An0042

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MPEG-4 Compressor module board capabilities

EuroTech

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CTR-1472/75

PC/104-Plus MPEG-4 Compressor module with 4 independent videocomposite channels

Understanding the board capabilities

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PC/104-*Plus* form factor, ruggedly designed for high reliability surveillance systems in transport, aviation and defense applications.
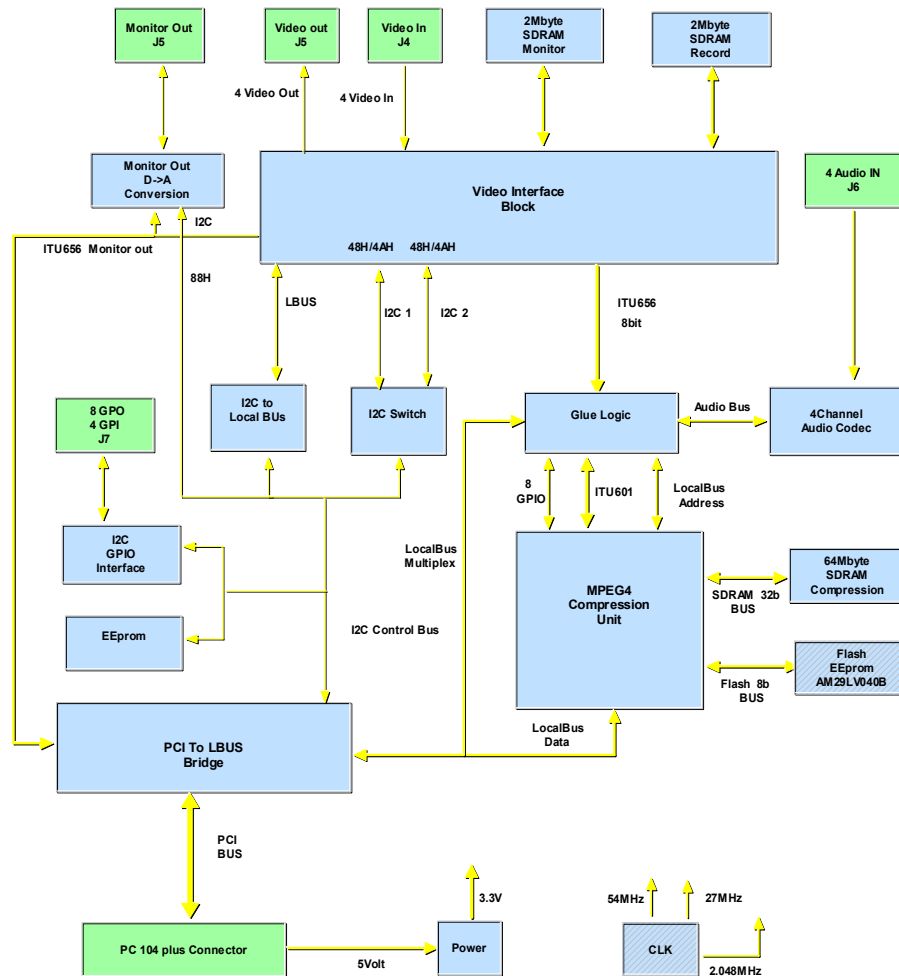
Features

- ❑ 4 NTSC/PAL 1Vpp Analog Video Input Channels (for up to 4 Cameras)
- ❑ NTSC Compression Rates:
    - ▪ 352x240 @ 120fps
    - ▪ 720x480 @ 30fps
- ❑ PAL Compression Rates:
    - ▪ 352x288 @ 100fps
    - ▪ 720x576 @ 25 fps
- ❑ 4 Video MPEG-4 encoder Channels
- ❑ Video Compression Modes: Supports I, P, B
- ❑ Video Quality Control: Programmable Quantization Value
- ❑ Programmable or Automatic Static Gain Control For Each CVBS Channel
- ❑ Video Recording Path: Full Frame for 1 Channel or 120 FPS for Four Channels at CIF Resolution
- ❑ Bit Rate Control: VBR, CVR, Hybrid Bit Rate
- ❑ Motion Detection Functionality
- ❑ Encoding Format: 4 Audio Input Channels (PCM, ADPCM Audio compression type)
- ❑ System File Formats: AVI, MPEG-4
- ❑ 1 Analog Video Output Channel for monitoring
- ❑ 8 Digital I/O
- ❑ Ideal for Windows CE and Linux Applications

