



**Multimedia Section**  
**Media Duplication/Format Conversion**  
**Digital and Multimedia Evidence** Division



## 1. Media Duplication/Format Conversion

### 1.1. Scope

- 1.1.1. This procedure applies to Multimedia Section analysts who are authorized to perform audio and/or video analysis. Media duplication and format conversion includes understanding the fundamentals of quality control, original media playback, and media capture.
- 1.1.2. Direct media duplication does not have to be treated or documented as a forensic process.

### 1.2. Limitations

- 1.2.1. Repetitive playback, rewinding, and pausing of original analog video media will lead to degradation of the original recording.
- 1.2.2. Depending on the process used, transcoding might result in the loss of data and degradation of the video. When outputting to digital media, be aware that the following factors can reduce output quality: high compression rates, long record times, poor quality equipment and media, and incorrect settings.
- 1.2.3. Some video files may not play in universal players (i.e. Windows Media Player or VLC Player) depending on the version number and administrative rights for the computer being used to play back the video.

### 1.3. Equipment

#### 1.3.1. Recommended Hardware

- CD/DVD Duplicator
- Analog Playback Devices (both audio and video): VHS, Hi8, mini-DV/HDV etc.
- Video Capture Card
- Video to USB Converter (uncompressed)
- Computer/Laptop – administrative access, CD/DVD optical drive, USB ports etc.
- Media card reader
- Cables – Component/S-Video/Composite, RCA Audio, USB/FireWire, VGA, DVI, HDMI etc.
- Monitors (various types including analog capabilities)

#### 1.3.2. Recommended Software – universal players (i.e. Windows Media Player and VLC Player) are not considered forensic software

- Capture software (i.e. Omnivore)
- Adobe Media Encoder (universal file formats)
- Amped FIVE (proprietary file formats and universal file formats)



- FFMPEG (proprietary file formats, universal file formats, as well as data carved streams from exe imbedded files)
- INPUT-ACE

#### 1.4. Procedure

##### 1.4.1. Analog Video Evidence

- 1.4.1.1. The appropriate playback device should be chosen to provide optimum signal quality thus providing the best images possible.
- 1.4.1.2. Examine the video footage to locate the requestor's defined area of interest.
- 1.4.1.3. The analog footage is then connected to a forensic workstation and digitized using forensic software (i.e. Amped FIVE, Video Focus) or a non-linear editor (i.e. Adobe Premiere).
- 1.4.1.4. The digitized video can now be transcoded/encoded out of the capture software into a universal file format for optimal playability.
- 1.4.1.5. In cases where transcoding of video files is required for examination and/or normal viewing, the transcoding/encoding process must ensure the least amount of degradation to the derivative.

##### 1.4.2. Universal Digital Format Conversion

- 1.4.2.1. The analyst should attempt to play the file using Windows Media Player, VLC Player, or other acceptable universal player on a computer that is completely free of any outside additional codecs. If the universal player is able to play the file and there are no issues, such as incorrect aspect ratio or frame rate, no more action is required.
- 1.4.2.2. A universal digital video file can be transcoded in the following ways:
  - 1.4.2.2.1. The analyst can use a forensically accepted media encoder, using a universally playable codec to transcode to a file format that is playable with Windows Media Player, VLC Player, or other acceptable universal players. If there are aspect ratio or frame rate issues with the original video, they can sometimes be corrected within the encoder before output.
  - 1.4.2.2.2. The analyst can use software (i.e. Amped FIVE, Adobe Premiere) to transcode the file into a playable format for Windows Media Player or VLC Player.
  - 1.4.2.2.3. If the above two options do not load the video, the video can be played in a universal player. It should then be captured using a screen capture utility and exported at the best quality possible to a format that is playable in Windows Media Player, VLC Player, or other acceptable universal players.
- 1.4.2.3. If the video displayed by the player is not displayed in the correct aspect ratio, it should be corrected in the software aligned with the screen capture utility or exported as an uncompressed video file, brought into software (i.e. Photoshop), the



aspect ratio corrected and then rendered out at the best quality possible to a format that is playable in an acceptable universal player.

#### 1.4.3. Proprietary Digital Conversion

- 1.4.3.1. The analyst should attempt to open the proprietary player on a computer that has no administrative rights. If the player will open, the video file will play, and there are no issues such as incorrect aspect ratio or frame rate, no more action is required.
- 1.4.3.2. If the player does not open, then transcoding of the video file(s) is necessary for universal playback. The following are ways of transcoding a proprietary digital video file:
  - 1.4.3.2.1. The analyst can use software (i.e. Amped FIVE) to transcode the file into a playable format for an acceptable universal player.
  - 1.4.3.2.2. If the video file does not open in software, the video can be played in its proprietary player. It should then be captured using a screen capture utility and exported at the best quality possible to a format that is playable in an acceptable universal player.
  - 1.4.3.2.3. If the video that is being displayed by the player is not being displayed in the correct aspect ratio, it should be corrected in the software aligned with the screen capture utility or exported as an uncompressed video file, brought into software (i.e. Photoshop), the aspect ratio corrected and then rendered out at the best quality possible to a format that is playable in an acceptable universal player.