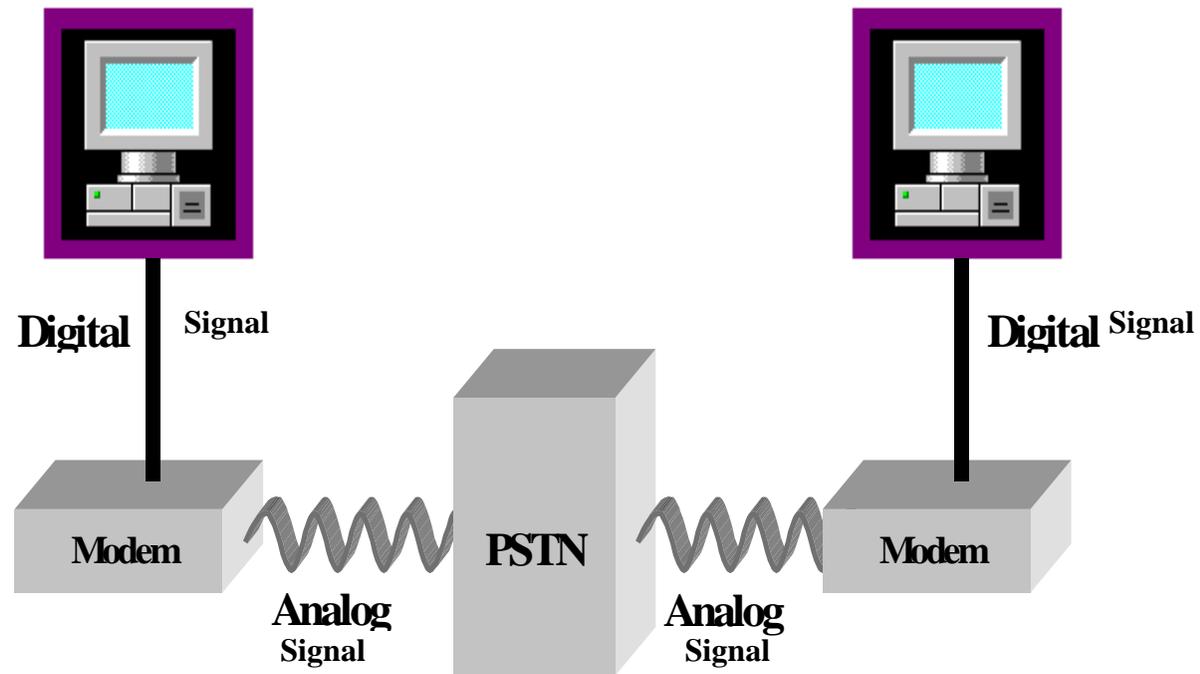


# Network Communications

## Chapter 7

Modems, DSL, Cable Modems and  
ISDN

# Public Switched Telephone Network (PSTN)



PSTN Public Switch Telephone Network

