What is Home Network?

Broadband Links
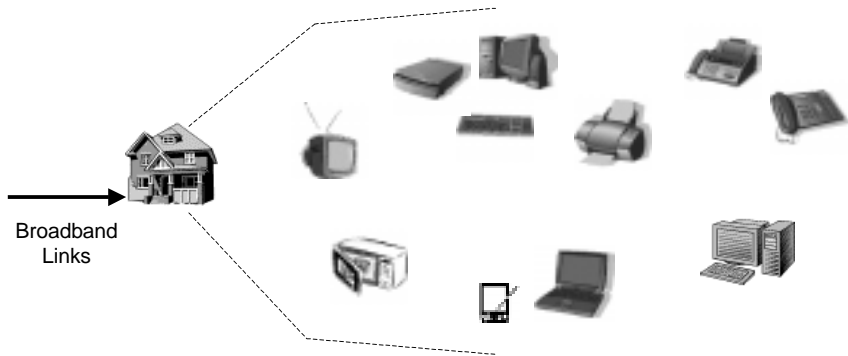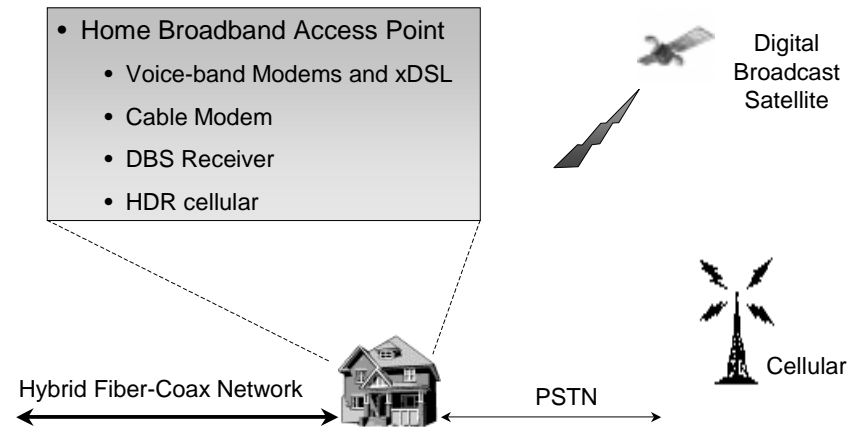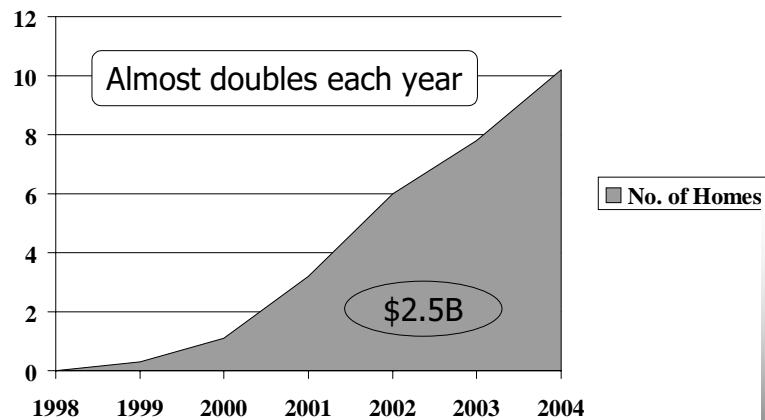
▪ Home networking enables intercommunication and sharing of multimedia content and broadband services among a variety of devices anywhere in and around the home.
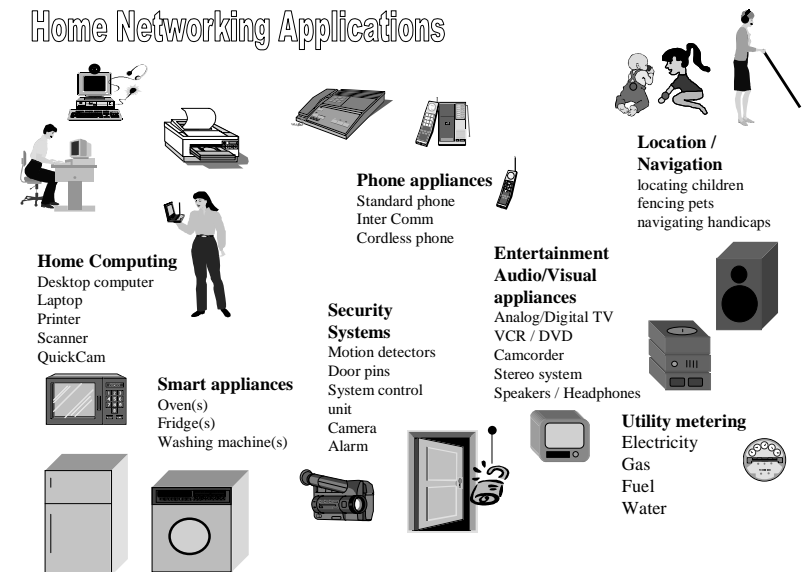
Broadband Home Access Alternatives

