Contents

1.0   Introduction

This is Version 2.0 of the FlexDesk Windows Driver.

FlexDesk is a very advanced Windows Driver. It supports the ATI mach32 (68800) chipset with 1MB or more of memory. 16, 256, 32768, 65536 and 16.7 million color modes are supported in resolutions of 640x480, 800x600, 1024x768 and 1280x1024.

The ATI Crystal Fonts feature has been integrated. Also included is the ATIKEY utility which allows keyboard panning and zooming of the desktop.

The Windows Desktop (work area) can be larger than the physical screen. This feature is called Virtual Desktop. 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.

Full palette manager functions are supported in 8 bpp modes. A more unusual feature is that the drivers palette manager can be disabled for an additional 3/3/2 color mode.

FlexDesk will only work with Windows 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 8514/A driver.

ATIKEY

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 FlexDesk Control Panel.

1.1   Feature Summary

FlexDesk is very feature rich. This table 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.

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

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

Control Panel
        Easy to use Windows application control most driver features.

Crystal Fonts
        Support for anti-aliased ATI Crystal Font technology to permit accurate screens
        for Desktop Publishing.

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.

Palette Manager
        FlexDesk has the ability to optionally disable the 8 bpp palette manager, for an
        additional fixed color mode. When enabled, full palette control is provided to
        applications in 8 bpp (256 color).

Field Configurable
        In case bugs are found in the driver, major sections can be enabled or disabled
        to provide a customer work-around until a real solution can be found. This
        provides a safety net for users.

1.2   Reporting Bugs

When reporting problems with this driver, please reference the driver build number. When in doubt about the build number, call up the FlexDesk Control Panel, and select About... in the Pull-down menu. If the Control Panel does not indicate the version number (NA), then

(a)   You may not be running the FlexDesk driver. Check that one of the MACH-??.DRV files is referenced in SYSTEM.INI.

(b)   Your bug may be preventing the Control Panel from reading the driver build number. Try restarting Windows, and if this does not remedy the problem, report the Date, Time and Size of the driver (MACH.DRV file).

(c)   You may be using BitStream Facelift 2.0. If you are using this Typeface Manager, report the Date, Time and Size of the driver (MACH.DRV file).

2.0   Files

These are the files which ATI has modified. All other files are from the standard Microsoft Windows 3.1 distribution. WIFEMAN.DLL is a standard Microsoft file, but is included in this list because it is not normally distributed with North American Windows releases. You may not have all of these files, because some are supplied only with Crystal Fonts, Video, DeskScan or other special features. File gsfonts.lzh is optional because Crystal fonts will run without it (using TrueType fonts).

mach.drv	main driver
machvdd.386	virtual display driver
mach.3gr	grabber
mach.386	non-display virtual driver
mxxpanel.exe	flexdesk control panel
mxxpanel.hlp	help for flexdesk control panel
atikey.exe	keyboard control
atikey.dll	keyboard control
oemm32.inf	win 3.1 installation
wifeman.dll	windows international font extensions module
lharc.exe	archive utility for gsfonts.lzh
mach-40.drv	4 bpp color resource, 120 ldpi front-end
mach-46.drv	4 bpp color resource, 96 ldpi front-end
mach-48.drv	4 bpp color resource, 128 ldpi front-end
mach-80.drv	8 bpp color resource, 120 ldpi front-end
mach-86.drv	8 bpp color resource, 96 ldpi front-end
mach-88.drv	8 bpp color resource, 128 ldpi front-end
mach-30.drv	8 bpp 332 color resource, 120 ldpi front-end
mach-36.drv	8 bpp 332 color resource, 96 ldpi front-end
mach-38.drv	8 bpp 332 color resource, 128 ldpi front-end
mach-h0.drv	16/24 bpp color resource, 120 ldpi front-end
mach-h6.drv	16/24 bpp color resource, 96 ldpi front-end
mach-h8.drv	16/24 bpp color resource, 128 ldpi front-end
mach-i0.drv	16/24 bpp color resource, 120 ldpi front-end
mach-i6.drv	16/24 bpp color resource, 96 ldpi front-end
mach-i8.drv	16/24 bpp color resource, 128 ldpi front-end
mach-g0.drv	8 bpp crystal font color, 120 ldpi front-end
mach-g6.drv	8 bpp crystal font color, 96 ldpi front-end
mach-g8.drv	8 bpp crystal font color, 128 ldpi front-end
gsfonts.lzh	crystal fonts

