265/ MPEG-2 and in
parallel low latency mosaic ST-2110/2022-6/7 streaming,
viewable on standard STB, ST-2110/2022-6 to HDMI
converters, mobile devices and web browsers

Subtitle Analysis
DVB subtitles... Overlay display
ID3 subtitles... Overlay display
CC errors... Separate rules
Closed Caption... CEA-708, CEA-608
Multi language support... Support for up to 8 PIDs

Notifications
SNMP... Configurable SNMP TRAPS
SYS LOG... Configurable sys-log notifications
SMTP... Email notifications
Overlay... Overlay error display on the mosaic
Centralized Error Display... Group error channels
to a single display

Management
Web... Complete configuration via web
Remote... JSON WEB services
CLI... Network & software management
Stacking... Group multiple units to a single logical one

Transport Layer Analysis
ETR, First priority... TS sync loss
Sync byte error
PAT error
Continuity count error
PMT error
PID error
ETR, Second priority... Transport error
CRC error
PCR repetition error
PCR discontinuity
PCR accuracy error
PTS error
CAT error
ETR, Third priority... NIT actual/other error
SDT actual/other error
EIT actual/other error
RST/TDT Error
Table analysis... TS PSI, TS DVB_SI

Channel Statistics
Service structure tree-view (per PID)
Display of each PID’s bitrate
Display of service bitrate
Display of service properties
Graphical display of audio loudness and True-peak

License Management
Dynamic license sharing between devices
Field upgradable – via FTP, for all licensed features

Software Maintenance
Field upgradable – via FTP
Supports dual software image
Export/import complete system configuration to XML
Compatible with VmWare ESXi 6/6.5

Hardware Requirements
Operates on standard off the shelf hardware
Intel CPU based platforms
No software installation required

ORDERING INFORMATION
Base Device:
MCM-9000... Flexible license model