Zamba's VMware page

Since I used VMware for the first time I have been fascinated about the virtualization technology.

On this page I put up some useful things for use with VMware products. Have fun, but use at your own risk.

If you want to contact me, see the end of the page.

Overview

- **(Software) VMRemote**
- **(Software) Shell extension for VMware DiskMount**
- **(Software) MS-DOS / Windows 3.1 / Windows for Workgroups 3.11 driver package**
- **(Article) Logging on to a Windows Server 2003 domain from older DOS/Windows systems**
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- **(Article) Playing games in virtual machines**
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(Software) VMRemote

VMware Workstation 5 includes a very nice tool, *vmrun*, that allows the user to control some VMware functions via the command line, mostly to start and stop virtual machines.

The tool VMRemote takes this further by exposing vmrun's commands to the network so they can be executed from another computer. VMRemote and its client require the .NET Framework 1.1.

Features of version 1.2:

- Supports all commands of Workstation 5.5:
  - List, start, stop, reset and suspend virtual machines or teams
  - Upgrade file format and virtual hardware
  - Install tools
  - List, revert to, take, delete snapshot(s)
- Client API is a separate class library, which makes it reusable
- Server can log all actions executed

Download VMRemote 1.2   *Requires .NET Framework 1.1*

Download VMRemote 1.2 Client API docs (for developers, extract into client directory)
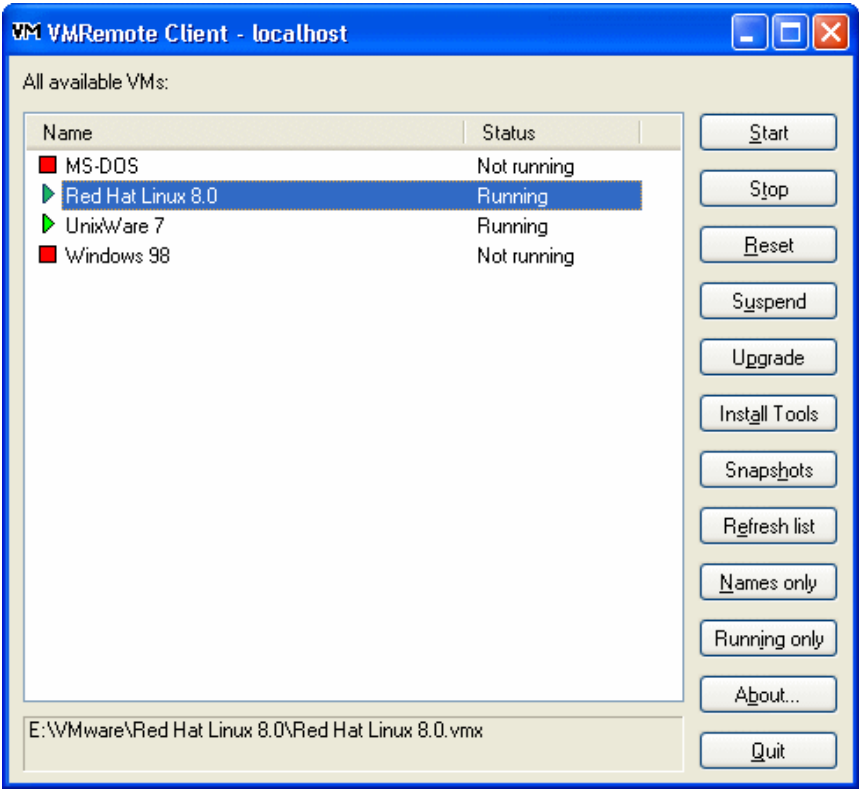
Notes:

- This software was created before VMware Workstation 6.0 was released. Newer Workstation versions contain features that are similar to what VMRemote provides.
- In VMware Workstation 6.0 and higher, the VIX API is available for developers to manage virtual machines from an application.
- In VMware Workstation 8.0 and higher, a server feature is available that allows users to share virtual machines and manage them remotely from another Workstation instance or the VIX API.

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(Software) Shell extension for VMware DiskMount

As part of the **VMware Virtual Disk Development Kit**, the tool *DiskMount* can be downloaded which allows offline mounting of VMware virtual disks as a drive letter.

The shell extension lets you mount such virtual disks via a Windows Explorer context menu.