The following files are from Microsoft Window 3.1 distribution.

```
8514oem.fon    8514sys.fon    8514fix.fon
vgaoem.fon     vgasys.fon     vgafix.fon
cga40850.fon   cga40woa.fon   cga80850.fon   cga80woa.fon
ega40850.fon   ega40woa.fon   ega80850.fon   ega80woa.fon
dosapp.fon
modern.fon     roman.fon      script.fon
coure.fon      courf.fon
serife.fon     seriff.fon
smalle.fon     smallf.fon
sserife.fon    sseriff.fon
symbole.fon    symbolf.fon
vgacolor.2gr
```

The Crystal Fonts feature can use Windows 3.1 TrueType fonts and ATI GSF format fonts. The GSF format is required under Windows 3.0, which does not support TrueType. To use GSF fonts requires that the Crystal Fonts be placed in a directory. The Crystal Fonts are in an archive to save space. Set the environment variable GSFONTS to the directory the fonts are in prior to running the driver.

gsfonts.lzh:

```
gsfonts.ini
system04.pfm   system05.pfm   system06.pfm   system07.pfm
font3004.gsf   font3004.pfm
font3005.gsf   font3005.pfm
font3006.gsf   font3006.pfm
font3007.gsf   font3007.pfm
font3104.pfm   font3105.pfm   font3106.pfm   font3107.pfm
```

3.0   Requirements

FlexDesk requires an ATI 68800 (mach32) based video controller. The driver is designed to work with Windows 3.1.

A minimum of 512KB of Video Memory is required for FlexDesk operation.

Video Memory Required:

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

* 1MB @ 56Hz, else 2MB required

FlexDesk uses Video Memory for Character and Bitmap cacheing, so more memory will result in greater performance. The above table is the minimum memory needed to run the given mode.

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.

To use the Video Acceleration driver features, the mach32 Memory Aperture feature must be enabled. The Video acceleration features will not run without the Aperture. Also, the Video Acceleration features are only available under Windows 3.1.

4.0   Installation

Manual installation of the FlexDesk driver is not recommended. 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 [Mach] settings, see the Configuration section.

Copy all files EXCEPT

        mxxpanel.exe   mxxpanel.hlp   atikey.exe   atikey.dll

to the WINDOWS\SYSTEM directory. Copy the listed files files to the WINDOWS directory.

Modify WINDOWS\SYSTEM.INI.

        [boot]
        386grabber=mach.3gr
        oemfonts.fon=8514oem.fon
        fixedfon.fon=8514fix.fon
        fonts.fon=8514sys.fon
        display.drv=mach-80.drv

        [boot.description]
        aspect=100,120,120
        display.drv=ATI FlexDesk Driver

        [386Enh]
        display=machvdd.386
        device=mach.386

Add a section to WINDOWS\WIN.INI.

        [Mach]
        PixelDepth=8
        DesktopSize=1024
        ScreenSize=1024

This sets the driver up for 1024x768, 8 bpp, 120 ldpi. To use other pixel depths and ldpi settings, change the settings as appropriate. Select the [boot] display.drv from this table:

	4 bpp no palette	8 bpp palette	8 bpp crystal	8 bpp	16 bpp/ 24 bpp
96 ldpi	MACH-46.DRV	MACH-36.DRV	MACH-86.DRV	MACH-G6.DRV	MACH-H6.DRV
120 ldpi	MACH-40.DRV	MACH-30.DRV	MACH-80.DRV	MACH-G0.DRV	MACH-H0.DRV
128 ldpi	MACH-48.DRV	MACH-38.DRV	MACH-88.DRV	MACH-G8.DRV	MACH-H8.DRV

MACH-I6.DRV, MACH-I0.DRV and MACH-I8.DRV are equivalent to MACH-H6.DRV, MACH-H0.DRV and MACH-H8.DRV. Two sets are used to allow the control panel to force a driver name change when the 65K color mode is changed via the FlexDesk Control Panel. If the driver name is not changed, icon colors will be incorrect.

