

## Videotek® MSA-100

### Multi-Source Analyzer

The Videotek® MSA-100 multi-source analyzer couples confidence monitoring with full testing of compressed video conformance, audio level, data services and ETR-290 on any terrestrial broadcast, cable headend, satellite or telco network. Cost-effective and compact, the entry-level MSA-100 is a powerful tool designed for today's video-over-IP infrastructures, while still supporting legacy delivery interfaces. A wide array of options allows it to scale from small stations to complex, multichannel operations.

The MSA-100 delivers awareness of system information and ancillary data in a space-efficient 1RU package. It possesses a rich user interface for both local and remote control situations, with conformance results displayed in the intuitive GUI. Real-time, full-motion video decode and audio level analysis can be viewed in one or more mosaic displays. A variety of physical input formats are supported, along with all major compression standards, a wide array of transport and streaming protocols, and the ability to simultaneously handle a large number of channels in real time.



### Product Features

- Decoding, testing, quality analysis and confidence monitoring in a 1RU solution
- Ability to mix a variety of compression formats (H.264/AVC, MPEG-2, VC-1 and MPEG-4 v2)
- IP input via dual high-performance gigabit copper network ports
- Support for multiple ports from a variety of input option types (DVB-ASI, DVB-T, DVB-T2, DVB-S, and DVB-S2)
- Simultaneous, real-time analysis of all sources on all channels
- Validation of systems, video and audio layers
- Persistent, unique test settings for individual channels or groups of channels
- Support for CC708, DVB Subtitles, DVB Teletext, CC608 and selected XDS message rendering
- Traffic status for SI, IP, TS layer, PSIP, AFD, WSS and DVB teletext
- Capture-on-error and manual capture options
- Rich local user interface standard, optional support for multiple remote users
- SNMP capable
- Single power supply
- Single hard disk drive

## Product Details

The MSA-100 multi-source analyzer provides total control of test parameters on each selected source. An option allows the scheduling of different levels of testing at different times of the day. All A/V essence is fully decoded in real time.

Up to 24 PiPs can be viewed on a virtual screen. The number of PiPs displayed depends on picture size (SD/HD) and video essence type. Video of the sources in the currently viewed screen — one of 12 available virtual screens — is rendered in real time. The multi-PIP display is quickly set up using standard layout formats and can also be customized to meet a user's unique preferences. Users can even focus in on a full-screen version of any single source under test.

All test and layout settings are remembered, and can be managed by persistent IDs to allow long-term trending in logs.

### Analysis/Test Report and History

The MSA-100 provides the following analysis data:

- Test summary of each source at system, video and audio level
- Detailed test message of each error/warning type
- Monthly, daily and hourly test history (error/warning count) over the past 12 months

### Stream Capture

Two different stream capture modes are supported:

- Automatic Stream Capture on Error  
For standard builds, auto capture enables monitoring of one source at a time (avoiding multiple sources having errors at the same time and overwhelming the capture device). Source data captured is saved from three seconds before the error happens and one to 60 seconds after the error happens. If a new error happens during the trailing period, auto capture continues without creating a new capture file.
- Manual Stream Capture  
For large builds, users can set the maximum capture file size, allowing large continuous files to be captured as smaller files for easy offline inspection from a workstation on the same network.

### Data Traffic Monitoring and Logging

The MSA-100 monitors and logs the data traffic at the following layers. The status can be overlaid on the corresponding video window.

- IP (loss/gain of sync)
- TS (loss/gain of transport sync)
- Audio/video
- NTSC CC
- ATSC PSIP
- SCTE-35
- DVB Teletext (ETSI EN 300 472 or ETSI EN 301 775)
- DVB VBI VPS
- DVB VBI WPS
- DVB VBI AMOL
- DVB VBI TVG2X
- DVB VBI CopyGuard
- DVB VBI VITC

There is an option to show the PIDs of applicable traffic on screen. The order of the audio ES can be configured according to either the PID value or the position in the PMT table.

