

Release Notes



MTS4EA Compressed Video ES Analyzer 071-1787-01

This document supports software version 4.2.

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Release Notes

In this document, you will find the following information:

- Changes that were implemented in the current version of the MTS4EA software
- Problems or behaviors that you may encounter while using the MTS4EA software
- Platforms on which the MTS4EA software has been verified
- Changes that were implemented in previous versions of the MTS4EA software
- Documentation for the features implemented in version 4.2

Changes Implemented in the Current Software Version

The changes listed below are implemented in software version 4.2. Refer to *MTS4EA Version 4.2 Feature Descriptions* on page 11 for additional user information about these new features.

Refer to *Changes Implemented in Previous Software Versions* on page 5 for a list of previous software repairs and enhancements.

- First frame shown after loading of stream.
- H.264/AVC over MP4 file format is supported: new example streams are available.
- Enhancements to stream structure view for certain streams:
 - Available for H.264/AVC.
 - Enhanced Stream structure view for other standards; display of standard-specific icons.
- Analysis options automatically disabled on stop.
- Select all icons in trace view.
- New icon to open the current graph file.
Only available when analysis of stream or stream selection is complete.
- Left-click advance frame feature removed.
Previously, a left-click on the user's mouse would advance the stream by one frame; in response to user feedback, this feature has now been removed.
- Stream seeking feature available. The start position for decoding using a byte offset or decode frame number can be specified.

Supported Compression Standards. Changes to standards supported in this version of MTS4EA include:

- VC-1 updated to FCD 1r2
- H.264/AVC updated to support JM9.6
- MPEG-2 4:2:2 profile ML and HL (included in MPEG-2 license option)
- H.264/AVC over MP4 file format (Standard References [23], [24] and [25]; see below).

Standard References. With version 4.2, the MTS4EA conforms to the following additional standard references:

MPEG-4 Part 12: standard number ISO/IEC 14496-12; ISO title: Information technology - Coding of audio-visual objects: Part 12: ISO base media file format, **2nd Edition 2005-04-01**.

MPEG-4 Part 14: standard number ISO/IEC 14496-14; ISO title: Information technology - Coding of audio-visual objects: Part 14: MP4 file format, **1st Edition 2003-11-15**.

MPEG-4 Part 15: standard number ISO/IEC 14496-15; ISO title: Information technology - Coding of audio-visual objects: Part 15: Advanced Video Coding (AVC) file format, **1st Edition 2004-04-15**.

Software Problems and Behaviors

Listed below are the known software problems and behaviors that you may encounter while using the MTS4EA software:

Installation Delays

The MTS4EA installation procedure may take several minutes to complete, depending on platform performance.

Toolbar Positions in Project Files

The window position of toolbars (including Macroblock and Summary tooltips) is not stored in MTS4EA project files.

Audio Support on Windows NT 4.0 OS Platforms

The MTS4EA audio ployout feature is not supported on platforms using the Windows NT 4.0 OS because of limitations in the operating system.

MPEG-4 part 2 video interlace motion vectors

Field-coded motion vectors are reported incorrectly in the GUI macroblock tooltip. The motion vectors are correctly reported in the trace file. This issue only affects MPEG-4 part 2 interlace streams.

Verified Platforms

The MTS4EA software has been verified with the platforms listed in Table 1.

Table 1: Verified operating systems for the MTS4EA software

Operating system	Service packs
Microsoft Windows XP Home	Service Pack 2
Microsoft Windows XP Pro	Service Pack 2
Microsoft Windows 2000 Pro	Service Pack 2
Microsoft Windows NT4.0	Service Pack 6a Security level patches: KB823182, KB824141, KB824146, KB825119, KB828035 Internet Explorer 6 with SP1 and Q828750

Changes Implemented in Previous Software Versions

The following major and minor changes were implemented in previous versions of the MTS4EA software:

Version 4.0.0.5 - Major Changes

The following major changes were implemented in software version 4.0.0.5:

Audio Stream Playback. Support for playback of audio streams was added, with the following audio standards being supported:

- MPEG-1 part 3
- MPEG-2 part 3
- MPEG-2 part 7 (AAC)
- MPEG-4 part 3 (AAC, HE-AAC)

Audio Waveform View. The audio waveform view now shows the time domain waveform of the decoded audio stream.

