VICON
MOTION SYSTEMS

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This document is to assist users in setting up and get the best out of DV (Digital Video) movie capture when used with the latest Vicon WorkStation software. You can use older analogue Camcorders with a DV bridge or the latest DV Camcorders. Existing analogue movie capture using the Broadway Capture card and the latest DV movie capture using a 1394 Firewire port on the PC are selectable through the latest WorkStation software.

DV Capture

Prior to the arrival of the Internet in the home, analogue camcorders were dominant in the home and small business market for low cost movie capture. More recently Digital Video standard have started to supersede the analogue offering of low cost, high quality video. Digital Video is easily integrated into a PC system, whereas Analogue Video requires an analogue to digital converter. The A to D converter is normally found on an Analogue Capture card, which is installed in the WorkStation PC. Vicon currently use the Broadway Pro Analogue Capture card to capture video from an analogue camera, digitise it and then convert into the Mpeg 1 format so that it can be display in WorkStation.

With the introduction of the DV format, Vicon can now import video in high quality AVI format into WorkStation. The picture size is re-scalable up to 720 x 480 for NTSC and 720 x 576 for PAL. With the introduction of DV Bridge, older analogue cameras can also use with this new digital format. The two digital video formats used by Vicon are:

DV – AVI 1 or 2 A strict standard that is found in DV camcorders and will work with 1394 devices	For high-quality playback and for going back to tape on a DV or D8 (fitted with DV port) camcorder. Similarly through a DV bridge to an analog VCR. New Digital format used by Vicon WorkStation when using the Firewire port on a PC.
MPEG-1 A VHS-type quality format that has very small file sizes	A strict standard that is found in DV camcorders and will work with 1394 devices

Images are always displayed on a PC screen using square pixels. All image file formats also use square pixels. This means that if an image is for example 640 x 480 pixels, it will display at an aspect ratio of 4:3.

The same is not always true of video frames. For example the DV format is 720 x 480 for NTSC and 720 x 576 for PAL, but in both cases the final image when rendered on a TV is 4:3. When these frames are displayed on a computer (e.g. in a preview windows while editing) they are usually slightly distorted – NTSC is horizontally stretched, and PAL is horizontally squashed.

When viewing a movie within WorkStation, the software will automatically keep the picture 4:3 aspect ratio, no matter whether you squash or squeeze the movie image.

IEEE 1394 Serial Bus

The transfer of DV data is done using the IEEE 1394 Serial bus, which provides the serial high speed communication path between camera and PC, which results in an AVI video picture in WorkStation.

Since the video carried on the IEEE 1394 cable is digital, each device can process the video directly in the digital domain without the expense and image quality loss incurred when converting back and forth to analogue video. There is no need for a video capture card or any analog-to-digital video conversion, as the entire data path is digital.

IEEE - 1394 Features:

• Real-time data transfer for multimedia applications

• 100 and 200Mbits/s data rates today; 400- 800 Mbits/s and multi-Gbits/s upgrade path

• Supports up to 63 devices

• Live connection/disconnection without data loss or interruption

• Automatic configuration supporting "plug and play"

• Freeform network topology allowing mixing branches and daisy-chains

• No separate line terminators required

• Guaranteed bandwidth assignments for real-time applications

• Common connectors for different devices and applications

• Compliant with IEEE-1394 High Performance Serial Bus standard

DV has emerged as the format of choice for consumer and small professional market digital movie capture because, with the right software, you can edit in DV and transfer files with no further quality losses at a quality to rival professional formats such as DigiBeta. This new format will allow Vicon users to take advantage of DV camcorder technology in preference to the older analogue movie technology.

File Formats and Codec Issues

With the DV movie capture, Workstation save the movie in the AVI (audio video interleaved) file format. The reason for using avi's is because of the breadth of support for the AVI format in Windows 2000 and Direct X, which is not the case with the older Mpeg 1 format used by Vicon systems fitted with the analogue Broadway capture card.

If you intend to do lots of movie captures, your WorkStation PC will require a large hard drive. This is because DV AVI's require on average 3.6 to 4 Mb of hard disk space.

With WorkStation set to Microsoft DV Camera and VCR, you can choose whether to save your AVI's with no additional compression, or you can select in WorkStation from a list of codecs to add additional compression when saving to your AVI movie.

If you prefer to use Mpeg 1 or 2, then third party software editing packages can be used to perform the conversion from AVI to the Mpeg 1 or 2, but this will have to be post processed.

In WorkStation you will have to choose a codec carefully because some codecs were not designed to work in real time. There are a number of issues with the following codecs:

• MJPEG (is installed with Direct X 8.1) works OK good image quality but compression only about 50%.

• Microsoft RLE and Microsoft Video 1 and Autodesk FLC and work and compress better but image quality is not very good.

• Cinepak codec by radius cant do the encoding quick enough in real time so is not suitable.

• Div X 3.12 is a superb one giving Mpeg 4 compression within the avi format.

• The latest Div X release 5.0 (March 2002) is downloadable off the web but single step frame advance and scrubbing / seeking to frame has not yet been fully implemented by the DivX developers and will only work if the keyframe interval is set to single frame in the codec's encoder properties.

Types of DV AVI Files

The DV Avi format specifies two different types of AVI file:

Type 1: AVI files containing one DV data stream comprising interleaved video and audio data

Type 2: AVI files containing DV video comprising DV data plus audio as separate streams

Vicon Workstation is currently configured to create DV Type 1 format avi files. Some 3rd party editing applications such as Adobe Premiere Release 6.02 have not been upgraded yet to support DV Type 1 and will only work with DV Type 2 avi files.

A Vicon Plug In is available for you to post process Type 1 files into Type 2 format.

Analogue Capture

To capture S-Video or Composite analogue video from an analogue camcorder in a PC, an analogue capture card is used. The card is installed in the host PC in a PCI slot on the motherboard. The PC converts the incoming video into a computer movie format.

Vicon currently recommend the Broadway Pro analogue capture card. Vicon Workstation software accesses the Broadway drivers directly, which capture straight into the mpeg 1 file format using the hardware mpeg encoder on the Broadway card. WorkStation allows simultaneous capture of Motion Capture data and analogue video, displaying the captured video clip in WorkStation. Both the motion captured data and the Mpeg 1 captured move data are stored in the Vicon Eclipse Database.

Mpeg 1 is used because it provides good compression with acceptable quality loss and is a format that does not require proprietary codecs. Mpegs playback is at half NTSC or half PAL resolution.

In older versions of Vicon WorkStation, movie capture was and still is based on analogue camcorder technology using Microsoft Video For Windows (Vfw) API libraries. Windows NT was the chosen operating system, which allowed movie capture using this format. Vfw has now been largely superseded by Direct Show, which is a component of the Microsoft Direct X graphics and multimedia API. Direct Show version 8.1 or higher supports Digital Video (DV) and is can be run on Windows 2000 and XP, but not Windows NT.

WorkStation will still retain the legacy analogue capture to Mpeg via Broadway card for those customers wishing to make use of existing analogue equipment.

Digital Video (DV) Capture

Vicon WorkStation version 4.4, build 110 or greater, allows DV movie capture within WorkStation. Video is captured and converted from analogue to digital at the camera end or using a DV Bridge. A chip on board the camcorder or DV Bridge carries out the conversion and compression of the video data stream into the DV format.

This stream of continuous digital data (in DV format) can then either be recorded onto the camcorders Mini DV tape or into WorkStation PC via an IEEE 1394 Firewire serial interface. Firewire is a technology developed by Apple, which has much faster data transmission rates compared with either USB or SCSI. At the WorkStation PC end the data is converted using an appropriate codec into an AVI file, which can be store in Vicon's Eclipse Database for playback in WorkStation.

The DV data is saved at NTSC 720 x 480 30fps or PAL 720 x 576 25fps so movie playback will be potentially be smoother and with a higher resolution than analogue.

One extra benefit of DV is that the sound is recorded simultaneously with the video down the same Firewire cable, so you don't need a separate cable for audio.

Once the data is captured, editing in the Digital Video domain can be done using a variety of software programs that are available on the market.

PC Platform

- Minimum 700MHz Pentium III or equivalent processor (greater if codecs used)

- Minimum 256MB RAM memory

- 3D graphics card for displaying WorkStation

- 20Gbyte Hard Drive

- Windows 2000 or XP Operating System

- DirectX 8.1 or greater (Required for DV movie capture)

- IEEE 1394 Firewire serial interface card and software

Direct X Version 8.1 home user edition can be downloaded from Microsoft at:
http://www.microsoft.com/downloads

IEEE 1394 FireWire interface

A wide range of IEEE 1394 FireWire serial interface add on PCI cards are available for the PC with many new systems coming already equipped with a FireWire port on the motherboard. Microsoft Windows 2000 and XP recognises the FireWire interface without the need for additional drivers.

The FireWire card must be Open Host Controller Interface (OHCI) compliant. If the card includes the Texas instruments chip set, then it is.

There are some further technical considerations with IEEE1394 / FireWire you should be aware of:

- The maximum permitted length of a single IEEE1394 fireWire cable for maximum data rate is around 15 feet / 4.5 metres. Some companies are now selling extra long cables. Please check the cable specification for suitability and performance. DV data rate needs to carry around 4 MBytes per second for one movie stream.

- To extend range, you can add FireWire repeaters / hubs to join cables for greater reach by 15ft (4.5m) increments up to 225 ft (70m).

- Theoretically you could have more than one movie capture device capturing simultaneously as your FireWire card may have multiple ports. Vicon Workstation at present can only utilise a single device so if you want to have several cameras capturing simultaneously to a single movie file, you will have to buy a DV video mixer such as the MX Pro DV.

Hard Drives

Movie capture requires a lot of bandwidth and storage space. A stream of DV data is compressed down (in hardware on board your camcorder) to give a data rate of 3.6MB per second at 720 x 576 (PAL) (480 for NTSC). That's over 4.3 GB for every 20 minutes of video captured in raw DV format.

In terms of speed, your hard drive must be capable of handling this data rate as a sustained rate in addition to the Vicon motion capture data , i.e. not just a theoretical maximum under no other load.. It is best to use an Ultra SCSI 2 controller and a very large hard disk drive. It is possible to do movie capture using an EIDE hard drive, but it will be pushed to its limits

If the hard drive cannot sustain this rate then you will drop movie frames on capture which will result in gaps in your movie on playback and the single frame advance and frame seek will lose synchronisation with the playback of the Vicon data when you play back in Workstation. During capture in Workstation there is a dialogue which tells you the number of movie frames dropped during capture. You should aim for zero dropped frames.

The Vicon Workstation has to handle the capture of Vicon trial data and the movie data to the same drive simultaneously, so there are several recommendations if the system is to capture effectively.

• Firstly, it is recommend that a SCSI drive is fitted instead of an EIDE, which are just not fast enough and burdens the main processor with read / write load needed by other processes such as WorkStation and the compression codecs.

Go for a AV-rated 10MB/sec (or faster) hard drive (sustained rate) from a manufacturers like:
    Western Digital
    Maxtor
    La Cie USA
    EZ Quest

• IEEE1394 Firewire drives can be used as an option drive to capture movies to, though not implemented at present. These are both portable and "hot swappable" via a Firewire port and need no further software yet are capable of write speeds in excess of SCSI or USB.

• Use an additional codec if movie file size is more importatant to you than quality but beware of impact on system performance

If quality of image is not so important but you envisage lots of long capture sessions, then you have the option of adding further real time compression in WorkStation using a codec, but at the cost of a loss in image quality, which may or may not be significant to you.

If you select to use additional compression of the movie using a codec, the "hit" on your hard drive will be reduced, but at the cost of extra burden on the host

system's processor. You may have to experiment with your system configuration in the context of a typical Vicon data capture session to achieve zero dropped frames.

DV Camcorder Issues

When deciding on what DV camcorder to use, the following must be available on the camcorder:

• IEEE1394 Firewire port in and out.

• Make sure your camcorder has the ability to disable auto shutdown - on some cameras, simply taking the tape out disables the auto shutdown feature. Auto shutdown is a feature for saving wear and tear on the tapes.

• Choose a camera with progressive scan instead of interlaced to get round the problem of the comb effects you sometimes get with moving objects when you single frame advance a movie captured from an interlaced signal on a PC. If you use a camera that is interlaced, you can reduce this effect in WorkStation by resize your Movie playback window. Progressive scan (full frame) camcorders can scan a full frame at a time so don't suffer from the comb effect. It is important to check out the frames per second (fps) of the resulting video because some cameras have relatively slow frame rate that result in jittery moving objects on playback rather than smooth ones.

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Firewire Card Install

Usually you must install a 1394 Firewire PCI card, but many new computers are coming with 1394 ports already built in. Most often the port is a six-pin connection for connecting to a Firewire cable. It allows the user to upload digital information from a camcorder to the WorkStation PC.

Install the Firewire card and switch on the PC. With the plug and play features available on Windows 2000 and XP, you will be prompted for a CD that contains the cards relevant drivers. Insert the CD to finish the installation

FIG. 1   1394 FIREWIRE CARD

Vicon Software Installations on new PCs

• Insert the Vicon software CD into the CD drive and allow Autorun to start the software installation program.
If no install prompt appears, then select START | RUN and enter
"(CD Drive Letter):Setup.exe"
to execute the Vicon software installation program.

• When prompted to choose a destination folder for the Vicon software, choose the most convenient drive (usually drive C or D) and use a folder called Vicon (in other words, the recommended installation folder is either C:\Vicon or D:\Vicon). Make sure that the drive has plenty of spare capacity (the full installation is approximately 250 Mb), especially if you would like to install the Sample Data.

• The installation program will copy the Vicon software into the appropriate folders.

• Start the software from the Vicon submenu on the Start menu.

• Configure your system according to the relevant User Manual.

Vicon Software Install on a PC with older version of Software

• Ensure that you have backed up the Vicon\Systems folder on your hard disk. This folder contains all System information such as analog setup and information about the different users. This is to avoid having to set up from scratch after the upgrade - it's strongly recommended to back up this folder for later reference. For Science & Engineering users,also back up the file VariableRanges.txt from your Vicon\Polygon folder if you've customized the Polygon Variable Ranges and Workstation.ini from the Vicon\Workstation folder.

• Decide if you would like to keep the old software or not. It is perfectly possible to keep copies of the old versions of Workstation, Bodybuilder and Polygon and have these available in parallel with the new software. However, this will require additional storage capacity on your hard drive (approx. 250 Mb for the full installation) as well as having the potential to confuse the users as to which version they should use.

- If you have decided not to keep the old software, uninstall the old software using the Add/Remove option in the Control Panel. Contact your System Administrator if you have problems doing this.

- Insert the Vicon software CD into the CD drive and allow Autorun to start the software installation program. If no install prompt appears, then select START | RUN and enter "(CD DriveLetter):Setup.exe" to execute the Vicon software installation program.

- If you are keeping old versions of Vicon software, install the new software to a different location on the hard disk. The old software will most likely be in C:\Vicon or D:\Vicon. You could, for example, choose a folder name such as C:\ViconFeb2002\ as the destination folder for the new software.

- If you are not keeping old versions of Vicon software and you have uninstalled the old software, choose the same destination folder for the new software as the old versions used (again most likely this will be C:\Vicon or D:\Vicon).

- If you're keeping an existing installation and installing the new CD to a different location, you may choose not to install the sample data. The installation disk will do the rest for you.

Tweak in Vicon Eclipse Database

You may need to modify the Eclipse Template files by adding a number of lines using a text editor like Notepad. The Animation, Clinical and Generic Template.eni files all need to be modified. New software installations do not require the modification as the files installed will have already been modified. Resave the files back in the Eclipse folder found under Program Files|Vicon so that the Eclipse database will recognise and display AVI format movies as well as MPG. e.g. Manually insert the following lines into the * template.eni files:

[FILE 9] /* note this should be the next available number in your .eni file */
TYPE = avi
DESCRIPTION = Movie file
IMAGEINDEX = 1

DV Capture Installation

Fig. 2
DV to DV

WORKSTATION PC`FITTED
WITH FIREWIRE CARD

DV CAMCORDER

6 TO 4 PIN 1394 FIREWIRE

When using a DV Camcorder, you can connect it using a Firewire cable directly to the WorkStation PC Firewire port. A PCI 1394 Firewire card must be installed in the WorkStation PC.

Installing an Internal DV Mixer (Future Possibilities)

There are two possibilities for the future in mixing between two DV camcorder sources.

Software solution: Two DV camcorders connected to two PCI 1394 FireWire cards fitted in the WorkStation PC. On board software is then used to mix the two DV movie streams into one.

Hardware solution: Two DV camcorders are connected to two 1394 FireWire inputs on a PCI - DV Mixer fitted in the WorkStation PC. The internal DV mixer will mix the two incoming DV streams into one.

Neither is possible at the moment due to there being no DV mixer software or a PCI - DV Mixers currently available. The WorkStation PC would also have to be very high specification.

FIG. 3
INTERNAL DIGITAL VIDEO
(DV) MIXER

WORKSTATION PC FITTED WITH
FIREWIRE DV MIXER CARD

DV CAMCORDERS

6 TO 4 PIN 1394 FIREWIRE

Installing an External DV Mixer

Similarly an external DV Mixer can be used to mix between two DV camcorder sources. DV Mixers are available on the market that will allow a single FireWire connection to be made between the DV mixer and WorkStation PC. A PCI 1394 FireWire card must be installed in the WorkStation PC.

Fig. 4
External Digital Video
(DV) Mixer

WORKSTATION PC
FITTED WITH
FIREWIRE CARD

DV CAMCORDER

DIGITAL DV MIXER

4 TO 4 PIN 1394 FIREWIRE
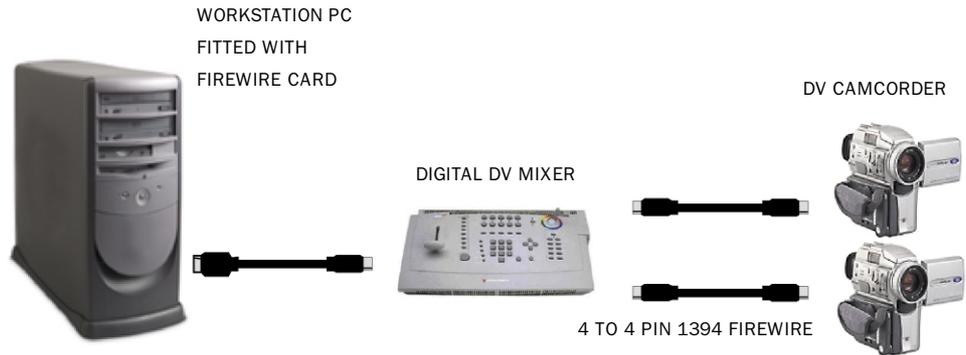
Analogue to DV Capture Install

This requires the use of an external Analog to DV Bridge to convert from Composite Analogue or analogue S-Video into the DV format for transfer to the Vicon WorkStation PC. If a Firewire port is not already present on the motherboard, a PCI 1394 Firewire card must be installed in the WorkStation PC.

Fig. 5
Analog Composite to
DV

WORKSTATION PC
FITTED WITH
FIREWIRE CARD

ANALOG TO DV BRIDGE

ANALOG CAMCORDER

6 TO 6 PIN 1394 FIREWIRE

COMPOSITE RCA VIDEO

Fig. 6
S-Video to DV

WORKSTATION PC
FITTED WITH
FIREWIRE CARD

ANALOG TO DV BRIDGE

ANALOG CAMCORDER

6 TO 6 PIN 1394 FIREWIRE

S - VIDEO

ANALOG RCA AUDIO
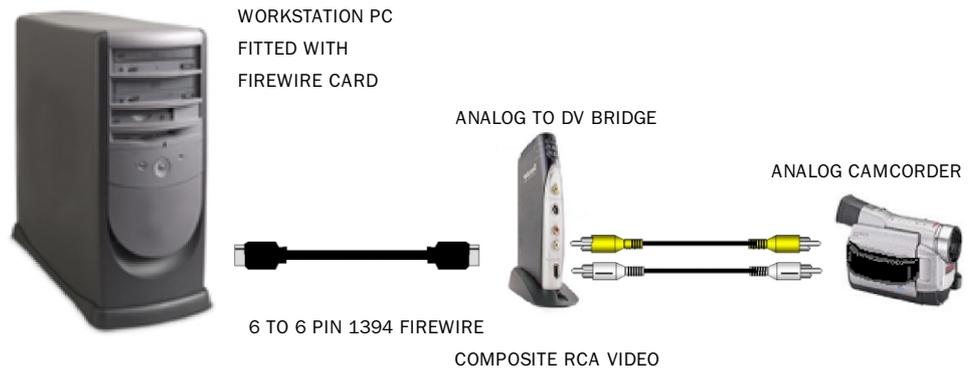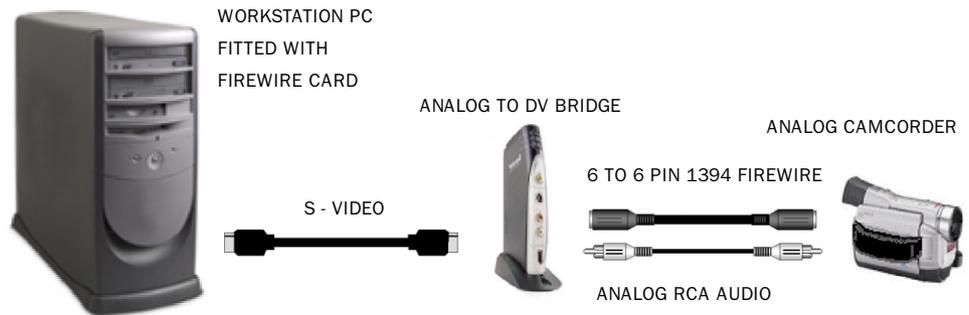
Installing an Analogue Mixer

When using more than one analogue camcorder or video camera, you will require an external Analogue Mixer to mix between the two sources. You will also require an external Analogue to DV Bridge to convert from Composite Analogue or analogue S-Video into the DV format for transfer to the Vicon WorkStation PC. A PCI 1394 FireWire card must be installed in the WorkStation PC.

Fig. 7
Analog Mixer to DV

WORKSTATION PC
FITTED WITH
FIREWIRE CARD

COMPOSITE RCA VIDEO

ANALOG RCA AUDIO

S - VIDEO

ANALOG CAMCORDER

6 TO 6 PIN 1394 FIREWIRE
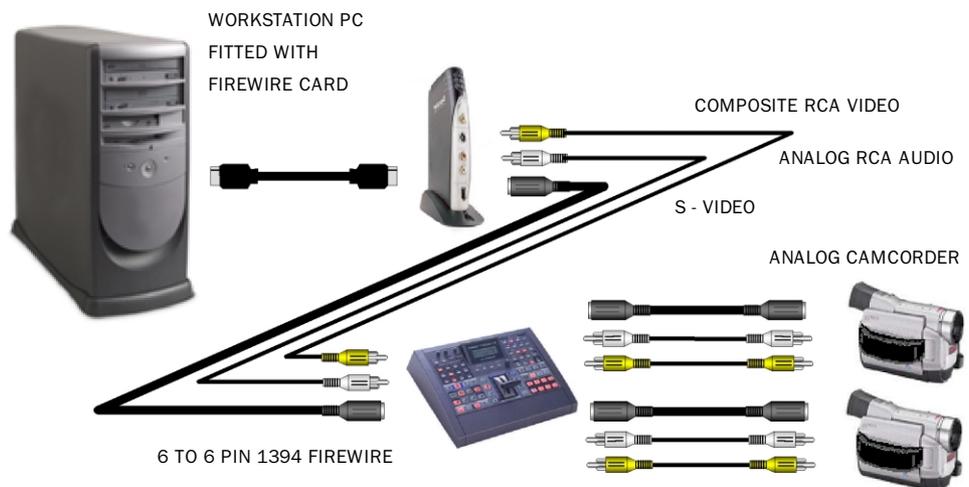
WorkStation Movie Setup

• Connect and switch on your camera.

• Open up WorkStation and select System and Movie Setup. If Movie Setup is greyed out, then WorkStation has not seen the connected camcorder. Check your connections and that the Firewire cards is functioning by looking under System | Device Manager in the Control Panel.

• Once the Movie Setup window is open, set the "Capture Mode" to Direct X (DV).

• Set the "Capture Device" to Microsoft DV Camera and VCR.

- Set maximum "Capture File Size" - remember for DV you will need 3.6MBytes per second of capture

- Set "Video Codec" - select << none used>> for best quality raw DV capture.

- Set "DV Resolution" - usually "Half" res will be optimum - "Full" res plus additional compression codec may exceed the system's capabilty.

Fig. 8
Movie Setup Window
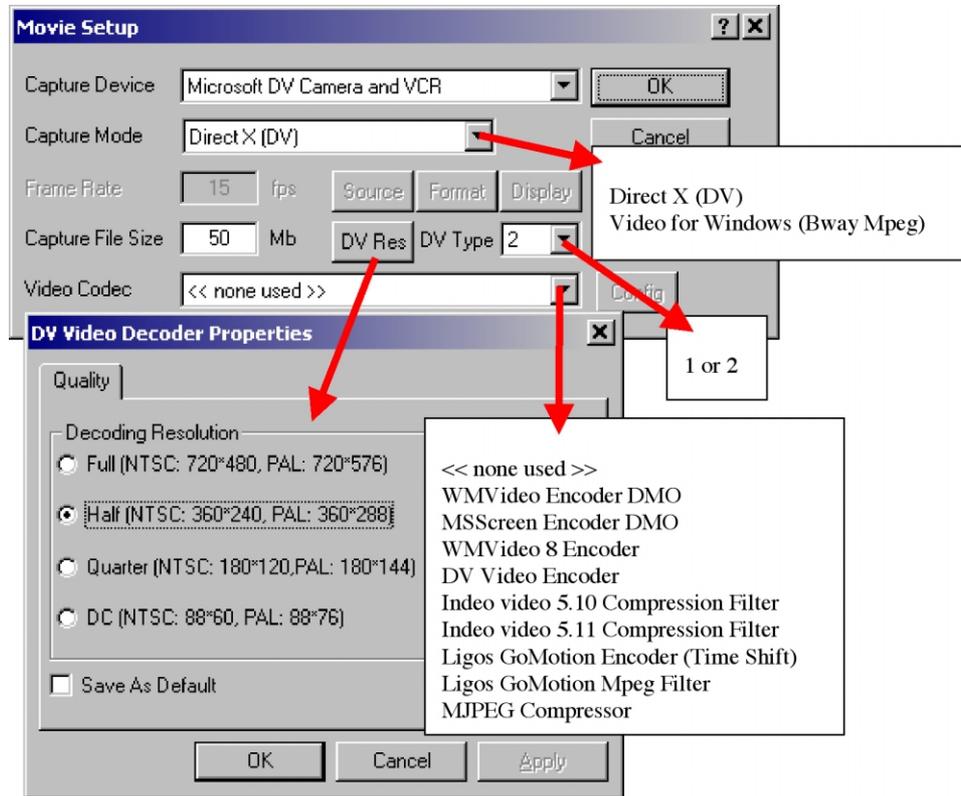
To synchronise movie playback with Motion capture data playback, you will need to open the System - Movie Synchronisation window and adjust the movie delay slider until the movie is playing in sync with the motion captured data.

Fig. 9
Movie Synchronisation
Window
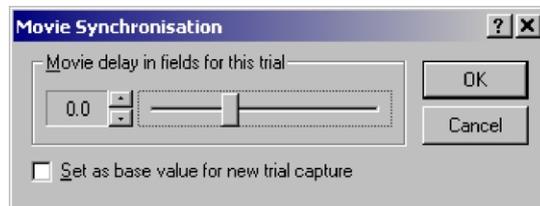
Legacy Analogue Capture Provision

Workstation will still retain the legacy analogue capture to Mpeg via Broadway card for those users wishing to make use of existing analogue equipment - you can choose between Direct X mode and the old Video for Windows mode in the WorkStation Movie Setup Dialog.

Capture and Playback Issues

To have smooth uninterrupted operation of your hard drives during motion capture and movie playback, turn off certain programs e.g. anti virus software, web streaming banners and stuff like that running in the background. These programs maybe making calls to the Operating system or the hard drives causing interruptions in WorkStation playback.

If you are getting dropped frames during a capture trial, the movie may get out of synch with the Vicon data. Dropped frames will arise either from:
• The hard drive is not fast enough

• The hard drive is full or fragmented files

• The processor being asked to do too much work at once ie when using a codec

• The selected codec is old and too slow.

To stop drop outs:
• Before starting a capture session, ensure your hard drive has been defragmented and there is a large amount of free space available to minimise hard drive seeking

• Get a faster SCSI hard drive.

• Reduce your Vicon camera capture frequency.

• If you are using a codec, try a different codec or (even better) no codec. The no codedc setting << none used>> saves the movie in DV format so there will be insignificant load on the system processor during capture as no additional compression is being carried out.

For smoother playback you may benefit from adding more RAM to your system.

1394 FireWire Cable

The special cable that connects your DV camcorder or D8 (Fitted with DV port) camcorder to your computer is called a FireWire cable. It is also known as an iLink or IEEE 1394 cable. This cable transmits digital data of both audio and video to your computer and can also send the same data back to your camcorder when you want to output your project back to tape. In addition to

Fig. 10
IEEE 1394 FireWire
Cable
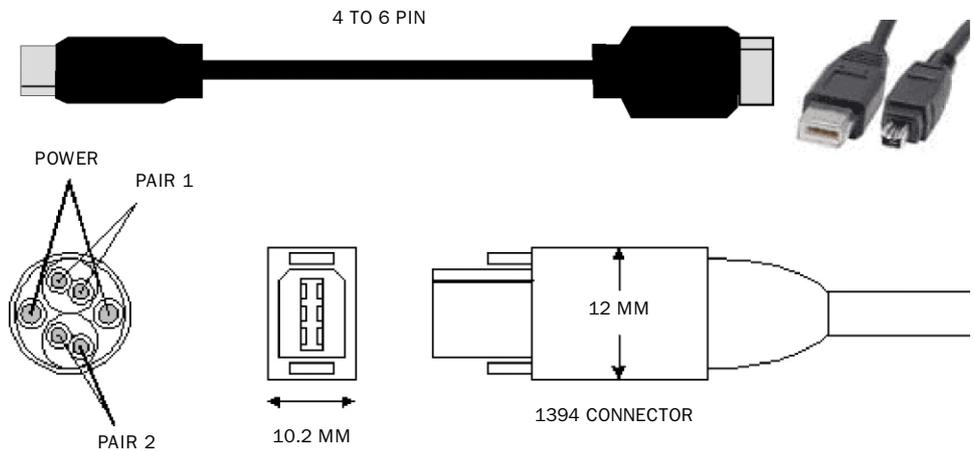
sending video data, it can also send commands from your computer to control the play buttons of your camcorder.

Most cables have one four-pin end and another six-pin end. Some cables have the same on both ends. Your camcorder will always connect to a four-pin and your 1394 card in your computer will most often use a six-pin. If you use this cable to connect your computer to an external 1394 drive such as another hard drive or a CD burner, you will use a cable that has a six-pin connector on both ends. Sometimes, it might be a four-pin connection on computers that have a front port for hooking up specifically to a DV or D8 camcorder.

Fig. 11
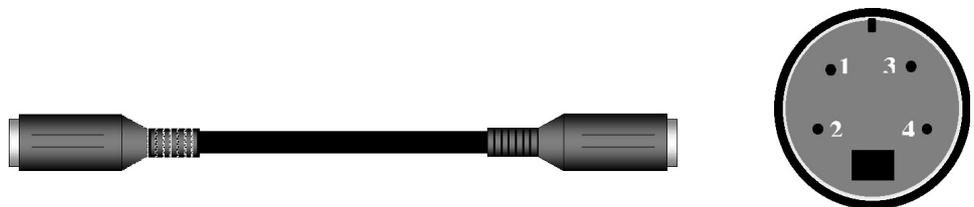
S-Video Cable

1 Luma signal   3 Chroma signal

2 Luma ground   4 Chroma ground

Analogue RCA Video & Audio Cables

The most common set of cables that connects your analogue camcorder to your Vicon WorkStation are called RCA. It normally consists of three connectors: Red for the right audio channel, White for the left audio channel (or mono) and Yellow for the composite video channel. Both ends look the same. All of the current Hi8/VHS-C camcorders and many of the DV and D8 camcorders have these RCA connections.

Fig. 12
Analogue RCA Cable
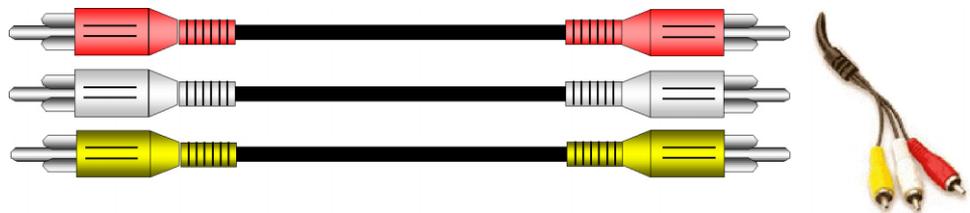
Analogue to DV Bridge
Dazzle – Hollywood DV-Bridge

Hollywood DV-Bridge is the universal solution for converting and editing analogue and DV video. The Hollywood DV-Bridge convert analogue video and audio to high quality DV video and audio.

You can also convert your edited DV video back to analogue video and audio using the Hollywood DV Bridge. This makes it easy to send video tapes to people with analogue VCRs. With Hollywood DV-Bridge, you edit your video in the DV format, which means you won't lose any video quality in the editing process.

Key Features:
• Capture Analogue or DV Video - Connect an analogue camcorder, TV, VCR or DV/D8 camcorder to capture video to your computer.

• Converts Analogue Video to DV - Archiving video in DV ensures it will be around in a high quality standardised format. Make multiple copies of a DV video without losing video quality from one generation to the next.

• Edit in DV Video Format for Quality and Speed - Editing in DV ensures you will not loose video quality during the editing process and is faster than editing in other formats.

• Converts DV Video to Analogue - Analogue devices such as VCRs and analogue camcorders are the most   common devices in the market so converting video to analogue makes it easy to share video.

• Convert Video Without a PC - Connect an analogue and DV camcorder to Hollywood DV-Bridge and you can   convert from Analogue to DV and DV to analogue without the use of a computer.

• Monitor Video From a TV - View your video on a TV monitor while you are transferring it to the computer.

• Works with FireWire-enabled PCs - Hollywood DV-Bridge works with 1394 FireWire enabled PCs.

• Video Editing Software Applications – Hollywood DV Bridge comes with two video editing software packages.

Product Includes:
• Hollywood DV-Bridge Hardware

• Six-foot IEEE FireWire/1394/i.Link Cable

• Dazzle Video Editing Software (PC only)

• Installation CD

- Hardware Manual

- QuickStart Guide

- Registration Card

Specifications:
- 1 x S-Video (Y/C) input

- 1 x Composite video input

- 1 x Stereo input

- 1 x S-Video (Y/C) output

- 1 x Composite video output

- 1 x Stereo outputs

- 1 X 6-pin IEEE 1394 FireWire DV input

- 1 X 6-pin IEEE 1394 FireWire DV output

PC System Requirements:
- 400MHz or Higher Pentium II or higher

- Windows 98SE,ME,2000

- 64MB RAM

- 1024 x 768 pixel resolution

- Sound Card

- Free1394 (FireWire) Port
Note: Hollywood DV-Bridge does not come with cables to attach to the Dazzle DV-Editor for Notebook computers.
Software:

- Dazzle MainActor Professional Video Editing Software.
MainActor provides all the tools necessary for the professional videographer, multimedia developer or semi-professional. While anyone can use MainActor, the user interface and tool set are designed with an emphasis on power and performance.

- Dazzle MGI VideoWave 4 SE.

VideoWave is a more consumer oriented video editing solution. VideoWave can be used by anyone from the first time video editor to the more experienced user. VideoWave takes the complexity out of video editing and makes it quick and easy to work with video.

Distance DV Cable

DistanceDV from Videonics is the ideal cable solution for live and studio events where longer DV cables are required. Videonics enhanced quality cable components and proprietary passive filter minimize the jitter and noise that long distances are susceptible to. Your production will benefit from the pristine digital signals produced by today's DV source.

Fig. 13

Whether you're running cable on location or in the production studio, DistanceDV cable can extend your DV signal to required distances If you need to go 10 meters (33-feet), 20 (66-feet) or even 50 meters (164-feet), DistanceDV cabling solutions are designed to deliver the best picture possible. Each end includes a locking four to six pin adapter for maximum flexibility. Use the four pin adapter for connections to digital cameras and mixers. Remove the adapter to use with six pin devices like, converters, hubs, digital VCRs, digital monitors, and a myriad of digital post production video and equipment.

Conveniently, leave the four pin side of the short adapter plugged into your camera's DV port to eliminate connection cycles to its fragile four pin connector.

Product Description:
DistanceDV compatible cabling solutions are available in 10, 20 and 50 meters lengths. DistanceDV cables are designed to extend the distance of your DV signal beyond the 4.5 meters spec limitation.

Features:
• IEEE 1394-95 Compatible

• Reduces signal attenuation and noise

• Two 4-6 pin locking conversion adapters included

• Sturdy, durable construction

• Three cable lengths to choose from, 10, 20, or 50 Meters

• Ideal for both Industrial and Consumer applications

• Improve video quality

• One year warranty

• UL Approved

VICON
MOTION SYSTEMS

Analogue External Mixer
Roland V5 Video Mix & Title Processor

The V-5 has the ability to switch between many analogue inputs with the freedom to mix scenes, add video effects, fades, and create titles. Use handwritten lettering or key composites to create any kind of titles. Computer graphics and typefaces can also be used as materials for video editing. Your videos can even be synchronised to musical tempo. Apart from the main video signal, four sub-inputs are available on standby. As the need arises, a single button can activate either Video 1, Video 2, PC Display, or Still Picture/Title File. Freely create scene transitions that use mixes and wipes. Connections are made easily between the playback and recording sides.

- Numerous Built-in Video Effects and Transitions

The V-5 features over 30 special built-in video effects and the ability to create effective scene transitions. Fades can be applied automatically with the V-5 and frequently used white or black fades can even be applied with the press of a single button. The V-5 features over 200 wipe patterns for scene transitions.

- Picture in Picture

Creating a picture within another picture is an effective technique for presentations, and it's easily accomplished with the V-5. A sub-graphic (input 1, 2, PC Display) is miniaturized and put into the main screen as a window. This feature provides automatic settings for position, size, border type (none, surrounding, and shadow), as well as colour and entrance/exit type (fade, moving, etc.).

- Audio Mixer Function

The V-5 features an audio mixer in addition to the video mixer. Primary and secondary sound source switching as well as the mixing or replacement of video sound with music can be performed with a single push of a button.

- Use Image Resources from a PC

With the V-5, your computer can be used as a source of creative production materials. Letters, flying logos, animations and other computer graphics displayed on the computer screen can easily be integrated into your video productions.

- Numerous Title Creation Functions

The V-5 is equipped with a versatile function that allows you to freely create opening titles.

- Key Composition Function

The V-5 supports chroma-key composites in which, for example, a still or moving image photographed with a blue background is super imposed onto an image with a different background. It also supports luminance key composites whereby images can be superimposed onto backgrounds of different lightness or darkness intensities.

- Title and Still File Function

Titles, video images and stills that appear on your computer screen can be

stored and imported into appropriate scenes with the simple push of a button. Up to 24 screens can be saved into the V-5's memory or into an optional PC card.

Synchronization with MIDI

Video images can be synchronized to music by using the MIDI clock messages of a MIDI sound device. (MIDI, Musical Instrument Digital Interface)

Audio Mixer

The V-5 also features a 4-track audio mixer, and dedicated volume controls for auxiliary and microphone inputs.

Specifications:

- 2 x S-Video (Y/C) inputs

- 2 x Composite inputs

- 2 x Stereo inputs

- 1 each S-Video (Y/C), Composite video and Stereo audio outputs

- 1 x S-Video (Y/C) auxiliary input

- 1 x Composite video auxiliary input

- 1 x Stereo auxiliary inputs

- 1 x Headphone: Stereo jack, 8-100 ohms, mono signal

- 1 x Microphone input

Digital External Mixer
Videonics MX-Pro DV (& MX-Pro) 10-bit Digital AV Mixer

The MXProDV is a 10-bit, four-input video production switcher, mixer, frame synchroniser/ TBC (Time Base Corrector), manual colour corrector and special effects generator. It has the added advantage of DV video input and output, with IEEE 1394 FireWire connections. It is a versatile and easy to use switcher/mixer for both analogue and digital video.

The MX-Pro DV 10-bit (4:2:2) video technology takes video quality to a new level. The MXPro boasts a signal-to-noise ratio of better than 60 db and bandwidth of 5.5 MHz. These enhancements, together with Videonics full frame time base correction, deliver the kind of video quality you demand.

The MX-Pro DV Mixer has a built-in audio mixer with background music feature (constant audio independent of video).

Over 500 different effects provide a multitude of creative options. The effects are grouped in a logical way to make them easy to find. Each of the MXPro's effects "banks" can be easily accessed with the press of one button. Once you get to know the MXPro layout, you'll effortlessly select any effect, using the cursor keys or the numeric keypad.
Create your own custom effects menu: MXPro lets you select up to 30 of your favourite effects and access them instantly by pressing the "User" button. Transitions can be performed manually using the "take bar," or automatically. MXPro can even memorise a sequence of actions and repeat them for you, on cue.

The GPI interface allows external controllers to trigger transitions.

Features:
- 10-bit 4:2:2 digital video internal processing

- DV In / Out (MX-Pro DV)

- Over 500 transitions - Organic shapes that include Heart, Keyhole, Star, etc.

- True manual RGB colour correction

- Stores 30 favourite transitions

- Single and multiple PIP and moveable mosaic

- Can memorise series of FX, routing, colour correction

- Chroma-key, soft edges, colour borders, etc.

- Built-in audio mixer

- Many other features...

Specifications:
- 4 x S-Video (Y/C) inputs

- 4 x Composite inputs

- 4 x Stereo inputs

- 1 each S-Video (Y/C), Composite video and Stereo audio outputs

- 1 x Composite video preview monitor output

- 2 X 4-pin IEEE 1394 FireWire DV inputs (audio and video).

- 1 X 4 pin IEEE 1394 FireWire DV output (audio and video).

- Headphone: Stereo jack, 8-100 ohms, mono signal

Video Performance:
Digital
- DV-standard sampling: 13.5 MHz, 8-bit quantisation

- Horizontal resolution: 500 TV lines

Analogue
- Digital conversion: 13.5 MHz, 4:2:2, 10-bit quantisation (Y/C); 8-bit quantisation (composite)

- Gain: Unity

- S/N Ratio: greater than 60 dB (Y/C); greater than 56 dB (composite)

- Horizontal resolution: 480 lines NTSC, 576 lines PAL

Audio Performance:
Digital 2-Channel Mode
- Sampling: 16 bit, 48 kHz

- Frequency response: 20 Hz- 20 kHz

- S/N Ratio: 85 dB

Digital 4-Channel Mode
- Sampling: 12 bit, 32 kHz

- Frequency response: 20 Hz- 14.5 kHz

- S/N Ratio: 80 dB

Analogue
- Frequency response: 20 Hz-20 kHz, ± 3 dB

- S/N ratio: 80 dB

General:
- Power Supply: External in-line; 110VAC@60Hz/220VAC@50 Hz universal

- Dimensions: 422 x 241 x 76mm, (16.6" x 9.5" x 3")

- Weight: 1.8Kg (4 lbs)

- Ambient temperature: 32-104°F (0-40°C)

- Ambient humidity: Less than 90%

- GPI: Mini-Jack

AVI Audio Video Interleave
is the video format most commonly used on Windows PC's. It defines how video and audio are attached to each other, without specifying a codec.

COder/DECoder
is a codec is a piece of software that allows you to encode something - usually audio or video - to a specific format and can decode media encoded in this specific format again. Popular Codecs: MPEG1,

MPEG2, MPEG-4, Indeo, etc. AVI, ASF, etc
is not a codec but a format - that can be encoded using different codecs.

De-interlace
is the process of creating a single frame from two fields (one contains odd lines and the other the even lines).

Demultiplexing
is the opposite of multiplexing. In this process a combined audio/video stream will be separated into the number of streams it consists of (a video stream, at least one audio stream and a navigational stream). Every VOB encoder demultiplexes the VOB files before encoding and every DVD player does the same (audio and video are being treated by different circuits, or decoded by different filters on a pc).

Digital Video
is usually compressed since it'd take Terabytes - thousands of Gigabytes or for the mathematicians among you : 10^12 Bytes) to store a movie uncompressed. Since standard loss less compression is insufficient for video, the video codecs have to get rid of unimportant information - stuff the human eye won't see or is unlikely to see. Since that is still not enough modern compression algorithms use keyframes, I and P frames in order to save space.

Digital8
is a cassette format to record DV on a Hi8 cassette. The speed is higher than normal Hi8 so on a 60-minute Hi8 tape, one can record 40 minutes.

DirectX
is an application program interface developed by Microsoft, first for Windows 95, for creating and managing graphic images and multimedia effects in applications such as games and active Web pages. It includes the DirectDraw API for direct access to video memory.

DV
DV is an acronym for Digital Video as a broad domain.
DV is also a video standard used for mini-DV and Digital8 camcorders.
DV is also a video cassette standard (60-180 minutes).
DV is also used to describe camcorders that use the standard DV video cassettes.

Encoding
The process of taking a raw uncompressed file and compressing it to an encoded form while maintaining the quality.

Field
is half the image in an interlaced frame. A field occupies alternate horizontal lines in a frame and is displayed for half the time of the frame.

FireWire
is the Apple name for IEEE1394. Fast interface (100, 200 and 400Mbps) for transferring digital video. Also known as FireWire in the Apple world or i-Link for Sony products. IEEE1394 devices are "hot-swappable", allowing you to plug devices in and out without having to reboot your system.
Firmware is a controller software which resides on a programmable chip within the drive itself (DVD/CD/Hard Drives). It's upgradable through Firmware Patch such as BIOS at PCs.

Frame
is the name for a picture in a movie. The basic source of a movie; one frame represents one image. A movie usually runs at 24 frames per second, equalling 24 different images per second. Imagine 24 images with a bird on it. In the first image, the bird is on the left, gradually moving to the right. On the 24th frame the bird is on the right end of the image. When these 24 images are played in sequence fast enough, the human eye sees a bird flying from left to right.

Frameserving
is using one utility to decode or read a video file and after it has been decoded, sending it straight to any other video editing or encoding application.

Frame Rate
is the number of frames displayed per second. The standard frame rate for NTSC is 29.97fps, for

PAL
is 25fps and for FILM is 24fps.

Hue
is the overall gradation of colour.

Interlace
is the process of building a single video frame from two fields. The two fields are placed on alternate lines and are displayed in sequence at twice the frame rate.

Interleaving
describes the process of gluing together the audio and the video track at defined points. The player will recognize the interleave points and make sure that both audio and video are played in a manner that the "glued" points match throughout the movie.

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JPEG
is a acronym for Joint Picture Experts Group. JPEG is a bitmap file format which is popular for storing full colour images. The format uses a user defined amount of lossy compression, meaning that there is a trade off between file size and image quality in that the more compression is used (smaller file sizes), the lower the quality of the image.

Keyframe
is a complete frame but compressed in the DV format.

Mini-DV
is a video cassette standard identical to DV but for smaller cassettes (60 minutes).

MiniDVD
basically is a DVD on a CD-R(W).

MJPEG JPEG
is an acronym for Motion Joint Picture Experts Group. Video compression format which compresses each frame individually with a technique very similar to the JPEG bitmap format.

MPEG
which stands for Moving Picture Experts Group, is the name of familly of standards (joint of the International Organization for Standardization [ISO]) used for coding audio and video data in a digital compressed format including data transmission across digital networks. MPEG Video files have the .mpg or .dat extension and MPEG Audio files generally have the extension .mp1, .mp2, .mp3. MPEG is cross-platform compatible and can be played on all popular computer systems.
The major advantage of MPEG compared to other video and audio coding formats is that MPEG files are much smaller for the same quality (eg, mp3 size is about 1:10 compared to Audio CD). This is because MPEG uses very sophisticated compression techniques.
MPEG2 is a standard for compressed video that are used in SVCDs and DVDs.

MPEG-4 MPEG-4
is a standard defined by the Working Group 11 (Moving Picture Expert Group) of ISO (International Standard Organization) in October 1998 (date of the first draft of the standard). It is the standard for the mature digital era. With its added features, MPEG-4 offers better compression, interactivity, and universal Internet/wireless access to the medium.

Multipass Encoding
True multipass encoding is currently available only for WM8 and MPEG-2 (SVCD & miniDVD). An encoder supporting multipass will, in a first pass, analyze the video stream to be encoded and write down a log about everything it encounters. Let's assume we have a short clip that starts out in a dialog scene where we have few cuts and the camera remains static. Then it leads over to a

karate fight with lots of fast cuts and a lot of action (people flying through the air, kicking, punching, etc.). In regular CBR, encoding every second gets more or less bitrate (it's hard to stay 100% CBR but that's a detail) whereas in multipass VBR mode the encoder will use the bitrate according to his knowledge about the video stream, i.e. the dialog part gets the available bitrate and the fighting scene gets allotted more bitrate. The more passes, the more refined the bitrate distribution will be. In single pass VBR, the encoder has to base his decisions on where to use how much bitrate solely on the knowledge of the stuff it previously has encoded.

Multiplexing video and audio
are usually encoded separately. You have to join them to make a movie you can play (you can play audio and video separately in two players but to get synch would be rather hard). During multiplexing, the audio and video tracks are combined into one audio/video stream. The audio and video stream will be woven together and navigational information will be added so that the player can, for example fast forward/backward and still retain synch audio/video.

NTSC
is an acronym for National Television Standards Committee. The standard for television pictures in the USA (525 lines, 29.97fps). The digital resolution of NTSC is 720x480. The acronym is also for Never The Same Colour which represents the weakness of this analog standard.

PAL
is an acronym for Phase Alternate Line. PAL is the standard for television pictures in most of Europe (625 lines, 25fps). The digital resolution of PAL is 720x576.
Render is the process of drawing a video frame or calculating an audio ouput when editing video files.
Resolution refers to the number of pixels that an image has. For example, an image which has 720 pixels across and 480 pixels down is said to have a resolution of 720x480.

RM Real Media
uses Real Player by RealNetworks for playback. The worst video quality but very small files.

Saturation
is the strength of the colours in a video.

SBC Smart Bitrate Control.
A new way to encode DivX;-). Using Nandub, it can modify many internal codec parameters on the fly during compression, giving you better quality and more control over the encoding.

SMPTE,
which stands for the Society of Motion Picture and Television Engineers, is a method of displaying time in the timecode. There are two ways that SMPTE can

be displayed; non-drop or drop frame.

SMPTE non-drop

Is represented by the display; hours, minutes, seconds and frame number, or 0:00:00:00. This format works the best when the source and destination video has a "whole number" for the number of frames per second. When using the NTSC frame rate (29.97 frames per second), time slipping is a potential problem.

SMPTE drop frame

is represented by the display; hours, minutes, seconds and frame number, or 0:00:00:00. This format is only available for the NTSC frame rate of 29.97 frames per second to avoid the time slipping problems of SMPTE non-drop timecode.

Timecode

is how the running time of a file is shown; such as SMPTE (non-drop) and SMPTE (drop-frame).

Time Slip

(NTSC timecode) When using the NTSC frame rate of 29.97 frames per second, and the SMPTE non-drop timecode, the timecode will shift from "real" time due to the fact that there are only 29.97 frames per second in NTSC instead of the normal 30. This is called time slip.

VOB

All DVD movies are stored in so-called vob files. Vob files usually contain multiplexed Dolby Digital Audio and Mpeg2 video. Vob Files are called as follows: vts_XX_y.vob where XX represents the title and Y the part of the title. There can be 99 titles and 10 parts, although vts_XX_0.vob does never contain any video, usually just menu or navigational information.

Windows Media is a Microsoft's proprietary architecture for audio and video on the pc. It's based on a collection of codecs which can be used by the WindowsMedia Player to play files encoded in any supported format. The current release of the Windows Media Player is version 7.0. WindowsMedia 7.0 offers a new set of codecs, among them a fully ISO compliant MPEG4 codec (called MS Windows Video V1), an improved MPEG-4 codec called MS Video V7, an encoder that supports de-interlacing.