Figure 7.1

# Telephone Carrier Signal (Sine Wave)

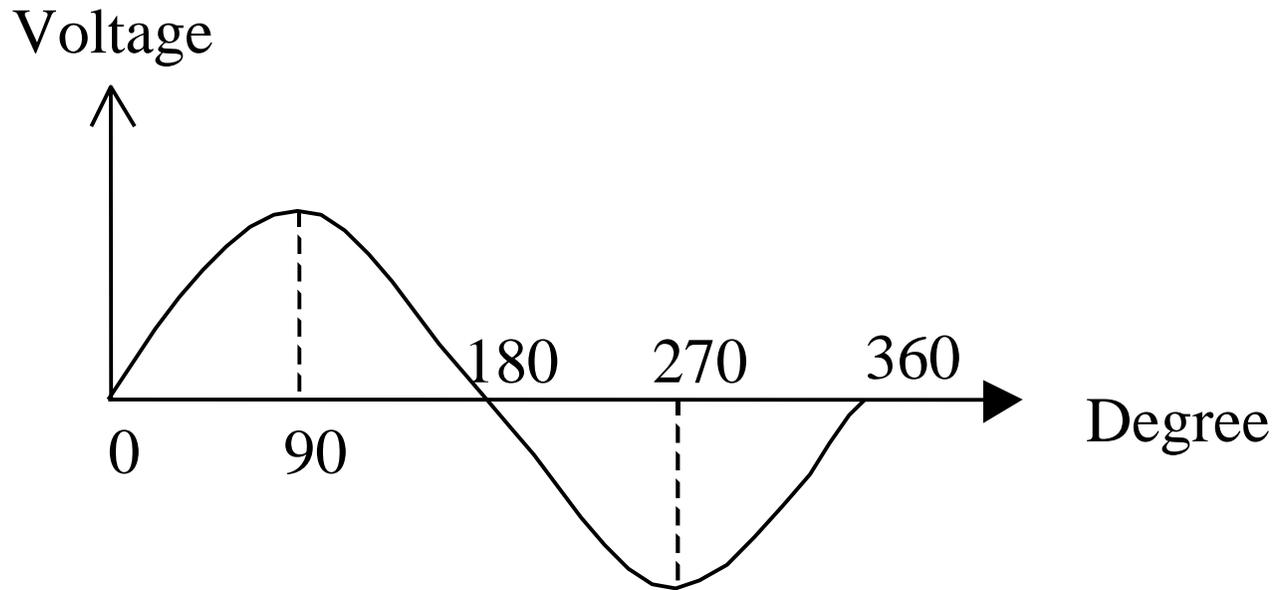


Figure 7.2

# Amplitude Shift Keying (ASK)

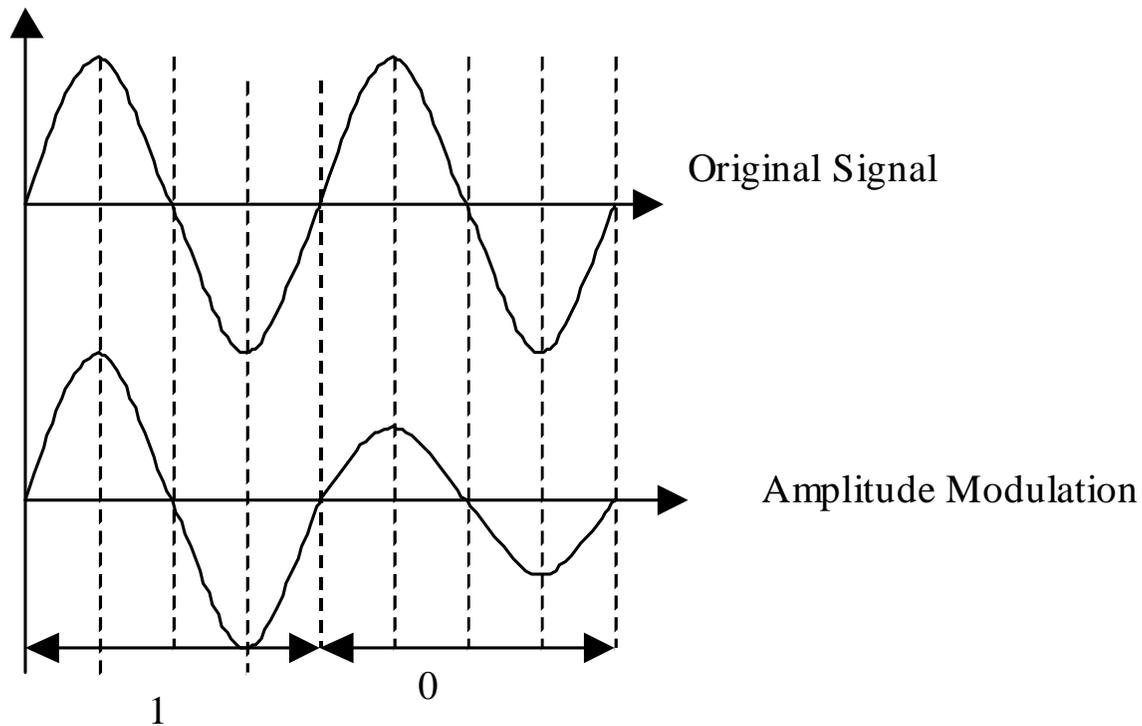


Figure 7.3

