miroMOTION DC20
USER'S GUIDE

miro manuals are printed on chlorine-free paper using environmentally safe ink.
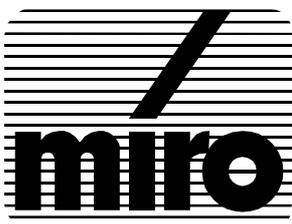
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miroMOTION DC20
User's Guide

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VDOK-MODC-100

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Contents

For your own safety

In the interest of your own safety and the flawless functioning of your new product and computer system please note the following:

- Computer components are sensitive to static charge. Discharge any electrostatic charge from yourself before touching the components with your hands or any tools using a grounding strap or suitable device.
- Make sure that the components you want to add to the computer are in compliance with the computer's characteristics.
- Make sure that the **video equipment and the Macintosh** are **switched off** when connecting them to the miroMOTION DC20 board.

For changes that have occurred after the manual has been printed, refer to the release notes on the supplied disk!
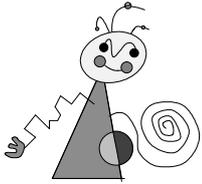
About this manual

This manual explains how to install and use the miroMOTION DC20 hardware and software. It also contains tips and tricks to make optimal use of miroMOTION DC20.

See the release notes for additional important information.

Subheadings   In the margins are subheadings to help you quickly find your way through this manual.

Important text passages are marked with the "notepad" and this background.

Bullets mark instructions for optional steps the order of which is not important.

• Connect the video devices.

Numbers mark step by step instructions:

1. Restart the computer.

Menus, commands, options or buttons which the user can select are written in *italics*.

Overview

WHAT IS miroMOTION DC20?

The miroMOTION DC20 is a system of hardware and software used to digitize, compress, process, and play back video clips in motion JPEG format for PowerMacs with a PCI bus.

Where to use it?

miroMOTION DC20 converts video into a computer-usable format by digitizing video clips to uncompressed or motion JPEG compressed QuickTime files. The video clips can then be edited on the computer and output in **S-Video quality** to a VCR, television, or computer monitor. The higher the quality of the video input and the higher the computer's data transfer rate, the better is the output quality of the video image.

miroMOTION DC20's video post-production capabilities provide a complete video studio plus editing table on your desktop.

miroMOTION DC20 allows conversion of video into another compression format which you can play back afterwards on any Macintosh computer without using miroMOTION DC20. In addition, QuickTime movies or animations can be converted to the miroMOTION DC20 JPEG format and output to VCR.

System components

miroMOTION DC20's capabilities result from integrated hardware and software:

Hardware miroMOTION DC20 is a state-of-the-art PCI video digitizer. miroMOTION DC20 includes a JPEG processor to compress video as well as a video encoder.

Software The miroMOTION DC20 software includes:

- miroMOTION DC20 QuickTime driver for controlling the video capture (recording) and compression and the video decompression and playback,
- Adobe Premiere 4.

WHAT DOES miroMOTION DC20 OFFER?

The miroMOTION DC20 system stands out for its quality (S-VHS), compression capabilities, performance, and digital video editing capabilities.

Video Input   *Video Output*
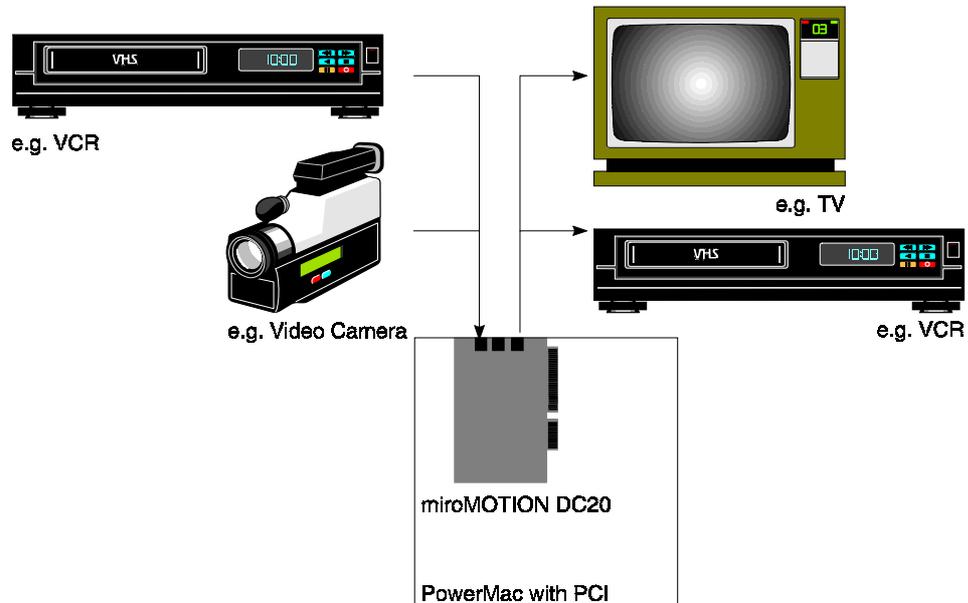
System components with miroMOTION DC20

❑ **Video inputs**
   miroMOTION DC20 connects to any video source (VCR, video camera, TV tuner, laserdisc, still-video camera, camcorder) that generates a composite video signal or an S-Video signal (e.g. VHS, S-VHS, Hi8, Video 8, DVC).

❑ **Video outputs**
   To record video clips back to tape, connect a composite or S-Video VCR to miroMOTION DC20. Video clips can also be displayed on a TV or video monitor.

❑ **Video encoder**
   The digital video encoder integrated on miroMOTION DC20 converts the saved digital video clips to video signals complying to the TV standards without any additional device.

❑ **Video formats**
   NTSC, PAL, and the SECAM (capture only) TV standards are supported.

❑ **Video compression**
   The integrated JPEG processor on miroMOTION DC20 compresses video clips in real-time in the motion JPEG format. For further details on how the JPEG compression works, refer to the Appendix.

❑ **Digital video editing**

miroMOTION DC20 offers all the possibilities of a digital video studio: digital video editing, filters, overlap effects, integration of computer graphics and computer animations etc. miroMOTION DC20 only uses *one* VCR for video editing where normally two or three VCRs are needed.

❑ **Best color quality**

The video image is scanned at a high color bandwidth at a 4:2:2 ratio (brightness by color information in accordance with the YUV model) so that the color quality of S-Video signals is maintained.

❑ **Full Screen – Full Motion Video**

miroMOTION DC20 can digitize video with 16.7 million colors (24 bits color depth) in real time offering full-screen play back.

❑ **Hardware-independent playback**

Applications, such as Adobe Premiere (included), can generate QuickTime files when using suitable compressors (e.g. Cinepak). These files can be played back without using the miroMOTION DC20 hardware.

Before you begin

SYSTEM REQUIREMENTS

Please make sure your system meets the following requirements before installing miroMOTION DC20:

Hardware *Computer*
PowerMac with PCI e.g. 9500, 8500, 7500, 7200 with an empty PCI slot.

Memory
at least 16 MB of memory.

Hard disk
hard disk with sufficient capacity and speed. Capturing video clips at a medium quality results in compressed data of 80 MB per minute. Therefore, we recommend a hard disk operating at a transfer rate of at least 1.5 MB/sec.

Operating system
System 7.5.2 or later, QuickTime 2.1 or later

For more information, also refer to the "Tips & tricks for miroMOTION DC20" section.

Graphics card and monitor
Graphics card and monitor with at least 16 bits color depth (Thousands).

To accelerate writing/reading the amount of data, it is recommended to defragment the hard disk.

Video input
miroMOTION DC20 connects to any video source generating a composite video or S-Video signal in NTSC, PAL, or SECAM. To connect a video device to the miroMOTION DC20 board, you need suitable cables (RCA or S-Video cable).

Video output
The miroMOTION DC20 output connects to any video device accepting a composite video or S-Video signal in NTSC or PAL. To connect a video device to the miroMOTION DC20 board, you will also need suitable cables (RCA or S-Video cables).

For connecting devices to the combined composite input/output, you will also need the Y adapter included in the package.

