H264Visa

H.264/AVC analysis software

User Manual

H264Visa Customer Support
If you have any questions concerning this software, please write an email to:

support@h264visa.com

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1. Introduction

H264Visa is a powerful real-time analytical tool for H.264/AVC for Consumer, Mobile, PC and internet streaming Products. It can analyze baseline/main/extended profile H.264/AVC streams based on **ITU-T Rec. H.264 (03/2005)**.

H264Visa provides users with a unique visual representation of the encoded video features and stream structure analysis.

Here is the list for main features:

Main Features

- Profiles & Levels:
  + Baseline/Main/Extended/High profiles on all levels for standard version.
  + Baseline/Main/Extended/High profiles on all levels, Frame-only, for Mobile version.
  + Baseline profile on all levels for Baseline version.
- File formats:
  + H.264 Byte Stream format(Annex B)
  + H.264 in RTP format
  + Flash flv/f4v file formats
  + MP4/3GP/M4V file formats.
  + mpeg2 ts file format, inlcuding mpeg2 ts for ISDB-T 1seg
- Full Playback Mode, including :
  + Display Order Playback: Play/Pause/FF/FR/StepForward/StepBackward.
  + Decoding Order Playback: Play/Pause/FF/StepForward.
- Fully Support for Data Partitions.
- I/P/B MB insight analysis, including:
  + mb type
  + intra/inter prediction info
  + ref list
  + LP filter strength info
  + I/P/B MB mode overlay display
  + **MB Search**, can locate and count the number of MB type by MB type/group, mb bits etc.
- MB pixel info and **picture display in all decoding stages**, including:
  + Finally decoded pixels and picture display
  + Pixels before Deblocking Filter and display
  + Predicted Pixels and display
  + Pixels info from residual data and display
  + IDCT coefficients

+ Pixels in Reference YUV and display
+ The pixel difference between Reference YUV and finally decodec picture, and display

- **Detailed statistics info**
  + Bit numbers for the picture & encoding rate
  + Average MB bits & Average QP
  + MB bit histogram per mb type
- Overlay display on
  + Bit numbers for each MB
  + QP/QPC for each MB
  + Block Structures
  + Motion Vectors
- Header Info, including:
  + SPS tree
  + PPS tree
  + SEI tree
  + Slice Header tree
- File Structure Analysis, including:
  + MPEG2 TS packet tree
  + MPEG2 PES packet tree
  + MP4/3GP Box tree
- Dump decoded YUV output/Pixel/MB/NAL/SPS/PPS/SEI/Slice Header info into file.
- **ISDB-T 1Seg spec check on H.264/AVC Video.**

Limitations for Mobile Ver and Baseline Ver

- Mobile Solution Ver: supports FRAME-only Baseline/Main/Extended/High Profiles on all levels.
- Basline Ver: supports Baseline Profile on all levels for all features except the statistics info.

2. Intended Applications

Users of **H264Visa** include:

- **semiconductor device designers and manufacturers**
- **video over internet**
- **video conferencing & communications**
- **corporate and training video**
- **mobile video**
- **video applications software**
- **education**

3. Software/Hardware and User Pre-requirements

H264Visa has the following minimum hardware and software requirements:

- SSE-enhanced CPU (Intel® Pentium III or above, Celeron, AMD® Athlon, Opteron etc.)
- DirectX 7.0 (or higher) compatible VGA card with 32-bit display at 1024 x768 resolution or higher
- Windows® 2000/XP/2003/Vista
- 1G RAM or higher

4. Installation and Licensing

All the installing, copying, updating **H264Visa** must follow and agree to the terms of **H264Visa** End-User License Agreement("EULA").

For purchasing and registration, please access

http://wwwh264visa.com/buy.html

After downloading H264Vsia Setup Package, please follow the installation instruction to install it.