# Frequency Shift Keying (FSK)

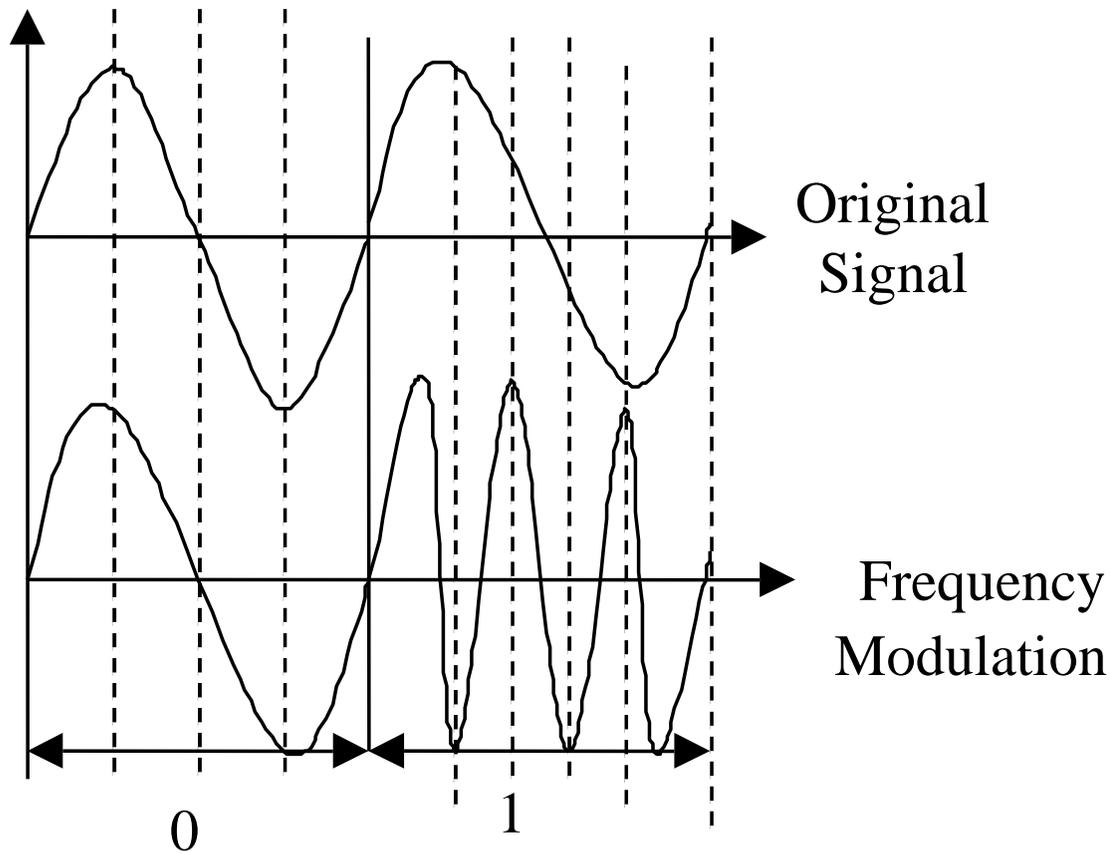


Figure 7.4

# 90 Degree Phase Shift

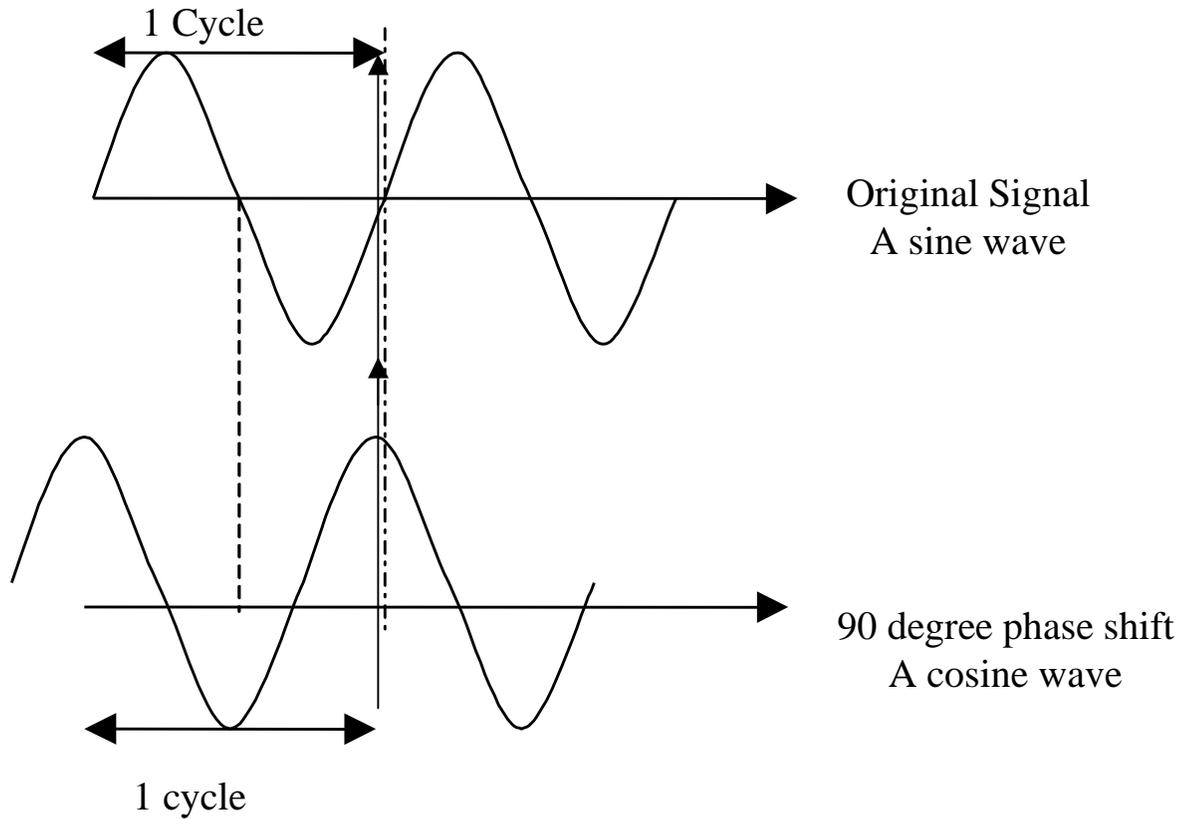
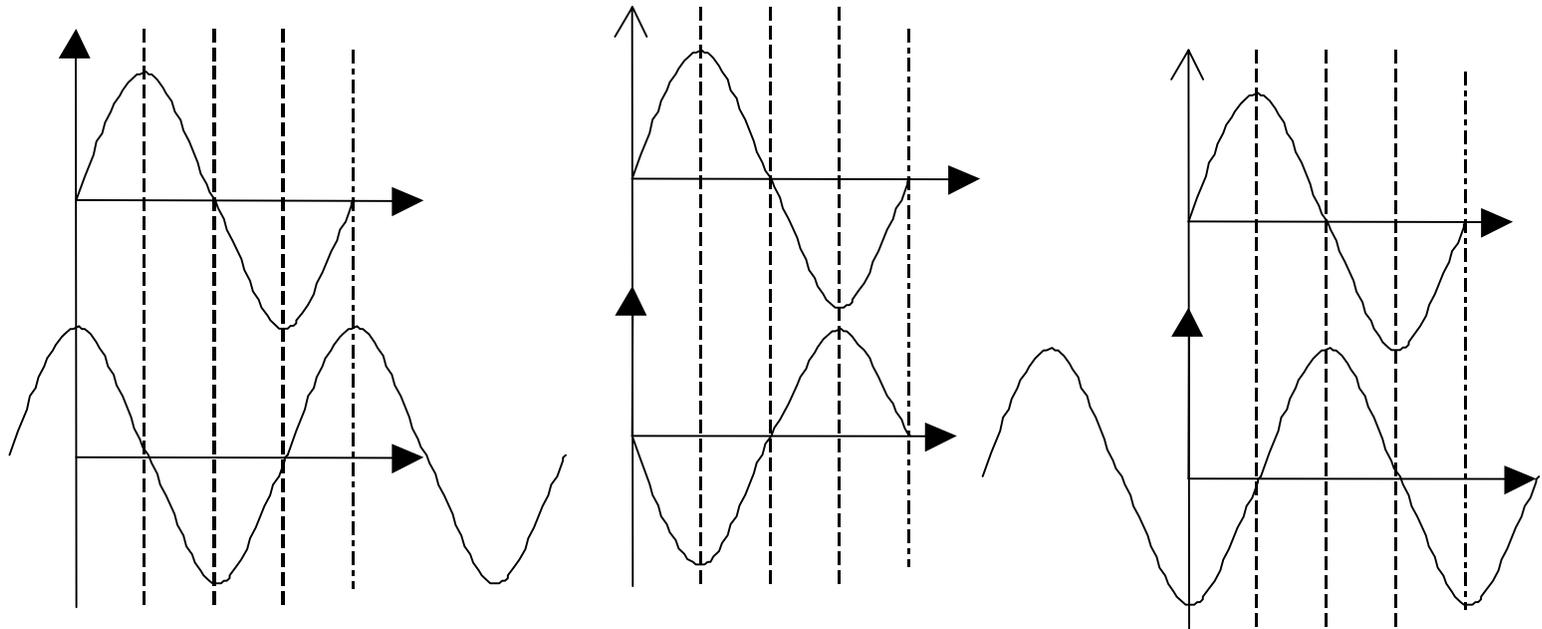