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

Each of the shell drivers (MACH-??.DRV) has suggested Windows default colors. In order to make use of these colors, you can delete the entries in the WIN.INI [colors] section. This will prevent inadvertantly selecting colors that make the menu entries disappear.

To Activate the ATIKEY feature, modify the WIN.INI [windows] section, adding the atikey.exe utility to the load line:

```
[windows]
load=atikey.exe
```

5.0   Problems

DOS Boxes

Modes 14, 16 and 18 cannot be entered while in a DOS Window. This causes failure of the Microsoft HCT test procedure. When in DOS Full Screen, this is not a problem. If you see garbage lines on the Windows screen after starting a Dos Box, try setting "High Graphics" in the PIF file.

Excessive dithering and incorrect colors in 8 bpp PaletteManager=off

When running in 8 bpp non palette manager mode, the available colors are very different from thos found in the fixed palette of the VGA. This is because the 3/3/2 palette (3 bits of red, 3 of green and 2 of blue) does not have exact matches for the standard VGA colors. This can result in dithering in many places where it is unattractive. This can be partially avoided by setting new desktop color settings for this palette that use exact match colors. There are several good reasons to leave this mode in:

1 -   256 non dithered colors to choose from.
2 -   Fast, very good dithering
3 -   Fast, somewhat accurate translation of true color dibs. This allows the use of true color files as wallpaper without palette translation.
4 -   Good image quality without the slow annoying redraws when displaying multiple 256 color images.

15 bpp DCT ROP Failure

It is not possible to run the driver as a 15 bpp driver. FlexDesk actually reports that it is a 16 bpp driver. The driver fails to include the 16th bit in logical operations causing the DCT to report half of the ROPs as having failed. The ROPs are actually correct, but the DCT cannot determine this. The fault lies in a MS-Windows problem resulting in resource corruption when the driver claims that it is a 15 bpp driver. Windows has no provisions for such a "un-packed" mode. Our VGA 15 bpp driver has work-around code for this, which will slow down Blits. This is undesirable due to the Video Integration in the FlexDesk driver. We want the driver to run in 12 to 16 bpp modes, to allow for multiple video streams. All these mode declare that they are 16 bpp to Windows. The only modes that pass DCT are true 16 bpp modes.

GDI DCT Color Tests

There are some variances in the MS DTA Brush Color Tests between the display and the Smart Prompting Box. These are the same as will occur with the MS VGA driver.

Changing Pixel Depth and Colors

When changing pixel depths and PaletteManager mode, there may be inappropriate color choices made (especially when using Windows Standard Colors). This can manifest in Clock when updating the time, and in Menu items not being highlighted. To fix this, delete the color entries from the WIN.INI [Colors] section. Windows will re-read the suggested colors from the driver, and the problem will be resolved. You can also use the Windows Control Panel to adjust your system colors.

BitStream Facelift 2.0

The BitStream Facelift 2.0 Typeface Manager is not fully compatible with Windows 3.1. It works as an "interception" between Windows and the Display driver, and does not pass all information through to the driver. To use Facelift with the FlexDesk driver, edit your WIN.INI [Mach] section, modifying or adding the line:

    DeviceBitmap=off

Also, modify your SYSTEM.INI [boot] section:

    display.org=mach.drv

The FlexDesk Control Panel will not correctly display the driver version, and it will claim that the FlexDesk driver has not been loaded. The Control Panel can be used to change driver resolution, but changing font size (Small/Large/DTP) will not work. Also, after changing color depth, the desktop colors may need adjustment using the Windows Control Panel Colors utility.

To use other than Large Font mode (120 ldpi), you will have to manually modify the SYSTEM.INI file. Select the correct MACH-??.DRV file from the section on manual installation, and alter the "display.org=" line. Remember to update the [boot] and [boot.description] sections to reflect the new ldpi (96, 120 or 128).

WINRIX

There are problems when using WinRix from RIX Softworks Inc. with the FlexDesk driver. This can result in stripped garbage appearing on the screen when this product is used in 256 or 65,536 color modes. We are working with RIX Softworks to remedy this problem.

386MAX

If using the FlexDesk driver with the Aperture disabled (virtual aperture mode) on a system running Qualitas 386MAX, the 386MAX.PRO file must be modified to remove the "VGASWAP" flag. The VGA area is used to provide aperture services by the driver, and thus cannot be moved by 386MAX.

