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IMPORTANT INFORMATION
for
mach32 Users

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ATI FlexDesk Driver

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1.0 Introduction

This new Mach32 Windows driver is faster than previously released drivers with an emphasis on stability. Extensive internal and beta testing have shown the driver to meet this target criteria.

In order to achieve the speed and stability the designers were targeting, the specifications for this new driver differ from the original Mach32 Windows driver in the following ways;

The proprietary Crystal Font feature that appeared in the original Mach32 driver have been removed. They were found to be incompatible with most graphic based software applications and cause significant performance degradation.

The extended 16 bit per pixel 664 and 655 modes were also removed. The new driver will only support 555 and 565.

The 8BPP non-palletized mode has been removed and as a result the 256 Dithering option is no longer required.

FlexDesk is a very advanced Windows driver. It supports the ATI *mach32* (68800) chipset with 512KB or more of memory. This driver supports 16, 256, 32768, 65536 and 16.7 million colors in resolutions of 640x480, 800x600, 1024x768 and 1280x1024 (depending on memory configuration).

The Windows Desktop (work area) can be larger than the physical screen. This feature is called DeskScape. This allows a large (up to 1280x1024) work area even on fixed frequency VGA monitors. The mouse is used to pan around on the desktop.

This driver also supports Multimedia Video Acceleration. This allows users to stretch small Video

for Windows images to partial or full screen for better visibility while maintaining smooth, realistic playback. ATI's Color Interpolation reduces pixel "blockiness" associated with stretched images. A color configuration control panel enables adjustment of the hue, brightness, saturation and contrast of multimedia video images for optimal quality.

VESA Display Power Management Signalling (DPMS) is supported, providing energy savings and extending the life of DPMS-compliant monitors.

The ATI Desktop requires that Windows be in 386 Enhanced Mode. The driver uses the best possible combination of Linear Frame Buffer and Accelerator in order to maximize performance. If the Linear Frame Buffer is not available, that feature is emulated. To use the *mach32* on a 286 based processor, or in Windows Standard Mode, use the supplied Microsoft VGA driver if your card has 1MB of memory, if your graphics card has 2MB you may also use the Microsoft supplied 8514/A driver.

The ATIKEY.EXE (with ATIKEY.DLL) application allows keyboard pan and zoom. This application is started by including it in either the WIN.INI load= line (load=atikey.exe) or your Startup Group (see your Windows documentation for details). When installed, you can change the keystrokes that will call up any of six functions (pan left, right, up or down and zoom in and out), by using the DeskScape button.

2.0 Feature Summary

FlexDesk is very feature rich. This section summarizes the features that are in the current driver:

Multiple Pixel Depths
16, 256, 32K, 65K and 16.7M color support.

Multiple Resolutions
640x480, 800x600, 1024x768 and 1280x1024.

DeskScape
Desktop Size can be different from the Screen Size, allowing panning over the Windows workspace.

Keyboard Pan and Zoom
Keyboard control over the DeskScape panning, and keystrokes to zoom in and out of the image.

Control Panel
Easy to use Windows application controls resolution, color, font, desktop size, video color controls and power savings from a single driver.

Multiple Font Sizes
Small Font (96 ldpi), Large Font (120 ldpi) and DTP (Desktop Publishing 128 ldpi) support is provided.

Linear Frame Buffer
FlexDesk can exploit the Linear Frame Buffer feature of the *mach32* for greater performance.

Multimedia Video Acceleration

Video for Windows images can be enlarged to a more usable size while maintaining smooth, realistic motion. This makes the *mach32* "video-ready"; ready to accelerate applications incorporating videos based on Microsoft's Video for Windows (.AVI) file format.

Video Color Configuration Control Panel

Special control panel allows users to adjust the hue, brightness, saturation and contrast of their Video for Windows images for maximum viewing quality.

Color Interpolation

The FlexDesk driver reduces pixel "blockiness" of stretched Video for Windows images for more realistic playback quality. (This feature is only supported on more recent versions of ATI's *mach32* products. Support is indicated when the horizontal and vertical color interpolation buttons are displayed in the VIDEO portion of the FlexDesk Control Panel).