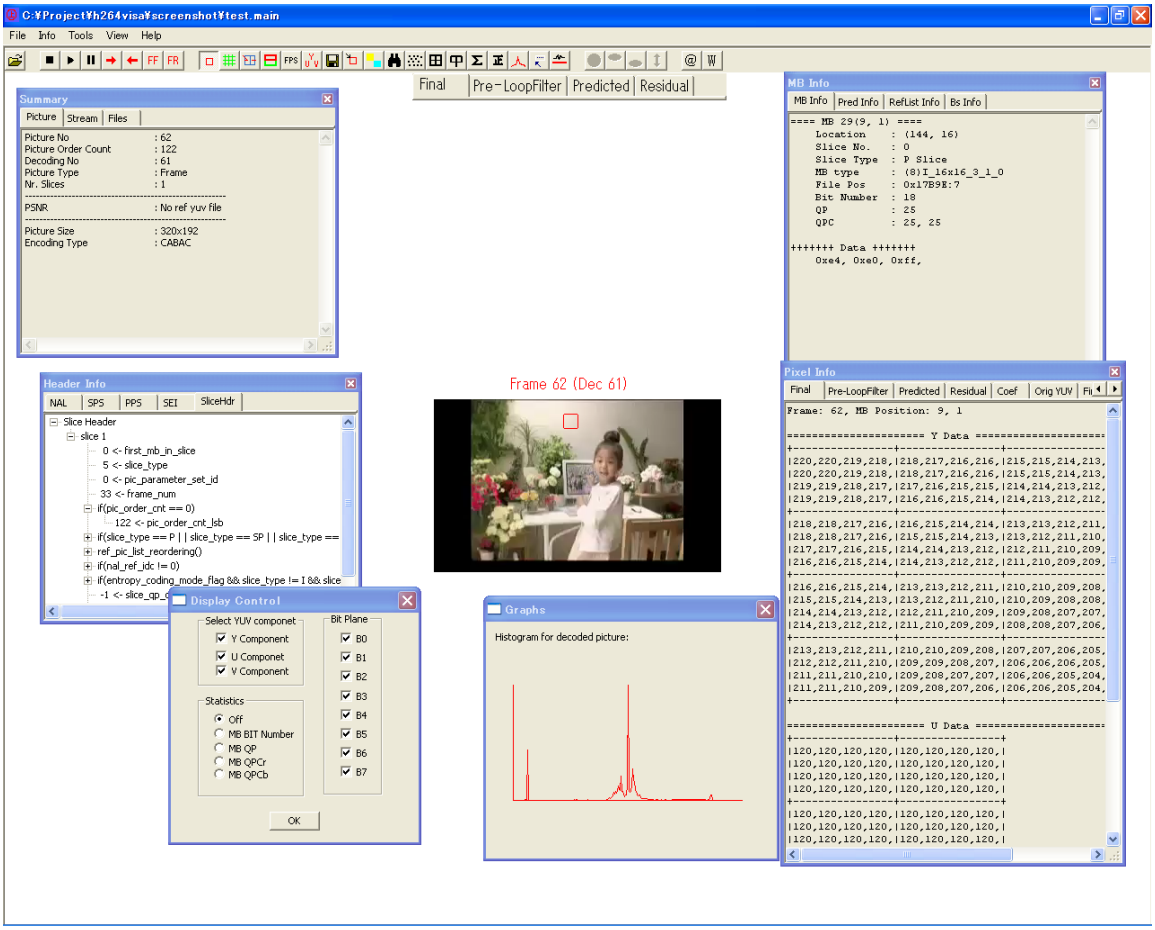
The registration is done only after **H264Visa** is installed, with the following steps:

1. Run **H264Visa**,
2. Input the registration key in the "Register H264Visa" dialog.
3. Push "OK" button

Or you can register it later at H264Visa->[Help Menu]->Register

5. Use of H264Visa

5.1 Window Elements



5.2 Open a file

H264Visa supports files with three stream types: H.264/AVC Annex B raw data, Mpeg2 TS data, and mp4/3gp data. For the last two stream types, **H264Visa** will retrieve the H.264/AVC data and save to H.264/AVC Annex B raw data file first and then open the saved data for further analysis.
New files can be opened from the file menu, the open icon in the tool bar, or dragging directly into **H264Visa.**