Bitstream Editing. You can now perform bitwise editing of video elementary streams, including delete, insert, and invert of individual bits; full change tracking and change highlighting can now be performed; the edited stream can now be decoded or saved to disk; syntax element labels are now shown in the editor.

Image Inspector. You can now view the pixel values for each color component of the current highlighted macroblock; you can now show the magnified image as well as decimal values.

Misc. Enhancements. A number of other major enhancements were implemented:

- When using an uncompressed reference input, the time-based frame rate can now be ignored.
- H.264/AVC monitoring: Frame time stamps are now derived from DPB SEI messages when present.
- The fidelity graph now has three alternative modes for x-axis labeling: time, frames, or fields.
- In the alert log view, alerts can now be copied to the Windows clipboard.
- The decoded video output file can now be specified through the analysis options dialog as well as the command line.

Version 3.1.1.0 - Major Changes

The following major changes were implemented in software version 3.1.1.0:

H.264/AVC Fidelity Range Extensions. Support was added for the following H.264/AVC fidelity range extensions:

- High
- High 10
- High 4:2:2
- High 4:4:4 profiles (all levels)

H.264/AVC Monitoring. Is now compatible with JM 9.3 code base.

VC-1 Monitoring. Support was added for RCV file format (SMPTE CD2r3 release).

Microsoft Windows Media v9 RC-1 Monitoring. Incorporated changes for Microsoft Windows Media v9 RC-1 release.

Version 3.1.1.0 - Minor Changes

The following minor changes were implemented in software version 3.1.1.0:

H.264/AVC Monitoring. The following problems were fixed:

- Fixed the problem in CABAC streams where certain bitstream errors could lead to incorrect decoding of when playback is repeated.
- Fixed the incorrect interpretation of the pan_scan_rect SEI message.

MPEG-4 Monitoring. The following changes were made:

- Video packet number is now available as overlay statistic.
- Motion compensation was corrected in quarter-sample interlace streams.

VC-1 Monitoring. The following problems were fixed:

- Corrected the tracing of IMODE and MVMODE elements.
- Corrected the MB trace when no quant is set.

Fidelity Metrics. Corrected the display of average fidelity metrics for interlace streams.

**Version 3.1.0.2 -
Minor Changes**

The following minor changes were implemented in software version 3.1.0.2:

WMV9 Monitoring. The following changes were made:

- Added a warning about pre-RC1 interlaced streams.
- Corrected some block level elements being traced out at macroblock level (affects indentation and context, for example [PIC|MBK]).
- Improved the startcode logging, plus tracing of SUBBLKPAT and HYBRIDPRED elements (these were not always output in the log).
- Corrected the display of field pictures where the frame is an odd number of macroblocks high.
- Corrected the overlay for 4MV MBs in field coded pictures.
- Fixed the loss of stream sync in pictures using extended MVs where mvrange != 0.
- Added many new alerts.
- Range Reduction is now being performed in Advanced Profile.
- Trace flushing bits.
- Flush last frame on end of sequence.
- Fixed frame loss bugs for skip frames, and intensity-compensated field interlace pictures.

ASF Monitoring. The following changes were made:

- Support for the “WVC1” four-CC as VC-1 Advanced Profile.
- Corrected the handling of compressed payloads.

MPEG-2 Monitoring. Improved PES demux to allow non-video extraction and updated stream types from 13818-1 Amd.2.

H.264/AVC Monitoring. Corrected the parsing of filler data and user data SEI messages.