Figure 7.5

# Phase Shifting the Carrier



a. 90 degree shift

b. 180 degree shift

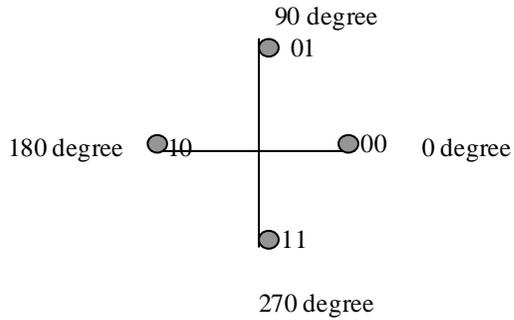
c. 270 degree shift

Figure 7.6

Note: Error in text

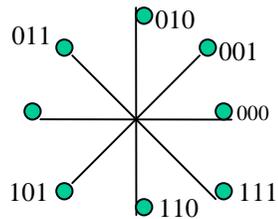
# Constellation Diagrams

Figure 7.7  
QPSK



Bits	Phase Shift
00	0
01	90
10	180
11	270

Figure 7.8  
8-PSK



Bits	Phase Shift
000	0
001	45
010	90
011	135
100	180
101	225
110	270
111	315

# 8 – QAM Modulation

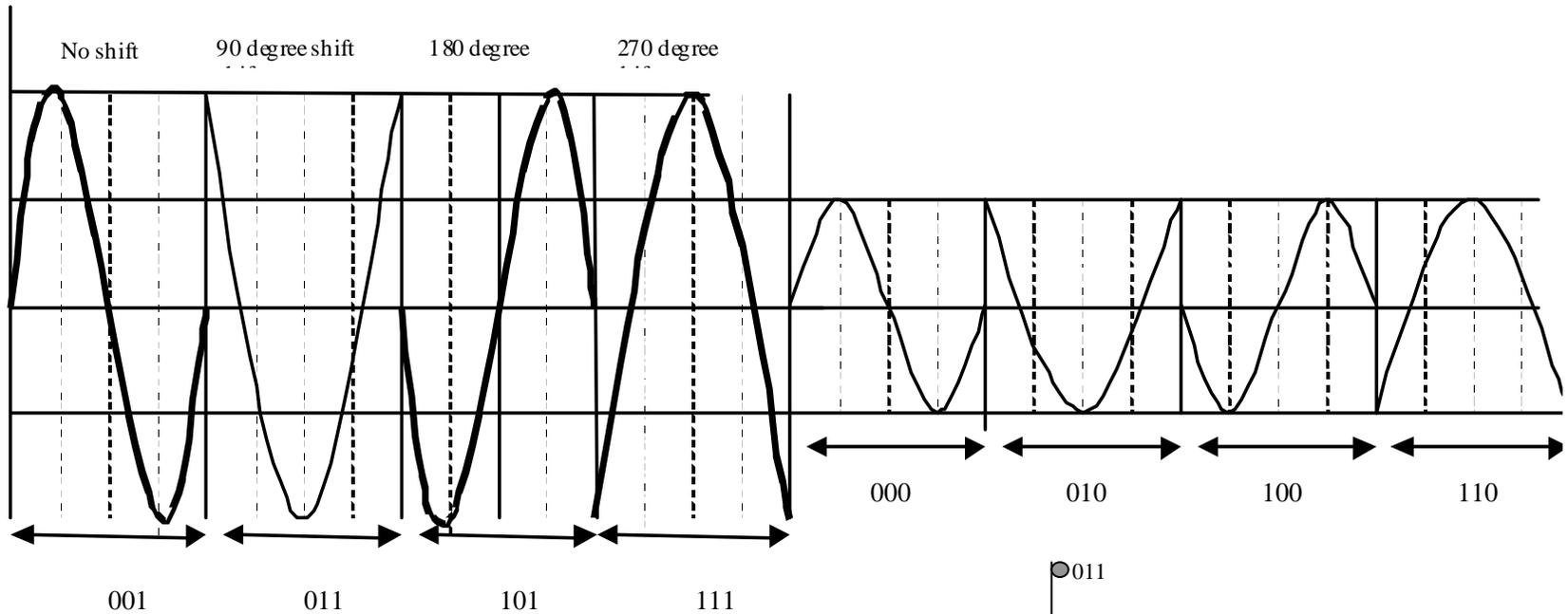


Figure 7.9

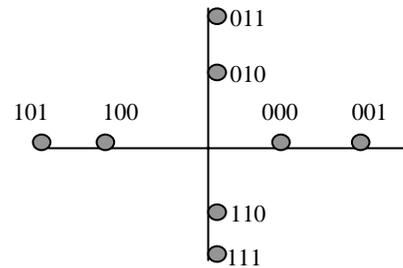


Figure 7.10

# 56 Kb/sec Modem Connection

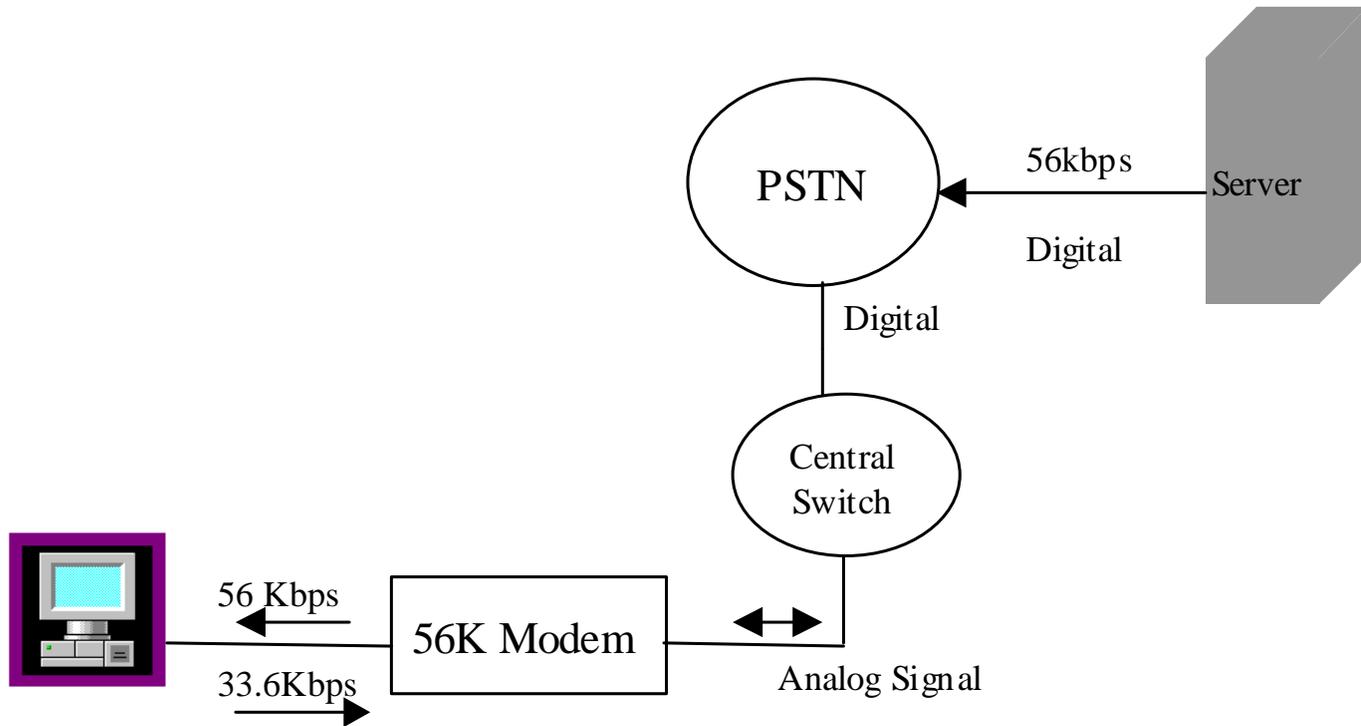


Figure 7.11

# ADSL Modem

## Asymmetric Digital Subscriber Line

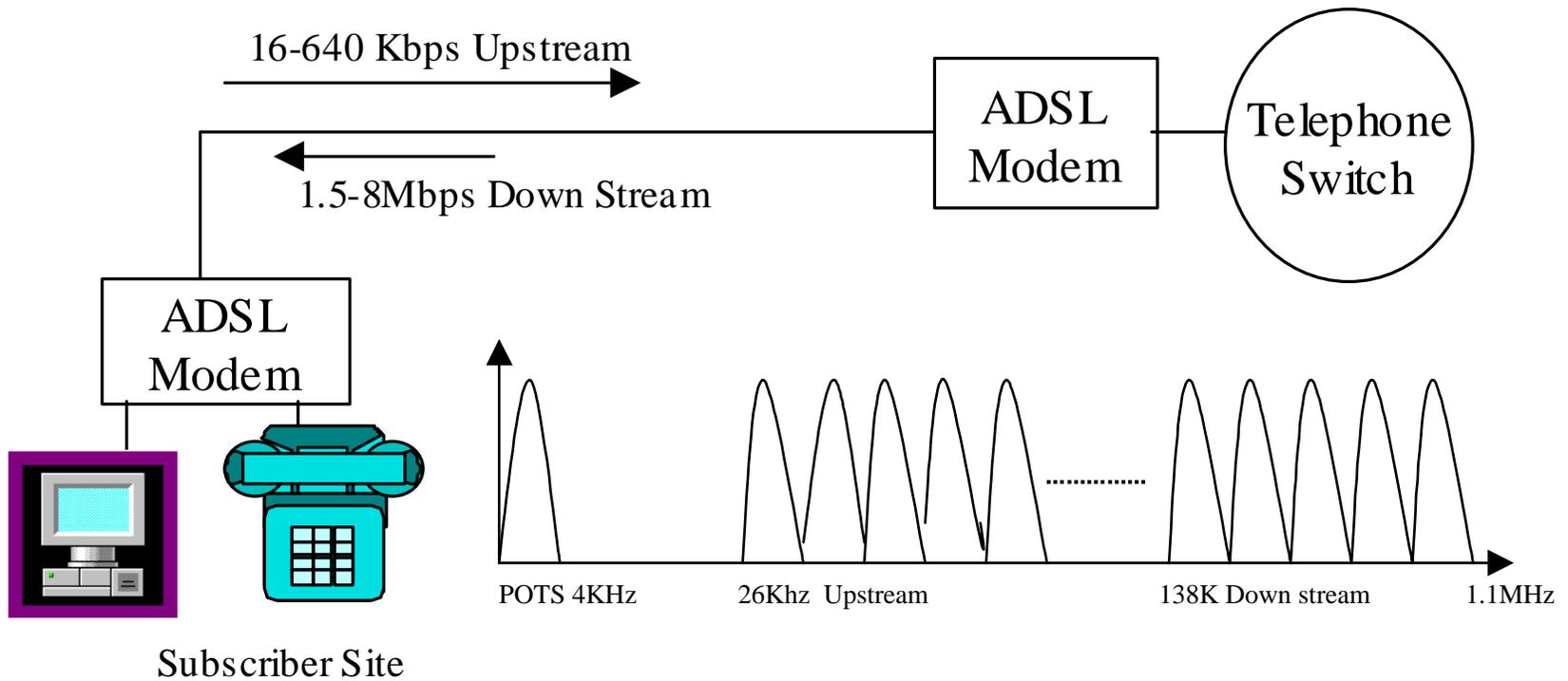


Figure 7.12

Figure 7.13

# ADSL Modem Architecture

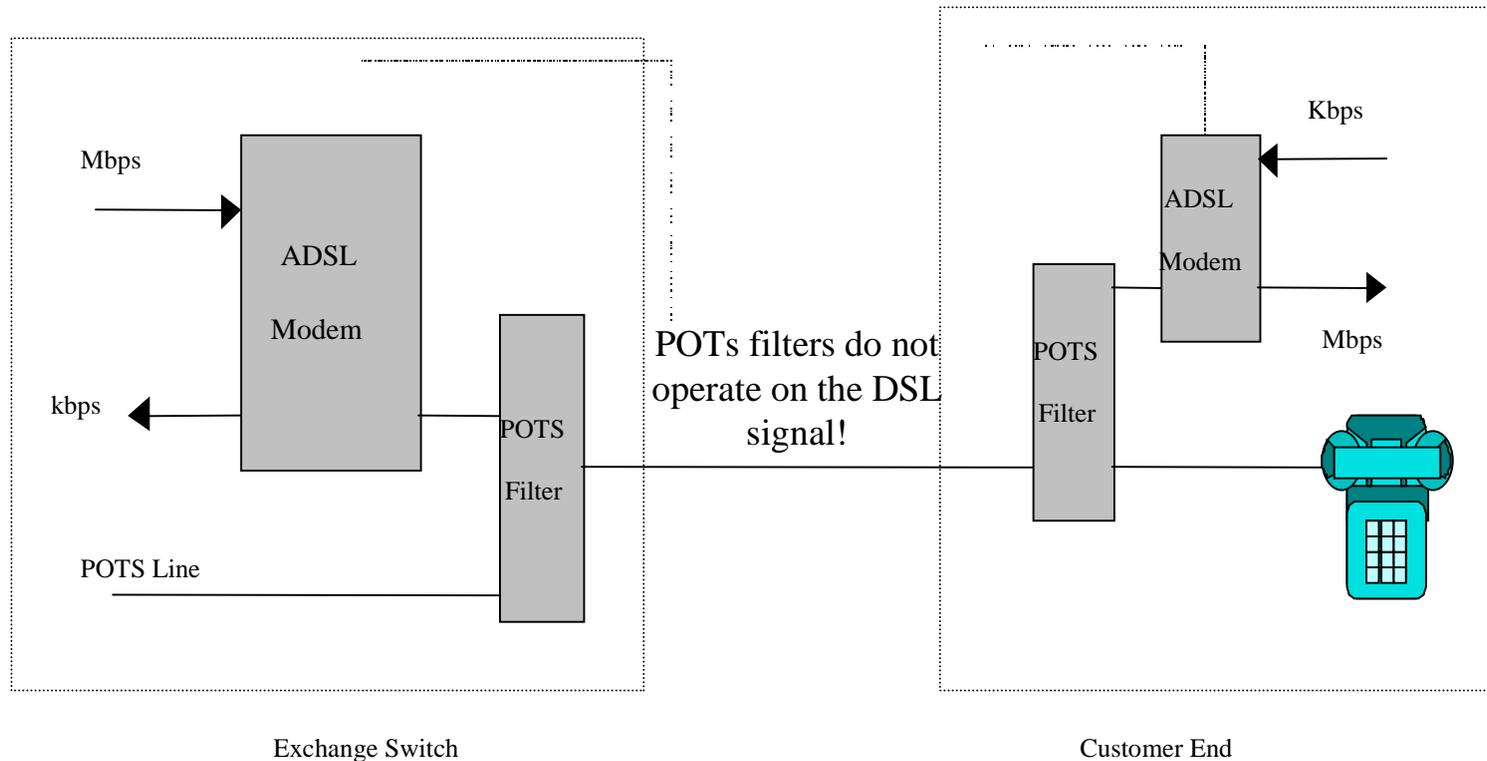


Figure 7.14