WorkGroup for Windows

Microsoft WorkGroup for Windows will not install if the FlexDesk driver is active. Select the VGA driver prior to installing this product, and then reselect the FlexDesk driver after the installation is complete.

Video Overlay Boards

A switch has been added VGADAC=on (off). When set to off, only the 8514/A DAC registers are set. Some Video Overlay boards will require this switch to be set on, because they do "DAC snooping" to show correct colors.

AfterDark and 24BPP

The aquarium screen saver in AfterDark (Berkley) may chop fish when FlexDesk is in 24BPP

mode.

Ventura Publisher

You may experience General Protection Faults when running Ventura Publisher for Windows in 16BPP (65,000 color) modes. Try 8BPP (256 color) color modes instead.

Adobe Illustrator

You may experience General Protection Faults when running Adobe Illustrator. We are working with Adobe to remedy this problem. As a work-around, set the WIN.INI [Mach] DeviceBitmap=off.

Microsoft Excel

You may run out of system resources when running very large spreadsheets or when running in 65,000 color modes. We suggest running Excel at 256 color mode as a work-around.

Lotus AMI Pro 3.0

This word processor must be run with Small Font mode (96 ldpi) selected in the FlexDesk Control Panel. Not all screen buttons are positioned correctly if Large Font mode has been selected.

Fractal Design Painter 1.2

When using this application in 16BPP (65,000 color) modes, go to the Advanced panel within the FlexDesk Control Panel and select 5/5/5 color mode. 5/6/5 color mode does not work correctly with this application.

6.0   Configuration

WIN.INI [Mach] Entries

The [Mach] section of WIN.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. Switches have the tags BASE, CRYSTAL, DESKSCAN, SUPPORT or VIDEO, depending on which option they are for.

CacheCharacters   = on | off   Default on

        Allow for cacheing characters into the off-screen memory area.

ColorWeight16   = 555 | 565 | 655 | 664   Default 565

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. 655 and 664 modes are only available on TI and ATI 68860 DACs.

CrystalFonts   = on | off   Default off

When set on, enables the Crystal Font feature. When Crystal Fonts is enabled, the palette is fixed in 8 bpp non-programmable mode. 5 gradients of red, blue and green (125 colors) are available in the palette. Also the usual 20 Windows system colors are supported, and 16 shades of gray (including black and white). The remainder of the palette is unused.

DesktopSize   = 640 | 800 | 1024 | 1280   Default 640

Choose size of Windows work area. The screen may be smaller than the work area (see ScreenSize setting), in which case the Virtual Desktop feature is activated. Use the mouse to pan the display over the desktop. 640 selects 640x480, 800 selects 800x600, 1024 selects 1024x768 and 1280 selects 1280x1024. All modes have 4:3 aspect (which results in square pixels), except 1280. (1280x1024 is a 5:4 pixel ratio. Square pixels 4:3 with 1280 would be 1280x960).

Dithering   = on | off   Default on

Allow for disabling color dithering. This results in faster performance, at the expense of color fidelity.

DeviceBitmap   = on | off   Default on

Allow for realizing bitmaps in the off-screen memory area. For some applications (for example BitStream Facelift), this feature must be turned off.

DeviceBitmapDraw   = on | off   Default off

Allow the mach32 draw engine to draw into realized bitmaps. DeviceBitmap=on must be set for this to have any effect. Also enables fast Polygons.

EngineBlt   = on | off   Default on

Use the mach32 blit engine.

ErrorFatal   = on | off   Default on

When set on, all startup errors are treated as fatal, and will result in returning to the DOS prompt. When set to off, a message is displayed and the user is invited to press <D> to return to the DOS prompt, or <I> to ignore the error and continue.

GSFonts   = <path: c:\gsfonts>   Default NONE

If this entry is specified, the directory path is used to search for the Crystal Font outlines. If not specified (normal), the environment variable GSFONTS is used instead.

MinFontSize   = <number: 0..255>   Default 8

Minimum height of a font in pixels to be anti-aliased (Crystal Fonts). If a font renders to less than MinFontSize, it is not anti-aliased. This allows very small characters to remain legible.