Download shell extension (for x86 systems)

Download shell extension (for x64 systems)
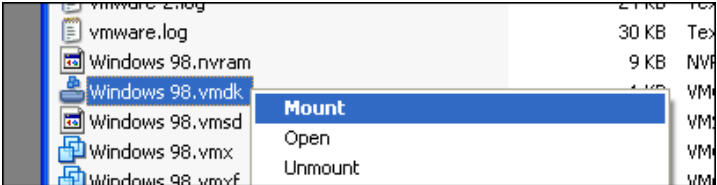
Notes:

- This software was created before VMware Workstation 6.0 was released. Newer Workstation versions contain features that are similar to what this shell extension provides.
- In VMware Workstation 6.0 and higher, there is a built-in feature to mount disks offline. This also includes a shell extension.

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(Software) MS-DOS / Windows 3.1 / Windows for Workgroups 3.11 driver package

I've put together a package containing drivers and important updates for using with MS-DOS, Windows 3.1 and Windows for Workgroups 3.11 within VMware products.

I call this collection the "31pack" (pronounced "three-one pack").

The current version is 1.1. The following changes were made from the initial release:

- An older DOSidle version 2.0 was added for the cases where the version 2.10 conflicts with EMM386.
- MSCDEX was added for scenarios where it is not installed as part of MS-DOS.

The 31pack is available as a simple set of files or as an ISO image, ready for mounting in a virtual machine. Enclosed in the ISO image download is also a floppy disk image that contains only the CD-ROM driver and MSCDEX.

📥 **Download driver package as a simple set of files**
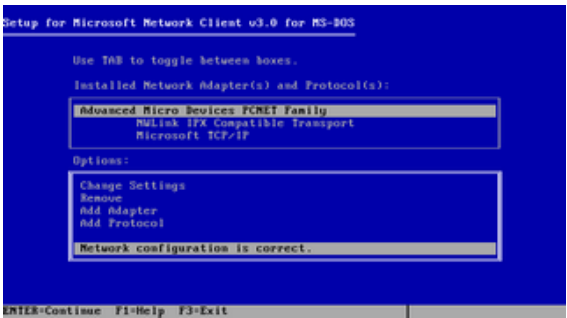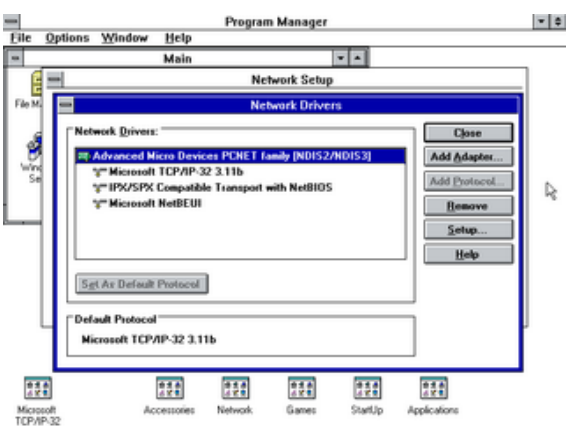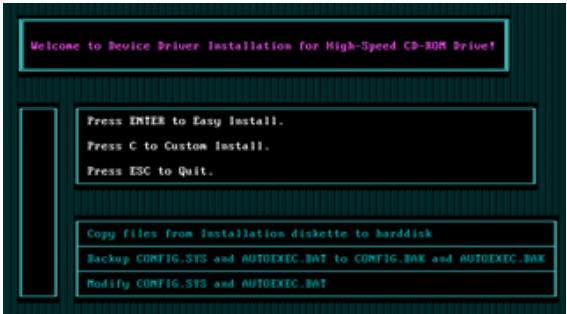
📥 **Download driver package as ISO image**

The package contains:

- Microsoft Network Client 3.0
- Network card driver for AMD PCNET cards (NDIS2/NDIS3)
- CD-ROM driver
- MSCDEX
- Sound driver for SoundBlaster 16
- Super VGA driver patch
- DOSIdle tool
- WQGHLT tool
- Y2K Update for File Manager
- Euro support

To install the software, either copy all files into an INSTALL directory within the virtual machine, such as C:\INSTALL, or mount the provided ISO image.

Below I'll outline the steps to install each component, along with the systems that the driver or update applies to.