# Cable TV Distribution

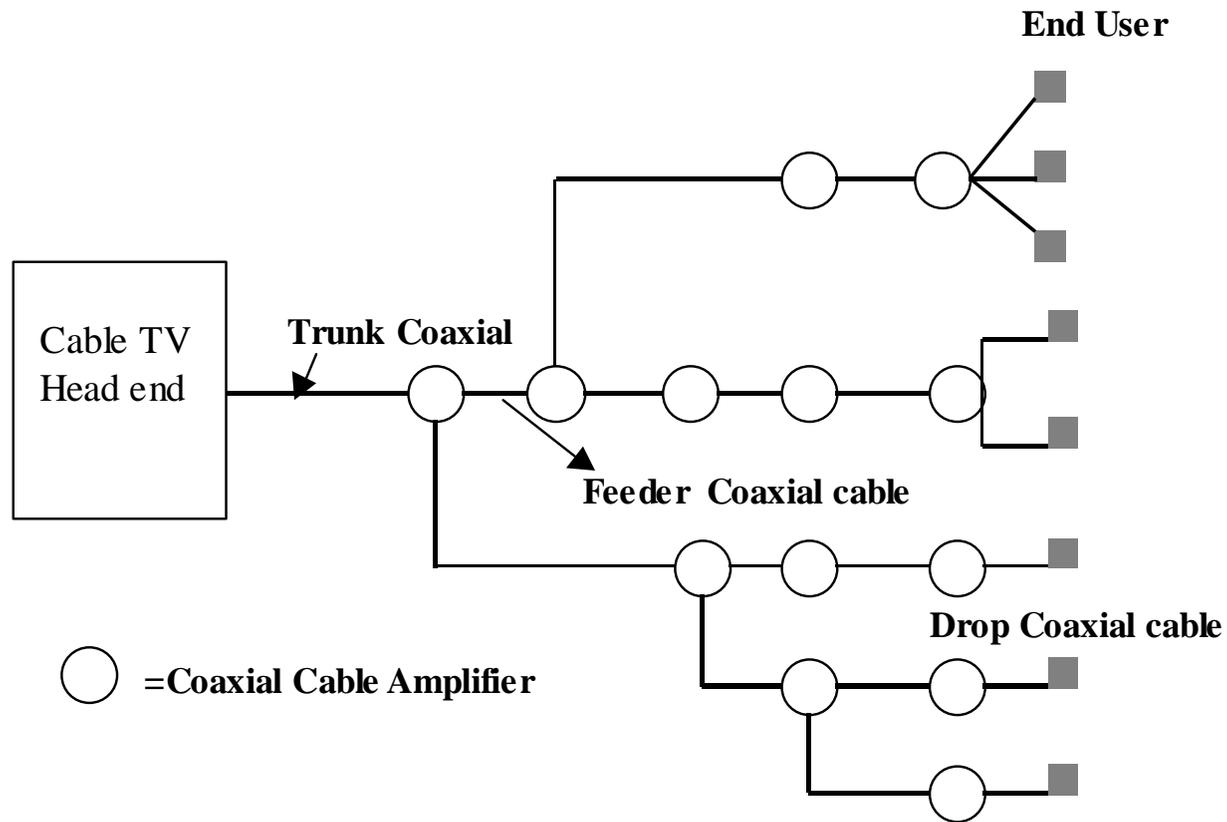


Figure 7.15

# Hybrid Fiber Coax (HFC)

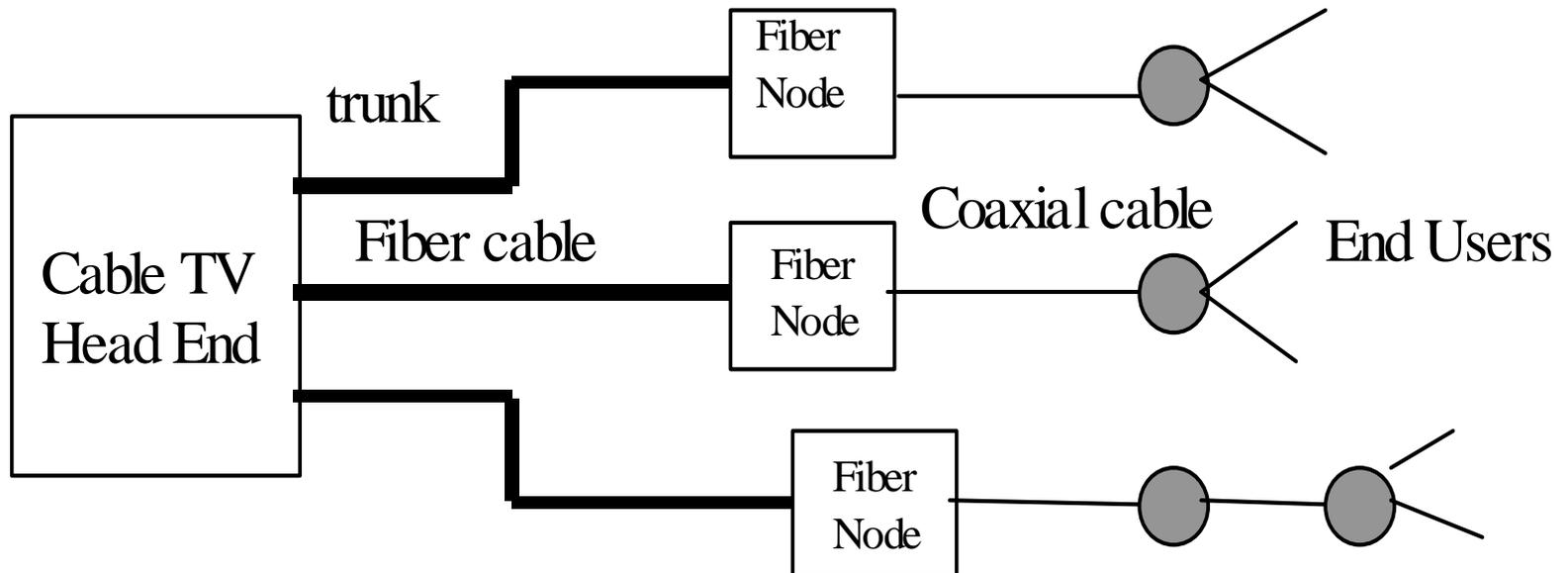


Figure 7.16

# A Cable Modem Connection

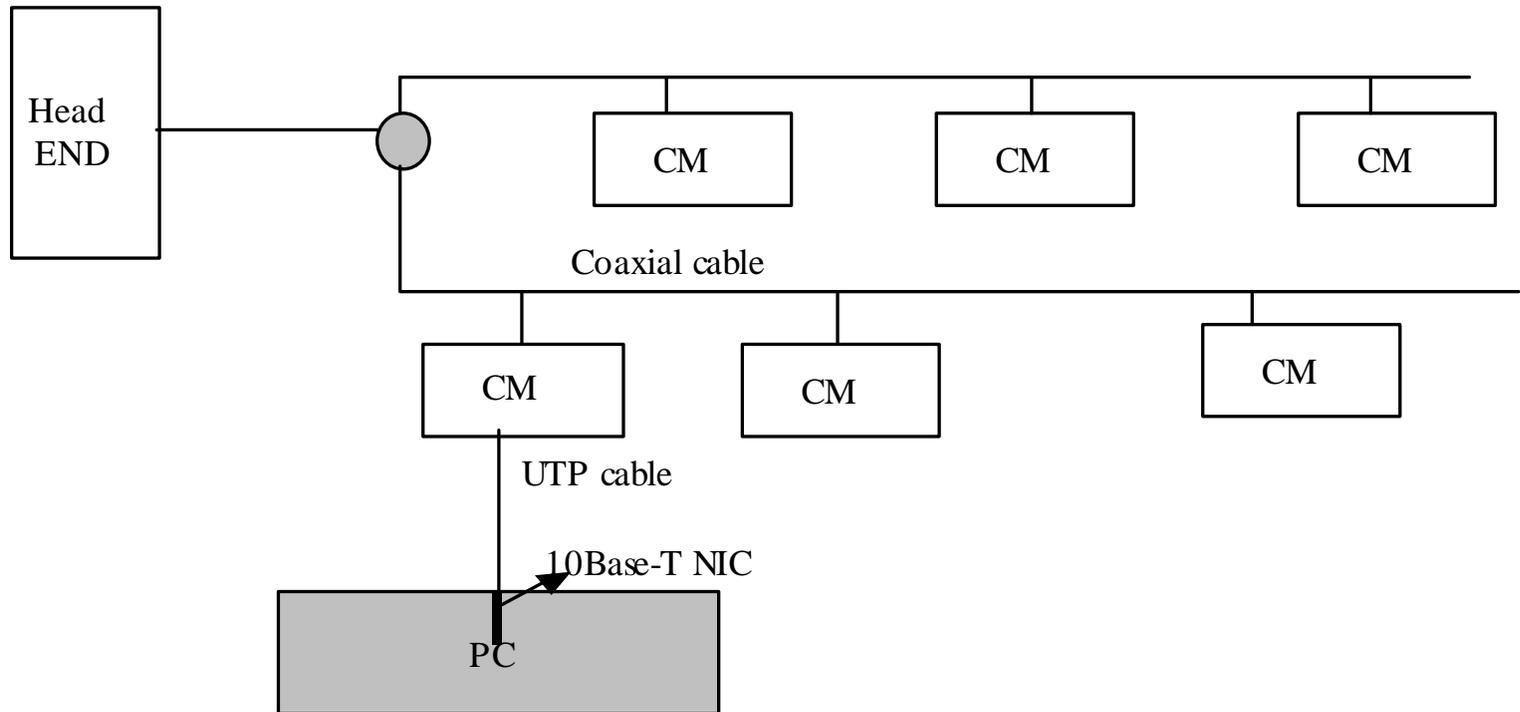
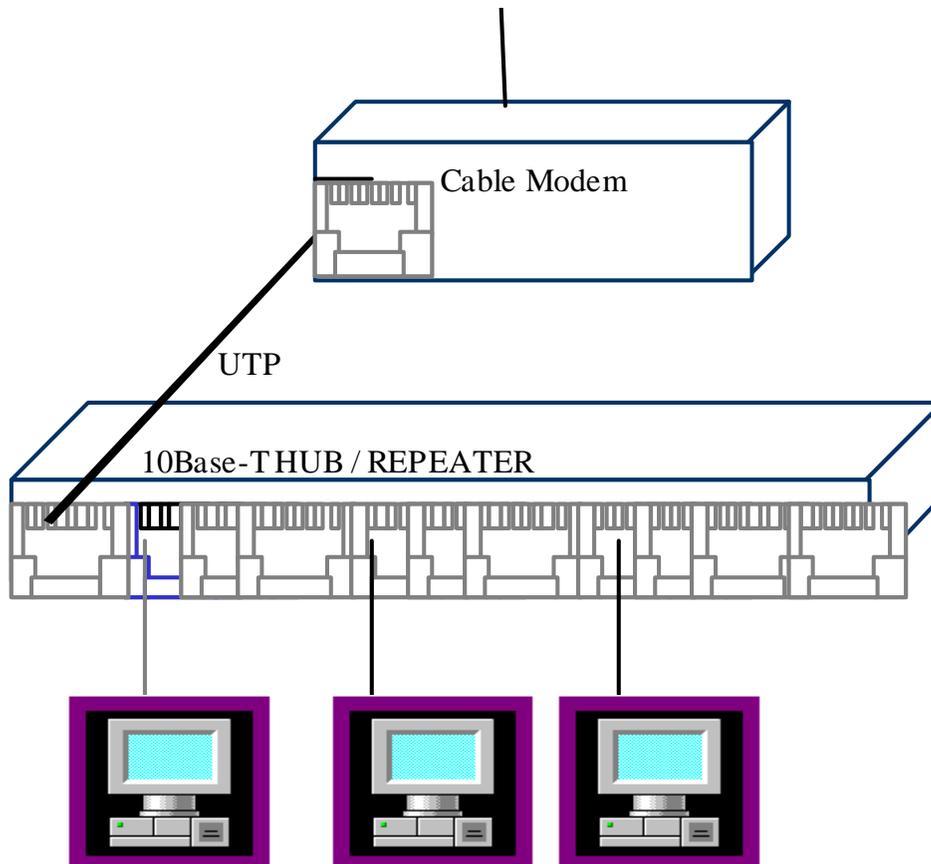


Figure 7.17

# Sharing a Cable/DSL Modem



Should be a Router and  
a Hub / Switch

Figure 7.18

# ISDN Basic Rate

2B + D: 144 Kb/sec

2B voice  
or data  
channels

1D  