5.3 Playback Modes

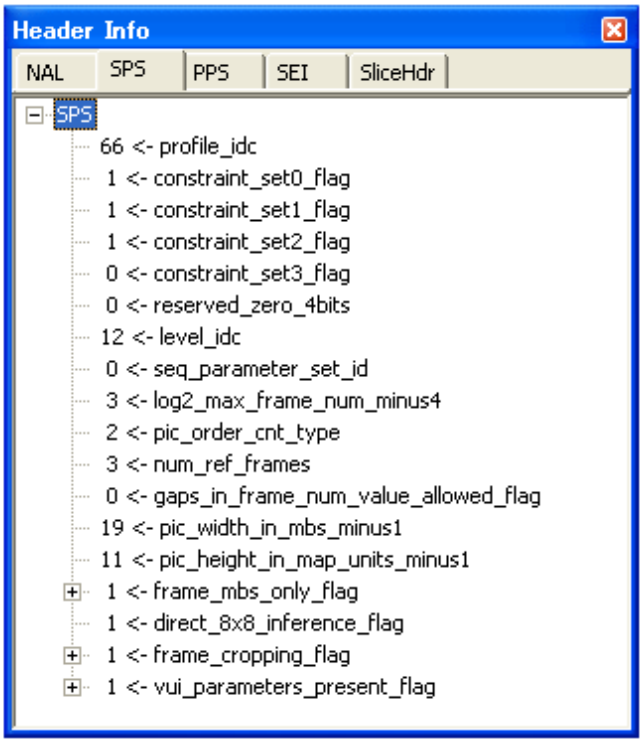
H264Visa supports STOP, PLAY, STEP Forward, STEP Backward, FF and FR playback modes. Here is the explanation on those play modes:
with the following meaning(from left to right): **Stop, Play, Pause, Step Forward, Step Backward, Fast Forward, Fast Rewind**

5.4 Stream Info

H264Visa exports the four info types: **stream Header Info**, **MB Info**, **MB Pixel Info** and **Stream Summary Info**. All of them will be explained the each sections.

5.4.1 Header Info

H264Visa will display each NAL, SPS, PPS and Slice Header in their own info tree, besides that it also exports Picture Timing SEI and Buffering Period SEI and Pan Scan SEI.
The format of each item in the info tree is: Value <- parameter name
Here is an example of SPS tree:

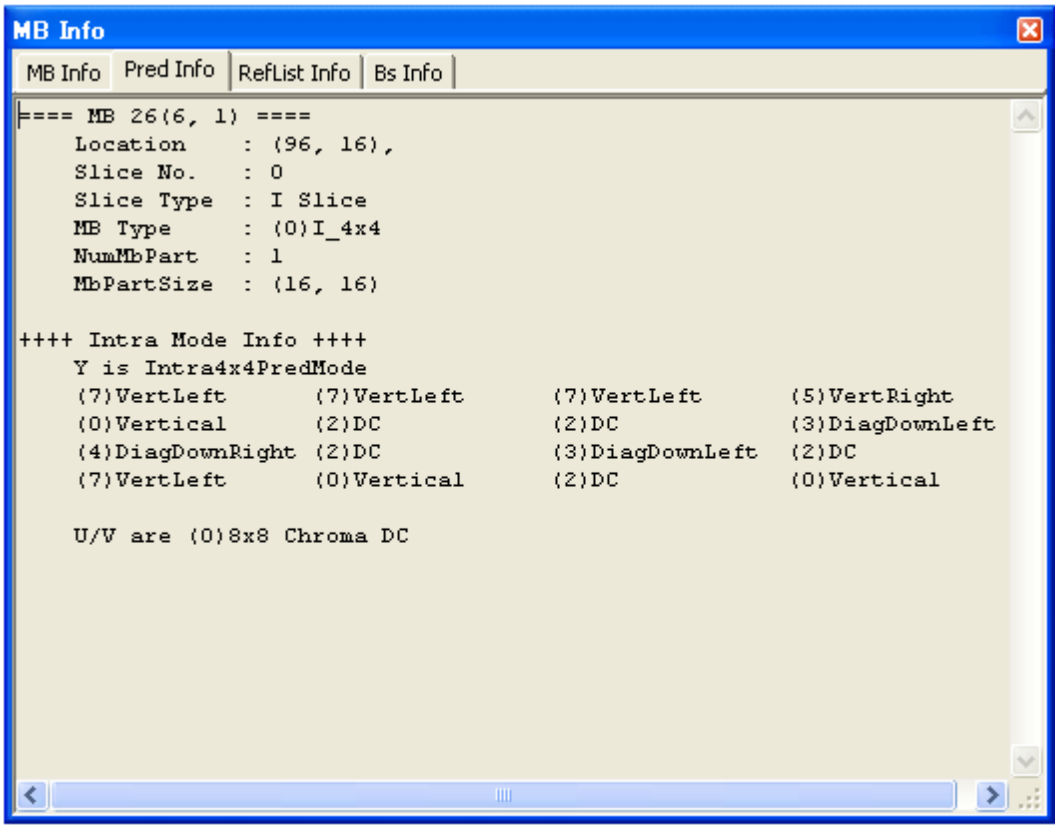


5.4.2 MB Info

H264Visa organizes MB in four categories:

- **General Info,** for MB type, location, bit number, stream data, etc.
- **Pred Info,** for detailed Inter/Intra prediction information.
- **Reflist Info,** for detailed reference list of the current slice.
- **BS Info(if there is),** for the Boundary Strength list of current MB .

Here is a screen shot of Pred Info:

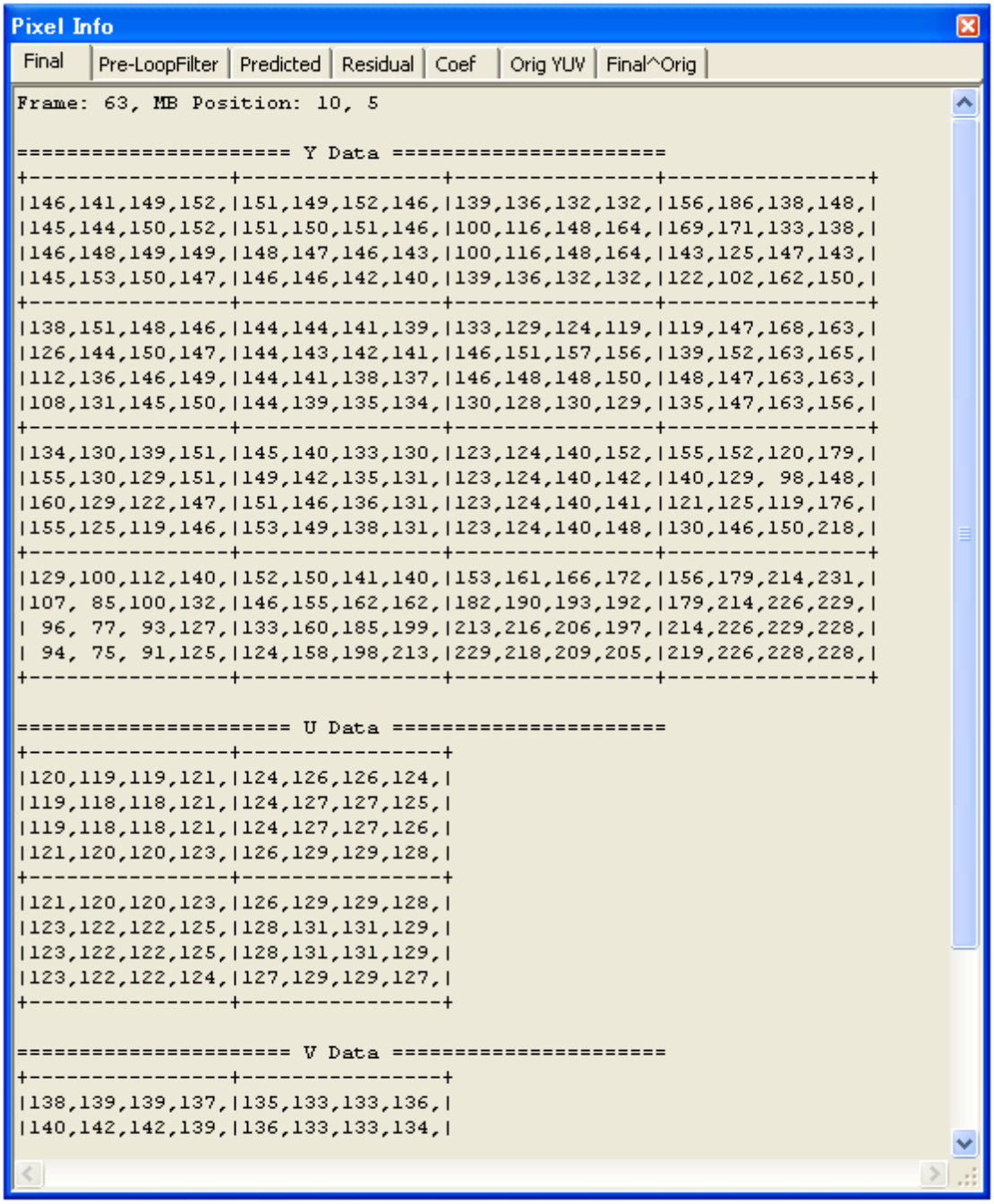


5.4.3 Pixel Info

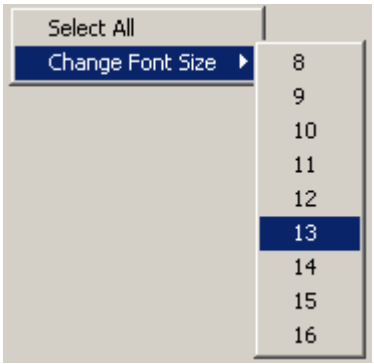
H264Visa provides very detailed pixel info for each Macroblock. Seven categories are currently supported:

- **Final Decoded Pixel info,**
- **Pixel info before Deblocking Filter,**
- **Predicted Pixel info,**
- **Residual Pixel info,**
- **DCT Coefficient info,**
- **Original Reference YUV Pixel info,**
- **Difference between Finally Decoded Pixel and the Original Reference YUV Pixel info.**

Here is a picture of Predicted Pixel info:

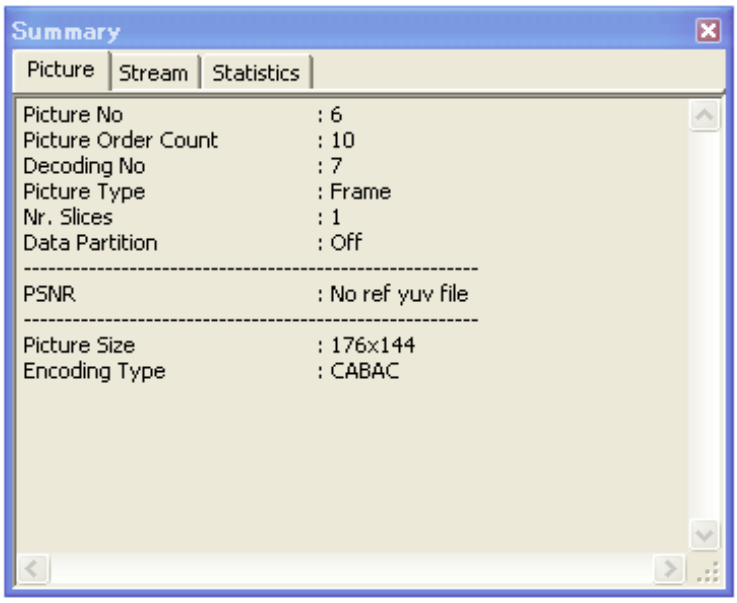


Note: For viewing convenience, **H264Visa** provides font size changing for pixel info dialog too, here is the screenshot for font size changing from popup menu(right click):

