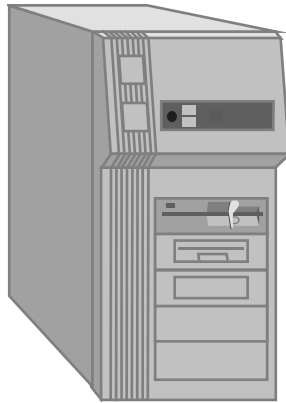


Chapter 4

Network Interface Cards



Network Interface Cards

- Plugs into adapter slot inside computer
- Network interface card
- NIC
- Network adapter
- Network card

NIC Basics

- Creates the network connection
- Manages the network connection
- Changes digital data to signal for media
- Changes signal into data for computer

Parallel to Serial & Back

- Data travels between CPU & adapter in multiple lines on the computer bus (bus)
 - Parallel transmission
- Network signal travels over media in a single line (serial transmission)
- NICs job is managing this translation

Parallel Transmission

- Multi lane highway in computer
- Each lane carries part of the traffic
- At the same time
- A two-way street

Serial Transmission

- Single lane road on media
- Single lane carries all of the traffic
- One direction at a time
- A one-way street
- NIC memory stores data till conversion (buffer)

Communication Mediator

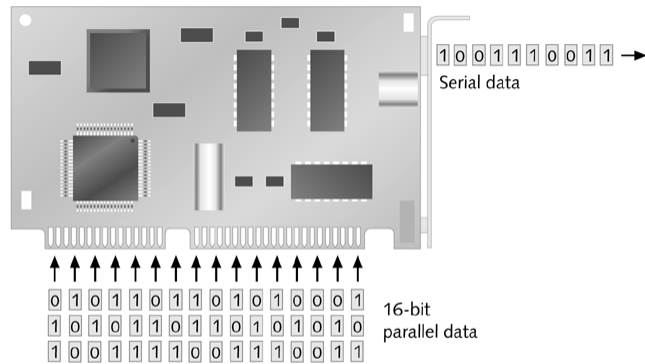


Figure 4-1 NICs mediate communication between a computer and the network cable

NIC Transceiver

- Allows connection to media
- BNC
- RJ-45
- AUI
- Some NICs have multiple ports

NIC Media Interfaces

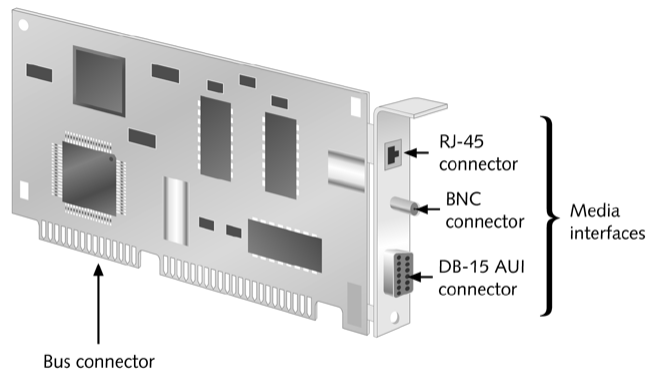


Figure 4-2 Ethernet NIC with interfaces for thinnet (BNC), thicknet (AUI), and 10BaseT (RJ-45)

NIC Data Packaging

- Packs bits into packets
- Handles addressing of data
- Each NIC has unique network address
- Media Access Control (MAC)
- Manages & controls network access

Principles of NIC Configuration

- Three basic settings:
 - Interrupt request line (IRQ)
 - Base I/O port
 - Base memory address
- Hardware and software configurations

Hardware NIC Settings

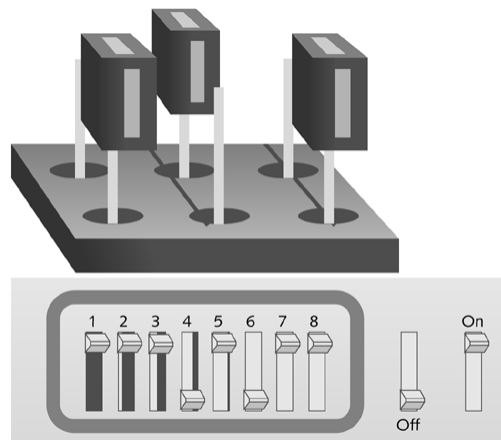


Figure 4-4 Jumper block (top) and DIP switches

Setting IRQs

- Peripherals signal CPU for attention
- Each peripheral must have its own IRQ
- Map machines IRQs using software
- Microsoft MSD.exe for DOS
- Microsoft WIN-MSD.exe for Windows

Common IRQs

Table 4-1 Common PC IRQs

IRQ	Typical Assignment
0	PC system timer
1	Keyboard
2	Cascading IRQ controller or video adapter
3	Unassigned (used for COM2/COM4 or bus mouse)
4	COM1/COM3
5	Unassigned (used for LPT2, often for sound card)
6	Floppy disk controller
7	Parallel port LPT1
8	Realtime clock
9	Cascading IRQ controller, sometimes sound card
10	Unassigned (used for primary SCSI controller)
11	Unassigned (used for secondary SCSI controller)
12	PS/2 mouse (if none present, unassigned)
13	Math co-processor (if none present, unassigned)
14	Primary hard drive controller, usually IDE (if no IDE drives, unassigned)
15	Secondary hard drive controller, usually IDE (if absent, unassigned)

Base I/O Ports

- Memory area device and CPU use to communicate
- Dedicated “mailbox” address
- Each device has its own, unique address
- Identified by 3 digit hexadecimal #

Common I/O Assignments

Table 4-2 Common NIC Base I/O Port Assignments

Port	Device	Port	Device
200	Game port	300	NIC
210	Unassigned	310	NIC
220	Unassigned	320	Unassigned
230	Bus mouse	330	Unassigned
240	Unassigned	340	Unassigned
250	Unassigned	350	Unassigned
260	Unassigned	360	Unassigned
270	LPT3	370	LPT2
280	Unassigned	380	Unassigned
290	Unassigned	390	Unassigned
2A0	Unassigned	3A0	Unassigned
2B0	Unassigned	3B0	LPT1
2C0	Unassigned	3C0	EGA/VGA video
2D0	Unassigned	3D0	CGA video
2E0	Unassigned	3E0	Unassigned
2F0	COM2	3F0	COM1, floppy disk controller

Base Memory Address

- Memory buffer area for temporary storage
- Fixed maximum size (extent)
- Usually in upper memory area or High memory area (HMA)

The Network Attachment

- Select adapter to match medium
- Establish a physical link to medium
- Generate & receive network signals
- Control when to receive signals
- Control when to transmit signals

Special Purpose NICs

- Interface for wireless networks
- Interface for diskless workstations
 - Thinclient, netpc
- Remote boot
- Remote initial load