

Ten Steps for the creation of a DOS 7.1 Real Mode System (Win98 DOS) with Network support for either NETBEUI or IPX/SPX/Netware protocols

Last updated : March 10, 2007

P. Scott Harris, P.Eng.

e-mail : psharris@trilicium.ca

home page : http://www.trilicium.ca/hl_index.php

I had a requirement for network support with a machine controller running DOS. There are a number of third party suppliers of client services for DOS but Windows 9x has networking support built in.

You can restart a Win9x machine in 'Command prompt only' mode and get network access through the NET USE command (assuming a few changes to the CONFIG.SYS file as outlined below in Step 8) but it requires a full Windows 98 install.

For situations where there isn't space or CPU horsepower available, it is easier to create what is essentially a DOS 7.1 boot floppy having built in network support. A network capable, real-mode DOS could also be transferred to a hard drive using this boot floppy.

My experience has been that something that worked easily and well for me with a given hardware setup may not work for you with a different hardware configuration. This procedure comes with no guarantees and your mileage may vary.

It is assumed that you have Win98 installed on your machine and that you have some sort of Network support installed. For this discussion, the following applies for the development machine but any user and workgroup names could be used :

- Windows 98 is installed
- the machine has a floppy disk drive
- the machine/user name is 'homer'
- the workgroup name is 'server.smb'
- a DAVICOM 9102 PCI Fast Ethernet card is part of the motherboard (could be anything)
- Windows networking is installed
- NETBEUI, IPX/SPX and TCP/IP protocols all happen to be installed but at least one of NETBEUI or IPX/SPX should be installed.

Note that that Win98 DOS only supports NETBEUI and IPX/SPX protocols in real mode. Adding TCP/IP protocol support requires more work and files that don't come with Windows 98.

Step 1

From a DOS window command prompt, create a bootable floppy

```
C>format a:
C>sys a:
```

Step 2

Locate and copy the xxx.DOS file that comes with your ethernet adapter to the floppy. For this example, the file is called DM9PCI.DOS and resides in the C:\WINDOWS directory.

```
C>copy c:\windows\dm9pci.dos a:
```

Step 3

Create three register data files, KEY1.REG, KEY2.REG and KEY3 corresponding to the system register entries for the following registry keys:

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Network\Real Mode Net]
[HKEY_LOCAL_MACHINE\System\CurrentControlSet\control\ComputerName\ComputerName]
[HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\VxD\VNETSUP]
```

These files can be created in one of two ways:

Method 1 : copy and edit the sample data files shown here and insert the user name, workgroup and ethernet adapter DOS file that applies for your system.

Method 2 : use REGEDIT.EXE to find the keys above and then export them to the corresponding KEY1.REG, KEY2.REG or KEY3.REG file

Step 4

Copy KEY1.REG, KEY2.REG and KEY3.REG to the floppy.

```
C>copy c:\key?.reg a:
```

For this example, the files look like the following :

```
----- KEY1.REG -----
REGEDIT4
[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Network\Real Mode Net]
"transport"="*nwlink,ndishlp.sys" <--- this line for IPX/SPX support
"transport"="*netbeui,ndishlp.sys" <--- or this line for NETBEUI support
```

```
"netcard"="DM9PCI.dos"
"LoadRMDrivers"=hex:00,00,00,00
"preferredredir"=""
-----

----- KEY2.REG -----
REGEDIT4
[HKEY_LOCAL_MACHINE\System\CurrentControlSet\control\ComputerName\ComputerName]
"ComputerName"="homer"
-----

----- KEY3.REG -----
REGEDIT4
[HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\VxD\VNETSUP]
"Workgroup"="server.smb"
"ComputerName"="homer"
"Comment"="My desktop"
"StaticVxD"="vnetSUP.vxd"
"Start"=hex:00
"NetClean"=hex:01
"MaintainServerList"="2"
"LMAnnounce"="0"
"EnablePlainTextPassword"=dword:00000000
-----
```

Step 5

Find the following files (usually all residing in the C:\WINDOWS directory) on your Win98 system and copy them to the floppy diskette:

```
REGEDIT.EXE
PROTOCOL.INI (use the listing below as a model if you don't have one)
NET.EXE
NET.MSG
NETH.MSG
PROTMAN.EXE
PROTMAN.DOS
NDISHLP.SYS
IFSHLP.SYS
EMM386.EXE (optional if you want to use upper memory blocks etc.)
HIMEM.SYS
MORE.COM (usually in C:\WINDOWS\COMMAND\)
SYS.COM (optional, usually in C:\WINDOWS\COMMAND\)
```

```
----- PROTOCOL.INI ----- real mode network setup
[ndishlp$]
DriverName=ndishlp$
Bindings=DM9PCI$
```

```
[protman$]
priority=ndishlp$
DriverName=protman$

[data]
version=v4.10.2222
netcards=DM9PCI$

[DM9PCI$]
DriverName=DM9PCI$

[NETBEUI$]          <--- include this section for NETBEUI support
DriverName=NETBEUI$
sessions=10
ncbs=12
Bindings=DM9PCI$

[NWLINK$]          <--- or include this for IPX/SPX/Netware support
DriverName=nwlink$
Frame_Type=4
cachesize=0
Bindings=DM9PCI$
-----
```

Step 6

Boot the machine using the floppy created so far.

Step 7

The system should now be operating as a simple DOS real-mode machine. Create a system registry file using the following steps:

```
A>regedit /c key1.reg
A>regedit key2.reg
A>regedit key3.reg
```

Step 8

Create a CONFIG.SYS file on the floppy containing the following lines

Note that in the 4th line, the /I:A: means that the PROTOCOL.INI file resides in A:. For a Windows 'Command prompt only' startup, this would typically have to be changed to /I:C:\WINDOWS.

```
DEVICE=HIMEM.SYS
DEVICE=EMM386.EXE NOEMS
DEVICEHIGH=IFSHLP.SYS
DEVICEHIGH=PROTMAN.DOS /I:A:
DEVICEHIGH=DM9PCI.DOS
DEVICEHIGH=NDISHLP.SYS
```

```
DOS=UMB
DOS=HIGH
```

This CONFIG.SYS file will basically give you lots of conventional DOS memory as well as load the drivers for network support. Note that in the PROTMAN.DOS line above, the option /I:A: identifies the location of the PROTOCOL.INI file.

Step 9

Reboot the system (again) using the floppy diskette created so far as the boot floppy. In order to check the default IPX/NETBEUI protocol support, there must be a machine somewhere on the local network which uses the NETBEUI or IPX/SPX protocol (depending on what you chose) and has sharing enabled for its drive. For this example, a machine named 'lisa' has a shareable C drive called 'c-drive' and was set up for both NWLINK and NETBEUI protocols.

Step 10

At the prompt, invoke the NET programme (use NET USE /? | more) to get help) :

```
A>net view \\lisa
A>net use n: \\lisa\c-drive
```

The remote drive \\lisa\c-drive now appears as a local drive N:.

For completeness, a directory of the boot floppy is shown below:

--- hidden files ---

IO	SYS	222,390	04-23-99	10:22p	IO.SYS
DRVSPACE	BIN	68,871	04-23-99	10:22p	DRVSPACE.BIN
MSDOS	SYS	6	08-30-00	11:02a	MSDOS.SYS
SYSTEM	DAT	8,192	09-12-00	11:41p	SYSTEM.DAT
USER	DAT	4,096	09-12-00	11:37p	USER.DAT
		5 file(s)			303,555 bytes

--- standard files ---

COMMAND	COM	93,890	04-23-99	10:22p	COMMAND.COM
DM9PCI	DOS	46,828	03-18-99	3:02p	DM9PCI.DOS
KEY1	REG	213	09-12-00	11:25p	key1.reg
KEY2	REG	119	09-12-00	11:26p	key2.reg
KEY3	REG	307	09-12-00	11:36p	KEY3.REG
REGEDIT	EXE	118,784	04-23-99	10:22p	REGEDIT.EXE
PROTOCOL	INI	311	08-16-00	9:41a	protocol.ini
NET	EXE	356,134	04-23-99	10:22p	NET.EXE
NET	MSG	109,196	04-23-99	10:22p	NET.MSG
NETH	MSG	73,275	04-23-99	10:22p	NETH.MSG
PROTMAN	DOS	22,810	04-23-99	10:22p	PROTMAN.DOS
PROTMAN	EXE	14,952	04-23-99	10:22p	PROTMAN.EXE

```
NDISHLP  SYS           6,140  04-23-99  10:22p  NDISHLP.SYS
IFSHLP   SYS           3,708  04-23-99  10:22p  IFSHLP.SYS
EMM386   EXE          125,495  04-23-99  10:22p  EMM386.EXE
HIMEM    SYS           33,191  04-23-99  10:22p  HIMEM.SYS
CONFIG   SYS             162  08-14-00  8:09p  CONFIG.SYS
MORE     COM           10,471  04-23-99  10:22p  MORE.COM
SYS      COM           18,967  04-23-99  10:22p  SYS.COM
          19 file(s)      1,034,953 bytes
```

A typical floppy disk boot up and network connection session is shown below :

Starting Windows 98...

DAVICOM DM9 PCI Series Ethernet Adapter NDIS 2 MAC Driver Version 1.07 ...

Microsoft (R) Windows 98

(C)Copyright Microsoft Corp 1989-1999

A:\>net use n: \\lisa\c-drive

The WORKSTATION service is not started.

Is it OK to start it? (Y/N) [Y]:

DM9PCI Binded Result :10Base_T Half_Duplex

Type your user name, or ENTER if it is HOMER:

Type your password:*****

Type the password for \\LISA\C-DRIVE:*****

The command was completed successfully

A:\> n:

N:\>

Transfer to a Hard Drive

Once this works, you can take the floppy and use it to transfer networked DOS to a different machine. The transfer of networking support from the floppy to a new, partitioned and freshly formatted hard drive requires the following steps (after booting with the network floppy):

```
A>sys c:
A>md c:\windows
```

The creation of the `c:\windows` directory is required for the new system registry files. The registry files (`SYSTEM.DAT` and `USER.DAT`) must be copied from the floppy disk (A:) to the hard drive (`C:\WINDOWS`). The registry files on the floppy disk are hidden so the attributes must be changed first (`ATTRIB.EXE` is available from the `C:\WINDOWS\COMMAND` directory of a Win98 installation).

```
A>copy *.* c:
A>c:
C>attrib -r -s -h a:*.dat
C>copy a:*.dat c:\windows
C>attrib +r +s +h c:\windows\*.dat
```

Now edit the `CONFIG.SYS` file, and change the reference to `PROTMAN.DOS /I:A:` to `PROTMAN.DOS /I:C:` to reflect the changed location of the `PROTOCOL.INI` file.

You could also copy over most of the files from `C:\WINDOWS\COMMAND\` in the original machine in order to produce a more complete DOS system.