- Home Broadband Access Point
  - Voice-band Modems and xDSL
  - Cable Modem
  - DBS Receiver
  - HDR cellular

Digital Broadcast Satellite

Cellular

Hybrid Fiber-Coax Network   PSTN

Networked Homes (M)

Almost doubles each year

$2.5B

No. of Homes

12
10
8
6
4
2
0

1998 1999 2000 2001 2002 2003 2004

Home Networking Applications

Home Computing
Desktop computer
Laptop
Printer
Scanner
QuickCam

Phone appliances
Standard phone
Inter Comm
Cordless phone

Location / Navigation
locating children
fencing pets
navigating handicaps

Security Systems
Motion detectors
Door pins
System control unit
Camera
Alarm

Entertainment Audio/Visual appliances
Analog/Digital TV
VCR / DVD
Camcorder
Stereo system
Speakers / Headphones

Smart appliances
Oven(s)
Fridge(s)
Washing machine(s)
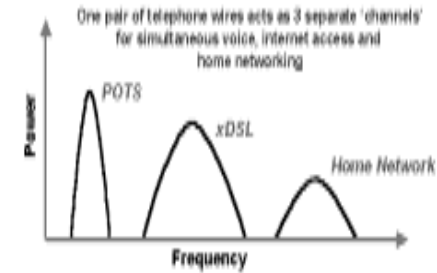
Utility metering
Electricity
Gas
Fuel
Water

No-New Wiring Alternatives

- *Phoneline using HPNA* (1 – 10 Mbps)
- *Power Lines* (10 Mbps)
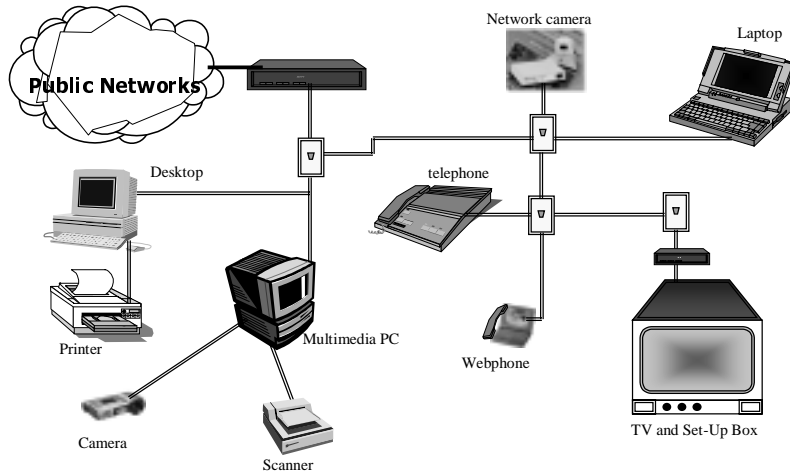- Coaxial Cable (10 Mbps)

Spectral Compatibility of HomePNA

Compatible with Voice and xDSL
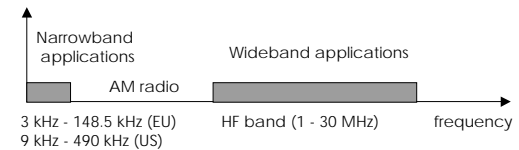
One pair of telephone wires acts as 3 separate 'channels' for simultaneous voice, internet access and home networking

- POTS: 20 Hz – 3.4 kHz
- xDSL: 25 kHz – 1.1 MHz
- HomePNA: 2 MHz – 30 MHz

Home PNA

Public Networks

Network camera

Laptop

Desktop

telephone

Printer

Multimedia PC

Webphone

Camera

Scanner

TV and Set-Up Box

Power Lines Technology

Narrowband applications

Wideband applications

AM radio

3 kHz - 148.5 kHz (EU)
9 kHz - 490 kHz (US)

HF band (1 - 30 MHz)