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Block Diagram

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Video

- 4 NTSC/PAL 1Vpp Analog Video Input Channels (for up to 4 Cameras) J4 connector
- NTSC Compression Rates:
  - 352x240 @ 120fps
  - 720x480 @ 30fps
- PAL Compression Rates:
  - 352x288 @ 100fps
  - 720x576 @ 25 fps
- Motion Detection Function
- Embedded font RAM for color OSD(each display/record path)
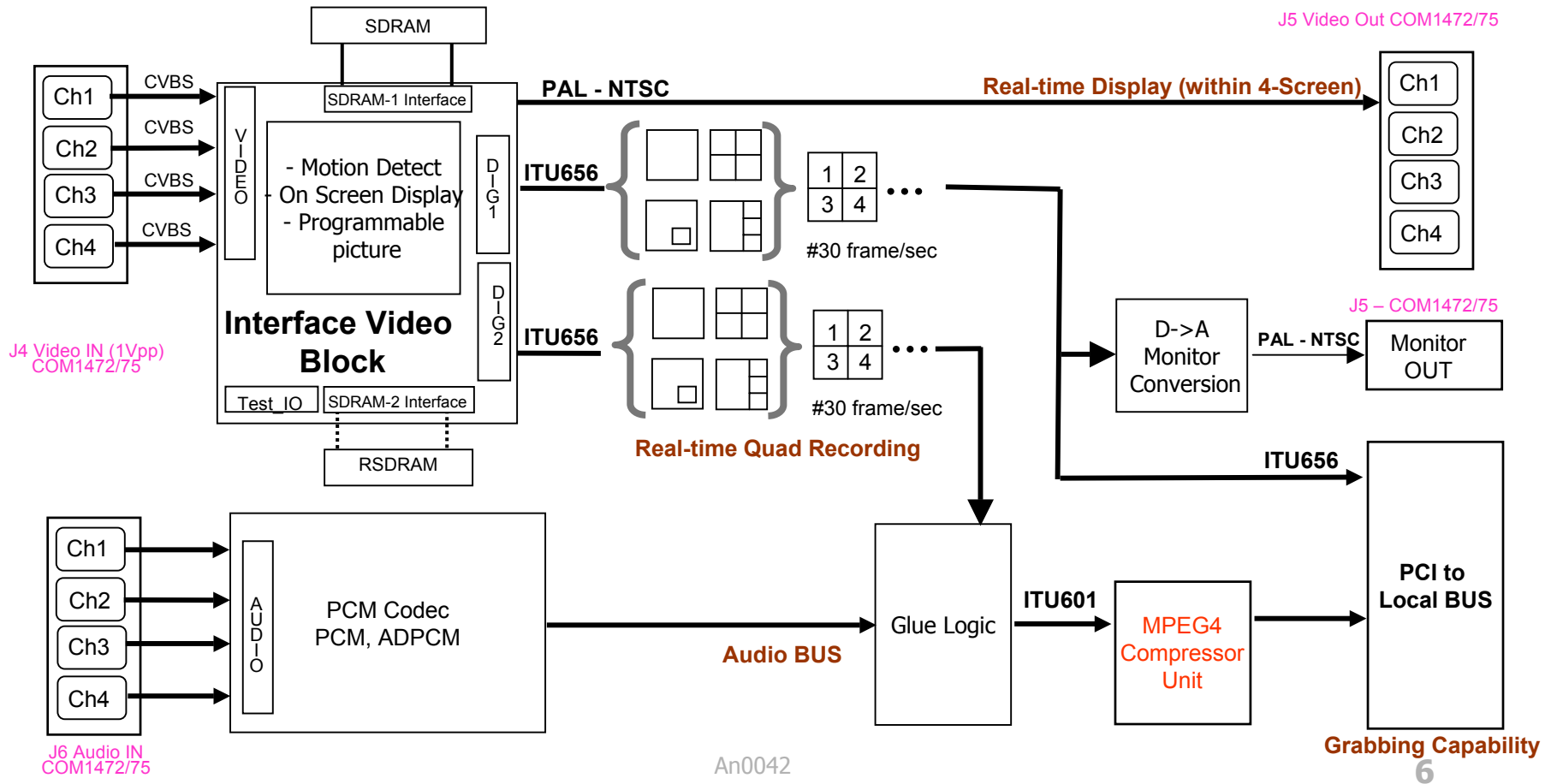- Video Output direct on J5 connector for connecting an external monitor