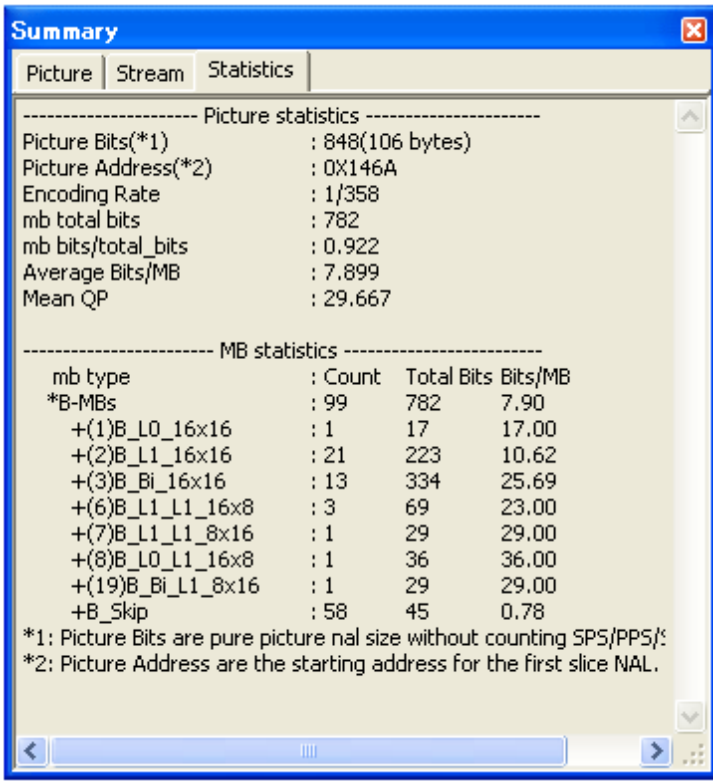


5.4.4 Stream Summary Info

H264Visa exports some stream parameters as well as some statistics info based on them into Summary Dialog for convenience. Here is a picture of Picture Summary:



Here is a picture of Statistics Summary for Standard and Mobile Solution ver:



5.5 Display on difference decoding stages

H264Visa provides the unique feature of displaying those intermediate picture reconstructed in different decoding stages. Now 4 stages are supported:

- **Finally Decoded Picture,**
- **Picture before Deblocking Filter,**
- **Predicted Picture, and**
- **Residual Picture**(with visual enhancement)**.**

Besides that, **H264Visa** also provides the display on

- **Original Reference YUV Picture**
- **Difference between Finally Decoded Picture and Reference YUV Picture.**

If the user provide the reference YUV Picture.

Here are some screen shots of this feature on the same decoded frame:

- **Final Decoded Picture**

- **Picture before Deblocking Filter**

- **Predicted Picture**

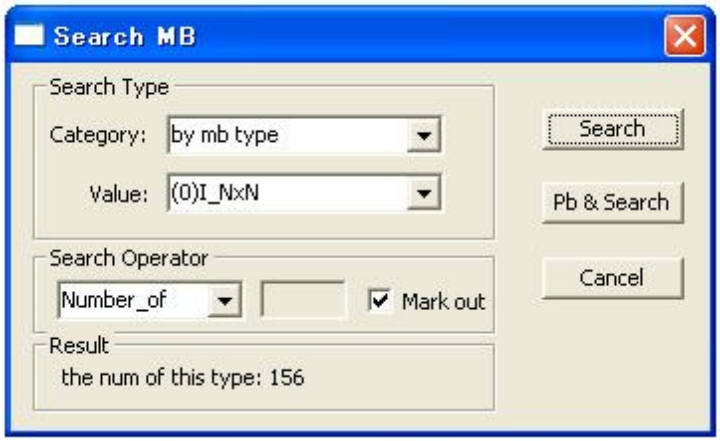
- Residual Picture

5.6 MB Search

H264Visa supports search on MB level with the following criteria:

- **MB types,** like I_NxN, P_Skip etc.
- **statistic values,** with mb bits, QP value.
- **and MB group,** with I MBs, P MBs, etc.

Here is a screen shot(search on I_NxN with markout):



5.7 Screen Overlays

H264Visa supports Screen Overlays on MB Bits, Motion Vectors, MB structures, MB Types.
Here is the screen shot for Motion Vectors:

Here is the screen shot for Slice Group Type 2(foreground/leftover slice group):

