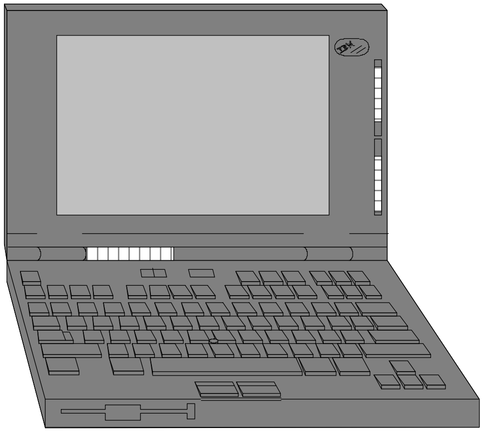
IBM



ThinkPad 560

Technical Information, Tips, and Techniques

Version 3.4

December 1996

Troubleshooting IBM Thinkpad Hardware Setup Problems

If you should experience problems setting up PCMCIA Cards, please follow the procedures listed below:

(1) Please ensure that your ThinkPad is using the latest BIOS release for that system. Later BIOS releases correct problems that users have experienced with the earlier releases. Refer to the ThinkPad BIOS section to determine if you need to update your system's BIOS.

(2) Make sure that your software drivers are at the correct release level and are setup properly. Refer to the ThinkPad PCMCIA Drivers section to see if you need to update your system's PCMCIA device drivers. If you are using Point Enablers, please ensure that they are at the latest release level.

(3) Determine if any upper memory conflicts exist between the areas claimed by ThinkPad BIOS, Card & Socket Services, and Point Enablers. Refer to the ThinkPad Memory Map section.

The Device Driver DICRMU01.SYS /MA=C800-CFFF (DOS PCMCIA Resource Map Utility) sets the upper memory addresses used by Card & Socket Services. The /MA parameter tells Card Services what locations in upper memory can be used by PCMCIA cards or Card Services, and must match or be a subset of an excluded memory range on the EMM386 line of CONFIG.SYS.

(4) Microsoft Windows can overwrite the upper memory address used by Card & Socket Services. To prevent this, add an EmmExclude=XXXX-XXXX statement to the [386 Enh] section of SYSTEM.INI (Where XXXX-XXXX is the same as the memory region as used in the /MA parameter for the DICRMU01.SYS driver). If you are using point enablers, be sure to exclude any upper memory used by the enabler by adding an EmmExclude statement to SYSTEM.INI.

(5) Make sure that no interrupt conflicts exist between ThinkPad devices and any PCMCIA Cards. Refer to the ThinkPad Interrupt Assignments section to view the default interrupt assignments. Please note that the ThinkPad System Setup Utility allows you to view and change interrupt assignments for many internal devices.

Installing Windows 95 on the ThinkPad 560

(1) For complete Windows 95 directions, please download TPWIN95.EXE from the IBM BBS.

(2) The ThinkPad 560 uses a Trident Cyber9382 Graphics Accelerator. Ensure that Windows 95 is installed using the ThinkPad 560 Windows 95 Video Driver Diskette.

(3) It is STRONGLY RECOMMENDED that you update your system BIOS to the latest BIOS release before installing Windows 95 on your system. Early BIOS releases do not support Plug & Play or MWAVE under Windows 95. Refer to the BIOS section for the latest BIOS level for you ThinkPad.

(4) The ThinkPad Features Program for Windows works on Windows 95. If you install Windows 95 on a blank hard disk or you haven't installed ThinkPad Features Program, follow the instructions of "ThinkPad Features Program - Installing for Windows" in the ThinkPad User's Guide. Please ensure that you are at the latest levels (refer to Driver Levels section of this document).

(5) Enable the Windows 95 Integrated PCMCIA Support Software. Install the ThinkPad 560 Socket Services Driver and PC Card Director for Windows 95 (using the Windows 95 & OS/2 PCMCIA Drivers diskette).