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Video Interface Block

- ❑ Built-in 4 channel NTSC/PAL/SECAM Video Decoders
- ❑ 4 channel analog input for camera
  - 4 channel real time display, 1 channel record and 1 channel playback
  - full size 30 frame, Quad size 120 frame record output
- ❑ 2 channel digital output(CCIR-656)
- ❑ Motion Detection Function:
  - ▪ Programmable Detection window, motion velocity and motion sensitivity
- ❑ Built-in High Quality Scaler (1/2, 1/3, 2/3, 1/4)
- ❑ Random position high quality linear ZOOM(2X~4X) function
- ❑ High flexibility record output function
  - ▪ N-field switching, external trigger switching
  - ▪ Priority recording, Random Sequence recording
  - ▪ QUAD recording, DVR-QUAD recording, DVR-DUAL recording

- ❑ Image enhancement function
- ❑ Embedded font RAM for color OSD(each display/record path)
- ❑ Camera Loss Processing: Last Image Capture
- ❑ Programmable picture size/position/panning/tilting/freeze
- ❑ Split border and background color setting
- ❑ Video full erase with specified color
- ❑ ABCD(A Blind Camera Detection) function
- ❑ Support 4 channel triplex system with 1 chip
- ❑ Channel index information access/control by host interface

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Video (Interface Video Block) and Audio Input architecture logic

J5 Video Out COM1472/75

SDRAM

Ch1 —CVBS→
Ch2 —CVBS→
Ch3 —CVBS→
Ch4 —CVBS→

VIDEO

SDRAM-1 Interface

PAL - NTSC → **Real-time Display (within 4-Screen)** →

Ch1
Ch2
Ch3
Ch4

Interface Video Block
- Motion Detect
- On Screen Display
- Programmable picture

DIG1 — **ITU656** →

#30 frame/sec

DIG2 — **ITU656** →

Test_IO | SDRAM-2 Interface

RSDRAM

#30 frame/sec

Real-time Quad Recording

J4 Video IN (1Vpp) COM1472/75

J5 – COM1472/75

D->A Monitor Conversion **PAL - NTSC** → Monitor OUT

ITU656 →

Ch1
Ch2
Ch3
Ch4

AUDIO

PCM Codec PCM, ADPCM

Audio BUS →

Glue Logic **ITU601** → MPEG4 Compressor Unit →

PCI to Local BUS

J6 Audio IN COM1472/75
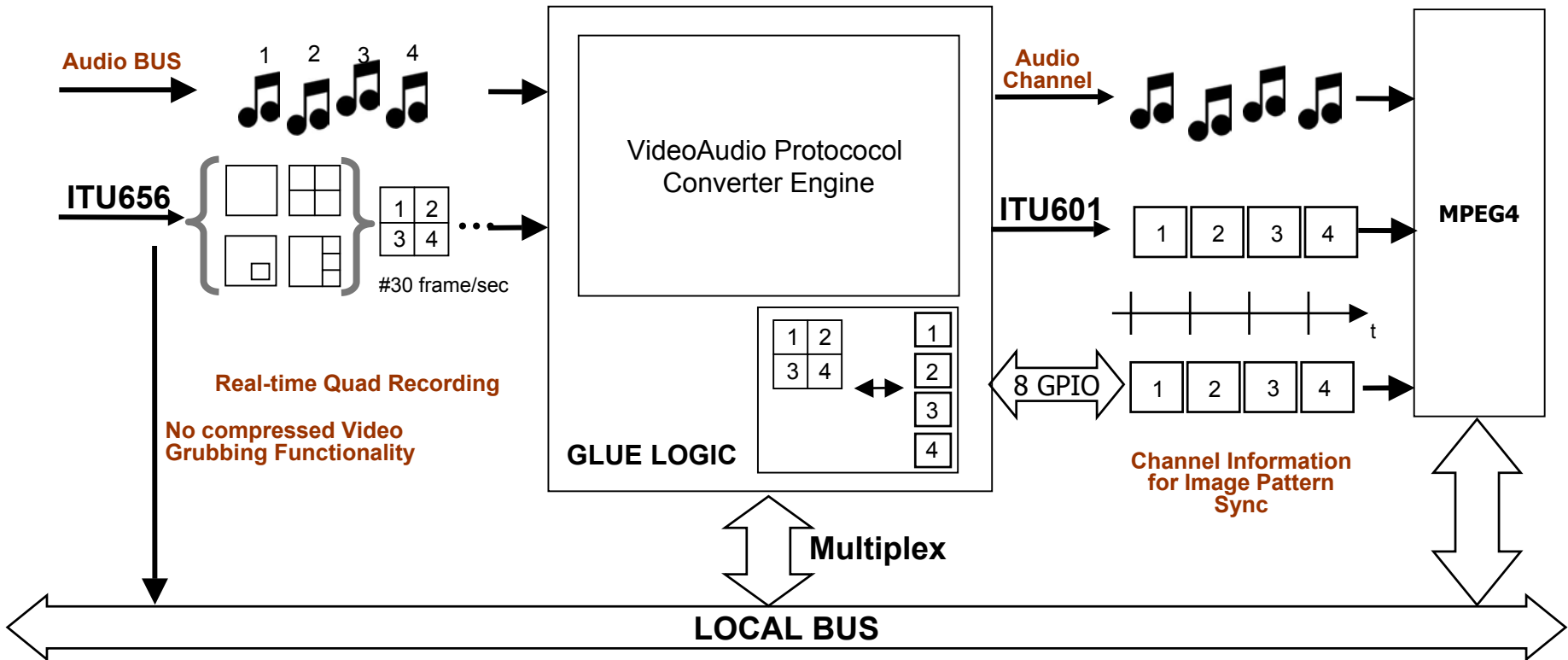
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Grabbing Capability