**Version 3.1.0.0 -
Major Changes**

The following major changes were implemented in software version 3.1.0.0:

Microsoft Windows Media v9/VC-1 (WMV9/VC-1) Monitoring. Added support for Microsoft Windows Media v9/VC-1 (WMV9/VC-1) Simple, Main and Advanced Profiles (all Levels).

Added support for Microsoft Advanced Systems Format (ASF) extraction for WMV9/VC-1.

MPEG-2 Transport Stream (ISO/IEC 13818-1) Monitoring. Added support for MPEG-2 Transport Stream (ISO/IEC 13818-1) extraction for MPEG-2 and H.264/AVC Elementary Streams, and MPEG-2 PES and Program Streams.

H.264/AVC Monitoring. Added reporting of Reference frames in Summary Tooltip, MacroBlock tooltip and Trace/Interpret.

MPEG-4 Monitoring. Updated software to reflect 2004 ISO/IEC 14496-2:2004 edition.

MacroBlock Overlay Statistics. Added color maps for MacroBlock overlay statistics.

Input Type Specification. Input type can now be specified in file open dialog and in stream select dialog.

**Version 3.1.0.0 -
Minor Changes**

The following minor changes were implemented in software version 3.1.0.0:

Command Line. Added flags to enable fidelity analysis trace in batch mode.

MPEG-4 Monitoring. The “Unexpected end of stream” error was being incorrectly reported with files using the `visual_object_sequence_end_code`. This has now been fixed.

H.264/AVC Monitoring. The following changes were made:

- Changed the color of Intra_4x4 MacroBlock type to Yellow in MacroBlock types overlay (to distinguish from Intra_16x16 types).
- Corrected the motion vector range check. It was comparing horizontal component to both horizontal and vertical limits.
- Corrected the handling of leading zero bytes in Annex B NALU format.

GUI Correction. Corrected the motion vector overlay renderer. In rare cases, incorrect clipping was causing a software crash.

**Version 3.0.0.5 -
Minor Changes**

The following minor changes were implemented in software version 3.0.0.5:

H.264/AVC Monitoring. Reduced the level of the “First access unit must be IDR” alert to an error.

H.263 Monitoring. Improved the handling of GSTUF bits.

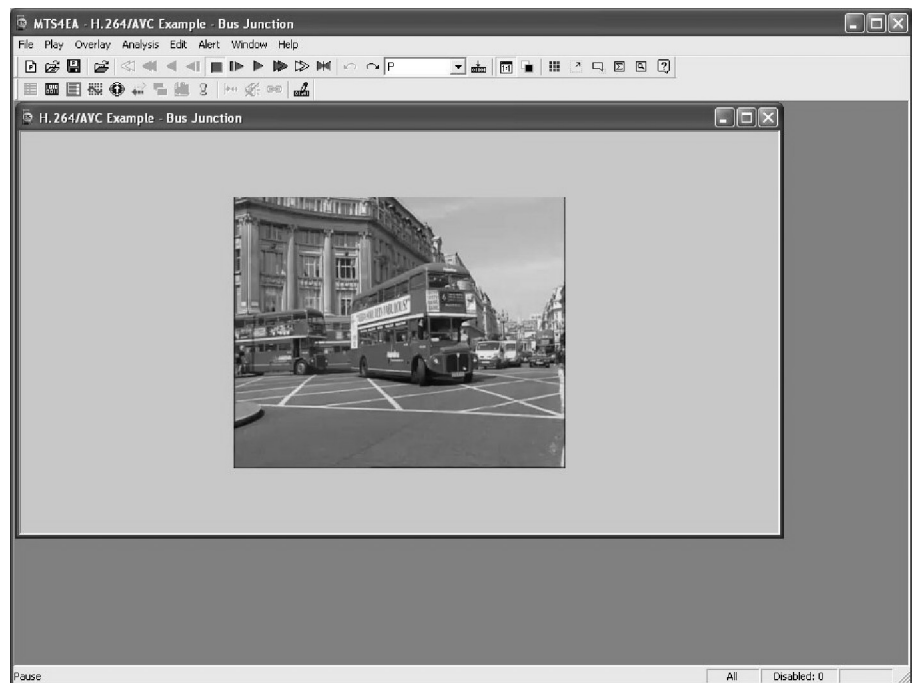
MTS4EA Version 4.2 Feature Descriptions

This section describes the features implemented in version 4.2 of MTS4EA; the features are listed on page 2.

