## SYBEX Book Index

## The Complete PC Upgrade & Maintenance Guide, 12th Edition

Mark Minasi

Index

Copyright © 2001 SYBEX Inc., 1151 Marina Village Parkway, Alameda, CA 94501. World rights reserved. No part of this publication may be stored in a retrieval system, transmitted, or reproduced in any way, including but not limited to photocopy, photograph, magnetic or other record, without the prior agreement and written permission of the publisher.

ISBN: 0-7821-2990-0

SYBEX and the SYBEX logo are either registered trademarks or trademarks of SYBEX Inc. in the USA and other countries.

TRADEMARKS: Sybex has attempted throughout this book to distinguish proprietary trademarks from descriptive terms by following the capitalization style used by the manufacturer. Copyrights and trademarks of all products and services listed or described herein are property of their respective owners and companies. All rules and laws pertaining to said copyrights and trademarks are inferred.

This document may contain images, text, trademarks, logos, and/or other material owned by third parties. All rights reserved. Such material may not be copied, distributed, transmitted, or stored without the express, prior, written consent of the owner.

The author and publisher have made their best efforts to prepare this book, and the content is based upon final release software whenever possible. Portions of the manuscript may be based upon pre-release versions supplied by software manufacturers. The author and the publisher make no representation or warranties of any kind with regard to the completeness or accuracy of the contents herein and accept no liability of any kind including but not limited to performance, merchantability, fitness for any particular purpose, or any losses or damages of any kind caused or alleged to be caused directly or indirectly from this book.

SYBEX Inc. 1151 Marina Village Pkwy. Alameda, CA 94501 USA Phone: 510-523-8233

www.sybex.com

## Index

**Note to the Reader:** Throughout this index **boldfaced** page numbers indicate primary discussions of a topic. *Italicized* page numbers indicate illustrations. Page numbers prefixed with "C" refer to the chapters on CD #2.

## Numbers

"0 hard disk(s) found" message, 759 1PCBuilder mailing list, 1352 2.1GB barrier, **562** 2B+D abbreviation, C176 3D audio. 1031-1032 3D video boards, **986–987** 3Dfx chip sets, 987 3DNow! Technology instructions, 161 4.2GB barrier. **563** 5-bit error correction, 555 6x86 CPU, 159-160 8-bit boards vs. 16-bit. 415-417 conflicts with, 415-417 slots for, 202, 204, 205-206 sound cards, 1014-1015 8 mm format, 1052-1053 8.4GB barrier. **563** 10/100 devices, C175 10Base-2 networks, 260 10Base-5 networks, 265

10Base-T cable, C176 10Base-T networks, 260, 264, 265, C175 10Base-TX cable, C176 10Mbps, C176 11-bit error correction, 555 16-bit applications, system file backups for, 715-716 16-bit boards conflicts with, 415-417 slots for, 204-209, 205-206 sound cards. 1014-1015 23B+D abbreviation, C176 24/7 availability, C176 24-bit color, C176 30-pin memory chips, 165, *166*, 461 32-bit boards slots for, 209-210 sound cards, 1014-1015 32GB barrier, **563** 50-ohm cable terminators, 1164 "55" error message, **860-861**  64-bit bus, **215-219**, *216* 64-bit computers, memory banks on, 463-464 64-bit sound cards, 1014-1015 70-bit error correction, 555 72-Hz video, 985 72-pin memory chips, 165, *166*, 461 75-ohm cable terminators, 1164 80-Hz video, 985 100Mbps, C176 101-key keyboard, 946-947 110 Alert product, 278, *279* 120-Hz video, 985 386 extension, 177 528MB barrier. **562** "1701" message, 759 "1780" message, 759-760 "1781" message, 759-760 "1790" message, 759-761 "1791" message, 759-761 3270 PC communications controller connectors for, 259, 260 emulating, 251–252