PACKAGE CONTENTS

Please make sure your miroMOTION DC20 system is complete before you begin the installation. The system includes:

- miroMOTION DC20 card
- Y cable
- miroMOTION DC20 software
- Adobe Premiere 4
- documentation.

If any parts are missing, please contact your reseller.

Computer components are sensitive to electrostatic charge. To avoid damages caused by electrostatic charge, do not take the miroMOTION DC20 card out of its antistatic package until you install it. Keep the package for future shipment.

Installing miroMOTION DC20

QUICK INSTALLATION

When installing the hardware and software, do so in the following order:

- Install miroMOTION DC20 card.
- Connect video source(s) to the video input with the computer and peripherals switched off.
- Connect VCR/TV to the video output with the computer and peripherals switched off.
- Install Adobe Premiere.
- Insert the miroMOTION DC20 disk.
- Start *Install miroMOTION DC20* and perform configuration.

After configuration, please see the release notes for the latest information.

Please read the detailed instructions in the corresponding manual sections to ensure a correct installation.

INSTALLING THE miroMOTION DC20 BOARD

For a detailed description on how to install expansion cards in a PowerMac with PCI slots, refer to your Macintosh documentation.

To install the miroMOTION DC20 card in your computer, proceed as follows:

1. Turn off the power to your Macintosh and your monitor. Leave the computer plugged in to ground it.
2. Loosen the chassis screws, if necessary. Then remove the cover from the computer.
3. Touch the metal part of the power supply case inside the computer to discharge static electricity.
4. If necessary, lower the auxiliary fan located in front of the slots.
5. Pull out the metal access port cover behind the expansion slot you want to use.
6. Remove the miroMOTION DC20 card from its antistatic bag.
7. Align the connector end of the miroMOTION DC20 card above the slot.
8. Insert the miroMOTION DC20 card gently but firmly into the slot. Do not bend or wiggle the card. Do not force the card; if you meet resistance, pull the card out and try again.

9. If necessary, lift the auxiliary fan back into place.

10. Replace the cover on the Macintosh and tighten the screws on the back panel.

Now the installation of the miroMOTION DC20 card is completed and you can install the software.

For more information on the installation of boards, refer to your Macintosh documentation.

CONNECTING VIDEO DEVICES

Make sure that the video equipment and the computer are **switched off** when connecting them to the miroMOTION DC20 card!

miroMOTION DC20 has one combined composite input/output, one S-Video input and one S-Video output.

Video inputs You can connect two video sources to the video inputs. The software is used to switch between the video inputs. The composite input connects to the VIDEO IN RCA connector on the Y-Cable (which connects to the middle mini-DIN 8 connector on the miroMOTION DC20 card). The S-Video input is a 4-pin Mini DIN female connector.

Always connect the composite video devices using the Y cable.

Video outputs To the S-Video output (4-pin Mini DIN female connector) you can connect a VCR and/or TV.

To use the composite video output, you will need the Y adapter included in the miroMOTION DC20 package. This cable has a composite video input and a composite video output. Video is output to both outputs simultaneously (S-Video, composite).

Always connect the composite video device via the Y cable.

The following illustration shows the miroMOTION card.

① S-Video Input
② Combined Composite
   Video Input/Output
③ S-Video Output
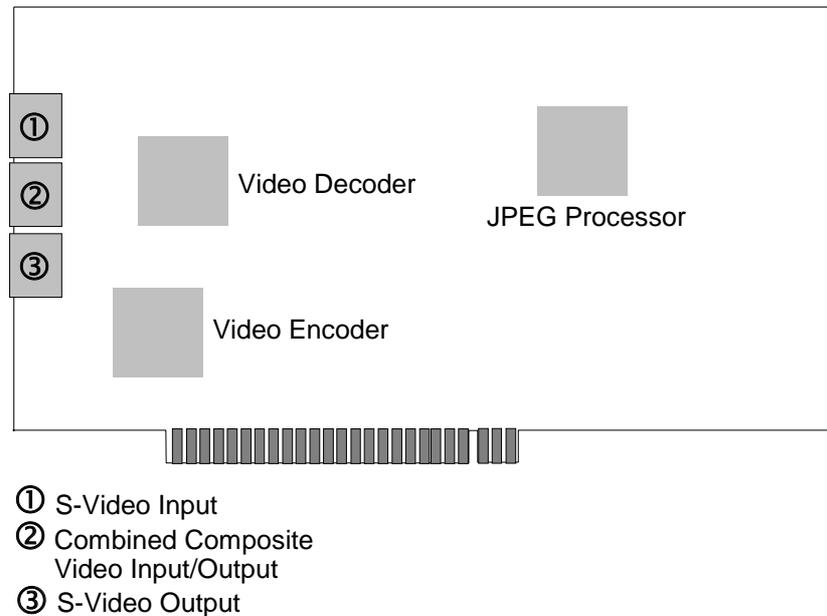
Inputs 1. If you have a video source with an S-Video output, connect it to the miroMOTION DC20 S-Video input using a suitable cable.

2. If you have a video source with a composite output, connect it to the VIDEO IN connector of the Y cable using a suitable cable.

Outputs 3. Connect a VCR and/or television set to the S-Video output using a suitable cable.

4. Connect a VCR and/or television set to VIDEO OUT connector of the Y adapter using a suitable cable.

INSTALLING ADOBE PREMIERE

Adobe Premiere and miroMOTION DC20 are a perfect match and offer a complete video editing and effect studio in your PowerMac.

Install Adobe Premiere as is described in your Adobe Premiere documentation.

During installation of Adobe Premiere, QuickTime is automatically installed as well. miroMOTION DC20 requires QuickTime 2.1 or higher.

To find out the version number, first open the system folder, then the system extensions, and click on *QuickTime*. The version number is displayed under ⌘ - "I". If the wrong version is installed (Version 2.0 or lower), then you will have to reinstall QuickTime.

INSTALLING miroMOTION DC20 SOFTWARE

Before installing the miroMOTION DC20 software, you must install Adobe Premiere. If this is not the case, the miroMOTION DC20 installer will display a warning.

The installer program places all the required files on your hard disk: The driver files *miroMOTION DC20* and *miroMOTION DC20 QT* will be copied to the *System Folder:Extensions*, a plug-in for the video output *miro DC20 PtV* and Project presets will be copied to the Adobe Premiere *Plug-Ins* folder located within the Adobe Premiere folder. Furthermore, a miroMOTION DC20 folder will be created where the release notes are saved.

To install the software, proceed as follows:
1. Insert the English miroMOTION DC20 diskette.
2. Open Install miroMOTION DC20.

After having completed the installation you are requested to restart the computer.
3. Restart the computer.

After the software installation is completed please read the release notes which contains the latest information about changes that occurred after the manual has been printed.

Using miroMOTION DC20

GENERAL

This chapter provides a first overview about how to use miroMOTION DC20.

For detailed information, please read the "Tips & tricks for miroMOTION DC20" section and the release notes.

Capture quality In general, miroMOTION DC20 can record and play back video in S-Video quality. To be able to do so, the hard disk has to be fast enough, and the video source must supply a good low-noise input signal.

Data rate You should adapt the data rate to the hard disk speed. If the data rate is too high, some frames are not saved ("dropped") which results in unsmooth playback. If the data rate is too low, this might result in a quality loss.

Output via graphics hardware The video output via the *Mac monitor* (not via the video outputs of miroMOTION DC20) performs a *preview function*: The video is output at a low frame rate on the monitor with the colors the graphics hardware offers and is not full-screen.

Output via video output The complete miroMOTION DC20 function range is available: Full Screen, Full Motion Video in millions of colors on the miroMOTION DC20 video outputs (connected to a VCR and/or a TV screen).

To check the color representation, always use your TV set; due to a difference in gamma values and CRT coatings between a TV and a computer monitor, the computer monitor may not show the correct colors in the preview function.

Digital video with sound When producing digital video with sound, you should always keep in mind that the sound also needs disk space. The higher the sound quality, the less space remains to store video.

Your miroMOTION DC20 uses the built-in Macintosh audio hardware for sound recording and playback. For more information, see the documentation that came with your Macintosh.