3.0 Operational Requirements and Optimal Settings

a) The ATI Desktop requires an ATI 68800 (*mach32*) based video controller. The driver is designed to work with Windows 3.1.
b) A minimum of 512KB of Video Memory is required for ATI FlexDesk operation.
c) Video Memory Required for various graphics resolutions and color depth combinations:

	16 color	**256 color**	**65K color**	**16.7M color**
640x480	512K	512KB	1MB	1MB
800x600	512K	512KB	1MB*	2MB
1024x768	512K	1MB	2MB	---
1280x1024	1MB	2MB	---	---

- 1MB @ 56Hz, else 2MB required

FlexDesk uses Video Memory for Character and Bitmap caching, so more memory will result in greater performance. The above table shows the minimum memory needed to run the given mode.
65K color and 16.7M color modes require either (1) that the Memory Aperture be enabled, or (2) if the Memory Aperture is disabled, the VGA is enabled. This means that 65K and 16.7M color modes are not available if the Memory Aperture is disabled, and the VGA is disabled (this can be done on a some mach32 cards).
For unsupported configurations, we recommend that you use the Microsoft 8514/A driver. When installing the 8514/A driver, ensure that the VGA Memory Size is set to 256K or greater. Do not set the VGA Memory Size to Shared, or DOS Boxes will not function correctly with the Microsoft 8514/A driver.

d) Multimedia Video Acceleration Requirements

ATI's Multimedia Video Acceleration (MVA) drivers require an ATI 68800 (mach32) based video controller. The VRAM based mach32 is preferred and achieves better video playback performance.

Modes Supporting Multimedia Video Acceleration

	640x480	800x600	1024x768	1280x1024**
4 bpp *	VRAM *m32* 512K/1,2MB DRAM *m32* 512K/1,2MB	VRAM *m32* 512K/1,2MB DRAM *m32* 512K/1,2MB	VRAM *m32* 1,2MB	VRAM *m32* 1,2MB
8bpp Palette Mgr. On	VRAM *m32* 512K/1,2MB DRAM *m32* 512K/1,2MB	VRAM *m32* 1,2MB DRAM *m32* 1,2MB	VRAM *m32* 1,2MB	VRAM *m32* 2MB
16 bpp (Recommended)	VRAM *m32* 1,2MB DRAM *m32* 1,2MB	VRAM *m32* 2MB	VRAM *m32* 2MB	N/A
24 bpp	Unaccelerated Playback	Unaccelerated Playback	N/A	N/A

VRAM *m32* = VRAM-based *mach32* product
DRAM *m32* = DRAM-based *mach32* product

Users may experience color degradation in 4bpp and 8bpp. 16bpp color mode is strongly. recommended.
***Playback performance is negatively impacted by increases in screen resolution.*

For optimal performance of video clips, the following settings are suggested for the ATI FlexDesk parameters:

Resolution - 640 x 480
Colors - 65,000 (16-bit)
Desktop - No effect
16 bpp RGB Mode - 5/6/5

e) Overview of Issues and Limitations for Multimedia Video Acceleration

While a great deal of effort has gone into providing you with the best possible acceleration capability for Video for Windows clips, the enormous data requirements of video place limitations on the playback capabilities of most PC's. The following document highlights the outstanding issues and limitations of the Multimedia Video Acceleration drivers, and is intended as a supplement to the Multimedia Video Acceleration User's Guide:

(i) Multimedia Video Acceleration is not supported under the following conditions:

a) On products other than ATI's *mach32*-based products
b) When using 24 bpp color mode.
c) For the Dram based products, in modes other than 640x480 (4, 8 & 16bpp) and 800x600

(4 & 8bpp).
d) When playing back RLE video images captured at sizes larger than 160x120.