Show First Frame after Loading of Stream

When a stream is loaded, the first frame is decoded and displayed. While the first frame of the stream is displayed, the stream itself is not in play mode and therefore analysis options can be selected and configured.

In the image below, the example file *Bus Junction* sample stream is loaded, its first frame displayed but, as indicated by the depressed Stop icon and the empty frame counter in the bottom right-hand corner of the screen, the stream is yet to be played.



If the loaded stream is initially advanced by one frame, the first frame is again decoded/played before entering the Pause mode. In this mode, Analysis options are not available. When stopped, the first frame reappears on display until the stream is advanced or played further.

H.264/AVC over MP4 File Format

MTS4EA now supports extraction of H.264/AVC video elementary streams from the MP4 file format. The specification for this format is provided by the standards in References [23], [24], and [25]. The existing MP4 support in MTS4EA has been extended to include the following features of the specification in Reference [25] in the user manual:

- **avc1** box type (AVCSampleEntry syntax)
- **avcC** box type (AVCConfigurationBox syntax)
- Video elementary stream only mode, as defined in Reference [25] (*Standards References*), in which SPS and PPS NAL units are stored in the sample descriptions of the track and are not present in the AVC samples within the stream itself.
- MP4 sample times are used to override the display time of decoded pictures.
- Extraction from MP4 file to Annex B byte stream format file.

Example Files

Four MP4 sample files are provided. These are MPEG-4.mp4 container files, containing compressed video and other data (as described under *MP4 files* and Reference [11] (*Standards References* in the user manual).

Name	Standard	Warnings/Errors
Packet Woman	MPEG-4 Simple Profile/Level 1	Level is set at 1: max. frame size in this Level is 176x144 pixels, but the video is 352x288VCV overflow and VBV underflow
Piccadilly Circus	MPEG-4 Simple Profile/Level 2	VCV overflow and VBV underflow
Beijing Weather Girl	MPEG-4 Simple Profile/Level 5 (video); AAC (audio)	VBV overflow
Las Vegas	H.264/AVC Baseline Profile/Level 1.2	HRD information missing: no pic_timing SEI message

Stream Structure View

The existing Stream structure view has been enhanced to provide more information about the stream. The Stream structure view is available for all of the supported container formats. In addition, for H.264/AVC video elementary stream format, the view shows the top-level structure of the stream.

Syntax	Value	Start bit	Size (bits)
file		0x000000,7	5548184
ftyp		0x000000,7	192
mdat		0x000018,7	5526560
mdat		0x0a8a9c,7	368
size	46	0x0a8a9c,7	32
type	mdat	0x0a8aa0,7	32
data	[690852, 690890]	0x0a8aa4,7	304
moov		0x0a8aca,7	22064
size	2758	0x0a8aca,7	32
type	moov	0x0a8ace,7	32
unknown		0x0a8ad2,7	864
iods		0x0a8b3e,7	336
trak		0x0a8b68,7	9696
size	1212	0x0a8b68,7	32
type	trak	0x0a8b6c,7	32
tkhd		0x0a8b70,7	736
mdia		0x0a8bcc,7	8896
size	1112	0x0a8bcc,7	32
type	mdia	0x0a8bd0,7	32
mdhd		0x0a8bd4,7	256
size	32	0x0a8bd4,7	32
type	mdhd	0x0a8bd8,7	32
version	0	0x0a8bdc,7	8
set flag	0x0	0x0a8bde,7	24

The view is divided into four columns:

- **Syntax:** shows the stream syntax parse tree, including the names of each syntax element or syntactic structure. Nested syntax structures are shown by nesting nodes of the tree. An icon shows the type of data at each tree node, see Table 2 and Table 3.
- **Value:** shows the interpreted value of syntax elements in the tree. The content of this field will vary according to the type of data to be shown.
- **Start bit:** shows the start bit address of the syntax node. The address is given as a hexadecimal byte position followed by a bit position number.
- **Size:** shows the size in bits of the syntax node. For nodes with children, this shows the total bits of the parent and child nodes.