GETTING STARTED WITH miroMOTION DC20

After installing miroMOTION DC20 you can capture, compress and play video clips in the Motion JPEG format using Adobe Premiere. To facilitate working with miroMOTION DC20, an example is given describing how to capture and play back a video clip using Adobe Premiere.

For a detailed description of the Adobe Premiere functions, refer to the Adobe Premiere manual.

Capturing video clips in brief

⏱ If you have not done so already, connect the video source and switch it on. If necessary, start the tape.

⏱ Start Adobe Premiere 4.

⏱ In the *New Project Presets* window select *miro DC20 - NTSC full Size* or *miro DC20 - PAL full Size.*

⏱ Select the *Movie Capture* command from the *Capture* sub-menu of the *File* menu. The *Movie Capture* window appears and the *Movie Capture* menu appears in the menu bar.

⏱ If necessary, disable the *Video Off* option (no checkmark).

⏱ Select *Video Input* from the *Movie Capture* menu.

Video settings made under the menu item *Movie Capture* only have to be made once.

⏱ Select *Source* from the pop-up menu at the top of the dialog box. Under *Digitizer* select *miro DC20*, under *Input* select *Composite* or *S-Video* and under *Format* select *NTSC, SECAM,* or *PAL* depending on the source connected.

⏱ Select C*ompression* from the pop-up menu at the top of the dialog box. Select the *miro DC20 Rec* compressor, set *Quality* to the maximum (100), under *Frames per second* select *30* for NTSC and *25* for PAL/SECAM. Select *Limit data rate* (for the first recording, miro recommends 1500 Kbytes/sec.).

Always select *miro DC20 Rec* for capturing, never use *miroDC20 MJPG*.

⏱ Click *OK* to accept all further presets.

⏱ From the *File* menu, select *Capture,* then *Movie Capture.*

⏱ Select *Recording Settings*. If necessary, select the size (NTSC 640 x 480, PAL/SECAM 768 x 576) and click *OK*.

⏱ In the *Movie Capture* window click on the *Record* button.

⏱ To stop recording, click the mouse.

As soon as the recording process is completed, a window appears which displays the recorded video clip. For information on how to edit the video clip, refer to the Adobe Premiere manual.

Outputting Video in Brief

⏱ To output a prerecorded video sequence, choose *Open* from the *File* menu and select the command. Choose a video sequence.

⏱ Select *File*, *Export* and *Print to Video*.

⏱ Set the *Video mode* (*PAL* or *NTSC*); click *OK* to accept all further presets and the sequence will be printed to video. The video standard must match the video standard used in the recording or the *Make Movie* settings. If a VCR is connected to the miroMOTION DC20 and set to record, the video sequence will be recorded.

SETTINGS IN DETAIL

Movie Capture/Video Settings

The *Movie Capture* command in the *File* menu and the *Video Input* command in the *Movie Capture* menu enable you to choose the video source (*Video Input*), the compression format (*Compression*), and to do the image settings.

Video Input   If you have not done so already, select *Video Input* from the *Movie Capture* menu.
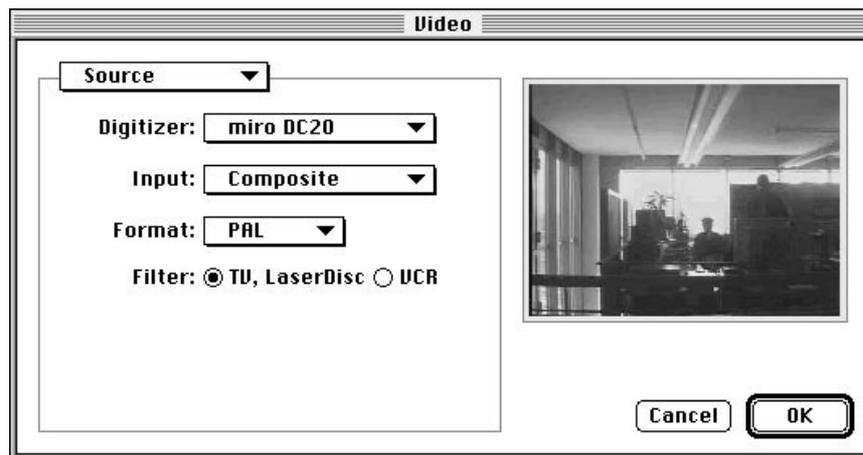
Source
Select the video source, in this case *miro DC20.*

Input
Selects the miroMOTION DC20 video input to which the video source connects: composite or S-Video. This setting is permanent. If you connect the video source to another video input, you must change this setting. Otherwise, there will be no video on your monitor.

Format
Selects the video standard of the video source: PAL, NTSC, or SECAM.

Filter
Selects whether video input is from tape (*VCR*) or not from tape (*TV, LaserDisc*).

Compression   Select *Compression* from the pop-up menu at the top of the dialog box.

Compressor

Here you can select the data format. Select *miro DC20 Rec* and the video clip will be recorded in the motion JPEG format.

Never select *miro DC20 MJPG* here.

Depth

The miroMOTION DC20 always records in millions of colors. Here you cannot select any additional settings.

Quality

Here you can specify the *Quality* of JPEG-compression. Normally the quality should be set to *Most* (100), so that the *data rate* mentioned below is observed.

Frames per second

Here you can specify the rate, in frames per second, at which a video clip should be recorded (25 PAL/SECAM, 30 NTSC). If you change this to a lower value, the motion will not be as smooth during playback.

Limit data rate

Here you can specify the data rate at which the video sequence will be recorded. If you do not limit the data rate, the quality settings will be used instead.

If the data rate is too high and exceeds the performance of the hard disk, the clip will not play back smooth. If the quality is too low, then the clip will deliver only limited picture quality.

Image Select *Image* from the pop-up menu.
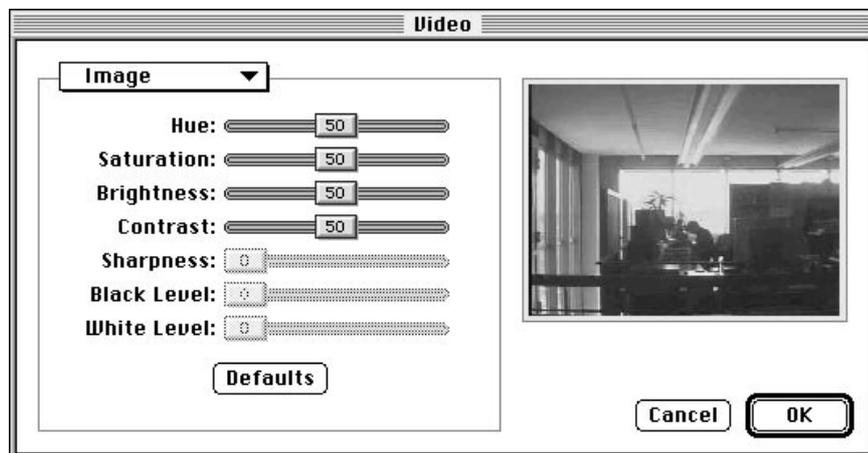
Here you can specify the color saturation, the brightness and the contrast.

Normally, you should leave the settings on the Adobe Premiere defaults: only then will the video output picture match the input signal. See also the "Tips & tricks" section.