Networking		
	[X] DOS [X] Win 3.1 [ ] WFW 3.11	**Microsoft Network Client 3.0 / Network card driver:** • In DOS mode, change to the MSCLIENT directory and run SETUP.EXE. • As the adapter, select "*Network adapter not shown on list below" and enter C:\INSTALL\AMDPCNET\DOS as the driver directory to install the drivers for the "Advanced Micro Devices PCNET Family" adapter. • Configure other settings & protocols as you wish. There is a good step-by-step article at **WindowsNetworking.com**. • The TCP/IP protocol, which is vital for connecting to the Internet, is not installed by default. If you want to use it, you must explicitly select it during installation.
	[ ] DOS [X] Win 3.1 [ ] WFW 3.11	**Activating the network in Windows 3.1:** • In Windows, open Windows Setup and go to Options > Change System settings > Network • Select "Microsoft Network (or 100% Compatible)". "Microsoft LAN Manager 2.1" also works. **Important:** The MS-DOS network drivers must be loaded for the network to function in Windows.
	[ ] DOS [ ] Win 3.1 [X] WFW 3.11	**Network card driver:** • Requires that the Microsoft Network was installed when Windows was installed. • In Windows, open Windows Setup and go to Options > Change Network Settings > Network Drivers > Drivers > Add Adapter > Unlisted or Updated Network Adapter • Browse to the AMDPCNET\WFW311 directory to install the drivers for the "Advanced Micro Devices PCNET Family" adapter. **TCP/IP protocol driver:** • This protococol is vital for connecting to the Internet. • In Windows, open Windows Setup and go to Options > Change Network Settings > Network Drivers > Drivers > Add Protocol > Unlisted or Updated Protocol • Browse to the TCP32B directory • If you only want to use the TCP/IP protocol, you can remove the other protocols like IPX/SPX or NetBEUI. If you want to keep other protocols, you might want to set the TCP/IP protocol as the default protocol.
CD-ROM		
	[X] DOS [X] Win 3.1 [X] WFW 3.11	**CD-ROM driver:** • In DOS mode, go into the CDROM directory and run INSTALL.EXE. You should use the "Easy Install" option unless you have problems. **MSCDEX:** • The installer of the CD-ROM driver sets up MSCDEX to launch automatically in AUTOEXEC.BAT. • MS-DOS 6.0 and higher include MSCDEX. On these systems there is nothing more to do. • For scenarios where MSCDEX is not installed as part of MS-DOS, copy MSCDEX.EXE from the MSCDEX directory into C:\DOS.
Sound		
	[X] DOS [X] Win 3.1 [X] WFW 3.11	**Sound driver:** • The included drivers are for DOS and Windows. • You may have to change a setting in the virtual machine config file first, to get the SB16. This is because some VMware products supply a different type of sound card per default. Power off the VM, open the configuration file (.vmx) in an editor, find the line starting with "sound.virtualDev" and change it to **sound.virtualDev = "sb16"**. If the line is not present, just add it. After the change power on the VM again.
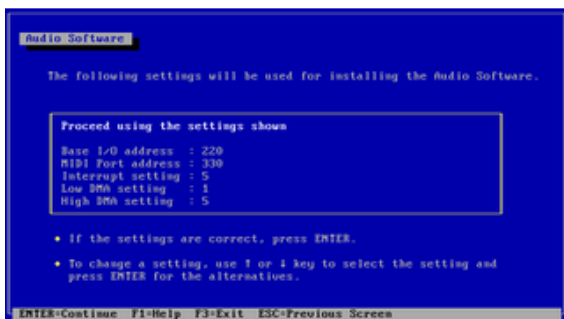
		• In DOS mode, go to the SB16 directory and run INSTALL.EXE. You should accept the defaults unless you have problems.
Display		
	[ ] DOS [ ] Win 3.1 [X] WFW 3.11	**Super VGA driver patch:** • This is a patch **Ken Kato** wrote to make Super VGA work under WFW 3.11 in a VMware environment. It might also work for Win 3.1, but I did not test that. Note: The web site linked to is no longer active. It has possibly moved to **this page**. • The patch files are in the VGAPATCH directory, be sure to read the included documentation. • To test the new graphics mode, I used a colorful **LCARS** image **I found on the net** as a wallpaper.
CPU Idling		
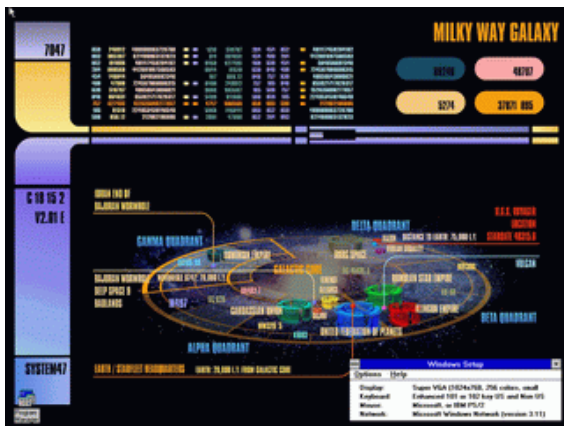
	[X] DOS
	[ ] Win 3.1
	[ ] WFW 3.11
		DOSidle tool (v2.10):
		
		• MS-DOS does not idle the CPU when there's nothing to do. This does not affect the operating system, but when running in virtualized environments, it takes up all the processor power on the host.
		• In DOS mode, start DOSIDLE.EXE from the DOSIDLE\V0210 directory to activate CPU idling.
		• Put it into your AUTOEXEC.BAT to start it automatically when booting.
		