signaling/  
control

channels

64 Kbps

16 Kbps

Basic Rate Interface (BRI)

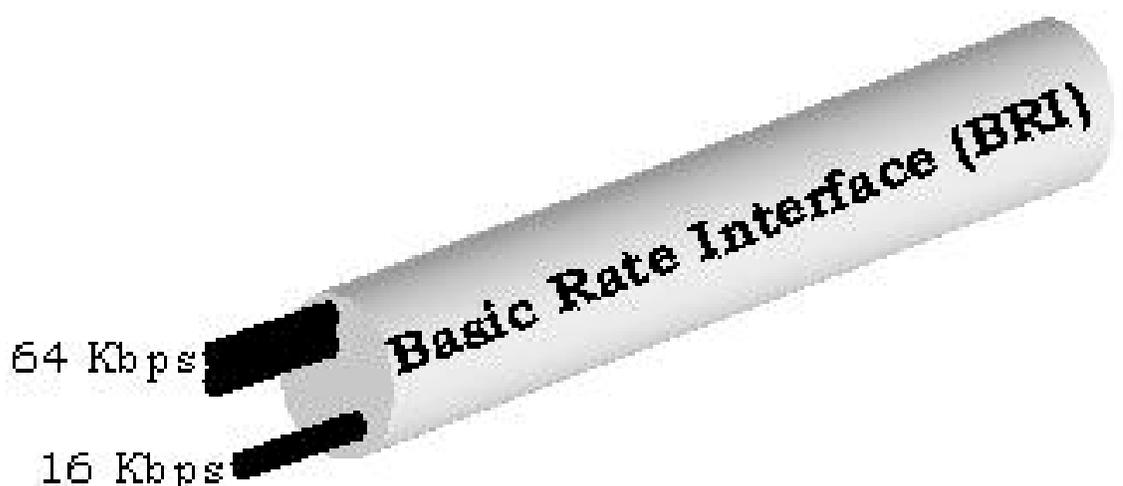
A 3D perspective illustration of a white cylindrical cable. The text 'Basic Rate Interface (BRI)' is printed on the side of the cylinder. Two black rectangular connectors are shown protruding from the front of the cylinder. The top connector is labeled '64 Kbps' and the bottom connector is labeled '16 Kbps'.