Movie capture/recording settings

To speed work, it is advisable to record all clips belonging to the same project in the same size and also create the final result in this size.

```
┌───────────── Recording Settings ─────────────┐
│  ◉ Record at current size                      │
│  ○ Record at: [768  ] x [576  ]                │
│               ☒ constrain                       │
│  ☐ Post-Compress Video                         │
│  ☐ Record to RAM                                │
│  ☐ Abort on dropped frames                     │
│  ☒ Report dropped frames                       │
│  ☐ Conform movie to [ 25.00 fps ▼]             │
│  ☐ Decode burned-in timecode                   │
│  Audio Block Size: [ 1/2 Second  ▼]            │
│                                                 │
│              [ Cancel ]  [  OK  ]              │
└─────────────────────────────────────────────┘
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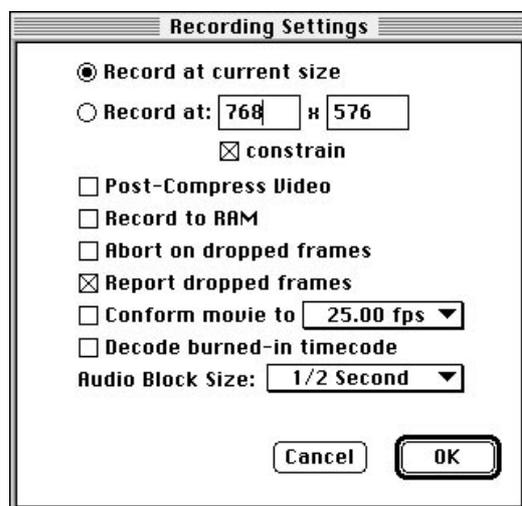
When you select the menu item Movie Capture / Recording Settings, you have the following possibilities for selection:

Record at current size
The video clip will be recorded at the size of the recording window.

Record at
Here you can specify the size at which the clip should be recorded.
constrain
Normally, here you can fix the aspect ratio (width to height) to 4:3, which is the standard value for television sets.

Post-Compress Video
Deactivate this option, since the video clip was already compressed during recording.

Record to RAM
You should deactivate this option, since it offers no advantages with regard to speed and the RAM memory is often too small to store an entire clip.

Abort on dropped frames
Deactivate this option to prevent undesired interruptions in the recording.

Report dropped frames
Starts the Clip Analysis Tool, which shows how many frames were dropped during recording, upon completion of recording. See the "Tips & Tricks" section for more information.

THE miroMOTION DC20 CONTROL STRIP MODULE

As soon as the miroMOTION DC20 is installed, the miroMOTION DC20 control strip module appears automatically after the Macintosh computer is started. Using this module, you can specify additional settings for the miroMOTION DC20. The current settings are displayed.

Using the miroMOTION DC20 Control Strip

Move   You can move the module with the mouse when the option key is held down.

Resize

These two buttons let you resize the control strip.

miroMOTION DC20 Control

Play movies on video: all pictures processed by the miroMOTION DC20 that would normally appear on the Macintosh monitor are output via the video outputs on the miroMOTION DC20 to a connected television set and/or video recorder. A corresponding message appears in the window on the screen of the Macintosh monitor.

View movies on monitor: Outputting of video images / clips to the computer monitor.

NTSC: the set video output standard is NTSC, PAL: the set video output standard is PAL.

This setting applies for the output of video clips via the miroMOTION DC20 video outputs and for the generation of clips, e.g. with Adobe Premiere's *Make Movie* command. Movies can only be output in the standard in which they were generated/recorded.

The standard for the recording of clips is set separately in the *Video Input* dialog box.

If the miro driver has not been activated yet (e.g. by starting Adobe Premiere), then no settings can be made via the miroVIDEO DC20 control strip module.

IMAGE QUALITY

The image quality of videos recorded or processed using the miroMOTION DC20 depends on the resolution, the data rate, the image noise and the type of video material used.

Resolution The miroMOTION DC20 can function at a maximum NTSC resolution of 640 x 480. At data rates of less than 2MB/s, it often makes sense to use a lower resolution, e.g., 320x240 (quarter-screen), 640x240 (half vertical) or 320x480 (half horizontal). While this does result in decreased sharpness of detail, at the same time, there is a considerable reduction in the image interference produced by the MJPEG compression, meaning better overall quality.

Data rate The higher the data rate, the less compression is required, which leads directly to improved image quality. The data rate should not exceed the maximum data rate of the hard disk, otherwise the playback will not be smooth—dropped frames.

Material At a fixed data rate and resolution, the fewer the fine details/sharp contours in the image, the higher the image quality will be. Take this into account when processing movies, e.g., by softening the hard edges of text with the use of appropriate filters.

Noise Image noise interferes a great deal with MJPEG compression. It leads to a considerable increase in compression interference and/or very high data rates are required for good image quality. So always make sure to use material with a minimum of noise.

HARD DISK

Since approx. 1 - 1.5 MBytes of *compressed data* is generated when recording video clips in medium quality, an appropriate fast hard disk is a necessity.

Size You should figure on two minutes of new footage per minute of finished video footage: this equals a data amount—depending on quality—of approx. 200 MBytes. This is joined by the quantity of data for the sound: one second of monaural sound in acceptable quality still means 22 KBytes (44 KBytes for stereo) of data.

Speed The hard disk must be fast enough to store data at the desired rate during video capture and be capable of reading data for video playback. To be on the safe side, the measurable maximum data rate of the hard disk should be twice the desired video data rate. The mean access time (in ms) of the hard disk, on the other hand, is less important when it comes to video processing.

FAST SCSI hard disks are very fast and thus ideal for highest quality video. Only WIDE SCSI hard disks top FAST SCSI when it comes to speed.

"AV"	Standard hard disks have the disadvantage for video recording that, due to their automatic internal calibration, the continual data flow occasionally has to be interrupted. The miroMOTION DC20 software is only partially able to compensate for this by using the main memory as buffer. Look for the designation "AV"; hard disks with this designation do not interrupt the data flow.
One hard disk	If only one hard disk is available for recording video clips, then partitioning the hard disk can make the procedure easier. In this case, one partition should be used exclusively for digital video.
Several hard disks	If there are several hard disks installed in your computer, then always use the fastest disk (if possible, exclusively) for recording digital video.
Preparing the hard disk	Repeated creation / modification/ deletion of files causes hard disk fragmentation, which degrades playback. So before recording videos, you should defragment you hard disk using a suitable utility.

Following postprocessing of all digitized clips, you should defragment the hard drive prior to playback in order to ensure maximum playback performance. |
| **Reserved hard disk/ partition** | If you have reserved a hard disk or a hard disk partition exclusively for digitizing video clips, then you do not need to defragment the hard disk/partition before the next digitization. In this case, it may be enough to delete those clips already recorded. |

MAIN MEMORY (RAM)

The more main memory you have the more convenient the miroMOTION DC20 is to use: To be able to use Adobe Premiere effectively, you need at least 16 Mbytes.

For working with videos at full resolution, we recommend a configuration with at least 24 Mbytes of main memory.