### The MSA-100 logs up to 16,000 events daily, including:

- Input signal status
- RTP errors
- ETR sync errors
- ETR continuity counter errors
- Audio/video buffer overflow
- Frozen video
- Black video
- Video resolution change
- Video DAR change
- Silent audio
- Clipping audio

Up to 30 days of traffic histories are kept and logs can be forwarded to syslog server or SNMP server.

### Table Analysis

A table analysis feature shows detailed syntax elements of all known tables and descriptors, and provides a Hex data view for debugging and analysis.

## Images / Diagrams



### Rear View



## Specifications

*Specifications and designs are subject to change without notice*

<b>Transport Protocols</b>	TS over ASI TS over UDP (multicast or unicast) TS over RTP/UDP (multicast or unicast) TS over TCP TS over Namepipe
<b>Session Announcement Protocol (SAP) Support</b>	
Throughput	Up to 8 SAP servers simultaneously
Default Group Address	224.2.127.254 at port 9875
Format	RFC-2974
<b>Streaming Protocols</b>	
Signaling	RTSP (RFC 2326), SDP (RFC 2327)
Transport	RTP (RFC 3550, RFC 3551)
Video Payload	MP4V-ES (RFC 3016): SP and ASP profiles H264 (RFC 3984): baseline, extended, main and high profiles
Audio Payload	MP4A-LATM (RFC 3016): AAC and HE-AAC MPEG-4 generic (RFC 3640): AAC-lbr and AAC-hbr <b>Note:</b> Payload interleaving mode is not currently supported

RTMP (Real-Time Messaging Protocol 1.0)	
Transport	RTMP/TCP
Video Payload	H.264/AVC: baseline, extended, main and high profiles
Audio Payload	AAC, HE-AAC v1, HE-AAC v2, MPEG audio
Apple HTTP Live (IETF Internet Draft HTTP Live Streaming)	
Transport	TS/TCP
Video Payload	H.264/AVC: baseline, extended, main and high profiles
Audio Payload	AAC, HE-AAC v1, HE-AAC v2
Video Compression Formats	
MPEG-1 Video (ISO/IEC 11172-2)	
MPEG-2 Video (ISO/IEC 13818-2)	Supported profiles (all levels): <ul style="list-style-type: none"> <li>- Simple</li> <li>- Main</li> <li>- 4:2:2</li> </ul> <b>Note:</b> HD is supported by main profile @ high level
MPEG-4 Part 2 Video (ISO/IEC 14496-2)	Supported profiles: <ul style="list-style-type: none"> <li>- Short video header</li> <li>- Simple (L0 – L5)</li> <li>- Advanced simple (L0 – L5)</li> </ul> Supported object type: <ul style="list-style-type: none"> <li>- Rectangular</li> </ul>
H.264/AVC Video (ITU-T H.264)	Supported profiles (all levels) <ul style="list-style-type: none"> <li>- Baseline</li> <li>- Main</li> <li>- Extended</li> <li>- High</li> </ul>
SMPTE VC-1 Video (SMPTE 421M)	Supported profiles (all levels) <ul style="list-style-type: none"> <li>- Simple</li> <li>- Main</li> <li>- Advanced</li> </ul>
<b>Video Layer Analysis</b>	Video stream information Video picture graph and bitrate profile Video conformance tests from sequence level down to block level Black video detection Frozen video detection
Video Conformance Tests	
MPEG-2/MPEG-1	Per ISO/IEC 13818-2 (ISO/IEC 11172-2 for MPEG-1)
MPEG-4 Part 2	Per ISO/IEC 14496-2 (v2)
H.264/AVC	Per ITU-T H.264
SMPTE VC-1	Per SMPTE 421M
AVS Part 2	Per GB/T 20090.2

<b>Audio Compression Formats</b>	MPEG-1 audio (ISO/IEC 11172-3) MPEG-2 audio (ISO/IEC 13818-3) MPEG-2 AAC (ISO/IEC 13818-7) MPEG-4 AAC (ISO/IEC 14496-3) MPEG-4 HE-AAC (ISO/IEC 14496-3/Amd.1) MPEG-4 HE-AAC v2 (ISO/IEC 14496-3/Amd.2) AC-3 (ATSC A/52B) E-AC-3 (Dolby® Digital plus) SMPTE 302M <b>Note:</b> multichannel audio is down-mixed to stereo audio for output and level analysis
<b>Closed Caption</b>	EIA-608D over ATSC A/53 or SCTE-20 EIA-708D / DTVCC over ATSC A/53 or SCTE-20 Teletext per ETSI EN 300 706 DVB Subtitles per ETSI EN 300 743
<b>XDS</b>	Program name (title) Content advisory (V-Chip), including MPA, U.S. PG, Canadian English, Canadian French Copy Generation Management System, Analog (CGMS-A)
<b>Transport Layer Analysis</b>	Dropped packet detection for RTP layer RTP header length error ESTI TR 101 290 tests for transport stream layer
<b>First Priority</b>	TS sync loss Sync byte error PAT error Continuity count error PMT error PID error
<b>Second Priority</b>	Transport error CRC error PCR repetition error PCR discontinuity indicator error PCR accuracy error PTS error CAT error
<b>Third Priority</b>	NIT actual error NIT other error Unreferenced PID SDT actual error SDT other error EIT actual error EIT other error EIT PF error RST error TDT error

<b>Table Analysis</b>	TS PSI TS DVB-SI TS ATSC-PSIP RTSP SDP
<b>Audio Layer Analysis</b>	
Audio Stream Information	Audio type Audio bitrate Sampling frequency Channel mode Other compression-format-dependent information
Audio Wave Monitor	Short-term wave window: 1 audio frame Long-term wave window: 5 seconds Fast PPM with digital clipping indicator
PPM Parameters	0 ms attack 12 dB/sec decay (fallback) 4 sec hold for peak
Audio Level Test	Silence detection Max level detection Digital clipping detection
<b>Physical Characteristics</b>	
Dimensions (H x W x D)	1.75 x 19 x 25 in. (4.4 x 48.3 x 63.6 cm)
Weight	22.5 lbs (10.25 kg)
<b>Power</b>	
Power Supply	Single supply
Voltage	110 to 240 VAC
Max Current	4.5 to 2.5 A
Frequency	60 to 50 Hz
Total DC Output	650 W
<b>Operating Environment</b>	
Operating Temperature Range	50° to 95° F (10 to 35° C)
Non-Operating Temperature Range	-40° to 158° F (-40 to 70° C)
Humidity Range	8 to 90% non-condensing
Non-Operating Humidity Range	5 to 95% non-condensing
<b>Standard Inputs</b>	2x RJ45, 10/100/1000 full line rate @ standard MTU size IP traffic
<b>OPTIONAL INPUTS</b>	
Note: MSA-100 has a total of 2 slots available for input options which support 1 DVB-ASI module and 1 RF input options or 2 RF input modules (MSA-OPT-DVB-T or MSA-OPT-DVBS-S2).	
<b>MSA-OPT-DVB-ASI</b>	
Input Ports	Limit 4 (1 slot x 4 ports )
ASI/SDI Connector	4x BNC, 75 ohms
Input Return Loss	>15 dB
Hardware Buffering	32 MB/channel
ASI Physical Layer	DVB-ASI (coaxial) EN50083-9
Rx Bitrate	0 to 214 Mb/s
Resolution	<1 bit/s
Packet Size	188 or 204 bytes