(6) You can use ThinkPad Infrared device driver on Windows 95. If you don't have ThinkPad Infrared device driver version 3.0, you may encounter some problems. Refer to the Driver Levels section of this document.

(7) If you are using an IBM PCMCIA Token-Ring Adapter, download TRCC1.EXE for an updated driver for Windows 95.

(8) Windows 95 treats the IBM Ethernet Credit Card Adapter as a Plug & Play Adapter. However, some older versions of this adapter do not support Plug & Play. If you insert this adapter into a system running Windows 95, the system may lock until you remove the adapter. To correctly configure this adapter for Windows 95, boot in Safe Mode, go into Device Manager, and manually configure the adpater for I/O 300, IRQ 9, Mem Address D400.

Installing Windows NT 4.0 on the ThinkPad 560

(1) Update your system BIOS to the latest BIOS release before installing Windows NT on your system.

(2) Download the latest ThinkPad Windows NT 4.0 Installation Instructions (TPWINT40.TXT) from the IBM BBS or Web site. Also download the latest drivers required for your system (see Drivers for Windows NT section for the files to download)

(3) Install Windows NT on the ThinkPad.

(4) After NT has been installed, update the ThinkPad 560 Windows NT Video Device Driver. Use the ThinkPad Video Driver you downloaded from the BBS. Insert the diskette in Drive A. Select Control Panel, then Display, then Settings, then Display Type, then Change, then Have Disk. Choose IBM ThinkPad (Cyber 9320/9382/9385). Restart Windows NT after installation. After restart, select the proper resolution.

(5) Install the Windows NT version ThinkPad Utilities program. Using this program, you can change your hardware configuration, display the fuel gauge, and set the device stand-by timers (same as in the Windows 3.1 or Windows 95 environments). Logoff and log back on to enable the ThinkPad Utilities. Once you install the ThinkPad Utilities, Suspend/Resume and Power Management are supported under Windows NT.

(6) For the ThinkPad 560, Windows NT Audio Support is provided via a file from the IBM BBS. Install Audio support using the appropriate diskette.

(7) Install ThinkPad infrared support using the file from the IBM BBS.

Currently, the following functions are not supported on Windows NT:

Hibernation functions are not supported on NTFS partitions.

Installing OS/2 WARP on the ThinkPad 560

(1) Update your system BIOS to the latest BIOS release before installing OS/2 WARP on your system.

(2) Boot the Thinkpad from the Installation diskettes and proceed through the first part of the installation. At the end of this stage of installation, at the screen which says "...Remove the Diskette and Press Enter to Restart the System..."; press the F3 key to exit to a command prompt. At this point, use the TEDIT editor to edit the CONFIG.SYS on the installable drive and remove the line:

```
BASEDEV=SONY31A.ADD
```

(3) After the Thinkpad re-boots to the System Configuration Screen, select VGA for the video display (the installation will auto-detect a Trident 8900, this will not work). Choose Thinkpad 755CE/CsE for PCMCIA support. Select Multimedia Device Support and change to Port Address for the ESS 688 device to 240. Select OK from the System Configuration Screen and proceed with the installation of desired software components.

Note: The ESS 688 driver may give an error on re-boot if the device was not previously set to Port Address 240. Ignore the error and proceed with the installation. This can be corrected at the end of the installation using the Thinkpad Features to set the device to 240.

(4) Install the Thinkpad Features for OS/2 using the INSTALL2 program from the Thinkpad Utilities diskette 1. The INSTALL2 program can be run from an OS/2 window.

(5) Installation of the PC Card Director v4.02 is not necessary unless the features of this version are desired. Install the PC Card director by running the PCMINST2 command from the PC Card Director for OS/2 and Win95 v4.02 diskette.

(6) Video Installation -- Insert the Video Features for OS/2 Warp diskette and type INSTALL x from the A: prompt, where x is the drive in which OS/2 is installed; and follow the instructions.

Latest Version of ThinkPad BIOS

ThinkPad Model	Latest BIOS Part Number	Date
560	91G1871	08/02/96

To view the BIOS Part Number, turn off the computer, press and hold F1, then turn on the computer. Hold F1 until the Easy-Setup menu appears. Select Config followed by SystemBoard. To get the latest BIOS for the ThinkPad 560, download SYTPK101.EXE from the IBM BBS.

Upgrading The ThinkPad Flash BIOS

- You need an AC adapter and a charged battery pack to update the system program.
- If your computer is attached to a ThinkPad Docking Station or a port replicator, turn off the computer and detach it before proceeding.

(1) Firmly connect the AC adapter to the computer.
(2) Insert the System Program Service Diskette into the diskette drive and turn on the computer.
(3) Select "Update system program" and follow the instructions on the screen.

Warning: Do not turn off or suspend the computer until the update has been completed. IF YOU TURN OFF OR SUSPEND THE COMPUTER WHILE THE UPDATE IS STILL IN PROGRESS, THE SYSTEM BOARD MAY HAVE TO BE REPLACED.

- After the update has been completed, you **MAY** need to initialize the system. Please note that initalizing the systems resets all customization settings (IRQ, DMA, I/O, and Device Settings made with the ThinkPad Utilities) to the factory default.

(1) Remove the System Program Service Diskette from the diskette drive and turn off the computer.
(2) Press and hold F1, then turn on the computer. Hold F1 until the Easy-Setup menu appears.
(3) If a password prompt appears, type the correct password.
(4) Select Config, then select Initialize.
(5) Select OK to initialize system.

- You may want to run the diagnostics to make sure that the computer runs with no errors:

(1) Turn off the computer, press and hold F1, then turn on the computer. Hold F1 until the Easy-Setup menu appears.
(2) Select Test, then select Start to run all the basic tests.
(3) Verify that OK appears for all of the devices tested.
(4) Press Esc to exit Test and turn off the computer.

Latest Version of DOS Card & Socket Services Drivers for ThinkPad 560

File Name	Driver Description	Version	File Date	File Size
IBMDSS01.SYS	DOS PCMCIA Socket Services Driver	2.02	04-03-96	16502
IBMDSS04.SYS	DOS PCMCIA Socket Services Driver	2.02	04-19-96	14036
IBMDSS14.SYS	DOS PCMCIA Socket Services Driver	2.02	04-19-96	15506
IBMDOSCS.SYS	DOS PCMCIA Card Services Driver	3.11	05-13-96	41264
DICRMU01.SYS	DOS PCMCIA Resource Map Utility	1.28	05-13-96	12733
$ICPMDOS.EXE	DOS PC Card Power Management Driver	3.03	05-13-96	20092
AUTODRV.SYS	DOS PCMCIA PC Card Auto Configurator	2.01	06-13-95	8361

Latest Version of OS/2 Card & Socket Services Drivers for ThinkPad 560

File Name	Driver Description	Version	File Date	File Size
IBM2SS01.SYS	OS/2 PCMCIA Socket Services Driver	2.02	04-03-96	19014
IBM2SS04.SYS	OS/2 PCMCIA Socket Services Driver	2.02	04-19-96	14926
IBM2SS14.SYS	OS/2 PCMCIA Socket Services Driver	2.02	04-19-96	19400
PCMCIA.SYS	OS/2 PCMCIA Card Services Driver	1.44	04-22-96	48646
VPCMCIA.SYS	OS/2 Virtual Card Services Driver	1.40	04-22-96	13824
ICRMU01.SYS	OS/2 PCMCIA Resource Map Utility	1.24	04-22-96	10381
$ICPMOS2.SYS	OS/2 PC Card Power Management Driver	2.06	07-08-96	5992
AUTODRV2.SYS	OS/2 PCMCIA PC Card Auto Configurator	2.01	03-22-96	9178

Latest Drivers for ThinkPad 560

IBM BBS File Name	Driver Description	Version	File Date
Drivers for DOS/Windows 3.1x:			
PCTPGW31.EXE	DOS/Windows 3.1X PCMCIA Drivers	4.03	10-03-96
UTTPGDOS.EXE	ThinkPad Utility Programs - DOS	3.51	10-31-96
UTTPGWIN.EXE	ThinkPad Utility Programs - Windows 3.1X/Windows 95	3.51	10-31-96
VFTPKW31.EXE	Windows 3.1X Video Drivers	1.10	08-26-96
AFTPGW31.EXE	560 Windows 3.1 Audio Driver	1.00	10-15-96
IRTPGALL.EXE	Infrared Drivers	3.01	10-15-96
ATADO200.EXE	PC Card Hard Disk Drive Device Drivers	2.00	03-22-94
Drivers for Windows 95:			
PCTPGO95.EXE	Windows 95 & OS/2 PCMCIA Drivers		10-31-96
UTTPGDOS.EXE	ThinkPad Utility Programs - DOS	3.51	10-31-96
UTTPGWIN.EXE	ThinkPad Utility Programs - Windows 3.1X/Windows 95	3.51	10-31-96
VFTPGW95.EXE	Windows 95 Video Drivers	1.10	10-15-96
AFTPGW95.EXE	560 Windows 95 Audio Driver	1.00	10-15-96
IRTPGALL.EXE	Infrared Drivers	3.01	10-15-96

Latest Drivers for ThinkPad 560

IBM BBS File Name	Driver Description	Version	File Date
Drivers for OS/2:			
PCTPGO95.EXE	Windows 95 & OS/2 PCMCIA Drivers		10-31-96
UTTPGDOS.EXE	ThinkPad Utility Programs - DOS	3.51	10-31-96
UTTPGOS2.EXE	ThinkPad Utility Programs - OS/2	3.51	10-31-96
VFTPKOS2.EXE	OS/2 Warp Video Drivers	1.10	08-26-96
AFTPGOS2.EXE	560 OS/2 Audio Driver	1.01	10-15-96
IRTPGALL.EXE	Infrared Drivers	3.01	10-15-96
Drivers for Windows NT:			
UTTPGWNT.EXE	ThinkPad Utility Programs - Windows NT	1.00	10-31-96
VFTP3WNT.EXE	Windows NT 3.51 Video Drivers	1.10	10-31-96
VFTP4WNT.EXE	Windows NT 4 Video Drivers	1.00	10-31-96
TPIDEWNT.EXE	Busmaster IDE Driver	1.00	08-28-96
AFTP3WNT.EXE	Windows NT 3.51 Audio Driver - 365X, 560, 760L & EL	1.10	10-31-96
AFTP4WNT.EXE	Windows NT 4 Audio Driver - 365X, 560, 760L & EL	1.00	10-31-96
IRTPGWNT.ZIP	Infrared Drivers - Windows NT	1.00	01-06-97

ThinkPad 560 Memory Map

Location	Use
0000 - 9FFF	System RAM
A000 - AFFF	Video Graphics
B000 - B7FF	Mono Video
B800 - BFFF	Video Text
C000 - C7FF	Video BIOS
C800 - DFFF	Available[1]
E000 - E7FF	Available
E800 - EFFF	Available
F000 - FFFF	System BIOS

[1] Available means open for either PCMCIA card usage or for mapping as upper memory blocks.

ThinkPad 560 Interrupt Assignments

	2	3	4	5	7	9	10	11	15
Cascade Interrupt Req From IRQ 8-15	Default								
Serial Port		Optional	Optional						
Infrared		Optional	Default						
Parallel Port				Optional	Default				
Audio				Default	Optional		Optional	Optional	
PCMCIA Cards		Optional	Optional	Optional	Optional	Optional	Optional	Optional	Optional

Note

The following interrupts are used by the system: IRQ 0 (Timer), IRQ 1 (Keyboard), IRQ 6 (Floppy Diskette Drive), IRQ 8 (Real-time Clock), IRQ 12 (Mouse/Trackpoint), IRQ 13 (Math Coprocessor), and IRQ 14 (Hard Disk Drive).

ThinkPad 560 DMA Channel Assignments

DMA	Default Assignment	Other Possible Uses
DRQ0	Unused	Audio, Parallel Port ECP Mode
DRQ1	Audio	Parallel Port ECP Mode
DRQ2	Diskette Drive	
DRQ3	Unused	Parallel Port ECP Mode
DRQ4	Cascade	
DRQ5	Unused	
DRQ6	Unused	
DRQ7	Unused	

IBM Card & Socket Services Drivers for ThinkPad 560

DEVICEHIGH=C:\THINKPAD\IBMDSS01.SYS /D (DOS PCMCIA Socket Services Driver for PCMCIA Socket Services 2.1)

The /D parameter allows warm docking when used with a Dock II docking station. If you are not using a Dock II then removing the /D parameter will reduce the amount of upper memory this driver uses by approximately 1KB. Socket Services uses between 6KB and 7KB of memory .

DEVICEHIGH=C:\THINKPAD\IBMDOSCS.SYS (DOS PCMCIA Card Services Driver for PCMCIA Socket Services 2.1)

Card Services uses 26KB of memory.

DEVICEHIGH=C:\THINKPAD\DICRMU01.SYS /MA=C800-CFFF (DOS PCMCIA Resource Map Utility)

The /MA parameter tells Card Services what locations in upper memory can be used by PCMCIA cards or Card Services, and must match or be a subset of an excluded memory range on the EMM386 line. The PCMCIA Resource Memory Map Utility Driver does not remain in memory.

DEVICEHIGH=C:\THINKPAD\$ICPMDOS.SYS (DOS PC Card Power Management Driver)

This driver uses 3KB of memory.

DEVICEHIGH=C:\THINKPAD\AUTODRV.SYS

This statement loads the PCMCIA Super Client Driver (AUTODRV.SYS) into upper memory. AUTODRV.SYS recognizes many popular modems, 3270 cards, and SCSI cards. It does not recognize 5250 PCMCIA cards, SDLC cards, or LAN PCMCIA cards. AUTODRV.SYS uses 7KB of memory.

Please note that Card & Socket Services also requires a 4KB block of upper memory.

THINKPAD DOS/WINDOWS MEMORY MANAGEMENT TIPS

Memory Management Without PCMCIA Cards

(1) If you do not intend to use PCMCIA Cards, there is no reason to load Card & Socket Services Drivers. Remove all IBM Card and Socket Services Device Drivers from CONFIG.SYS (See previous page).

(2) Card & Socket Services Drivers are not required to use the MWAVE DSP Modem or DSP Audio functions.

(3) Review the ThinkPad Memory Map for your system. Include any upper memory areas not used by adapter cards in the Docking Station. Be sure to exclude the address of the SCSI adapter in the Docking Station if SCSI support is needed.

(4) If you are not using the monochrome video mode (most applications do not), the Monochrome Video Area (B000 - B7FF) may be mapped (by adding I=B000-B7FF to the EMM386.EXE line in CONFIG.SYS). If using Microsoft Windows, add a Device=C:\DOS\MONOUMB.386 statement to the [386Ehn] section of SYSTEM.INI.

Memory Management With PCMCIA Cards

(1) Many PCMCIA card manufacturers provide Point Enablers with their products. Point Enablers are small programs that provide an interface directly to the PCMCIA controller; therefore they must be written to support a particular type of controller.

Point Enablers are relatively simple to configure, do not require Card & Socket Services Drivers, consume no memory (they remove themselves from memory after configuring the card), and provide the maximum DOS memory for your ThinkPad. However, with Point Enablers, you must specify the slot number of the card (therefore , the card must always be in a specific slot). You must also manually assign any upper memory blocks and IRQs used by that card. In addition, hot-plugging of the card is prohibited (in fact, it may damage the card). If Point Enablers are provided with the PCMCIA card(s) you are using, decide whether to use the Point Enablers or Card & Socket Services.

(2) If you use Card & Socket Services, decide whether to use the Super Client Driver (AUTODRV.SYS) or the drivers that are provided with your PCMCIA card(s). The Super Client Driver automatically recognizes many popular PCMCIA cards (including modems, 3270 cards, and SCSI adapters -- it does not recognize 5250 PCMCIA cards, SDLC cards, or LAN PCMCIA cards.). However, the Super Client Driver can consume more memory than do the drivers provided with the PCMCIA card.

(3) Determine the amount and location of upper memory required by your PCMCIA card(s). If possible, locate upper memory required by all PCMCIA cards in one contiguous block. If using Card & Socket Services, these drivers require a 4KB upper memory block that can be located anywhere in upper memory.

(4) Review the ThinkPad Memory Map for your system. Exclude from EMM386.EXE's usage the upper memory areas used by (a) the PCMCIA card(s) and (b) Card & Socket Services (4KB). Include any available upper memory areas not excluded above.

Memory Management With PCMCIA Cards (continued)

(5) If using Card & Socket Services, modify the DEVICE=C:\THINKPAD\DICRMU01.SYS /MA=XXXX-XXXX line in CONFIG.SYS. Make the XXXX-XXXX range match the upper memory area used by any PCMCIA cards (plus the 4KB used by Card & Socket Services).

(6) Exclude any memory area allocated to PCMCIA Cards from usage by Microsoft Windows by adding an EmmExclude=XXXX-XXXX line to the [386Enh] section of the SYSTEM.INI File. Where XXXX-XXXX is the upper memory range allocated to the PCMCIA cards. If you are using Card & Socket Services, the EmmExclude range must match the /MA= range of the DICRMU01.SYS Driver.

(7) If you are not using the monochrome video mode (most applications do not), the Monochrome Video Area (B000-B7FF) may be mapped (by adding I=B000-B7FF to the EMM386.EXE line in CONFIG.SYS). If using Microsoft Windows, add a Device=C:\DOS\MONOUMB.386 statement to the [386Ehn] section of SYSTEM.INI.

(8) If you are using an IBM PCMCIA Token-Ring Adapter download the IBM LAN Client Code from the IBM BBS. This code loads 802.2 Support, Netbios, the Netware Requester, and a TCP/IP stack into extended memory (not upper memory). It can reduce the DOS memory consumption of these protocols to 5KB.

Sample Config: IBM PCMCIA Token-Ring Adapter Installed in 560 Systems

Recommended Memory Locations

IBM Token-Ring PCMCIA Adapter ROM	CC00-CDFF
IBM Token-Ring PCMCIA Adapter RAM	C800-CBFF
IBM Card Services (If Used)	CE00-CEFF

Card Services CONFIG.SYS (Please ensure that you are using the latest Card & Socket Services Drivers)

```
DEVICE=C:\DOS\EMM386.EXE NOEMS X=C000-CEFF I=CF00-EFFF
DEVICE=C:\THINKPAD\IBMDSS01.SYS
DEVICE=C:\THINKPAD\IBMDOSCS.SYS
DEVICE=C:\THINKPAD\DICRMU01.SYS /MA=C800-CEFF
```

Note: Latest IBM Token-Ring Credit Card Adapter Drivers are Version 3.06 (TRCC1.EXE & TRCC2.EXE on the IBM BBS).

Point Enabler CONFIG.SYS

```
DEVICE=C:\DOS\EMM386.EXE NOEMS X=C000-CDFF I=CE00-EFFF
DEVICE=C:\POINTTR.EXE SB RS=16 MMIO=CC00 IRQ=9 SRAM=C800,16
```

Where: SB is Slot B (Bottom Slot) and RS is Ring Speed

If you are using the IBM PCMCIA Token-Ring Adapter in the PCMCIA slot in the Port replicator, you must add the PCIC parameter to your point enabler device statement: For example: DEVICE=C:\POINTTR.EXE PCIC=03E2 SB RS=16 MMIO=CC00 IRQ=9 SRAM=C800,16. The Port Replicator uses 3E2 as its I/O port base address.

Microsoft Windows SYSTEM.INI

```
[386Enh]
EmmExclude=C800-CDFF
```

(or EmmExclude=C800-CEFF if using Card Services)

Setting the Token-Ring ROM & RAM Address

(1)	Novell Netware ODI Drivers (NET.CFG File):	Link Driver TOKEN (Or TOKENCS Or LANSUP) MEM #1 CC000 MEM #2 C8000
(2)	For IBM LAN Support Native Drivers:	DEVICE=C:\LSP\DXMC0MOD.SYS N ,C800,0,0,0
(3)	The IBM LAN Support NDIS Drivers (PROTOCOL.INI File):	RAM = 0xC800 MMIO = 0xCC00 RAMSIZE = 16

Sample Config: IBM PCMCIA Ethernet Adapter Installed in 560 Systems

Recommended Memory Locations

IBM Ethernet PCMCIA Adapter RAM	C800-CBFF
IBM Card Services (If Used)	CC00-CCFF

Card Services CONFIG.SYS (Please ensure that you are using the latest Card & Socket Services Drivers)

```
DEVICE=C:\DOS\EMM386.EXE NOEMS X=C000-CCFF I=CD00-EFFF
DEVICE=C:\THINKPAD\IBMDSS01.SYS
DEVICE=C:\THINKPAD\IBMDOSCS.SYS
DEVICE=C:\THINKPAD\DICRMU01.SYS /MA=C800-CCFF
```

Note: Latest IBM Ethernet Credit Card Adapter Drivers are Version 2.06 (ETCC.EXE on the IBM BBS).

Point Enabler CONFIG.SYS

```
DEVICE=C:\DOS\EMM386.EXE NOEMS X=C000-CBFF I=CC00-EFFF
DEVICE=C:\NET\POINTETH.SYS SB IRQ=9 SRAM=C800 IO=300
```

Where: SB is Slot B (Bottom Slot)

If you are using the IBM PCMCIA Ethernet Adapter in the PCMCIA slot in the Port replicator, you must add the PCIC parameter to your point enabler device statement: For example: DEVICE=C:\POINTETH.SYS PCIC=03E2 SB IRQ=9 SRAM=C800 IO=300. The Port Replicator uses 3E2 as its I/O port base address.

Microsoft Windows SYSTEM.INI

```
[386Enh]
EmmExclude=C800-CBFF
```

(or EmmExclude=C800-CCFF if using Card Services)

Setting the Ethernet RAM Address

(1)	Novell Netware ODI Drivers (NET.CFG File):	Link Driver PCMDMCS PORT 300 INT 9 MEM C8000
(2)	The IBM LAN Support NDIS Drivers (PROTOCOL.INI File):	RAMADDRESS = 0xC800 INTERRUPT = 9 IOBASE = 0x300

IBM PCMCIA MODEM CONFIGURATION

Using the IBM Super Client Driver (AUTODRV.SYS)

(1) The IBM Super Client Driver will automatically recognize IBM PCMCIA Modems. Sample CONFIG.SYS file:

```
DEVICE=C:\DOS\HIMEM.SYS
DEVICE=C:\DOS\EMM386.EXE NOEMS X=C800-CFFF
DEVICE=C:\THINKPAD\IBMDSS01.SYS
DEVICE=C:\THINKPAD\IBMDOSCS.SYS
DEVICE=C:\THINKPAD\DICRMU01.SYS /MA=C800-CFFF
DEVICE=C:\THINKPAD\$ICPMDOS.SYS
DEVICE=C:\THINKPAD\AUTODRV.SYS C:\THINKPAD\AUTODRV.INI
```

Using the IBM PCMCIA Modem Point Enabler (Note: Not All IBM PCMCIA Modems Support this Point Enabler)

(1) The IBM PCMCIA Modem Point Enabler (called PCCOMDOS.SYS) does not require Card & Socket Services. It does reside in memory and requires 16KB. Using the Point Enabler can save up to 36KB (if you do not load Card & Socket Services or AUTODRV.SYS). However, with the IBM Point Enabler hot-plugging of the card is prohibited (in fact, it will damage the card).

(2) Be sure to exclude a 4KB block for the modem in upper memory. If you are also using card services, do not include the 4KB block in the /MA=XXXX-XXXX parameter of the DICRMU01.SYS driver.

(3) Sample CONFIG.SYS file:

```
DEVICE=C:\PCCOMDOS\PCCOMDOS.SYS COM2 /BEEP /WINBIOS /AMEM CE
```

Where:	COM2 is the COM 1, 2, 3, or 4	COM 2 is recommended
	/AMEM is the memory location for the modem's 4KB block	CE00 is recommended

Using the IBM PCMCIA Modem Driver

(1) The IBM PCMCIA Modem Driver (called ESTDFM.EXE) does require Card & Socket Services. It does reside in memory and requires 25KB. Therefore, I recommend that you use the AUTODRV.SYS driver since it takes less memory. ESTDFM.EXE is loaded via the AUTOEXEC.BAT:

ESTDFM.EXE S1C2	Where:	S1 is the Slot Number C2 is the Communications Port (C1, C2, C3, or C4)

MEGAHERTZ MODEM CONFIGURATION

Using the IBM Super Client Driver (AUTODRV.SYS)

(1) The IBM Super Client Driver will automatically recognize most Megahertz PCMCIA Modems. Sample CONFIG.SYS file:

```
DEVICE=C:\DOS\HIMEM.SYS
DEVICE=C:\DOS\EMM386.EXE NOEMS X=C800-CFFF
DEVICE=C:\THINKPAD\IBMDSS01.SYS
DEVICE=C:\THINKPAD\IBMDOSCS.SYS
DEVICE=C:\THINKPAD\DICRMU01.SYS /MA=C800-CFFF
DEVICE=C:\THINKPAD\$ICPMDOS.SYS
DEVICE=C:\THINKPAD\AUTODRV.SYS C:\THINKPAD\AUTODRV.INI
```

Using the MegaHertz PCMCIA Modem Point Enabler

(1) The MegaHertz PCMCIA Modem Point Enabler (called SETMHZ.EXE) does not require Card & Socket Services. In addition, it removes itself from memory once it has configured the modem. This can save up to 49KB (if you eliminate Card & Socket Services). However, with the MegaHertz Point Enabler, you must specify the slot number of the card (therefore, the card must always be in a specific slot). In addition, hot-plugging of the card is prohibited (in fact, it will physically damage the card).

(2) Obtain the latest Megahertz Point Enabler. Versions before 3.1 do not support the ThinkPad 760. Latest version is 4.3. Be sure to exclude a 4KB block for the modem in upper memory. If you are also using card services, do not include the 4KB block in the /MA=XXXX-XXXX parameter of the DICRMU01.SYS driver.

(3) The SETMHZ program is loaded via the AUTOEXEC.BAT file. Format of the SETMHZ.EXE Program:

```
SETMHZ.EXE /cn /in /sn /pnnnn /dnnnn
```

Where:	/cn is COM 1, 2, 3, 4	COM 2 is recommended
	/in is IRQ 1 .. 15	IRQ 3 is recommended
	/sn is Slot A, B, C, or D	
	/pnnnn is the memory location	CE00 is recommended
	/dnnnn is the delay in milliseconds	1500 is recommended

Obtaining Updated Drivers

IBM PC Company Bulletin Board System

BBS Phone Number	919-517-0001
Baud Rate	300-14400 bps
Parity/Data Bits/Stop Bits	N/8/1

IBM PC Company Internet FTP Site

ftp.pcco.ibm.com   cd /pub and get the allfiles.txt file for a listing of available files

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