New for H.264/AVC

In this version of MTS4EA, the top-level stream structure of an H.264/AVC format file can be viewed. This is the only elementary stream standard for which this facility is currently available.

Icons in Stream Structure View

In the Stream Structure view, the icons that appear at the node of each branch of the tree structure denote the type of data contained in that node. Table 2 describes the icons that are common to all standards. Table 3 describes the icons that are specific to different standards.

Table 2: Icons common to all standards


































Icon	Meaning
	Video elementary stream
	Audio elementary stream
	Container stream
	Packet or other syntactic grouping (various colors used – see standard specific icons)
	Binary data
	Integer data field
	Binary data field
	Exponential-Golomb coded data field
	String data field
	Identifier data field
	Time data field
	Custom data field
	Unknown data field
	User data
	Array based data structure
	List based data structure
	Video ES slice data
	Video ES macroblock data

Table 3: Standard specific items

Standard	Icon	Meaning
H.264/AVC		IDR access unit
		Non-IDR access unit
		'moov' box type
		'mdat' box type
		'trak' box type
		Generic MP4 descriptor
MPEG-2 TS		Transport packet
		Program association section
MPEG-2 PS, PES		System header
		Pack header
		Pack syntactic structure
ASF		Header object
		File properties object
		Stream properties object
		Index object

Current Graph Icon

This icon, which is available only when the Analysis option is enabled, opens the current graphs for the stream open in MTS4EA.



Graphs not enabled



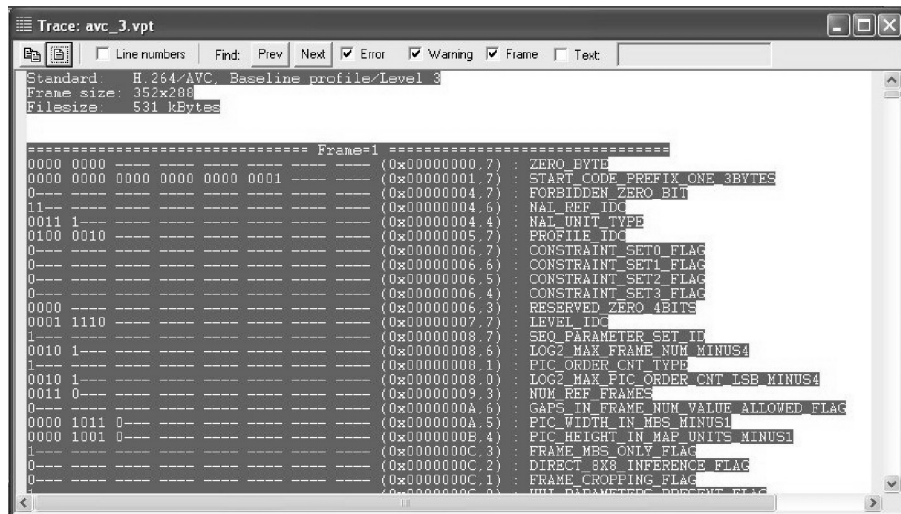
Graphs enabled

Clicking on this icon opens a session of Excel and displays the results of the last graphical analysis. The View graphs icon remains available to the user as long as the current stream is in use and in Stop mode.