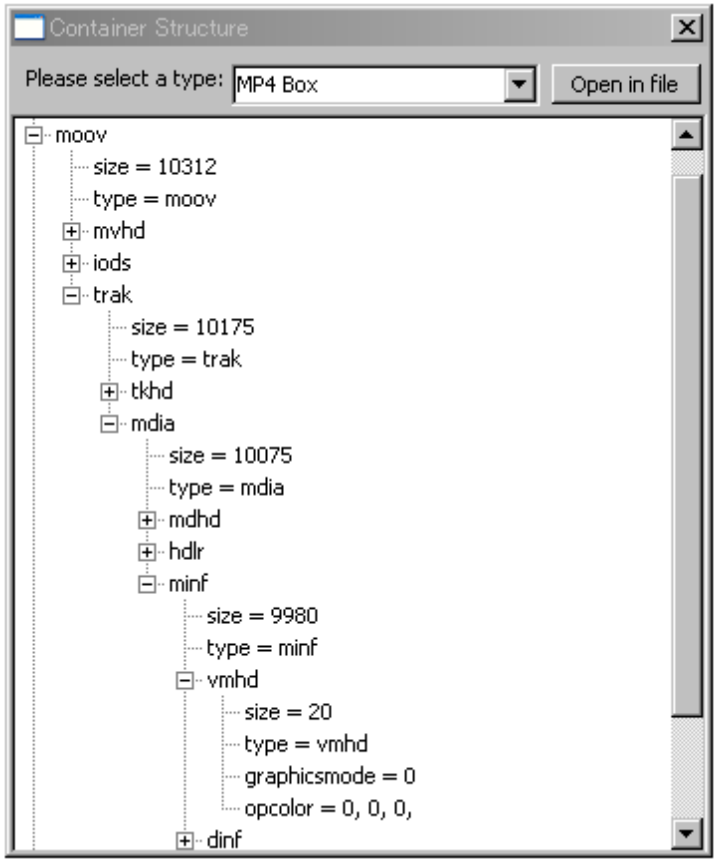
5.8 Comparison with reference YUV files

H264Visa supports the comparison between the original Reference YUV picture and finally decoded YUV picture, as well as the related PNSR calculation.
Here is the screen shot for the difference between encoded picture and the original YUV picture:

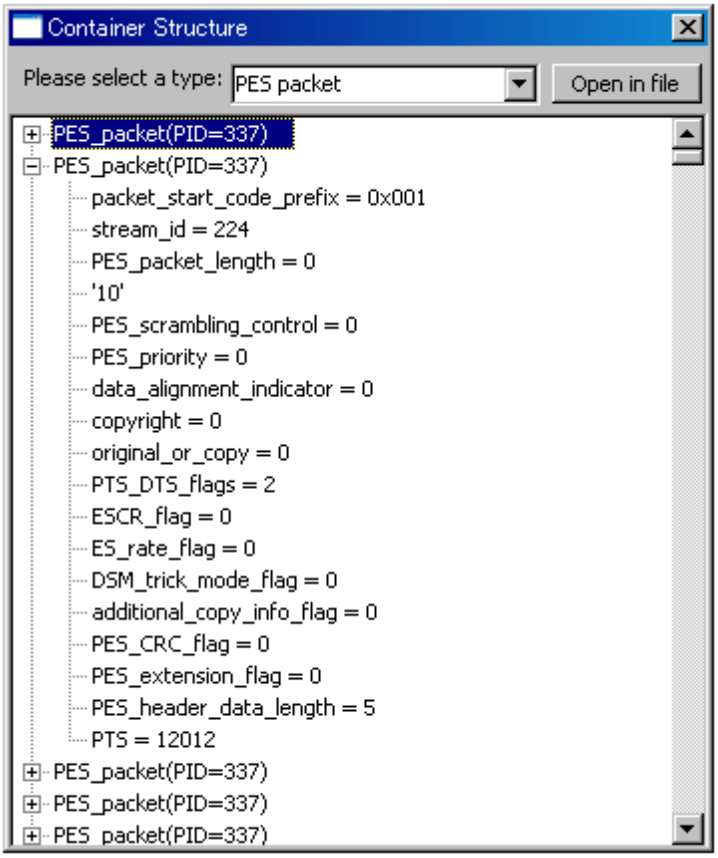
5.9 Container File Structures

H264Visa provides detailed Container File Structures for mpeg2 ts file, mp3/3gp file and flv/f4v file.

Here is the screen shot for a mp4 file structure:



Here is the screen shot for mpeg2 TS PES structure:



5.10 ISDB-T 1Seg Spec Check

H264Visa supports spec check for ISDB-T 1Seg DTV video. Here is the check result screen shot for a non-ISDB-T 1Seg h.264/AVC video.