Working with 16 Mbytes of main memory	If you have 16 MBytes of memory, then you should reduce the memory requirements for Premiere so that at least 1.5 MBytes of memory remain for QuickTime and the miroMOTION DC20 drivers. To do this, click on Premiere, select *Get Info...* from the File menu in the Finder and reduce the amount of memory allocated to Premiere.

MISCELLANEOUS

Setting the color depth

For playback of digitized videos on the computer monitor and for the preview, the color depth (number of colors displayed) should be optimized.

The miroMOTION DC20 optimally transfers the data without additional processor overhead (for conversion to another color depth) in millions of colors. For this reason, set this color depth using *Sound and Displays* or *Monitors* control panel.

Changing the color depth setting affects only the display on the computer monitor; the signal at the video output is always with million of colors.

Closing Programs / Applications

If you are disappointed with the quality of a video during playback, this may be due to other programs / applications that are running at the same time.

For this reason, always close or deactivate all unnecessary programs / applications (e.g., AppleTalk, screensaver, menu bar clock, network connections, menu clock display in the date and time control panel etc.).

DIGITIZATION

General Information

It is impossible to give blanket recommendations regarding the optimal recording parameters (image resolution, data rate, sound) for specific types of video footage and specific computers. Try various possibilities and make your own decision on the basis of trial and error.

Format

Stick to one format (one resolution) per project. This goes both for video as well as for the bitmaps and animation used. This will save a lot of processor time during calculation of the film.

Frame Rate

For a smooth result, video should always be processed at the full frame rate, i.e., 25 fps for PAL and SECAM or 30 fps for NTSC. If the data rate exceeds the performance of the hard disk, then individual frames will be omitted or "dropped": this results in unsmooth motion.

For video **editing** in optimum quality, **no** frames should be dropped; for digital video that is intended solely for playback on a computer, individual dropped frames are not as important.

Digital video with sound

When capturing digital video clips with sound, keep in mind that sound also uses disk capacity:

- CD quality (44 kHz, 16-bit stereo) results in about 170 KB/sec,
- stereo quality (22 kHz, 16-bit stereo) in about 88 KB/sec, and
- mono quality (22 kHz, 8-bit mono) in 22 KB/sec.

The higher the sound quality, the less processing time and data rate remains for the images. The maximum quality (CD) is seldom required. The minimum quality (11kHz/8-bit mono), however, is often not sufficient. miro recommends: 22 kHz, 16-bit mono.

To create video clips with a high sound quality, it is recommended to digitize sound and video separately and to mix them afterwards using Adobe Premiere.

Since most "homemade" videos do not have hi-fi quality, capture the video clips in 22 kHz and 8-bit mono. Record the music you mix in later separately in higher quality with 44 kHz, 16-bit stereo, then produce the film in 44 kHz and 16-bit stereo.

To interleave video and sound with Adobe Premiere, select *Every* and *1/2 sec* before saving.

VIDEO EDITING

When using Adobe Premiere, you will see the video in preview quality, meaning that it may look unsmooth. You will obtain smooth video once you have saved the processed clip with "Make Movie" and it is available as a finished movie and printed to video.

Text and computer-generated graphics

When you edit digitized video clips and you want to paste text into the video clip, make sure to prepare the text and/or graphics.

Text and graphics have very sharp contours. Sharp contours when being compressed supply high frequencies that may be lost during the JPEG compression. If a JPEG-compressed video clip containing pasted text is output as an analog signal, the quality of the text is often insufficient.

To avoid this, anti-alias the text using a suitable image editing software before pasting the text into a video clip.

JPEG EFFECTS

When compressing with the JPEG algorithm two kinds of effects may occur:

- Checkerboard pattern at sharp color transitions and edges (bright/dark)
- Irregular color distribution instead of smooth color shades

Sharp color transitions and edges.

The JPEG image data compression divides a video image into blocks of 8 x 8 pixels for the Y information (or 8 x 16 pixels for the UV information). The Discrete Cosine Transformation converts each of these blocks (Y, U, and V) into frequency coefficients. After the DCT sharp color transitions and edges have high-frequency portions. During the quantization the data are reduced by displaying the high-frequency portions with less precision. The lower the JPEG quality, the less precise are the high-frequency portions.

When the JPEG-compressed image is reconverted for the analog output, imprecisions occur. The lower the selected JPEG quality, the higher the imprecisions. These imprecisions cause incorrect brightness and color information in analog images. Since the reconversion is also done block by block (see above), the incorrect information stops at the block borders resulting in a flickering checkerboard-like image patterns.

Smooth shades

During the quantization data are also reduced by displaying the average brightness and color less precisely.

When reconverting a JPEG-compressed image, imprecisions occur, too. In analog images these imprecisions result in sharp color transitions in areas which had the same color and brightness or smooth shades before. The result is blocks of different color shades.

Computer monitors are especially sensitive to JPEG effects. When recording video to a VCR, these effects are partly eliminated. Thus, we recommend a complete digitizing, editing, and recording procedure to check the quality with a VCR.

miroMOTION DC20 AND ADOBE PREMIERE

When combining digitized video clips in Adobe Premiere, note the following to achieve optimal results.

Settings

To facilitate working with Premiere, project settings for Premiere projects and miroMOTION DC20 which cover the most important miroMOTION DC20 operating modes are provided.

When creating a new project, select the project setting which suits your footage best (format/resolution, cropping, video standard). If necessary, adapt the audio settings to your liking (menu *Project*, command *Output Options*).

If Adobe Premiere has been installed after miroMOTION DC20, you can install the preset files afterwards.

Same Size

Record all clips that belong to a given project in the same format (e.g., always half resolution, both fields, PAL). Moreover, always generate your finished movies in the same format. In this way, you avoid having Premiere carry out complicated mathematical operations to convert all clips to the same size before creating the final movie.

Output options Specify several settings for the creation of Premiere output movies by selecting the *Output Options* command.

Proceed as follows:

1. Specify *Output: as QuickTime movie*.

2. Adapt the resolution to the values of the video clip.

   For the resolution of the video clip, refer to the *Project* window.

   The output format (height and width) shall always have the same format as the video clips you use. If you have footage in different formats, always select the maximum height and width.

   ⬥ If you selected an output height of more than 288 (PAL, 240 NTSC), select *Field 2* for *Type*. For *288* (PAL, NTSC *240*) or lower select *Full Size Frame*.

   ⬥ If you have video clips in a project with a larger height than the selected one, select the *Half size options* command and the *Always Deinterlace* command in the *Clip* menu for these clips.

   ⬥ If you have footage in the *half horizontal* or *half vertical* resolution, disable the *4:3 Aspect Ratio* option.

3. Select the audio options.

   When capturing digital video clips with sound, keep in mind that sound also uses disk capacity:

   ⬥ CD quality (44 kHz, 16-bit stereo) results in about 170 KB/sec,

   ⬥ stereo quality (22 kHz, 16-bit stereo) in about 88 KB/sec, and

   ⬥ mono quality (22 kHz, 8-bit mono) in 22 KB/sec.

4. Turn off *Optimize stills*.

> The maximum quality (CD) is seldom required. The minimum quality (11 kHz/8-bit mono), however, is often not sufficient.

Compression options

1. To output the movie as video, select *miro DC20 MJPG* as *Compressor*. The color depth is automatically set.

    2. Set the highest quality (*Quality*).

3. Use the miroMOTION DC20 control strip to set the video standard to PAL or NTSC respectively.

4. Set the correct number of frames per second (NTSC = 30, PAL = 25).

5. Specify the data rate *(Data Rate)* for compressing the video clip.

   It is advantageous to use the same data rate used to capture the clip. Setting the data rate too low will result in a poor-quality video image, while setting the data rate too high (exceeding hard disk performance), will result in unsmooth motion.

Working with several video windows

When using Adobe Premiere please keep in mind that only one application can access the miroMOTION DC20 hardware and software.

If several video images are open, the video is played back in the active window.

Movie Analysis

The Movie Analysis Tool in Premiere shows whether frames were lost ("dropped") when a clip was recorded. Normally, in a PAL recording at 25 fps every frame in the movie should have a duration of 1/25th, in NTSC, accordingly, 1/30th. Not every frame that deviates duration means a frame was lost during recording: the first and last frames of a movie often deviate considerably in deviation, and deviant values sometimes occur due to rounding errors, e.g., 9/250th instead of 1/25th.

If, however, more than two frames have durations that deviate significantly from the normal duration, then frames were dropped and you should reduce the data rate setting.

Printing QuickTime Movies to Video

Movies that were not recorded using the miroMOTION DC20 or without the compressor parameter *miro DC20 MJPG*, cannot be printed **directly** to video. Corresponding settings in the control strip module or the "Print to Video" function have no effect in this case.

With the help of the miroMOTION DC20, however, you can print to video any QuickTime movie and any animation that you can load in Premiere. To do this, first create a new project, then load the movie and place it in the construction window, and use the *Make Movie* function with the compressor set to *miro DC20 MJPG* to create a version of the movie that can be printed to video.

Output without the miroMOTION DC20

Movies that have been recorded or compressed in MJPEG format using the miroMOTION DC20 can be played back only with the help of the DC20, i.e., they do not run on other Macintosh computers. To make these movies playable on any Macintosh on which QuickTime has been installed, you must select a software compression procedure, e.g., *Cinepak*, under *Make Movie*.

IN CASE OF TROUBLE

If you encounter trouble while installing and/or using the miroMOTION DC20

- refer to this User's Guide.
- read the release notes on the distribution disk
- check the cables.
- check the settings.
- If necessary, download the latest miro drivers from the miro BBS. See the release note on the distribution disk for instructions.

In case of trouble with Adobe Premiere

- refer to your Adobe Premiere User's Guide.
- Call the Adobe Premiere Hotline. You will find the telephone number in your Abode Premiere User's Guide.

Technical data

Bus	PCI bus
Memory	VRAM, SRAM
Processor	ZORAN ZR36050
Decoder	Philips VideoDecoder SAA 7110
Encoder	Philips VideoEncoderSAA 7187
Power supply	< 25 watts
Video inputs/ Video outputs	1 x combined composite video input/output (RCA; 1.0 Vss) 1 x S-Video input (Mini DIN; Y/C, 1.0 Vss/0.3 Vss) 1 x composite video output (RCA; 1.0 Vss) 1 x S-Video output (Mini DIN; Y/C, 1.0 Vss/0.3 Vss) inputs selected by software simultaneous output on both video outputs
System requirements	any MacOS compatible computer with a PowerPC processor (601 or higher) and a PCI expansion bus at least 16 MB memory sufficient free disk space QuickTime 2.1 or later System 7.5.2 or later
TV standards	PAL, NTSC, SECAM (input)
Video scan rate	14.75 MHz (NTSC 12.27)
Colors	16-bit RGB, 24-bit RGB internal color representation always YUV (24-bit RGB)
Settings	Brightness, contrast, saturation, color (NTSC) Image cropping Capture format Data rate Compression

miroMOTION DC20 HARDWARE CONFIGURATIONS

Depending on the operating mode, miroMOTION DC20 can be used in different configurations.

The following pages explain the different connections.

Make sure you always connect the inputs/outputs of the same type: Only connect an S-Video output to an S-Video input or a composite output to a composite input.

Digitizing with miroMOTION DC20

To use miroMOTION DC20 only for digitizing video clips, for example if you want to edit video clips as QuickTime video independently of miroMOTION DC20, make the following connections.

This diagram shows the connection of S-Video devices:
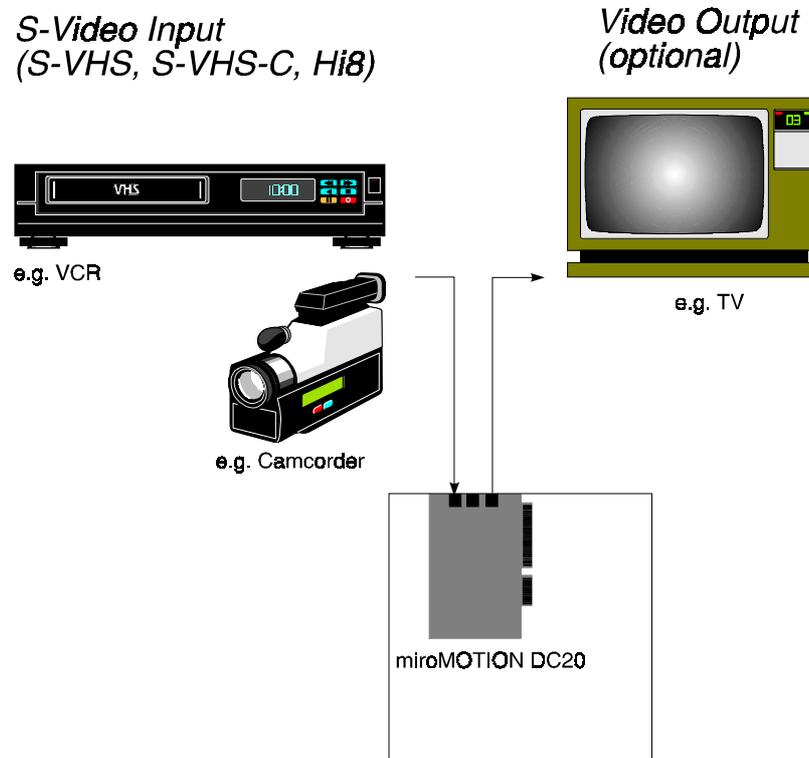
Digitizing with S-Video devices

The following diagram shows the connection of composite devices:

Composite Video Input
(VHS, VHS-C, Video 8)

Video Output
(optional)
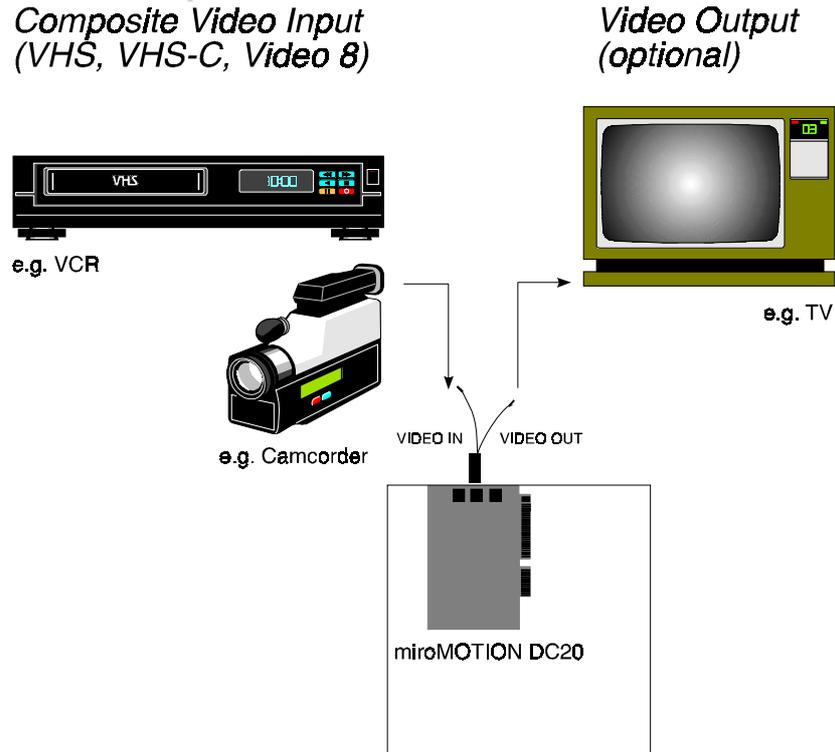
Digitizing with composite video devices

Connections The miroMOTION DC20 input (S-Video or composite) connects to a suitable video source, if desired, the miroMOTION DC20 output connects to a TV, if desired.

Function miroMOTION DC20 digitizes and compresses the input signal and saves the signal to the hard disk.

miroMOTION DC20 routes the output signal to the TV set.

During recording the video is displayed on the TV screen.

Digitizing with miroMOTION DC20 and recording with the VCR

To record digitized and edited video clips, the miroMOTION DC20 output signal is routed back to the VCR (this can be the **same** VCR which supplied the input signal).

The following diagram shows the connection of S-Video devices:
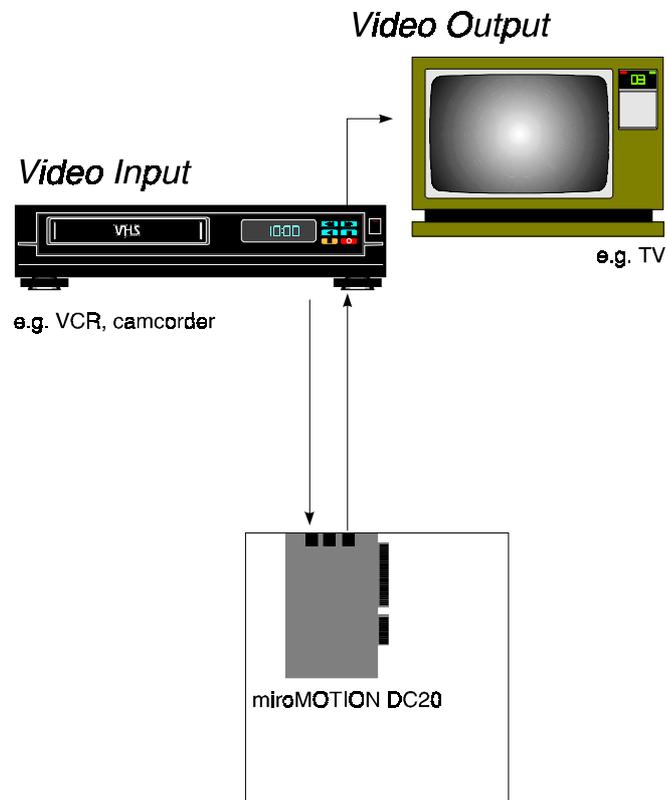
Digitizing and recording with S-Video devices

The following diagram shows the connection of composite video devices:
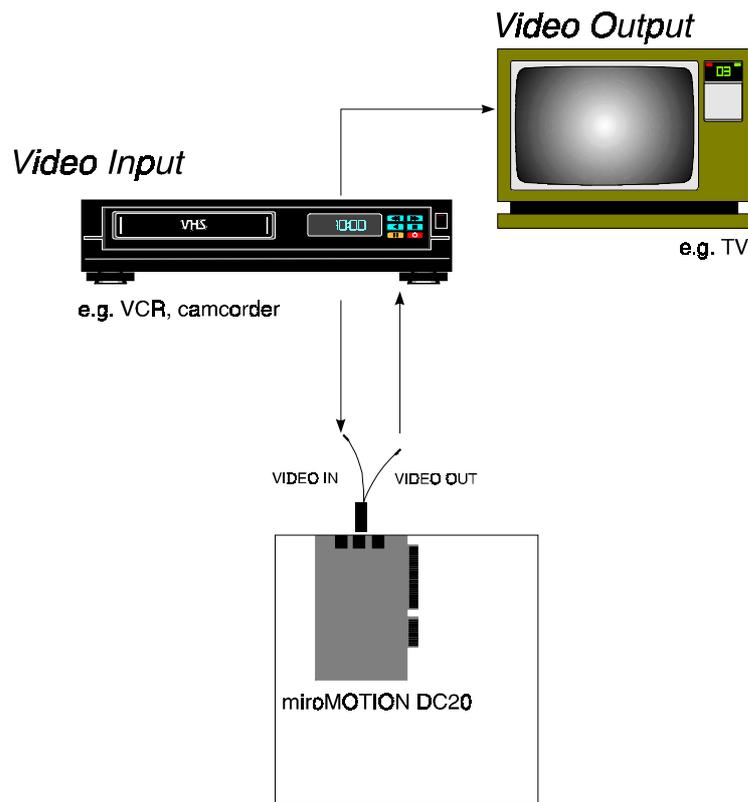
Digitizing and recording with composite video devices

Connections The miroMOTION DC20 video input and the miroMOTION DC20 video output connect to the same VCR. The second VCR output connects to a TV monitor.

Of course, you can also connect two VCRs. In this case, one VCR supplying the input signal connects to the miroMOTION DC20 input and one VCR which records video connects to the miroMOTION DC20 output.

The second VCR output can be the VCR's **SCART connector** or the **aerial output**. For these connections you need an adapter.

Function miroMOTION DC20 digitizes and compresses the input signal and saves the signal to the hard disk.

You can edit the video clips on the computer using suitable software. During editing the graphics card outputs a preview which the computer monitor or the TV monitor display.

miroMOTION DC20 outputs the final video to the VCR which then records the video.

The VCR outputs the recorded video clip to the TV screen.

IMAGE DATA COMPRESSION

What is JPEG Image Data Compression?

JPEG image data compression is a so-called "lossy" compression procedure, i.e. a portion of the original data is lost during compression.

JPEG data compression provides considerably higher compression factors than loss-free procedures. Loss-free compression procedures can only compress at a factor of 2-3, which is not sufficient for the compression of image data.

A total of 21 MB must be processed for one second of digitized PAL/SECAM video material.

The lower the compression factor during compression, the better the result.

How does JPEG Image Data Compression work?

JPEG data compression occurs in the following steps:

4:2:2 subsampling

The first step of JPEG data compression is the image conversion from the RGB format (e.g. computer image) to the YUV format. In this format Y contains the brightness information (luminance), U and V deliver the color information (chrominance).

Since the human eye can discern differences in brightness better than differences in color, the chrominance subsampling method (reduced scanning of color information) can be used to capture video. miroMOTION DC20 uses the 4:2:2 ratio where there are four bits for brightness information and two bits for color information: The U and V color information is used of every second pixel only .

A TV image *delivers YUV signals* so that no information is lost when digitizing video.

Discrete Cosine Transformation

Each TV image delivers one brightness signal and two color signals per pixel. The *DCT* (*Discreet Cosine Transformatio*n) converts these signals into a frequency coefficient containing the color and the brightness information.

Then the signals can be compressed more easily. The Discreet Cosine Transformation is the most computation-intensive step of the JPEG data compression. The DCT is lossless.

Quantization

By applying complex mathematical operations the quantization ensures that image parts which are important to the human eye are represented precisely and irrelevant information is represented with less precision.

Run Length Encoding

The Run Length Encoding (RLE) method makes use of the fact that many parts have the value "zero" after the DCT and the quantization operation have been applied. Instead of saving all "zeros" individually, "zero" is only saved once together with a counter, which states how often it occurs in succession.

Huffman Coding	The last step of image compression is the *Huffman Coding* method which makes use of the statistical properties of the data to be coded. This method evaluates how often and with what probability certain values occur. Values occurring seldom receive a long code, values occurring often receive a short code.
Playback	When playing back video the JPEG image compression steps occur in the reverse order.

miroMOTION DC20 and JPEG Image Data Compression

A standard NTSC TV image has 640 x 480 pixels, 24 bits of color depth per pixel and 29.97 frames per second resulting in 25 MB. A PAL TV image has 768 x 576 pixels, 24 bits of color depth per pixel and 25 fps resulting in 32 MB per second which have to be transferred to hard disk.
Saving long digital video clips would not be possible without video image data compression.

Software CODECs (**Co**mpressor/**Dec**ompressor) compress the image data without using miroMOTION DC20. Instead, it uses the computer's CPU. Image data compression does not allow recording video with the full image size and the complete number of images.

miroMOTION DC20 together with M-JPEG compression captures digital video clips in S-VHS quality. The JPEG image data compression is carried out by the integrated JPEG processor on the miroMOTION DC20.

GLOSSARY

Multimedia terminology contains computer and video terminology. The most important terms are defined in the following.

Cross references are marked with 📖.

AVI   Abbreviation for Audio Video Interleaved, standard format for digital video.

CD-ROM   CD-ROMs are mass storage media for digital data, such as 📖 digital video. CD-ROMs can only be read.

CODEC   Abbreviation for Compressor/Decompressor, compresses (packs) and decompresses (unpacks) image data.

There are different compression methods (📖 software CODECs and 📖 hardware CODECs).

Color depth   Number of bits delivering the color information for each pixel.

In the black-and-white operation 1-bit color depth means 2^1=2 colors. 8-bit color depth supply 2^8=256 colors, 24-bit color depth 16,777,216 (=2^{24}) colors.

Color palette   Number of colors the graphics system can generate.

Composite video   Composite video encodes all image information in one signal: Color information (chrominance), the image contents (the pixels the brightness of which differs, luminance), the blanking signal (for controlling the picture tube) and the synchronization signal.

Cropping   Technique for reducing the amount of data of digital video clips where invisible, irrelevant parts are cropped at the image margin.

Data rate   Data per second, e.g. amount of data which a mass storage medium (hard disk or CD-ROM) saves/plays back per second or the amount of data of a video clip per second.

DCT   Abbreviation for Discrete Cosine Transformation. Part of the 📖 JPEG image data compression: The brightness and color information is saved as frequency coefficient.

Digital video   Digital video stores information bit by bit in a file (in contrast to analog storage media).

Hardware CODEC   Compression method which creates compressed digital video clips. These video clips need special additional hardware to be recorded/played back and offer a better image quality than data compressed with software CODECs.

Hi-8   Improved version of the 📖 Video-8 system.

Huffman-Coding   Part of the 📖 JPEG image data compression. Values occurring seldom receive a long code, values occurring often receive a short code.

IDE   Also AT bus, common hard disk interface for PCs.

Image compression   Method to reduce the amount of data of digital image and video files.

Interlaced

Interlaced describes the refresh method which the PAL and other TV systems use: The TV image consists of two image halves of 312 1/2 lines each.

Irrelevance   Irrelevant (unimportant) information can be eliminated during the image data compression, since the human eye does not realize that this information is missing.

JPEG	Abbreviation for Joint Photographic Expert Group. Standard for the image compression.
Laserdisc	Medium which stores analog video. Information on laserdiscs can only be read, but not changed.
Motion-JPEG	Format for JPEG-compressed video clips.
MPEG	Abbreviation for Motion Pictures Experts Group. Standard for the compression of moving images.
Non-interlaced	Image refresh method, where the complete image is generated without skipping lines.
	A non-interlaced image flickers much less than an 📖 interlaced image.
NTSC	Abbreviation for Television System Committee.
	Color TV standard spread in the USA using 525 lines and 60 image fields per second.
PAL	Abbreviation for Phase Alternation Line.
	Color TV standard developed in Germany using 625 lines and 50 image fields per second.
Pixel	Abbreviation for *picture element*. Pixels are the smallest elements of a monitor image.
Quantization	Part of the 📖 JPEG image data compression. Relevant details are represented precisely, less relevant details for the human eye are represented with less precision.
Redundance	Redundant (superfluous) information can be eliminated during the image compression. During the decompression the images can be restored completely.
Run Length Encoding	The RLE = Run Length Encoding method is part of the 📖 JPEG compression. The "zero" values are not saved individually but with a counter, which states how often "zero" values occur in succession.
Resolution	The number of pixels (📖 pixels) which can be displayed on the monitor horizontally and vertically. The higher the resolution, the more details can be displayed.
RGB	Abbreviation for Red, Green and Blue, the basic colors of additive color mixing. RGB describes the method used in computer technology where image information is transferred by dividing it into the three basic colors.
Scaling	Adaptation to the desired image size.
SCSI	Abbreviation for Small Computers System Interface. The SCSI is used as hard disk interface for high-performance PCs because of its high 📖 data rate.
SECAM	Abbreviation for Sequential Couleur à Mémoire.
	Color television system developed on the basis of the 📖 NTSC system operating with 625 lines and 50 image halves per second.
Software CODEC	Compression method to compress digital video clips which can be played back without special hardware. The quality of these sequences depends on the performance of the complete system. VHS quality is not achieved.
Still-Video	Method where cameras digitally store photographs on floppy disks or in the computer memory.
S-VHS	Improved standard for home VCRs using S-Video signals to improve the color reproduction(📖 Y/C).

S-Video	With S-Video signals the brightness (luminance) and the color information are transferred separately (chrominance) (📖 Y/C).
VHS	Abbreviation for Video Home System.
	System commonly used for home VCRs to record and play back images and sound using a 1/2" tape. VH systems use 📖 composite signals consisting of brightness and color information.
Video-8	Video system using a 8 mm tape.
	Video 8 recorders generate a 📖 composite signal.
Video decoder	Converts analog signals into digital information.
Video encoder	Converts digital information into analog signals.
Video scan rate	Frequency with which the video signal is scanned.
	The higher the video scan rate the higher the image quality and the lesser the flicker.
Y/C	Y/C is a signal consisting of two components: Y = Brightness information, C = Color information.
YUV	Color model where Y delivers the brightness information and U and V the color information.

SUPPORT/SERVICE

Support

Via a worldwide network of branches and representatives, miro offers its customers the widest possible range of service and support resources. These run the gamut from national support hotlines and mailbox systems (BBS) to fax-back systems, to international forums such as Internet and CompuServe.

miro Support-BBS
Both Macintosh and PC users will find useful information on the various miro support bulletin board systems. The information ranges from technical data, tips and tricks to forms and drivers. Since all information on the miro support BBS is in 8-bit ASCII, it can be read by a wide variety of computer systems.

In general, please direct questions regarding miro products to your dealer. So that your dealer can answer all of your questions competently, please compile all the information pertaining to your hardware (expansion cards, address assignments, ...) and software configuration (memory manager, versions of the software used, ...) and provide your dealer with this information. To this end, please use the support questionnaire found on the installation disks.

Outside of Germany and overseas, please direct questions regarding miro products to your dealer, the distributor, or the local miro representative.

Service

Repairs
If you want to have a miro product repaired or recalibrated, please contact miro through your dealer.

Your dealer will then obtain from miro a repair number (RMA No.), which can be used to track the entire service process at miro at any time.

Warranty Certificate/ Description of Problem
Please always include proof of warranty (warranty certificate and purchase receipt with date and serial number) and a detailed description of the problem with the device. This simplifies matters for our service department and shortens processing time at miro.

The addresses, telephone numbers, hotline numbers, online times, etc. of all miro branches are contained in the release note on the installation disk.

miro Computer Products AG
Carl-Miele-Str. 4
D-38112 Braunschweig
Tel.:   (49) 0531/2113-100
Fax: (49) 0531/2113-99

SUPPORT QUESTIONNAIRE

Dear Customer:

In case of trouble, before calling or faxing the miro support hotline for help, please consult the manuals that came with your product, or ask your miro dealer.

If this still does not remedy the situation, please answer the following questions as completely as possible.

-

From:

Mr./Ms./Company: _____

Street.:   _____

Postal Code, City :   _____

Phone: _____

FAX :   _____

Hardware

Questions regarding hardware:

1. What model Macintosh do you own?

   Model designation: _____

   Serial number: _____

2. How much memory does the computer have?   _____Mbytes

3. What additional hardware is installed in the system?
   (e.g., accelerators, network and cache cards, hard disks, scanners)

   _____

   _____

   _____

Software

1. What operating system do you use?

   System 7.__   System __.__

2. Do you use cache memory (volume cache)? ☐ Yes ☐ No
   if yes, size of cache: _____ kbytes

3. Do you use virtual memory? ☐ Yes ☐ No
   If so, size of memory: _____ Mbytes

4. Which version of the miro installation disks do you use?
   (see label on the installation disks)
   Version: _____   Date: _____

5. Which version of QuickTime do you use?
   Version _____

6. What other drivers (aside from extensions of the operating system) are in
   the system extension?

   _____

   _____

   _____

7. Does the problem still occur even when the system extensions are
   deactivated?
   (To test this, please press the Shift key while starting your computer.)
   ☐ Yes ☐ No

8. On a separate page, please give a detailed description of your problem
   with regard to installation or use of the miroMOTION DC20. Please also
   tell us with what software and what version of the software the problem
   occurs.

Thank you very much for your cooperation in answering the questions!
Sincerely,

Your miro team
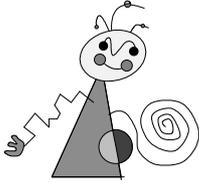
FCC Compliance Statement

FOR YOUR OWN SAFETY

NOTE: Shielded cables should be used for a composite interface. This is to ensure continued protection against radio frequency interference.

FCC WARNING STATEMENT

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAUTION

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Shielded interface cable must be used in order to comply with the emmission limits.

LABEL WARNING

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CE

KONFORMITÄTSERKLÄRUNG
DECLARATION OF CONFORMITY

Geräteart: Video-Board
Type of equipment: Video board

Produkt / Product : **miroMOTION DC20**

Das bezeichnete Produkt stimmt mit den Vorschriften folgender EU- Richtlinie(n) überein:
The aforementioned product complies with the following European Council Directive(s):

89/336/EWG   Richtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die
elektromagnetische Verträglichkeit
Council Directive 89/336/EEC on the approximation of the laws of the Member States to electromagnetic
compatibility.

Zur vollständigen Einhaltung dieser Richtlinie(n) wurden folgende Normen herangezogen:
To fully comply with this(these) Directive(s), the following standards have been used:

EN 55022   : 1987
EN 50082-1 : 1992

Dieser Erklärung liegt zugrunde: Prüfbericht(e) des EMV-Prüflabors
This certification is based on: Test report(s) generated by EMI-test laboratory

Aussteller / Holder of certificate :   **miro Computer Products AG**
Carl-Miele-Str. 4
D - 38112 Braunschweig

Braunschweig, 27.10.1995

(Ort / Place)   (Datum / Date)   Dr. Ulrich Schmidt, V.P. ENGINEERING

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