		Alternative 1: DOSidle 2.0
		
		• The DOSidle version 2.10 can conflict with EMM386 (at least in MS-DOS 7.1):
		
		`You started your computer with a version of MS-DOS`
		`incompatible with this version of Windows. Insert a Startup diskette matching`
		`this version of Windows and then restart. The system has been halted. Press`
		`CTRL+ALT+DELETE to restart your computer.`
		
		• If you get the above error, you can use the older DOSidle version 2.0 instead, which does not have this problem. It is in the DOSIDLE\V0200 directory.
		
		Alternative 2: Microsoft Power Manager (POWER)
		
		• Use this if you cannot use DOSidle for any reason.
		• In MS-DOS 6.0 and higher, POWER is part of the operating system.
		• To install POWER with maximum power saving, add the following line to the CONFIG.SYS file:
		
		`DEVICE=C:\DOS\POWER.EXE ADV:MAX`
		
		and reboot the system.

	[ ] DOS
	[X] Win 3.1
	[X] WFW 3.11
		WQGHLT tool:
		
		• Windows 3.x does not idle the CPU when there's nothing to do. This does not affect the operating system, but when running in virtualized environments, it takes up all the processor power on the host.
		• To install WQGHLT, copy WQGHLT.386 from the WQGHLT directory to C:\WINDOWS\SYSTEM, add a line to C:\WINDOWS\SYSTEM.INI's [386Enh] section, like this:
		
		`[386Enh]`
		`...`
		`device=WQGHLT.386`
		
		and restart Windows.

Operating System Updates		
	[ ] DOS [ ] Win 3.1 [X] WFW 3.11	**Y2K Update for File Manager:** • The File Manager shows wrong dates for files changed in or after the year 2000. To fix this, go to the WFWY2KUP directory in DOS mode and run INSTALL.BAT with the name of your Windows directory as parameter, for example "INSTALL C:\WINDOWS". • The update in the WFWY2KUP directory is for english Windows versions. If you have a german Windows version, you can use the update in the WFWY2KDE directory instead.
	[ ] DOS [X] Win 3.1 [X] WFW 3.11	**Euro support:** • This updates the keyboard drivers and fonts to include the Euro (€) symbol. • In DOS mode, go into EURO_DEU directory and run W31_EURO.BAT with the name of your Windows directory as parameter, for example "W31_EURO C:\WINDOWS". Note that this install batch is german. • The last output of that script should read "Fertig", meaning "Done". • Then copy the additional Euro fonts from the EUROFONT directory to C:\WINDOWS\SYSTEM.
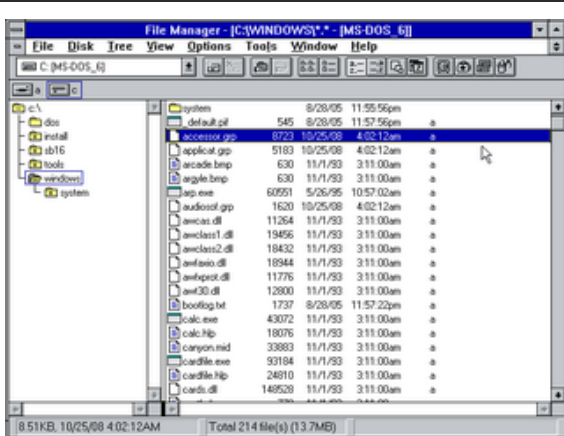
↑↓
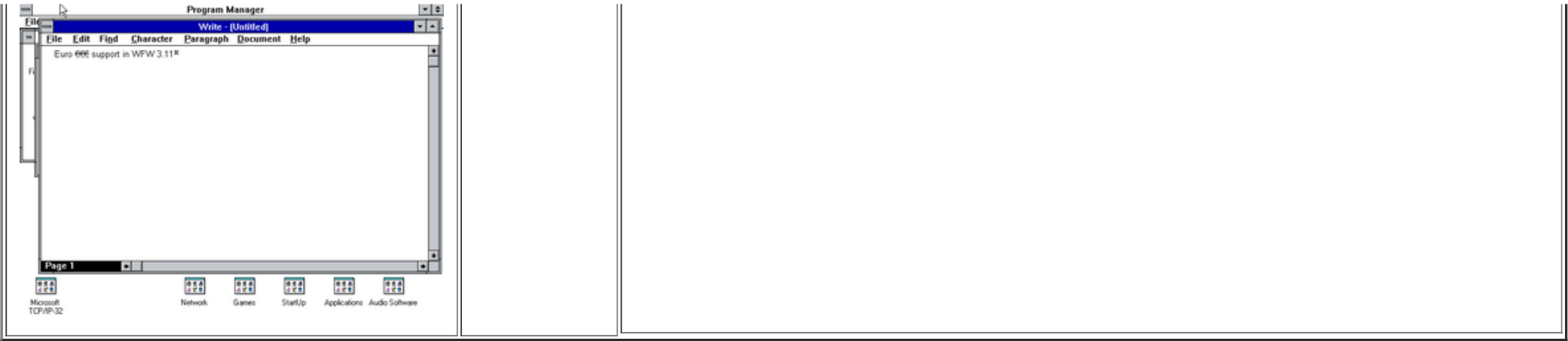
(Article) Logging on to a Windows Server 2003 domain from older DOS/Windows systems