Select all icons on Trace View

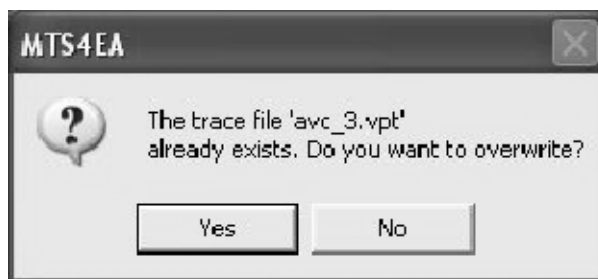


The ability to copy text from the Trace view to the clipboard was introduced in version 4.0 of MTS4EA. The Select all icon allows the user to quickly highlight all text in the Trace file for copying to the clipboard.



Analysis Options Automatically Disabled on Stop

In previous versions of MTS4EA, when stream analysis options were selected and the stream played to its end or stopped, if the stream was subsequently rerun, the MTS4EA saved the analysis options and displayed the following message:




In this version of MTS4EA (version 4.2), analysis options are disabled once the stream is stopped. If further analysis is required, you must revisit the Analysis options dialog box and reenble the desired options.

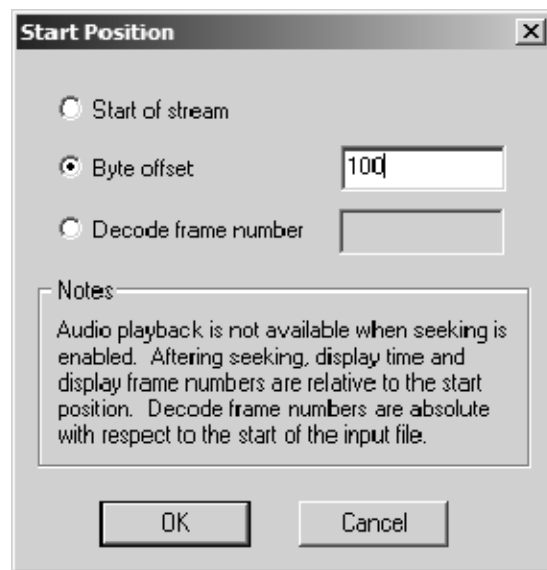
Stream Seeking

This feature allows the user to specify the decode start position using a byte offset or a frame number. This allows fast access to later sections of an elementary stream without the overhead of decoding all the preceding frames. This feature is supported for all of the current video elementary stream decoders.

Start Position Dialog Box


The start position dialog can be opened by:

- Clicking the  icon on the toolbar.
- Selecting **Start position...** from the Play menu.
- Selecting **Start position...** from the context menu when right-clicking on the Video view.



- **Start of stream:** Select this option to specify that decoding should begin at the start of the stream (that is, seeking is disabled).
- **Byte offset:** Select this option to specify a byte offset at which decoding should begin. Enter the byte offset as a decimal integer in the edit box next to this option.
- **Decode frame number:** Select this option to specify decode frame number at which decoding should begin. Enter the decode frame number as a decimal integer in the edit box next to this option.

Operation

When a start position has been specified, the toolbar  icon is shown depressed. To begin decoding from the specified start position, use the play, fast forward, blind fast forward, or pause buttons as usual.

Seeking can result in a start position that is not a valid entry point for the stream. In this situation, the decoder does not have the configuration information required to decode the subsequent frames. To overcome this, MTS4EA will use the configuration data that most recently appeared in the stream before the start position. For example, in MPEG-4, if seeking to an entry point that begins with a VOP start code, the decoder will use the most recent VOL header in the stream.

Seeking to a byte offset may result in a stream address that is not on a recognizable boundary; for example, not a valid start code. In this case, the decoder will skip bytes until it finds a recognizable synchronization point; typically the next start code.

After seeking, the display time and display frame numbers are calculated relative to the new start position because display order and timing information is lost when frames are skipped. Decode frame numbers are absolute with respect to the start of the input file, because MTS4EA always knows how many decode frames have been skipped. Consequently, if you set the start position to frame 100, for example, then the first decoded frame will be decode index 100; the first displayed frame will be display index 1 and have a display time of 0s.

Stream seeking is only supported for video elementary streams; audio playback is not available when stream seeking is enabled.