

Network Access

Unconditioned Copper Wire

Fax, Phone, PC, 56K Modem

xDSL/Home Network

Fax, Phone, wLAN Router, Splitter, XDSL Modem, Laptop, Entertainment Console

Broadband Cable/Home Network

TV, Set-top Box, Splitter, SDOH/FW Router, Cable Modem, PC, IP Phone

SOHO/SMB Networking \$1.5 Billion	Central Office Switch \$10 Billion
CSCO 30%, NTGR 20%, D-Link 16%, Buffalo 10%, WSTL 10%	Siemens 18%, ALA 18%, LU 15%, NT 13%, ERICY 8%
xDSL Modem \$1.9 Billion	Carrier VoIP \$1.2 Billion
Siemens 13%, Thomson 13%, CSCO 10%, NEC 9%, WSTL 7%	NT 25%, UTSI 21%, CSCO 13%, Siemens 8%, SONS 7%
NGDLC \$1.5 Billion	Broadband Aggr. Rtr. \$500 Million
ALA 40%, AFCL 33%, LU 15%, ZHNE 4%	CSCO 46%, JNPR 25%, NT 15%, RBAK 12%
DVR/Set top Box \$3.0 Billion	ATM/FR Switch \$2.1 Billion
MOT 37%, SFA 33%	NT 37%, LU 19%, CSCO 17%, ALA 15%
Cable Modem \$600 Million	DSLAM \$3.3 Billion
MOT 44%, Toshiba 14%, Thomson 12%, TERN 10%, SFA 9%	ALA 42%, Huawei 8%, LU 6%, Siemens 6%, UTSI 6%
Cable Transmission \$1.8 Billion	Telecom Software/OSS \$6 Billion
SFA 26%, MOT 22%, Other 52%	IBM 25%, ACN 21%, Telcordia 12%, VRSN 7%, LU 5%

Regional Central Office (e.g., Bell South)

Long Distance (e.g., AT&T)

Regional Central Office (e.g., Verizon)

Voice: Class 5 Switch, Soft Switch, Class 4 Switch, VoIP Gateway

IP: Edge Router, Core Router, Edge Router, VoIP Gateway

ATM: Multi-Service Switch, Core ATM, Multi-Service Switch

Optical: Add/Drop Mux, Optical Cross Connect, DWDM, Add/Drop Mux

Carrier Core Router \$800 Million	Metro WDM \$600 Million	Carrier Edge Router \$1.2 Billion
CSCO 62%, JNPR 31%, AVCI 5%	NT 33%, LU 13%, CIEN 11%, Adva 10%, CSCO 9%	CSCO 65%, JNPR 19%
NG/Legacy SONET/SDH \$4.1 Billion	Long-Haul WDM \$1.3 Billion	DXC/OXC \$2.0 Billion
ALA 17%, NT 14%, LU 12%, Fujitsu 12%, VRSN 8%, Marconi 8%	NT 18%, NEC 16%, ALA 11%, LU 7%	TLAB 35%, ALA 30%, LU 5%, CIEN 5%

Enterprise LANs

Enterprise WANs

Corporate Enterprise (e.g., Lehman Brothers Worldwide HQ): File Server, DNS, E-Mail Server, Database Server, Cluster Controller, Call Manager, Multi-layer Switch, Storage Switch, SNA, VoIP App Server, Layer 2 Switch, Layer 3 Switch, PC, Laptop, IP Phone, Fax, wLAN Access Point, Security Manager, WAN Router, Legacy PBX, Media Gateway, Legacy Phone.

Remote Office (e.g., Lehman Brothers Regional Branch): Branch Router, Voice Enabled Switch, PC, IP Phone, Call Manager, VoIP App Server, Video Conferencing.

Layer 2 Switch \$5.9 Billion	Layer 3 Switch \$4.4 Billion	Layer 4-7 Switch \$400 Million
CSCO 78%, COMS 5%, NT 5%	CSCO 59%, FDRY 7%, EXTR 7%, NT 6%, HPQ 5%, ETS 5%	CSCO 41%, FIV 19%, NT 18%, FDYR 8%, RDWR 5%
Ent. IP Telephony \$2.5 Billion	Legacy PBX \$6.5 Billion	Enterprise Router \$2.9 Billion
AV 19%, CSCO 17%, NT 17%, ALA 15%, Mitel 8%, INTL 6%	AV 14%, Siemens 13%, NT 11%, ALA 10%, NEC 8%	CSCO 92%, NT 5%
Security/VPN Appliance \$2.0 Billion	Storage Switch \$1.1 Billion	Ent/Carrier WLAN \$800 Million
CSCO 33%, NOK/CHKP 17%, JNPR 10%, NT 9%	BRCD 46%, MCDTA 35%, CSCO 8%	CSCO 54%, SBL 17%, PROX 9%, AireSpace, Aruba, Other 20%

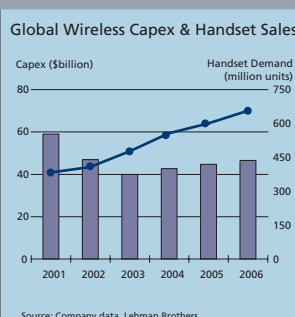
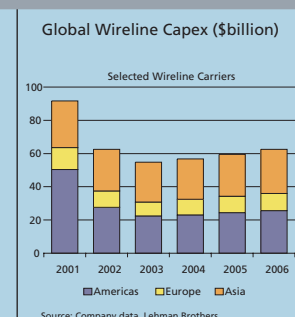
CATV Headend Office (e.g., Cox Communications)

CMTS \$400 Million	Fixed Wireless \$1.4 Billion	PAS \$3 Billion
CSCO 46%, ARRS 20%, MOT 15%, Terayon 12%	ALA 21%, HRS 20%, STXN 11%, ALVR 9%, PROX 5%	UTSI 60%, ZTE 25%, LU 10%

2.5G Wireless Network (e.g., GSM/GPRS/CDMAOne/1x)

W-CDMA Infra. \$3.1 Billion	Wireless Apps/Messaging \$3.3 Billion
ERICY 35%, NOK 20%, NEC/Siemens 19%, NT 9%, Fujitsu/ALA 8%	LogicaCMG 22%, RIMM 18%, CMVT 16%, OPWV 8%, LU 8%
GSM/GPRS Infra. \$25 Billion	GSM, WCDMA Handsets \$43 Billion
ERICY 36%, NOK 20%, Siemens 15%, ALA 10%, NT 7%, MOT 6%	NOK 48%, Siemens 14%, MOT 12%, Samsung 11%, SEMC 7%
CDMA/1x Infra. \$7.8 Billion	CDMA/1x Handsets \$22 Billion
LU 40%, NT 21%, MOT 15%, Samsung 10%, ERICY 5%	Samsung 19%, LG 19%, MOT 17%, NOK 10%

3G Wireless Network (e.g., WCDMA/CDMA20001x/DO/DV)



Guide to Company Tickers

ACN* Accenture ADCT* ADC Telecommunications ADTR* Adtran AFCL* Advanced Fibre Communications ALA* Alcatel ALVR Alvarion ARRS Arrys AVCI* Avaya AVCI* Avici Systems BRCD* Brocade Communications CHKP* Check Point Software CIEN* CIENA CMVT* Converse Technology COMS* 3Com CSCO* Cisco Systems CVG Convergys DOX* Amdocs ERIC* Ericson ETS* Enterasys Networks	EXTR* Extreme Networks FFRY* Foundry Networks FFY* FS Networks HRQ Hewlett-Packard HRS Harris INTL Inter-Tel JNPR* Juniper Networks LUC* Lucent Technologies MCDTA* MCDATA MOT* Motorola NOK* Nokia NT* Nortel Networks NETG* NETGEAR OPWV* Openwave PLCM* Polycore PLMO* PalmOne PROX* Proxim QCOM* QUALCOMM RBAK Redback Networks	RDWR Radware RIMM* Research In Motion RVSN* RADVISION SBL* Symbol Technologies SCMR* Sycamore Networks SEM* SonyEricsson SFA* Scientific-Atlanta SMRA* Sonera Communications SONS* Sonus Networks STXN Stratix SWIR* Sierra Wireless TERN Terayon TKLC* Telcel TLAB* Tellabs TMS Thomson ULCM* Ultimco UTSI* UTStarcom WSTL Westell Technologies ZHNE Zhone Technologies
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* Indicates Lehman Brothers Research Coverage

LAN / WAN Protocols

LAN	Ethernet 10 Mbps	Fast Ethernet 100 Mbps	Gigabit Ethernet 1 Gbps	10 Gigabit Ethernet 10 Gbps
wLAN	wLAN 802.11b 11 Mbps	wLAN 802.11a 54 Mbps	wLAN 802.11g 54 Mbps	
WAN	ISDN 128 Kbps	SMDS 34 Mbps	Frame Relay 45 Mbps	ATM 622 Mbps
	Gigabit Ethernet 1 Gbps	10 Gigabit Ethernet 10 Gbps		



Speeds & Feeds

ISDN 128 Kbps	HDSL 1.54 Mbps upstream, 1.54 Mbps downstream
T-1 1.54 Mbps	ADSL up to 1.54 Mbps upstream, up to 8 Mbps downstream
T-3 44.74 Mbps	VDSL up to 2 Mbps upstream, up to 52 Mbps downstream
E-1 2.05 Mbps	G-Lite 384 Kbps upstream, 1.54 Mbps downstream
OC-3 155.52 Mbps	cable modem 1 to 27 Mbps
OC-12 622.08 Mbps	MMDS 1 to 54 Mbps
OC-48 approx 2.5 Gbps	LMDS up to 622 Mbps
OC-192 approx 10.0 Gbps	

Guide to Acronyms

ADM Add Drop Multiplexer	NGDLC Next Generation Digital Loop Carrier
ADSL Asymmetric Digital Sub Line	OSS Operations Support System
ATM Asynchronous Transfer Mode	OXK Optical Cross Connect
BTS Base Station Transceiver	PAS Personal Access Systems
CDMA Code Division Multiple Access	PBX Private Branch Telephone Exchange
CMTS Cable Modem Termination System	PCU Packet Control Unit
DO Data Only	PDN Packet Data Switching Node
DSLAM Digital Subscriber Line Access Multiplexer	PSTN Public Switched Telephone Network
DV Data Voice	SAN Storage Area Network
DWDM Dense Wave Division Multiplexing	SDH Synchronous Digital Hierarchy
DXC Digital Cross Connect	SGSN Serving GPRS Support Node
FR Frame Relay	SONET Synchronous Optical Network
GGSN Gateway GPRS Support Node	SS7 Signal System 7
GiGE Gigabit Ethernet	TCP/IP Transmission Control Protocol/Internet Protocol
GPRS General Packet Radio Services	VoIP Voice over IP
GSM Global System for Mobile Communications	VSAT Very Small Aperture Terminal
HLR Home Location Register	WAN Wide Area Network
ISDN Integrated Service Digital Network	WAP Web Application Protocol
LAN Local Area Network	WDM Wavelength Division Multiplexing
MUX Multiplexer	WLAN Wireless Local Area Network

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