(ii) The following conditions may cause less than optimal multimedia video playback performance:

a) CPU less than 486 (e.g. 386)
b) Dual monitor configurations
c) Having less than 8MB of system RAM
d) Having more than 12MB of system RAM (on ISA systems)
e) Inferior disk speed (e.g. playback from CD-ROM)
f) In general, playing back movies with a native image size larger than 160x120 will result in a lower frame rate. This is especially noticeable on slower computers.

(iii) Color interpolation (image smoothing) issues:

a) functions only under 16bpp color depth and only when the image is enlarged to 2x, 3x and 4x its original size (2x/3x/4x zoom is enabled by pressing the ctrl-2, ctrl-3 or ctrl-4 key combination after the video image is on your screen). Any adjustments (size changes) made to the image after you have selected 2x, 3x or 4x zoom will disable pixel interpolation).
b) pixel interpolation is not available with 1MB boards.
c) maximum screen resolution for pixel interpolation is 800x600..
d) enabling pixel interpolation will decrease playback performance slightly.
f) pixel interpolation is enabled through the Video Acceleration icon. For this release, users can experiment by selecting vertical, horizontal or both horizontal and vertical interpolation. The default mode is interpolation on for mach32 products supporting it.

(iv) The following issues related to color modes should be noted:

a) 4bpp color mode is typically not suited for video playback due to the high color requirements of video. You will notice significant image quality degradation when playing video in this mode.
b) 8bpp playback will experience color corruption when more than one video is being played back. This is not a limitation of the Multimedia Video Acceleration driver, but is a contention present in all 256 colour palletized drivers.
c) The following characteristics should be noted when playing movies in 8bpp display mode:

(i) When a movie is played (depending on the palette that it requires), it may affect the background color or other application that is in the background, (such as PaintBrush). The background color will be restored once the application program that plays the movie (e.g. Media Player) terminates, or you make the background application “active” by clicking on its window.
(ii) The application that is currently active will gain control of the display palette (i.e. look normal). In the above example, to bring back the “correct” palette for PaintBrush program, just click on its window.
(iii) When a movie is played in “Full Screen” mode (by using the “configure” option in

MediaPlayer program), the movie will be played at the lowest resolution which was set up by the *mach32* install program. This is usually 640x480 mode. In other display modes, “Full Screen” playback will be done in 320x240 display resolution. As a result, playing movies in 8bpp palletized mode will result in a lower frame rate.

****** ADVANCED USER SECTIONS ******

4.0 Installation and Sample WIN.INI/SYSTEM.INI Settings

Use the Microsoft SETUP utility to initially install the driver, and then use the FlexDesk Control Panel to make modifications to the setup. This section serves to document the various changes that are made to the SYSTEM.INI and WIN.INI files. For more information on the [Display] settings, see the Configuration section.

Modifications to WINDOWS\SYSTEM.INI. (Sample Only)

```
[boot]
386grabber=machw3.3gr
oemfonts.fon=8514oem.fon
fixedfon.fon=8514fix.fon
fonts.fon=8514sys.fon
display.drv=machw3.drv

[boot.description]
aspect=100,120,120
displayinf=OEMMACH.INF
display.drv= mach32 Driver

[386Enh]
display=machw3v.386
```

(the below sections will be modified if the MVA drivers are installed and will vary depending on the version of Video For Windows detected)

```
[Drivers]
VIDC.CVID=ativdacc.drv
VIDC.MSVC=ativdacc.drv
VIDC.IV31=ativdacc.drv
VIDC.MRLE=ativdacc.drv
VIDC.RT21=ativdacc.drv
VIDC.YVU9=ativdacc.drv
INDEO=indeo.drv
VIDEO1=msvidc.drv
ATIVIDEO=ativideo.drv
VIDC.RLE=ativdacc.drv
VIDC.ATI0=ativdacc.drv
VIDC.DIB=ativdacc.drv
VIDC.YV12=ativdacc.drv

[Installable Compressors]
vidc.rle=ativdacc.drv
```

```
[ATI Interceptor]
MSVC=msvidc.drv
RT21=indeo21.drv
RLE=atirle.drv
ATI0=atirle.drv
IV31=ir30.dll
CVID=iccvid.drv
MRLE=msrle.drv
YVU9=isvy.drv
YV12=atiyvu12.drv

[display]
Environment=Large Font
CRTYSIZE=768      (NOTE: optimal setting for multimedia video = 480)
CRTXSIZE=1024     (NOTE: optimal setting for multimedia video = 640)
DPMSFeature=1
dpi=120
y_resolution=768  (NOTE: optimal setting for multimedia video = 480)
x_resolution=1024 (NOTE: optimal setting for multimedia video = 640)
bpp=8             (NOTE: optimal setting for multimedia video = 16)
svgamode=106
Five6Five=1
Palettized=1
```

This sets the driver up for 1024x768, 8 bpp, 120 ldpi. To use other pixel depths and ldpi settings, change the settings as appropriate.

When changing ldpi, select the fonts and aspect ratio used:

	Large Font 120 ldpi	**DTP 128 ldpi**	**Small Font 96 ldpi**
[boot]			
oemfonts.fon=	8514oem.fon	8514oem.fon	vgaoem.fon
fixedfon.fon=	8514fix.fon	8514fix.fon	vgafix.fon
fonts.fon=	8514sys.fon	8514sys.fon	vgasys.fon
[boot.description]			
aspect=	100,120,120	100,128,128	100,96,96

5.0 Configuration Information

SYSTEM.INI [Display] Entries

The [Display] section of SYSTEM.INI has many switches which can be tailored to change FlexDesk. Most of the switches are alterable via the FlexDesk Control Panel, and this is the preferred way to change them. Editing the entries directly in SYSTEM.INI is not recommended. Should you experience any problems, reset the switches to the default settings.

Note: ON is represented by 1 and OFF is represented by 0 within the SYSTEM.INI [Display]

section.

BlockWrite Turn Block/Write feature on/off Generally, on some machines and memory configuration BlockWrite cannot be supported reliably.
Default: OFF [0] - Driver determined

PolyLine Tells system that driver supports line drawing. If off, GDI will simulate, but with high performance penalty.
Default: ON [1]

FontUseVCache Use offscreen memory for cache. If off, will force driver to not use off-screen memory for caching fonts.
Default: ON [1]

PslEngine Support extended PolyScanline output call.
Default: ON [1]

EngineOnly If turned on, all writes to screen is done using engine only, this actually slows down most operations, the net effect is that driver assumes memory aperture does not exist. (Effectively mach8 mode).
Default: OFF [0]

Circle This flag not currently used, reserved for future expansion
Default: OFF [0]

BslEngine Support BeginScanline extended Output function.
Default: ON [1]

DevBmp Device Bitmap - bitmap caching function
Default: OFF [0]

ScanLine Tells system that driver supports the Scanline call.
Default: ON [1]

BltEngine If off, every bit blit goes through RADICAL8.DLL (Which in turn uses the frame buffer.) Large performance penalty.
Default: ON [1]

ScanLREngine Supports ScanLR using engine or by aperture
Default: ON [1] - Driver Determined

Dib2DevEngine Dib2DevEngine is usually done by radical8.dll (aperture). Forcing it ON will slow down DIBS and non-MVA video playback.
Default: OFF [0]

StretchBlt Tells system driver supports StretchBlt.
Default: ON [1]

VAD Virtual Aperture flag. On VLB and PCI forces driver to use VGA 64K aperture.
Default: OFF [0]

TxtEngine Perform textout using engine mono-expansion blit. If 0, will draw text using RADICAL8.DLL.
Default: ON [1]

WIFE Windows International Font extensions
Default: OFF [0]

PixEngine Use engine to support Pixel Fcn.
Default: OFF [0] - Driver determined

OutEngine Use engine code to support output fcn. If set to 0, use aperture code only (ie: radical8.dll).
Default: ON [1]

PlgEngine Engine Polygon flag, if turned off, driver will not support polygon drawing in engine.
Default: ON [1] - Driver determined