frequency
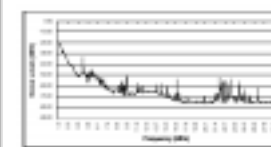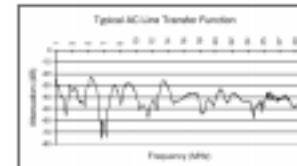
Low speed control and data applications
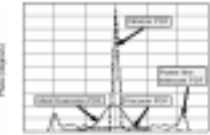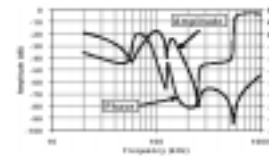
Transmission Techniques:
FSK, QPSK, Dual carrier BPSK
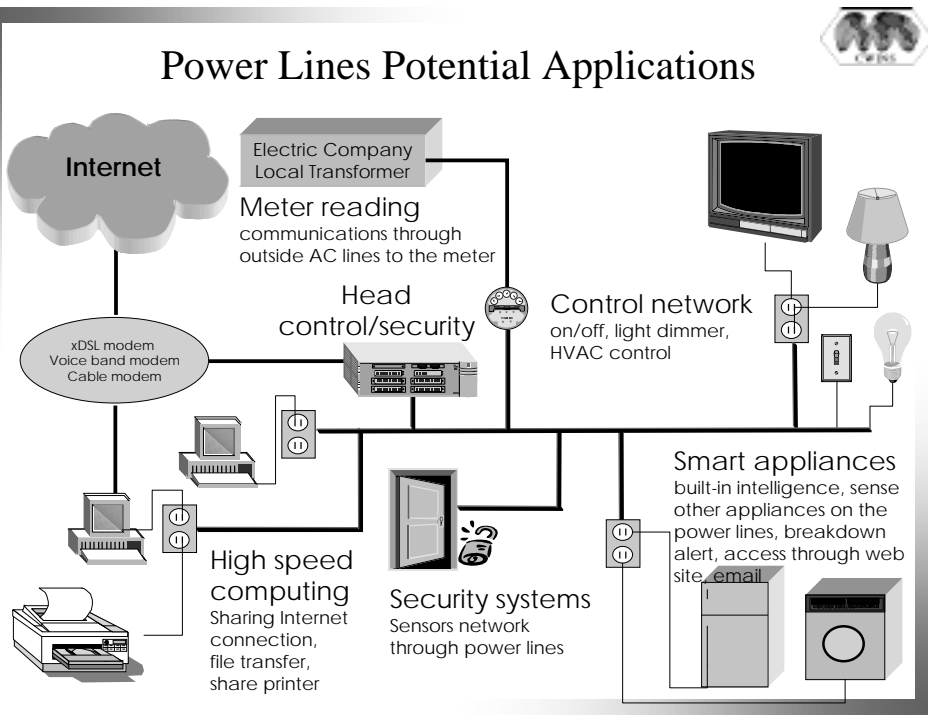Spread Spectrum: DSSS, HFSS, Chirp
Access Methods:
CSMA

Evolving high speed data applications

Transmission Techniques:
FSK (Intelogis)
OFDM (Intellon)
Access Methods:
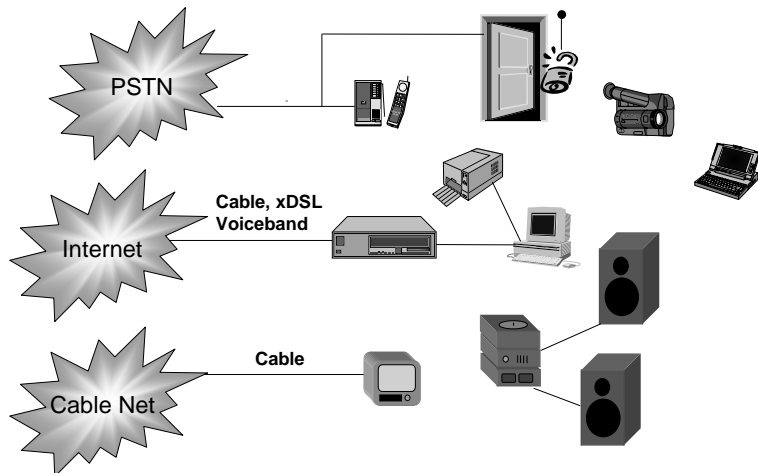DSMA/CTP (Intelogis)
CSMA/CDCR (Intellon)

Power Lines Potential Applications

Internet

Electric Company
Local Transformer

Meter reading
communications through
outside AC lines to the meter

Head
control/security

Control network
on/off, light dimmer,
HVAC control

xDSL modem
Voice band modem
Cable modem

Smart appliances
built-in intelligence, sense
other appliances on the
power lines, breakdown
alert, access through web
site, email

High speed
computing
Sharing Internet
connection,
file transfer,
share printer

Security systems
Sensors network
through power lines

Wireless at Home

- Incentives for wireless solution:
  - Wireless networking is the natural solution for portable appliances (laptops, video/digital camera, cordless phones, remote control, etc)
  - Wireless provides a plug-and-play-"anywhere" solution
- Challenges for wireless solution:
  - Data rate
  - Coverage
  - Interference
  - Cost

Today's Fragmented Home Networks

PSTN

Cable, xDSL
Voiceband

Internet

Cable

Cable Net

Evolving HAN (Home Area Network) Products

Home Server

Security

HPNA

Cable,
xDSL,
v.90

Internet

Home RF

Power Line