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Glue Logic

❑ Video Standard conversion from ITU-656 to ITU601 to interface the Video Interface output signal to the MPEG4 Compressor video input

❑ Generate GPIO information for MPEG streaming relation between active current video channel and compressed stream.

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Glue Logic

Audio BUS

1 2 3 4

ITU656

#30 frame/sec

Real-time Quad Recording

No compressed Video Grubbing Functionality

VideoAudio Protococol Converter Engine

1	2
3	4

GLUE LOGIC

1
2
3
4

Multiplex

Audio Channel

ITU601

| 1 | 2 | 3 | 4 |

t

8 GPIO

| 1 | 2 | 3 | 4 |

Channel Information for Image Pattern Sync

MPEG4

LOCAL BUS

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MPEG4 Compressor section

VIDEO PROCESSING

- Real-Time MPEG4 Video Encoding

- ISO/IEC 14496-2, MPEG4 SOP @LEVEL3

- 525/60(NTSC) up to 720x480 @ 30fps

- 625/50(PAL) up to 720x576 @ 25fps

- Supports I, P Frame Compression

- Variable Picture Size : programmable, Up to 720x480(NTSC) or 720x576(PAL)

- Large Motion Estimation Search Range : with halfpel accuracy

  - P Pictures : X = [-128 , +128], Y = [-64 , +64]

  - B Pictures : X = [-64 , +64], Y = [-64 , +64]

- Motion Estimation in Frame/Field Modes

- Bit rate control : VBR/CBR

- Color Format : 4:2:2 to 4:2:0 conversion

- Adaptive Field/Frame Modes, Field/Frame DCT

- Alternate & Zigzag Scan Support

- 8-11bit DC Precision

- Adaptive Decision (Intra/MC)

- Motion Detection (Scene Change Detection)

AUDIO PROCESSING

- ❑ Synchronous Serial Interface for Optional External Audio DSP
- ❑ Support u-Law PCM and IMA-ADPCM for speech quality