PanDown   = <keystroke>   Default NONE

Set the ATIKEY function PanDown. The PanDown function moves the desktop down using the keyboard.

        <keystroke>   =   [ALT+] [SHIFT+] [CNTRL+] <key>
        <key>   =   F1..F12 |
                               Home | End
                               Left | Right | Up | Down

    eg: PanDown=SHIFT+CNTRL+Down

PanLeft   = <keystroke>   Default NONE

Set the ATIKEY function PanLeft. The PanLeft function moves the desktop to the left using the keyboard.

        <keystroke>   =   [ALT+] [SHIFT+] [CNTRL+] <key>
        <key>   =   F1..F12 |
                               Home | End
                               Left | Right | Up | Down

eg: PanLeft=SHIFT+CNTRL+Left

PanRight   = <keystroke>   Default NONE

Set the ATIKEY function PanRight. The PanRight function moves the desktop to the right using the keyboard.

        <keystroke>   =   [ALT+] [SHIFT+] [CNTRL+] <key>
        <key>   =   F1..F12 |
                            Home | End
                            Left | Right | Up | Down

    eg: PanRight=SHIFT+CNTRL+Right

PanUp   = <keystroke>   Default NONE

Set the ATIKEY function PanUp. The PanUp function moves the desktop up using the keyboard.

        <keystroke>   =   [ALT+] [SHIFT+] [CNTRL+] <key>
        <key>   =   F1..F12 |
                            Home | End
                            Left | Right | Up | Down

    eg: PanUp=SHIFT+CNTRL+Up

PaletteManager   = on | off   Default on

Enable palette management when PixelDepth=8. This allows applications to control the physical palette, and permits applications such as After Dark to do palette cycling animation. When the PaletteManage is off, the color mode will use a fixed 332 (3 bits Red, 3 bits Green, 2 bits Blue) palette.

PixelDepth   = 4 | 8 | 16 | 24 | 32   Default 8

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 and 32 both provide for 16.7 million colors. 24 gives a 3 byte per pixel format and saves memory over 32 which gives a 4 byte per pixel format. 24 works for both 640x480 and 800x600 modes, whereas 32 is only usable in 640x480 mode. The Control Panel will always select 24 bpp for 16.7 million color mode.

PolyLine   = on | off   Default on

When set on, PolyLines are accelerated by the drawing engine.

ScreenSize   = 640 | 800 | 1024 | 1280   Default DesktopSize

Select the screen size (screen mode).

ScanLine   = on | off   Default on

Use the mach32 engine to assist in scanline drawing.

StretchBlt   = on | off   Default on

Enable driver StretchBlt when on. If set to off, GDI StretchBlt will be used instead.

SystemFont   = <font>   Default HelveticaBold

Allows the Windows System Font to be specified when CrystalFonts=on. This font is used for Icon titles, menus, etc. This entry should be used with Windows 3.0 only, because Windows 3.1 allows changing the System font through its own mechanism.

TextGamma   = <number: 20..300>   Default 100

This setting controls the edge sharpness for the Crystal Fonts feature. Higher values lighten up the edge pixels, giving you "thinner" characters.

UVmul   = <number: 0..65535>   Default 256

Video saturation. Adjusts ATI video playback color saturation.

UVsft   = <number: 0..65535>   Default 0

Video color. Adjust ATI video playback color. This control adjusts between red and green.

VAD   = on | off   Default off

Forces Virtual Aperture when set to on. When set to off, Virtual Aperture is enabled automatically when the Physical Aperture is disabled (through INSTALL).

VGADAC   = on | off   Default on

Program VGA DAC in synch with 8514/A DAC registers.

VGAShared   = on | off   Default on

Share the video board memory between VGA and Accelerator, or maintain separate memory spaces. When running with Virtual Aperture (Physical Aperture disabled, or VAD=on), VGAShared has no effect (it is forced on).

WIFE   = on | off   Default off

Support Windows International Font Extensions (DBCS). This allows FlexDesk to be used with Asian Windows versions. Do not turn this switch on with North American Windows. WIFE will just slow down your system.

Yadd   = <number: -256..256>   Default 0

Video brightness. Makes ATI video playback brighter or darker.