5.11 Field Display(Standard Version only)

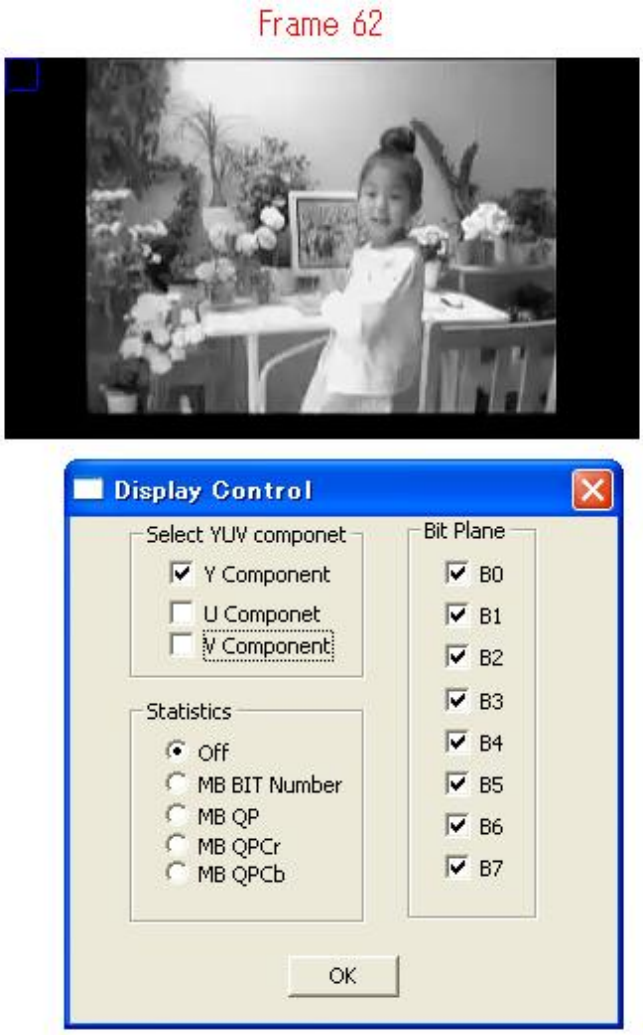
H264Visa Standard Version supports field display. Here are the buttons associated with this feature:

Meaning of those buttons are(from left to right): Frame display, Top Field, Bottom Field, Vertical Scale for Field Displas.
Those buttons are valid for streams with field picture inside.

5.12 Other Features

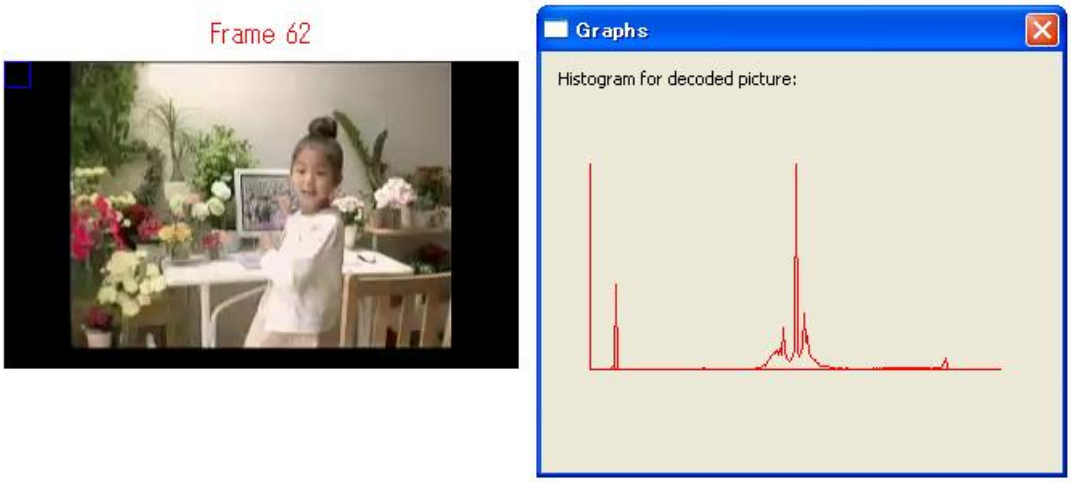
5.12.1 Picture Component Analyzer

H264Visa can analyze pixels on YUV component, or on bit plane base.
Here is an screen shot on Y-only analysis.



5.12.2 Histogram Graph

H264Visa supports histogram on frame basis for video quality enhancement.
Here is a screen shot.



5.12.3 Main Popup Menu

The following is the Popup Menu for H264Visa main window: