
Installation notes v 6.4 for DOS 6.22 VS 2005, 4D installation, 10/01/07
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The following is a discussion of installing DOS VMs for 4D on a winXP host running VS, with a 3 GHz P4 and 2 Ghz of ram. With the release of VPC 2007 and VS 2005, DOS continues to run as a OS but is no longer supported by MS.

The DOS virtual machine additions (Vmadd) remain in the VPC 2007 and VS VMAdditions.iso. These Vmadds will not work with Win95, which must be obtained from VPC 2004.

4D is installed in a DOS VM along with "Workgroups for DOS", the DOS Vmadd for the mouse and Cdrom (4D will not function properly with the vmadd idle.com). The order of loading the programs is critical to maximize the speed index of 4D in a VPC to a max of about 2,400. Install "fshare", "share" and "net" from 4D's dos shell after 4D loads in order to install "server" after 4D. This order has not been verified when running the VMs in VS. In VS, Fshare will not load and is ignored.

This system consist of VMs configured for networking as Cadd03 and CaddXX. They are connected via com1 to the tablet and switched between each other by custom software; Each VM is configured to utilize drive C: for the 4D program files. In my system Cadd03\Drive_D: is installed (empty) in order to assign Drive_E: as the data drive. All other VM in the network assign Drive_E: to \\Office02\Cadd03\Drive_E: (The matching drive letter is required because nested files in figures save the original drive letter. When a network machine opens a file from the VM with the drawings, 4d will call for the figure from the drive letter stored inside the drawing file and the VM must point to this drive letter to find the nested figure. Another way to do this is to save the data on the host subject to your acceptance of file transfer rates.). Cadd03, CaddXX and the host are networked by "Workgroups". UPL editing and compiling is accomplished on the host. File management is done through MyComputer, also from the host.

The implementation of VPC benefits from a virtual enabled multi-core pc if you are running programs in addition to the VPC, it will use one core and assign the other core(s) to the host programs. If you run the VMs in VS, you will be able to assign a core to each VM. Install one NIC for each VM and the host for maximum through put. Another method of gaining speed is to run the VM on a physical drive other then the drive containing the OS. Select video card for fastest throughput. See graphic card notes below. The VPC display is about 20% faster then the VMRC client display used by VMs running in VS. VPC shares code with VS. See VS notes below.

3. VM with DOS 6.22

Notes VM:

- a. Install the following DOS VM additions.
mouse.sys

cdrom.sys

b. Install the virtual drive as a dynamic expanding drive to save space; the fixed drive did not appear to help display speed.

c. VM "settings":

Com1 -- use physical port COM1 for tablet
Mouse -- install for mouse in DOS shell

d. VM memory is set at 16 MB. 4D memory setting is 8MB (higher setting did not improve my situation). Trio S2 memory is set at 8 MB. This can be raised to 16 MB but the current driver only used 2 MB. The VESA driver (*.DEF file) memory setting is default "off".

e. VM Cadd03 includes 3 drives, C: for program, DOS, and NET. E: for data. D: is a empty drive required only to locate data on E:. VMs CaddXX have one drive, C: for program, DOS, and NET.

Notes on DOS install:

a. Fdisk FAT16. If you install FAT32 the 4D auto backup feature will not work.

b. Do not attempt to upgrade devices such as display adapters. VM uses only the virtual device included in the system.

c. Smartdrv.exe did not seem to add anything to system speed.

d. Autoexec.bat (my setup):

```
c:\dos\scandisk /autofix /nosave /nosummary
e: --CaddXX only
c:\dos\scandisk /autofix /nosave /nosummary --CaddXX only
c:
c:\4D\pd\ds ndts c:\4D\pd\lib /s
c:\4D\pd\ds ndts e:\4D\pd\job /s --CaddXX only
c:\dos\defrag c: /S:NE /F
c:\dos\defrag e: /S:NE /F --CaddXX only
c:\dos\fastopen c:
c:\dos\fastopen e: --CaddXX only, will not work on
--networked drives

rem c:\4D\bin\vmad\idle.com --do not use, problem with 4d cursor
c:\4D\bin\vmad\mouse.com --leave in for DOS shell, other programs
rem c:\4D\bin\vmad\fshare.exe --use if no share and net else see neton.bat
rem c:\dos\mscdex.exe /D:idecd001 /L:D /M:8 --use if CDRom required to create drive D:
--them remove drive D: vhd from VPC settings
--and replace with drive E: vhd

PROMPT $p$g
```

```

PATH C:\NET;C:\DOS
SET TEMP=C:\DOS
SET BLASTER=A220 I5 D1 H5 T6          --If you create the VMs in VPC and install
                                       --the sound card drivers, they will function
                                       --in VS
call c:\4D\bin\4D_setup.bat          --4D setup
c:
cd 4D\pd
4D.exe blank

```

e. Config.sys include (typical):

```

DEVICE=C:\DOS\SETVER.EXE
FILES=40

device=C:\dos\ansi.sys
rem device=c:\4D\bin\vmad\cdrom.sys /D:idecd001 /L:D  --use if CDRom required.
                                                    --Replace Drive_D on Cadd03

device=C:\NET\ifshlp.sys
LASTDRIVE=Z

```

f. Neton.bat (in c:\4D\pd directory to be used by autoexec.sgx):

This is also great to start the net from the application command window

```

c:\4d\bin\vmad\fshare.exe          --this for VM, ignored by VS
c:\dos\share.exe                   --required for host to access guest
c:\net\net start /yes
c:\net\net logon atelier /yes
c:

```

For 4D setup:

a. Autoexec.sgx - the commands in neton.bat are executed here in order for 4D to run fastest:

```

disp cpl on
set trap .12
dos neton          --start net server after 4D for best speed index.
                  --See Network discussion below.
#13#  --?
OpenFile          --my file management prog DFile.com

```

b.4D configuration parameters for use with mouse: Mouse in y axis less move then x axis. Did not verify with VS setup.

```

Crosshair position display update rate: 0    --def 250
Crosshair update speed:                 2    --def 2

```

- Mouse dpi: 200 -- higher better then low
- c. 4D configuration parameters for use with tablet: --Verified with VS setup
- Crosshair position display update rate: 750 --default 250
 Crosshair update speed: 2 --default 2
- Kurta input wait counter loop: 32 -- (1000 was default)
- d. 4D configuration for network:
- Setting to lock if network detected: 2 --see discussion below

e. A 4D drawing file in the Cadd03 database includes "figures" that are linked to other drawing files. The drive letter\path names for those figures are stored with the figure and are checked for updated whenever the file is opened. When the file is opened in CaddXX, unless the assigned drive letter (for CaddXX) is the same as the physical drive letter in Cadd03, the figure will look to update the embedded file in terms of the drive assignments on CaddXX. Because of considerations no longer relevant, the physical drive E: was selected as the database drive on Cadd03. Because VPC's settings automatically assigned the drive letters sequentially, a empty drive was installed in CADD03 as drive D:. On CaddXX, the network drive E: is assigned to \\Cadd03\Drive_E and the integrity of the system is maintained.

If the system is setup to run with another physical drive letter for the data drive, and drawing files have been copied from a system with a different drive letter, all the figure names must be modified. Open any file in the new drive: job directory from the PD directory and run RESETDIR.UCD. The program will open each file and change all the figure name's drive letters.

From each 4D VM shell to DOS and execute Net.exe commands for persistence setup:

```
net share e: drive_c /full --Cadd03 allow full access, file locking set by 4D
net use e: \\cadd03\drive_e --CaddXX drive assignment for data.
```

f. When clicked, the mouse pointer is trapped by the current VM window and is released by a VM related combination of keys (alt-shift). Programming an extra button on the mouse to issue this key strokes facilitates moving out of the widows.

Notes on VM / VS:

1. If the VM console no longer appears on the desktop (may be minimized on the start bat) turn on view hidden folder option, go to %appdata%\Microsoft\Virtual PC Folder and save/delete options.xml and restart VPC.

2. The following is of little value as long as the current 4D VESA driver uses no more than 2MB. If you open the .VMC file with a text editor the following changes will increase the VM's graphic adapter memory size to a maximum of 16mb:

```
<video_adapter>  
<vram_size type="integer">8</vram_size> </video_adapter>
```

Change the line:

```
<vram_size type="integer">8</vram_size>
```

To 16:

```
<vram_size type="integer">16</vram_size>
```

Notes on VS:

In order to install VS, the following:

- a. Prior to install program, verify "Internet Information Services (IIS)" installed. Go to host "Start, Settings, Control Panel, Add or Remove Programs, Add or Remove Windows Components" and verify IIS box is checked. Detail files required include the "Common Files, IIS Snap-in, WWW Service (as well as "WWW Service " Detail)".
- b. Install program.
- c. Drag *.ico for VM additions to the Win98 CD icon and install VS VM additions this is update to VPC VM additions).

If required by some other procedure to stop VS, goto start run and execute "services.msc", then locate VS and stop it.

The VPC and VS are capable of sharing code. If the current release of VS is newer than VPC, install VS (without OS) and use the VS machine additions with VPC.

In a multi core PC, VS can be installed in order to provide each VPC with its own core.

Running 4D VMs in VS:

Unlike VPC VMs in VS doesn't display directly to the host monitor. A VM is viewed by a VMRC (virtual machine remote control) client. While the VMRC is slower than the VPC display, other factors must be considered in the selection of VS herein.

VMs turned on by the server can not be accessed from the host by VPC. To return control of a VM to VPC, turn off the VM from the VS Administration window. When booting the VMs in the Server, fshare will fail (I currently leave it in as I still run the VMs).

1. Install VS (run install setup)
2. Start VS Administration configure server and add existing VMs to VS. Config the VMs (network, ports, etc.) and turn on but do not connect from VS Admin window.
3. From the host start VMRC client (located in VS start folder), fill in path (mine is "office02:5900" where 5900 is default port) and connect the VMRC client to the VS. Select the VM from the window to access 4D. With a multi processor host, you should be able to assign a core to each VM. Use the VM configure, VM name window to select the network adapter and to setup any of the other VM properties.
4. When shutting down VS, be sure to turn off any VM that will be run from VPC.

Programming VS

Server Scripts:

When you launch a script from the scripts section of virtual server, it runs under the Network Service account, which may not have sufficient privilege. One way to handle this is by having script run from the host that watches for the specific event (like the VM starting) to initiate your requirements. Run yourscrip.vbs from the host command lines as "cscript yourscrip.vbs" where cscript is the system command that will interpret your script.

Windows App:

The easiest way to access a VM in VS is to use the AxVMRC (active X virtual machine remote control).

Select a VB Win Application template, go to tools, toolbox items, COM components, and select MS VS VMRC Control. Add this form to the Win App and config its properties. The VS VMRC may now be programmed to access the VM's application running on the VS.

Note on VS Network with gigabyte card when accessing a 1 meg data files on my system:

Cadd03 E:	0 seconds	E: is on Cadd03 VM
CaddXX E:	15 seconds	E: is on Cadd03 VM
CaddXX H:	7 seconds	H: is on Office02 host

Keeping the data on Cadd03 will permit Cadd03 the fastest access time. CaddXX however takes twice as long to access the data from Cadd03 then if it were on the host. In the situation that the host has its own card, I estimate that file access may be as low as 2 seconds.

Notes on DOS and NET:

When the VM is required to be seen from the host, start the server (net share drive_c) after 4D is installed (via autoexec.sgx). 4D will run fastest when installed in this sequence. If you do not start server.exe, it doesn't matter when you install Net.exe and Share.exe. Once you start the server, it will persist until you turn it off (net share drive_c /delete).

On my setup, file access from CaddXX to the database on Cadd03 is slow. In addition to DOS Share, installing the Vmadd program FShare.exe appears to increase file access speeds between the PCs. It is my understanding that the emulated network card operates as fast as the network hardware. I will verify this after I upgrade hardware.

Each network consists of a common protocol. The DOS network workgroup setup comes with NetBeui, therefore any PC on that net requires NetBeui as its protocol. WinXP and WinVista don't include netBeui, but it can be manually installed. Sources for NetBeui include the WinXP installation CD.

File locking is implemented at two levels, the OS and by 4D's configuration. Net is configured as /full and 4D identifies the locked file. With two versions of 4D running by VPCs, a file may be opened by both and both are locked out of updating any changes. Use of Net command via a batch file is required to unlock the file to one VM

Vmad386 is an optional driver to be used in place of the standard DOS driver. If it becomes necessary to free low dos memory, this driver may be considered.

Current problems:

Getting help from the 4D command line can crash the system in certain instances. For example: "File!" will open a window and display help for "File ". Placing a space between "File " and "!", such as "File ! " will cause the system to crash and loss of the current file.

System boots when opening a part (drawing 'd') created by "construct part" from drawing 'a'. Drawing 'd' includes figure 'b', that in turn includes figure 'c'. Have not attempted this in a DOS VM.

Copying a screen image with "Alt PrtScreen" on a DOS VPC causes the mouse to hang, Cntl-Alt-Del will not reboot the VM and it must be closed.

On my system, 4D hangs in a VS VM after it has been inactive for some time. The input devices do not function and VM is no longer accessible from the net. I am not sure of the cause, that may include VS itself, the VMRC client or the program I wrote to switch the digitizer from one VM to another. This is not a major problem because it happens infrequently and only after the auto save is made.

When editing multiple files, some of my UPLs crash when one VM attempts to open a drawing file that has been locked by another VM. This is difficult to fix because I use:

```
ivar=1                                --set to update figure
sysvarI(-1314,ivar)
send
send "Exit save replace pack#13#",CntFileName
```

ivar=2
sysvarI(-1314,ivar)

--set to ask for update figure

When the CntFileName opens and attempts to update a locked figure the program may hang, I do not know of any way to test for and bypass updating the locked file in this situation.

Graphic Cards:

The refresh rate of the VPC window doesn't seem to be related to its size. The 1024X768 redraw speed did not appear to be any faster than the 1280X1024 (40% larger) window. In the Win98 VPC, added memory on the mother board increased the graphic update rate. I did not verify this for 4D.

A good overall measurement of a card's performance is its frame rate, measured in frames per second (FPS). The frame rate describes how many complete images the card can display per second. The human eye can process about 25 frames every second, but fast-action games require a frame rate of at least 60 FPS to provide smooth animation and scrolling. Components of the frame rate are:

- Triangles or vertices per second: 3-D images are made of triangles, or polygons. This measurement describes how quickly the GPU can calculate the whole polygon or the vertices that define it. In general, it describes how quickly the card builds a wire frame image.
- Pixel fill rate: This measurement describes how many pixels the GPU can process in a second, which translates to how quickly it can rasterizing the image. The graphics card's hardware directly affects its speed. These are the hardware specifications that most affect the card's speed and the units in which they are measured:
 - GPU clock speed (MHz)
 - Size of the memory bus (bits)
 - Amount of available memory (MB)
 - Memory clock rate (MHz)
 - Memory bandwidth (GB/s)
 - RAMDAC speed (MHz)

After VESA, 3D garaphic card speed features includes improvements unavailable to 4D. Because of this, processer bus width and its speed, as well as graphic card throughput are of primary consideration in the host's configuration. It graphic card memory size is of no value.