VGADAC Program VGA DAC in synch with 8514/A DAC registers.
Default: OFF [0]

Five6Five Choose color weighting when PixelDepth=16 is active. The number is interpreted as the number of Red, Green and Blue bits. For instance, 565 allots 5 bits for Red, 6 bits for Green and 5 bits for Blue.
Default: ON [1] [565]

Environment	This switch is used by the FlexDesk Control Panel when restoring setting from FLX files. It is not used by the driver. To change this, use the FlexDesk Control Panel. Do not edit this manually.
Default	Small Fonts Valid options: Small Fonts| Large Fonts | DTP
BPP	Choose number of bits per pixel. 4 allows 16 colors, 8 allows 256 colors *and 16* allows 32768 (in 555 mode) or 65536 colors. 24 provides 16.7 million colors..
Default	8 Valid Options: 4 | 8 | 16 | 24
X_Resolution	Select Horizontal DeskScape size (Virtual screen mode). (Note: this must be set with the appropriate Y_Resolution value).
Default	640 Valid options 640 | 800 | 1024 | 1280
Y_Resolution	Select Vertical DeskScape size (Virtual screen size). (Note: this must be set with the appropriate X_Resolution value).
Default	480 Valid Options 480 | 600 | 768 | 1024
CRTXSIZE	Select Horizontal screen size. (Note: this must be set with the appropriate CRTYSIZE value).
Default	640 Valid options 640 | 800 | 1024 | 1280
CRTYSIZE	Select Vertical screen size. (Note: this must be set with the appropriate CRTXSIZE value).
Default	480 Valid options: 480 | 600 | 768 | 1024

6.0 Video Acceleration - Accessing Video Color Configuration Controls

Adjustments to the color, saturation, brightness and contrast of video images is allowed by moving the slider bar between 0 and 200 percent.

COLOR - This adjust s the amount of color in the video signal. When set low (0%) the picture will become black and white. As you increase the percentage, colors will start to saturate the test pattern. When 200% is selected, the colors are at maximum saturation.
(default setting is 100%)

BRIGHTNESS - This adjusts how light or dark the picture is. Set to lower values, the picture will become dark while higher values will tend to washout the picture, making it white.
(default setting is 100%)

CONTRAST - This adjusts how sharp the edges in the picture appear. Higher contrast settings

produce very sharp images, while lower contrasts produce a softer, almost fuzzy image. (default setting is 100%)

TINT - This adjusts the green and purple content of the picture. Lower values produce more green pictures, where higher settings create more purple. This control can be adjusted over a range from -180 to +180. (default setting is 0)

7.0 Operating Problem Detail

Windows for WorkGroup Network Drivers

If Windows for Work Groups 3.11 is configured to use the Microsoft provided network drivers, the initial desktop image will appear with vertical bars in the top 1/8 of the screen. To remove the bars, refresh the screen by maximizing any Window.

DOS box screen corruption

If opening a box causes vertical bars in the top 1/8 of the screen, use the PIF editor to modify the DOS box or DOS application settings to Video Memory - High Graphics.

Microsoft Visual C++ V1.0

Compiling a C program may result in lines appearing on screen.

Rotating objects in ChemWindows Ver 2.1

Selecting FREE ROTATE and attempting to rotate an object will result in a CW2 error. The application should be closed after this error occurs.

Scrolling in Word 6.0

Scrolling through a document in Word 6.0 may result in partial characters being left blow the tab and margin bar. Refreshing the screen by maximizing or minimizing the window will remove the characters.

Corel Show 3.0

Slides containing graphs may display with corruption.

WINRIX and TIFF images

TIFF images viewed under WINrix will be displayed with blue-green distortion.

Opening a PaintBrush file hangs the system.

PaintBrush files (.BMP), which are saved with high color and/or resolutions, may exceed memory availability. The memory available is dependent on you system hardware (i.e. RAM, swapfiles etc.) and the Mach32 driver configuration. It is generally recommended that bitmaps created or viewed using PaintBrush should not exceed 2MB in size.

Palletized Applications

Some applications will only display correctly when in a palletized (8BPP), 256 colour mode. You may experience incorrect coloring or other failures will occur in 15 bpp and higher color depths. Examples of such applications are: MS Dinosaurs and Sorcery from Intermission 3.0.

WinBench 3.11 produces lower results, after playing a video.

When the ATI Video drivers are installed, if you play a video then run WinBench 3.11. you will find that the results are lower. This drop-off in performance is due to the inability of the Mach driver to use any off-screen memory. All off-screen memory has been reserved by the video driver to ensure good video performance. To receive an realistic WinBench 3.11 result, we would recommend exiting and restarting Windows after playing a video.

Images are not saved correctly (i.e. wrong colors) in PaintBrush when using 4bpp (16 color).

For performance reasons, our driver in 4 bpp (16 color) mode actually informs Windows that we are an 8bpp (256 color) driver. As a result, some applications will exhibit color translation problems. We recommend using the Mach32 driver in 8bpp (256 color) mode until this is corrected in a future driver release.

Windows screen colors change after changing color depths:

Color changes may not be preserved across different Bits Per Pixel (BPP). To resolve this problem, open Windows Control panel, select the Color icon and change the color scheme. Another alternative is to remove the [colors] section in the WIN.INI to always use Windows default color scheme. The default color scheme is always consistent with any changes in BPP.

Intermittent GPFs occur when using multimedia and graphic applications:

Windows 3.1 allows using device bitmaps to enhance performance of display drivers. However, some applications may experience problems with our bitmap function causing drawing errors or GPFs. QuickTime for Windows, and applications which use the QuickTime runtime can cause a “Viewer caused a GPF in module GDI.EXE at 0001:0F6A” message. Applications using Quicktime, include The Journeyman Project by Quadra Interactive and Myst by Broderbund.

Macromedia Action causes a GPF at the same address as QuickTime for Windows.
Adobe Illustrator. On opening this application, you will receive the message “Illustrator caused a General Protection Fault in module ADOBEVUE.DLL at 0006:3B52.” Adobe’s direct manipulation of memory bitmaps is incompatible with ATI’s device bitmap implementation.
MS PowerPoint 3.O may experience GPFs starting when the driver configured for 24 bpp, if Device Bitmap is set to on. If you are running applications that have unexplained problems, ensure that Device Bitmap is set to OFF(default):

```
(in System.ini)
[Display]
DevBmp=0
```

Note: This section is intended for Application Developers:

When an application creates a compatible or discardable bitmap, Windows will ask the FlexDesk Windows Driver to create the bitmap (this can be suppressed if DeviceBitmap=off is specified in the [Display] section of SYSTEM.INI). When Windows does this, the driver "owns" the bitmap. The only legal means to get data into and out of the bitmap are those documented in the Windows SDK.

There will be problems if an application uses undocumented features to directly manipulate the bits in one of these bitmaps, because we CANNOT make our format identical to Windows'.

To avoid this problem, applications which intend to directly manipulate bitmaps should use

CreateBitmap or CreateBitmapIndirect (instead of CreateCompatibleBitmap or CreateDiscardableBitmap).

Low DOS Memory with Windows for Workgroups 3.11:

Each windows application requires at least 512 bytes of DOS memory to run. If you have problems launching windows apps after upgrading from Windows 3.1, try removing the following lines from config.sys :

```
DEVICE=SMARTDRV.EXE [flags]
DEVICE=IFSHLP.SYS
```

They are installed by Windows for Workgroup 3.11 to speed up disk access, but require a big chunk of DOS memory to run.

Printing Problems:

The ATI driver may make printing problems visible that were not present with generic Microsoft drivers because of the additional resources used by the ATI drivers. To minimize the impact we would recommend updating the printer's drivers regularly to ensure you are using the most current version. We would also recommend freeing up as much Windows resources as possible. This includes, increasing Windows' swap file size, increasing conventional memory available and reduce the number of applications active while printing.