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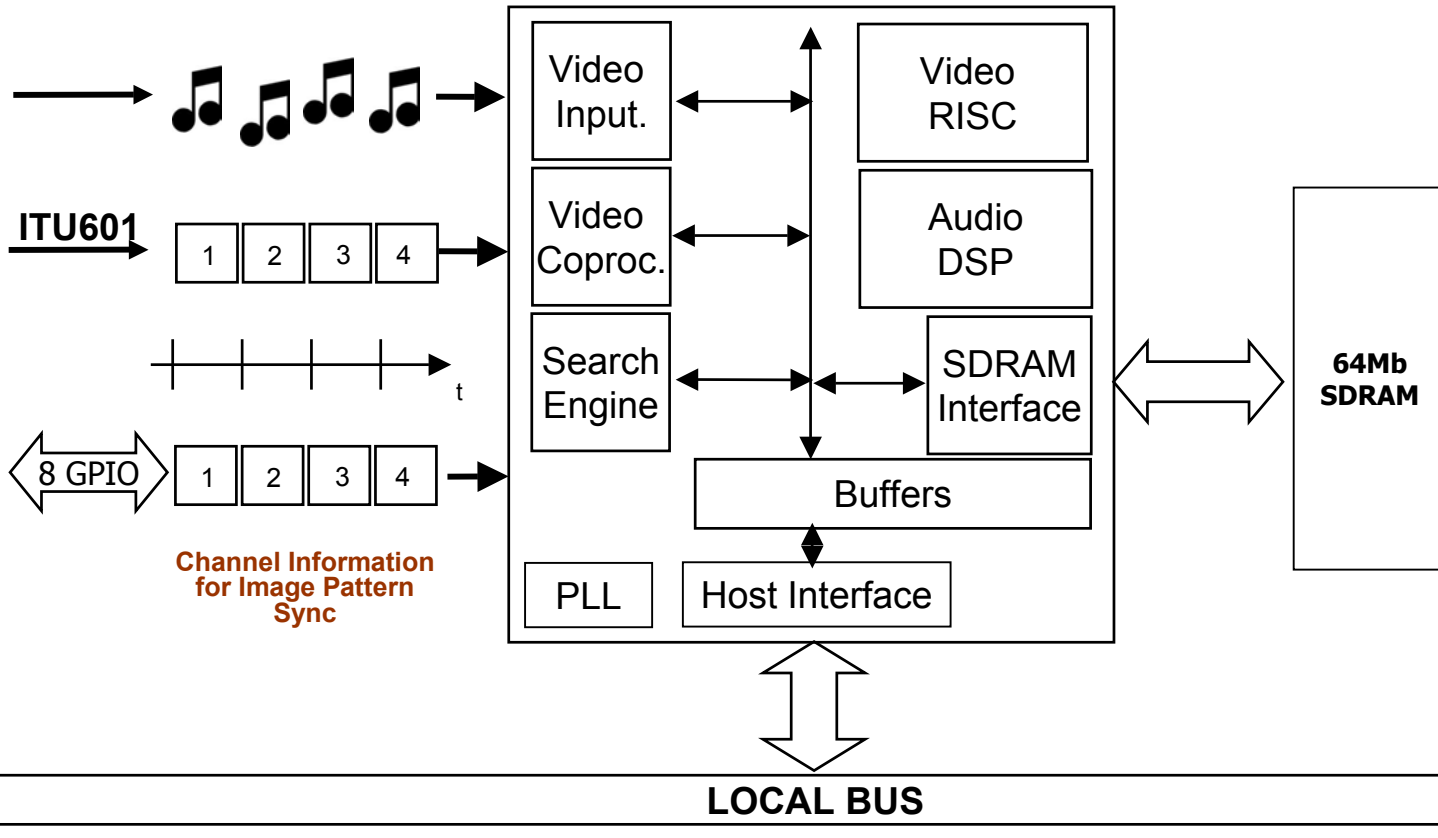
Drivers

Drivers will allow users to rapidly develop applications without entering detailed hardware architecture. Drivers are going to be released for the following O.S.:

- ❑ Linux
- ❑ Win CE
- ❑ Win XP
- ❑ Win XP Embedded

detailed information for the driver interface are contained in the driver documentation.

Glossary

- **NTSC:** Short for *National Television System Committee*. The NTSC is responsible for setting television and video standards in the United States (in Europe and the rest of the world, the dominant television standards are PAL and SECAM). The NTSC standard for television defines a composite video signal with a refresh rate of 60 half-frames (interlaced) per second. Each frame contains 525 lines and can contain 16 million different colors.

- **PAL:** (1) Short for *Phase Alternating Line,* the dominant television standard in Europe. The United States uses a different standard, NTSC. Whereas NTSC delivers 525 lines of resolution at 60 half-frames per second, PAL delivers 625 lines at 50 half-frames per second. Many video adapters that enable computer monitors to be used as television screens support both NTSC and PAL signals.

- **DVR:** Short for *digital video recorder*, another name for a *personal video recorder*

- **MPEG-4:** A graphics and video lossy compression algorithm standard that is based on MPEG-1 and MPEG-2 and Apple QuickTime technology. MPEG-4 files are smaller than JPEG or QuickTime files, so they are designed to transmit video and images over a narrower bandwidth and can mix video with text, graphics and 2-D and 3-D animation layers. MPEG-4 was standardized in October 1998 in the ISO/IEC document 14496.

- **AVI:** Short for *Audio Video Interleave,* the file format for Microsoft's Video for Windows standard. AVI files are limited to 320 x 240 resolution, and 30 frames per second, neither of which is adequate for full-screen, full-motion video. However, Video for Windows does not require any special hardware, making it the lowest common denominator for multimedia applications. Many multimedia producers use this format because it allows them to sell their products to the largest base of users.