Ymul   = <number: 0..65535>   Default 256

Video contrast. Adjusts ATI video playback contrast.

ZoomIn   = <keystroke>   Default NONE

Set the ATIKEY function ZoomIn. The ZoomIn function magnifies the display.

        <keystroke>   =   [ALT+] [SHIFT+] [CNTRL+] <key>
        <key>   =   F1..F12 |
                                Home | End
                                Left | Right | Up | Down

    eg: ZoomIn=SHIFT+CNTRL+Home

ZoomOut   = <keystroke>   Default NONE

Set the ATIKEY function ZoomOut. The ZoomOut function allows more of the display to be visible.

        <keystroke>   =   [ALT+] [SHIFT+] [CNTRL+] <key>
        <key>   =   F1..F12 |
                                Home | End
                                Left | Right | Up | Down

    eg: ZoomOut=SHIFT+CNTRL+End

7.0   Errors

All FlexDesk error messages are issued at startup. The error message is displayed, and the system speaker is beeped. The operator is invited to press a key to return to DOS. This behaviour can be modified to allow the operator to ignore the error and proceed (see the ErrorFatal switch).

```
ATI FlexDesk Windows Driver Error:

The ATI FlexDesk Windows Driver requires an ATI 68800 or 38800 based video
board or product.

Press a key to return to DOS.
```

The FlexDesk driver was started on a system without a mach32 based video product.

```
ATI FlexDesk Windows Driver Error:

The BIOS ROM cannot be accessed. Please refer to your owners manual
for hardware setup assistance.

Press a key to return to DOS.
```

The mach32 BIOS ROM failed. It has probably been disabled via DIP switch.

```
ATI FlexDesk Windows Driver Error:

The ROM BIOS Query has returned a failure. Please ensure that the BIOS ROM
is enabled, and that you have set up at least one video mode.

Press a key to return to DOS.
```

The mach32 BIOS ROM has not responded in a reasonable way to the QUERY service. This may be because the ROM is disabled, or there may be no video modes.

```
ATI FlexDesk Windows Driver Error:

You have insufficient Video Memory to run a %1x%2/%3 video mode. Run
Windows SETUP from DOS and select a lower resolution mode.

Press a key to return to DOS.
```

Not enough video memory. The numbers indicate X, Y and number of colors. For instance, 1280x1024/65536 is not possible on a 2MB card.

```
ATI FlexDesk Windows Driver Error:

The ATI FlexDesk Windows Driver requires that Windows be run in 386 Enhanced
Mode. Select the Microsoft 8514/A Driver to use your video board with
a 286 based processor, or to use Windows in Standard Mode. If necessary,
Windows Enhanced Mode can be forced on a 386 based processor by starting
Windows using the WIN /3 command. This is required on machines with less
than 4 Mb of system memory.


Press a key to return to DOS.
```

The driver only runs in 386 Enhanced Mode.

```
ATI FlexDesk Windows Driver Error:

The ATI FlexDesk Windows Driver cannot be started. No additional information
is available. Probable cause is insufficient resources or general
system failure. Please ensure system integrity and retry. If the
problem persists, contact customer support services with the following
error code: %1.


Press a key to return to DOS.
```

This message is issued in circumstances when an error is not expected, and the explanation is *very* technical. The only code currently defined is 1, which is issued if the DPMI mapping call for the aperture fails.

```
ATI FlexDesk Windows Driver Error:

The %1x%2 mode cannot be started. Please ensure that you have
installed the requested mode using the Mach8 or Mach32 INSTALL utility.
Your selected monitor may not be capable of operating in the requested
mode - if this is the case, run Windows setup from DOS and select
a compatible mode.


Press a key to return to DOS.
```

This message is issued when you attempt to start FlexDesk in a mode which is not set up by INSTALL. This may happen because you have selected an inappropriate monitor and the mode is not available with the current monitor, or because you have not enabled the mode in custom installation.

```
ATI FlexDesk Windows Driver Error:

The ATI FlexDesk Windows Driver cannot be started. The BIOS ROM has failed to
activate the requested mode. Please contact customer support services.

Press a key to return to DOS.
```

The mode was available in the BIOS and seems to have been installed correctly, but the BIOS ROM refused to switch to that mode. This usually indicates a fairly serious problem (probably a ROM bug).