If you have an MS-DOS or older Windows system running (Windows NT 4.0, Windows 98/ME or below), logon attempts from such versions to a Windows Server 2003 domain fail out of the box because Windows Server 2003 domain controllers have communication signing (SMB signing) enabled by default and the old systems do not support it. SMB signing was introduced to prevent malicious users from tampering or intercepting network traffic.

If you need a quick-and-dirty solution for compatibility reasons, simply turn of SMB signing at the domain controller - see below for how to do this. For more details about this issue and ways to resolve it, see Microsoft's KB entries **811497** and **555038**.

How to disable communication signing on Windows Server 2003:

- Open Control Panel > Administrative Tools > Domain Controller Security Policy
- In the tree, open Local Policies > Security Options
- On the right, find "Microsoft network server: Digitally sign communications (always)" and set it to Disabled or remove the check mark in front of "Define this policy setting"
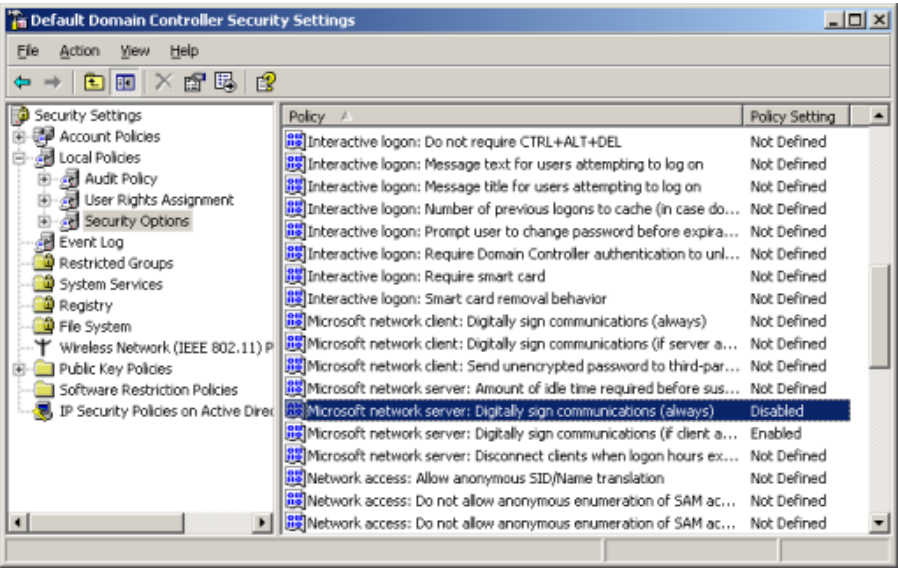
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(Article) Finding the right virtual sound card and driver for your guest operating system

The default sound card emulated in VMware Workstation depends on the program version and the guest operating system:

Program	Guest OS[1]	Sound Card Name
VMware Workstation 8.x and higher	Windows Vista and higher	High Definition Audio
VMware Workstation 8.x and higher	Windows XP and lower	Sound Blaster AudioPCI[2]
VMware Workstation 7.x and lower	All Windows versions	Sound Blaster AudioPCI[2]
VMware Workstation 10.x and higher[3]	MS-DOS or Windows 3.1	Sound Blaster 16

[1]For simplicity, the appropriate server versions of Windows were omitted, it applies to them as well.
[2]May be labeled differently in the guest OS depending on the driver used, e.g. Sound Blaster PCI 128.
[3]And maybe also in some lower versions, this was not tested.

By modifying the machine configuration file (VMX file), the card can also be changed to a different one that may be more appropriate than the default.

The following table shows which drivers to use for for Windows and DOS operating systems:

Card short name	Card name(s)	Operating systems	VMX file entry[1]	Driver to use[2]
HD Audio	High Definition Audio	All 32-bit and 64-bit versions of: Windows Vista, Windows Server 2008, Windows 7, Windows Server 2008 R2, Windows 8, Windows Server 2012	sound.virtualDev = "hdaudio"	Driver is provided by the guest operating system. The HD Audio sound card is available in VMware Workstation 8.0 and higher.
ES1371	Sound Blaster AudioPCI, Sound Blaster PCI 128	All 32-bit and 64-bit versions of: Windows XP, Windows Server 2003, Windows Vista, Windows Server 2008, Windows 7, Windows Server 2008 R2	sound.virtualDev = "es1371"	VMware VMaudio driver - included in the VMware Tools of VMware Workstation 6.5 and higher. Windows 7 and Server 2008 R2 support requires VMware Workstation 7.0 or higher.
ES1371	Sound Blaster AudioPCI, Sound Blaster PCI 128	Windows ME, Windows 2000, Windows XP (32-bit), Windows Server 2003 (32-bit), Windows Vista (32-bit), Windows Server 2008 (32-bit)	sound.virtualDev = "es1371"	**Sound Blaster PCI 128 driver for Windows 2000 (SBPCI128Setupus_w2k.exe)**
ES1371	Sound Blaster AudioPCI, Sound Blaster PCI 128	Windows 98 SE, Windows ME, Windows 2000, Windows XP (32-bit), Windows Server 2003 (32-bit)	sound.virtualDev = "es1371"	**Sound Blaster PCI (WDM) Drivers V 5.12.01.5017 (SBPCI_WebDrvsV5_12_01.exe)** **4 Megabyte Waveset for SB PCI 16/64/128 (eapci4m.zip)** **8 Megabyte Waveset for SB PCI 16/64/128 (eapci8m.ecw)**

				The wavesets are optional since a 2 MB waveset is already included with the driver. Using a larger waveset means better MIDI sound quality, but requires more memory. Use the Device Manager to add new wavesets (*.ecw) to the "SB PCI(WDM)" driver.
ES1371	Sound Blaster AudioPCI, Sound Blaster PCI 128	Windows 95, Windows 98	sound.virtualDev = "es1371"	**Sound Blaster PCI 128 driver for Windows 9x (SBPCI128Setupus_w9x.exe)** Beginning with VMware Workstation 6.0, installing this driver causes new Windows 95 and 98 VMs to crash (blue screen) at driver installation. Additionally, Windows 95 VMs where the crash occurred become unbootable and the operating system halts with a Windows Protection Error. Windows 95 and 98 VMs that have been created with previous Workstation versions that have this driver installed crash after upgrading the virtual hardware to Workstation 6.0 or higher. Workarounds: • For new Windows 95 VMs, use Workstation 5 hardware or a SB16 sound card. • For new Windows 98 (first edition) VMs use a SB16 sound card. • For new Windows 98 SE VMs, use the WDM driver instead of this driver, it does not have this issue. • For existing Windows 9x VMs with this driver, don't upgrade beyond Workstation 5 hardware.
ES1371	Sound Blaster AudioPCI, Sound Blaster PCI 128	Windows NT 4.0	sound.virtualDev = "es1371"	**Sound Blaster PCI128 (Drivers Only - Windows NT4.0) (SBPCI128Setupus_wnt.exe)**
SB16	Sound Blaster 16	Windows 95, Windows 98	sound.virtualDev = "sb16"	Driver is provided by the guest operating system.
SB16	Sound Blaster 16	Windows 95 MS-DOS mode, Windows 98 MS-DOS mode	sound.virtualDev = "sb16"	**Sound Blaster 16 driver for Windows 95 MS-DOS mode (95dosapp.exe)**
SB16	Sound Blaster 16	MS-DOS, Windows 3.1	sound.virtualDev = "sb16"	**Sound Blaster 16 driver for DOS/Windows 3.1 (sbbasic.exe)**

[1]The entry is only for selecting the sound card device, not to add a new virtual sound card. It might not be present if the default emulated sound card is in use.

[2]Some of the systems might already include the necessary drivers and in this case no separate driver needs to be installed.

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(Article) Playing games in virtual machines

I also like playing games, not only current ones, but also older games. The following is a list of operating systems that can or cannot be used for playing games in a virtual machine.

This list is specific to VMware Workstation and is solely based on my own opinion.

Guest OS	Can Play?	Comments
MS-DOS	No	Slow. Problematic hardware setup. Don't use. Use **DOSBox** instead.
Windows 3.1	Maybe	I only tried small games and no VMware Tools are available, so it may not work for more demanding games.
Windows 95	Yes	Looks ok.
Windows 98	Yes	Looks ok.
Windows ME	Yes	Looks ok.
Windows 2000	Maybe	May work if games don't require graphics hardware features (T&L, shaders, etc.).
Windows XP	Maybe	VMware Workstation 6.5 includes DirectX 9.0c support for Windows XP. You need a decent machine to make this work.
Windows Vista	Maybe	May work if games don't require graphics hardware features (T&L, shaders, etc.).

Experiences with the new Direct3D Support in VMware Workstation 6.5

When I tried out this feature the first time, I set all graphics settings in the games to minimum. It was still too slow for me, not fluid enough. Either my machine was too old for this or there is some improvent potential on VMware's side. On the host, I was able to play all the games in high quality without noticeable problems.

The first lesson I learned, was that upgrading to the Workstation 6.5 hardware version is absolutely necessary, to get something useful regarding 3D performance. Done that, the performance was still unsatisfying. In the end, it turned out that my host machine was underpowered for this task (Intel P4 "Prescott" @ 3 GHz with an ATI Radeon X800 GT).

So a decent machine is required, even for older games. I upgraded the host's hardware and it became better (Intel Core2Duo @ 3,16 GHz with an ATI Radeon HD 3850).

I tested the following games with the new host hardware:

• Max Payne 2 (2003): **High quality graphics settings** @ 1680x1050x32; Subjective performance: OK
• No One Lives Forever 2 (2004) - High quality graphics settings; Subjective performance: OK
• Half-Life 2: Episode Two (2007) - **Moderate graphics settings** @ 1680x1050; Subjective performance: Moderate, ~15 fps on average (not calculated, just by looking at the FPS counter from time to time)

Graphics settings for Max Payne 2:
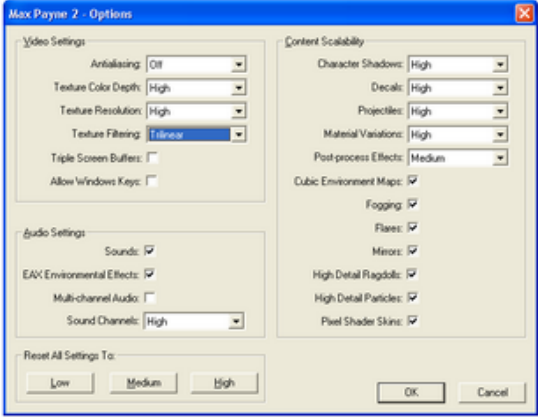
Graphics settings for Half-Life 2: Episode Two: Warning message when launching Half-Life 2: Episode Two about video hardware not meeting the minimum requirements:
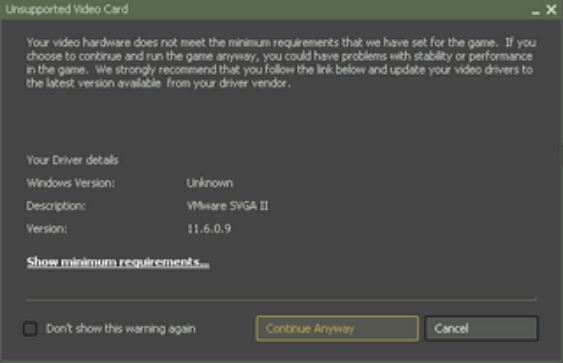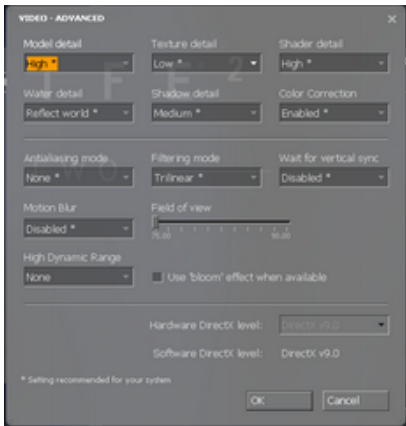
The link points to **this page.**

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Links

The page author is not responsible for the contents of the linked pages.

http://www.vmware.com Official VMware site

http://www.vmaschinen.de German site about virtual machines

http://boling.us/ebs/apps/vmmaster "VM Master", a tool to automatically start and stop Workstation 5 virtual machines.

http://www.vmware.com/community Offical VMware discussion boards

http://chitchat.at.infoseek.co.jp/vmware
Site is no longer active. Possibly moved to "VM Back", Ken Kato's page with info about VMware internals as well as various tools and drivers.
http://sites.google.com/site/chitchatvmback/

http://vmware-forum.de Unofficial german VMware forum

http://www.sanbarrow.com Homepage of a virtual machine "mad scientist".

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Page history

January 5, 2015:
- Updated the **31pack** to version 1.1:
  - Added DOSidle 2.0 for the cases where DOSidle 2.10 conflicts with EMM386 (thanks to The MAN).
  - Added MSCDEX for scenarios where MSCDEX is not installed as part of MS-DOS (thanks to Jonathan Bandelier).
  - Listed Microsoft Power Manager (POWER) as an alternative to DOSidle (thanks to Al Leween).
- Updated the **sound driver article**:
  - Added the information that the SB16 sound card can also be used in Windows 95 and 98 (thanks to ClassicGameVault and Thomas Aitken).
  - Added the information that in VMware Workstation 10 (and maybe in some earlier versions), creating a new MS-DOS or Windows 3.1 VM sets the SB16 sound card as the default (thanks to Kristian Whittick).
  - Added a sound driver for Windows NT 4.0.
  - Updated all driver download links to adapt to the changed structure on the Creative web site.
  - Added information about the HD Audio sound card.
  - Added information about default sound cards in VMware Workstation depending on the program version and guest operating system.
- Added information about features in VMware Workstation that are similar to what **VMRemote** provides.

September 24, 2011:
- The **31pack** is now also available as an ISO image, ready for mounting in a virtual machine. Enclosed in the ISO image download is also a floppy disk image that contains only the CD-ROM driver.
- Changed links to Ken Kato's original "VM Back" web site, which is long gone, to a new address, which looks like a replacement for the old site. I'm not 100% sure though whether this isn't just one more of the unofficial mirrors that exist.

May 21, 2011:
- Added a clarification that the **31pack** replaces the older DOS / Win 3.1 and WFW 3.11 driver packages. Re-added also the old anchors for other web pages that still link to the old drivers.

May 5, 2011:
- Added a new **driver package for MS-DOS, Windows 3.1 and Windows for Workgroups 3.11 systems**, called the **31pack**. This replaces the former two MS-DOS and WFW 3.11 driver packages. A new software in this package that was not in one of the old packages, is the WQGHLT tool. It idles the CPU when Windows is running and there is nothing to do, similar to what DOSidle does under DOS.
- Added an x64 version of the **shell extension for VMware DiskMount** (thanks to Batwings21).

May 11, 2009:
- Updated info about Windows 9x sound drivers
- Changed all outgoing links to open in a new window
- Added SVGA patch to WFW311 driver package
- Fixed a number of HTML errors
- Fixed link to Microsoft Network Client tutorial

January 24, 2009:
- Updated sound driver article:
  - Added info about VMware Workstation 6.5 driver problems
  - Changed driver links to link to the one download instead of the product support pages
  - Added new SB WDM driver

November 25, 2008:
- Added more guest OSs to the list of OSs that are supported by the VMware VMaudio driver
- Added experiences with virtual Direct3D support to the virtual gaming article.

October 25, 2008:
- Added VMware VMaudio to sound driver article
- Edited a few articles for clarity
- Added screenshots to the DOS/Win driver package documentation
- Updated shell extension for VMware DiskMount.

October 15, 2008:
- Renamed title of the sound driver article to a more appropriate one
- Added clarification about 32-bit systems
- Added clarification about ES1371 sound card name.

October 9, 2008:
- Added info about games in virtual machines.

August 23, 2008:
- Updated info about getting sound to work:
  - Windows 95 MS-DOS mode drivers
  - Windows Vista info
  - Updated links to sound drivers
  - Added VMX file entries.
- Updated entry for the shell extension for VMware DiskMount.

April 4, 2006:
- Added info about sound drivers
- Changed some texts
- Included sound driver in MS-DOS package again.

November 28, 2005:
- Updated VMRemote to version 1.2

October 23, 2005:	• Added MS-DOS / Windows 3.1 driver package
October 2, 2005:	• Updated VMRemote to version 1.1
September 3, 2005:	• Initial release

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If you have any comments or suggestions, please **contact me via E-Mail**.

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