MSA-OPT-DVB-T	
Input Ports	Limit 4 (2 slots x 2 ports per slot)
Antenna Inputs	2 F-type, female, 75 ohms
Antenna Power	2x 5 V @ 30 mA
Tuning Range	50 to 860 MHz
Bandwidth	6/7/8 MHz
Input Sensitivity	-78 to -20 dBm
Metrology RF Level	-80 to -20 dBm, $\pm 3$ dB
MER/SNR	10 to 32 dB, $\pm 2$ dB
BER	Pre- and Post-Viterbi
Constellation	1023x1023
MSA-OPT-DVB-T2	
Input Ports	Limit 2 (2 slots x 1 ports per slot)
Antenna Inputs	F-type, female, 75 ohms
Tuning Range	50 to 860 MHz
Bandwidth	6/7/8 MHz
Input Sensitivity	-78 to -20 dBm
RF Level	-80 to -20 dBm, $\pm 3$ dB
MER	10 to 32 dB, $\pm 2$ dB
Constellation	Diagram dependent on selected modulation
MSA-OPT-DVBS-S2	
Input Ports	Limit 4 (2 slots x 2 ports per slot )
Antenna Inputs	2 F-type, female, 75 ohms
Number of Channels	1 (16/32-APSK) 2 (QPSK/8-PSK)
Monitoring Outputs	2x ASI
Tuning Range	950 to 2150 MHz
Input Return Loss	>10 dB
Input Sensitivity	-60 to -30 dBm
Baud Rate	2 to 40 MBd
Metrology RF Level	-60 to -30 dBm
SNR	5 to 35 dB
MER	10 to 26 dB
BER (DVB-S2)	Pre LDPC
Constellation	256x256
LNB Supply (per channel)	13/18 V 400 mA

## Ordering Information

MSA-100-MPEG2	Multi-source analyzer, entry-level platform, MPEG-2 format, standard with 1 codec and 4 SD or 2 HD PIPs, providing full conformance testing and traffic status monitoring
MSA-100-MPEG4	Multi-source analyzer, entry-level platform, MPEG-4 format, standard with 1 codec and 4 SD or 2 HD PIPs, providing full conformance testing and traffic status monitoring
MSA-100-H264	Multi-source analyzer, entry-level platform, H.264 format, standard with 1 codec and 4 SD or 2 HD PIPs, providing full conformance testing and traffic status monitoring
MSA-100-VC1	Multi-source analyzer, entry-level platform, VC-1 format, standard with 1 codec and 4 SD or 2 HD PIPs, providing full conformance testing and traffic status monitoring
<b>Note:</b> Number of PIPs and/or shadow testing varies depending on codec type, picture resolution and bitrate.	
<b>OPTIONS</b>	
<b>Software Codecs</b>	
MSA-SWC-MPEG2	MPEG-1 (ISO 11172-2) and MPEG-2 (ISO 13818-2)
MSA-SWC-MPEG4	MPEG-4 Part 2 (ISO 14496-2)
MSA-SWC-H264	MPEG-4 Part 10 (ISO 14496-10)
MSA-SWC-VC1	SMPTE 421M
<b>Display and Testing Options</b>	
MSA-ADD-4PIPS	Add block of 4 SD or 2 HD PiPs with full testing and text
MSA-ADD-4SHDW	Add block of 4 SD or 2 HD Shadow C-testing plus text
MSA-ADD-4DOLBYD	Add a block of 4x 5-channel Dolby® decoder licenses
MSA-ADD-4AAC	Add a block of 4 AAC/HE-AAC decoder licenses
MSA-4PIPS-3G	Add a block of 4 PIPs of CIF or lower resolution with full video conformance testing and text
MSA-4SHDWA-3G	Add a block of 4, CIF or lower resolution background Shadow A – system tested programs
MSA-4SHDW-3G	Add a block of 4, CIF or lower resolution background Shadow C testing plus text
MSA-ADD-4SHDWA	Add a block of 4 SD or 2 HD background Shadow A - system level tested programs
MSA-4PIPS-RADIO	Add a block of Radio-Only PIPs that include audio and data monitoring
<b>Remote Viewers</b>	
MSA-OPT-RVS-LR	Remote view server — low-resolution (720x480) mosaic plus GUI
MSA-OPT-RVS-HR	Remote view server — high-resolution (1280x720) mosaic plus GUI
<b>Input Options</b>	
MSA-OPT-DVB-ASI	Quad-port ASI input board (limit 4 ports per MSA-100)
MSA-OPT-DVBS-S2	Dual-channel DVB-S/S2 interface
MSA-OPT-DVB-T	Dual-channel DVB-T interface
MSA-OPT-DVB-T2	Single channel DVB-T2 interface
<b>Hardware Options</b>	
MSA-100-HDD	Extra hard disk drive for MSA-100

See your Imagine Communications sales representative for more details.