Figure 7.19

# Using the Basic Rate Interface

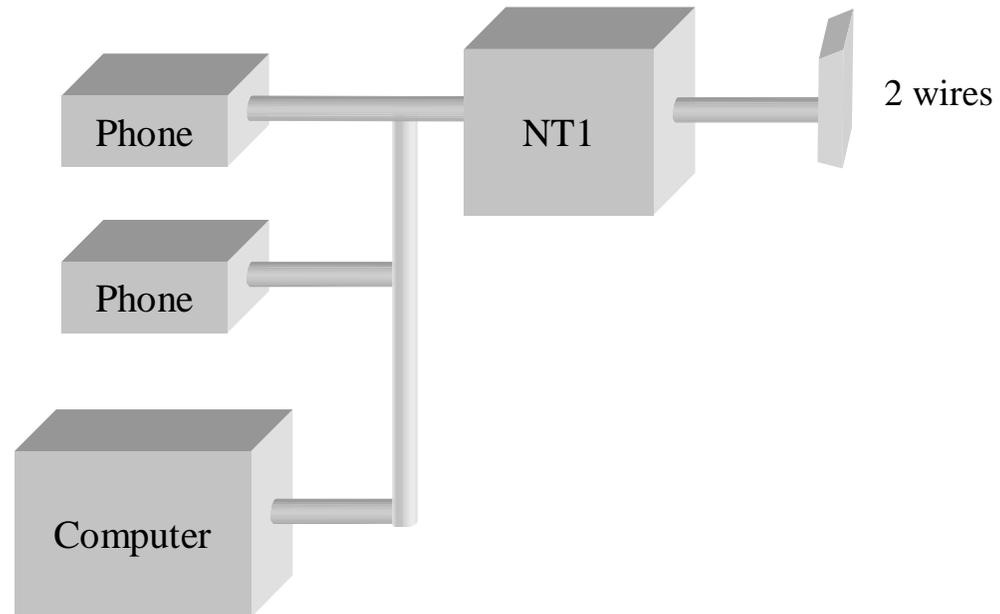


Figure 7.20

# ISDN Primary Rate

## 23B + D (T1)

23B (US Japan) or  
30B (Europe)  
voice or data  
channels

1D signaling/  
control channels

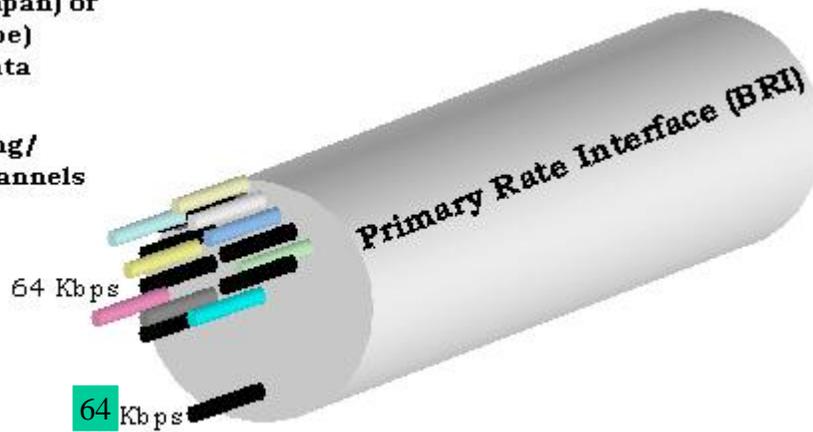


Figure 7.22

8 bits	1bit						
B1	D	B2	D	B1	D	B2	D

Figure 7.21

# ISDN PRI Application

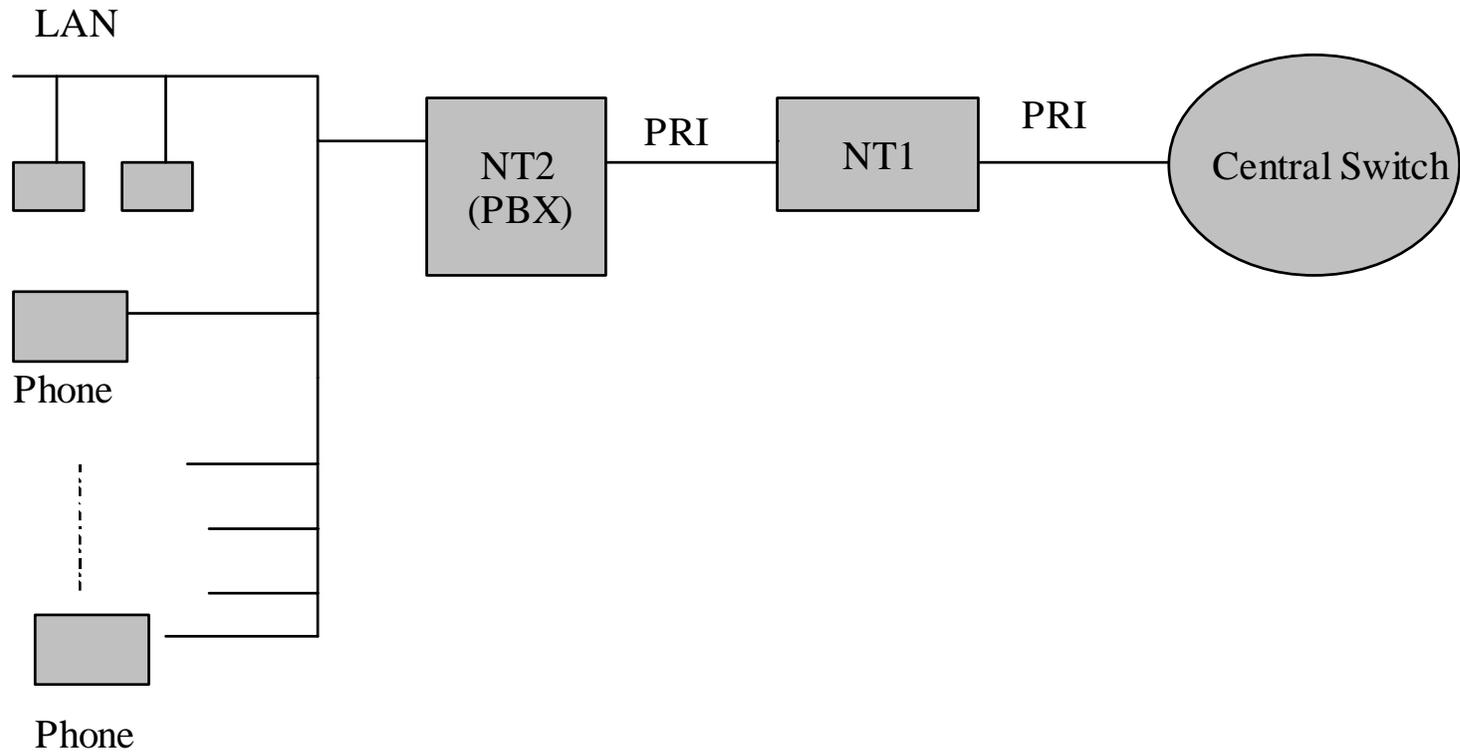


Figure 7.23