4004 microprocessor, <b>C3-C5</b> ,	<u>A</u>	mouse, <b>C104-C105</b> , <i>C104-C105</i>
5250 PC communications con-	A/B switches	quick steps for, <b>C93</b>
troller, 251-252	defined, C176	sound, C101-C103, C102
8008 microprocessor, <b>C5</b>	for printers, 806–807	acetate, triboelectric value of,
8041 microprocessor, 230	A value in hexadecimal num-	298
8042 microprocessor, 230	bering system, C169	acknowledgments with SCSI,
8048 microprocessor, 230	A3D API, 1031-1032	600
8086 CPU and computers	A97M prefix, 694	ACPI (Advanced Configuration
characteristics of, <b>144</b>	Aark23 MIDI cards, 1036	and Power Interface),
data path for, <b>121–122</b>	AboveBoard memory board,	C178
specifications for, 140	197-198	Active-Hardware site,
8087 coprocessor, 130	abrasive head cleaners, 779	1331-1332
8088 CPU and computers, 118	absolute sectors, 665–668	active hubs, <b>1212</b> , C177
characteristics of, 143–144	AC adapters, C176	active-matrix displays, C177
data path for, 121-122	AC Monitor product, 504	active partitions, 652
memory addresses in, 176	AC power	active SCSI termination
specifications for, 140	cables and connectors for,	and built-in termination,
8250 UARTs, 896	83-85	598-599
8259 interrupt controller,	checking, <b>500-506</b>	defined, C177
386-388, <b>391-394</b>	for notebooks, 1297	vs. passive, <b>621–623</b> , <i>622</i>
8284A chip, 229	Accelerated Graphics Process-	for SCSI-3, <b>603–604</b> , 609
8514 adapters	ing (AGP) bus, 29–30,	ActiveX scripts, 693, 699-700
characteristics of, 981, 997	<b>219-221</b> , <i>220</i>	actuator arms, <i>526</i> , 527, 530
interlacing in, 984-985	benefits of, 971-972	stepper motors for, <b>540</b>
16450 UARTs, 896	defined, C176	voice coils for, 538-540,
16550 UARTs, 896-897	description, 32–33	539
80186 CPU, <b>144</b>	for ultimate computer, C37	Adaptec AHA1542 SCSI
80188 CPU, 118, <b>144</b>	in upgrading, C21, C22	adapter, 610
80286 CPU and computers	accelerators, 236, 978	adapter boards. See also con-
characteristics of, 145	connectors for, 262	trollers; network inter-
data path for, 123	defined, C176-C177	face cards (NICs)
protected mode in,	in PC selection, 1249	identifying, 257-266
189-192	settings for, C122-C123,	need for, 231
specifications for, 140	C123	Adapter Unit Interface (AUI)
80386 CPU and computers	access, C177	for hubs, 1217
characteristics of, 146	access times	for network interface
data path for, <b>122–123</b>	of CD-ROM drives, 1122	cards, 1149, <i>1149</i>
efficiency of, 118	defined, C177	for thicknet, 265
specifications for, 140	of disk drives, 521,	adapters
80486 CPU and computers	541-544, C43	defined, C177
cache memory on, 125	accessibility options, C97-	drivers for, <b>C121</b> , <i>C121</i>
characteristics of, 146-148	C98, C98	refresh rates for, C121-
components in, C7-C9	display, <b>C103-C104</b> , <i>C103-</i>	C122
data path for, 123	C104	adaptive differential pulse
efficiency of, 118	general, <b>C106</b> , <i>C106</i>	code modulation
specifications for, 140	keyboard, <b>C98-C101</b> , <i>C99-</i>	(ADPCM) standard,
82284 chip, 229	C100	1117

Add New Hardware Wizard,	ADSL (asymmetric digital sub-	AGP (Accelerated Graphics
1200, <b>C106-C112</b> ,	scriber line)	Processing) bus,
C107, C110-C111	characteristics of, 918, 920	29-30, <b>219-221</b> , <i>220</i>
Add New Modem Wizard,	defined, C181	benefits of, 971-972
C125	ADSL Lite, 919-920	defined, C176
Add/Remove Programs fea-	Advanced Configuration and	description, 32-33
ture, <b>C113-C116</b> , <i>C113</i>	Power Interface (ACPI),	for ultimate computer, C37
for installing programs,	C178	in upgrading, C21, <i>C22</i>
C114-C116, C115	Advanced Micro Devices	AHA-1542 SCSI host adapter,
for removing programs,	(AMD)	610
C114	CPUs and microprocessors	air, triboelectric value of, 298
for Startup Disk, C116,	by, 24, 106	air cleaners, 284
C116	Athlon, <b>161–162</b>	AirPort wireless networks,
for Windows programs,	identifying, C50, <i>C50</i>	1189
C115-C116, C115	operating frequencies	aligning print heads, 832
address bus, C178	of, C54-C55	all-in-one combo devices,
address lines, error beeps for,	pipelines in, 120	796-797
429	slots for, 138	allocation errors, FAT,
Address Resolution Protocol	specifications for,	732-733, 747, 747
(ARP), 1183	142-143	alphanumeric characters,
addresses	for upgrades, C18	C178
burned-in, C185	DDR memory by, 471	alt newsgroups, 1344
defined, C177	advanced power management	Altair bus, 201
in EISA bus, 213	(APM) systems, 81	AltaVista search engine, 1330
hardware, C212	defined, C178	alternating current (AC)
in hexadecimal numbering	handling, 81–82	cables and connectors for,
system, C170-C172	Advanced SCSI Programming	83-85
with hubs, 1216, <i>1216</i>	Interface (ASPI),	checking, <b>500-506</b>
I/O. See I/O addresses	632-633	for notebooks, 1297
Internet, C217	defined, C178	aluminum
IP, C218-C219	as standard, 633	for CD-ROM disks, 1111
in IPX/SPX, <b>1178</b> , <i>1178</i>	Advanced Settings for Fil-	triboelectric value of, 298
for memory, <b>193-196</b>	terKeys dialog box,	AM prefix, 694
CPU limits, <b>137-138</b>	C100, <i>C100</i>	AM radios for RFI monitoring,
defined, C224	Advanced Technology Attach-	291
vs. I/O addresses,	ment (ATA) protocol	AMD (Advanced Micro
202-203	Fast ATA-2, <b>569–570</b>	Devices)
planning for, 176	specifications for, 568–569	CPUs and microprocessors
for parallel ports, 801-802	Advanced Technology Attach-	by, 24, 106
with PC Card bus, 224	ment Packet Interface	Athlon, <b>161–162</b>
ROM, <b>396-398</b>	(ATAPI), C178	identifying, C50, <i>C50</i>
in TCP/IP, <b>1181–1183</b>	Advanced Troubleshooting	operating frequencies
adjustable bus and memory	Settings window, C142	of, C54-C55
speeds, <b>410-411</b>	advice, online sources of,	pipelines in, 120
ADPCM (adaptive differential	1319-1320	slots for, 138
pulse code modula-	aftermarket, C178	specifications for,
tion) standard, 1117	age, hard disk drive data loss	142-143
	from, C12	for upgrades, C18

DDR memory by, 471	AnyPoint Home Network kit,	asbestos, triboelectric value
America Online (AOL),	1188-1189, C27	of, 298
1355-1356	AnyPoint Wireless system,	ASCII (American Standard
American Standard Code for	1189	Code for Information
Information Inter-	AOL (America Online),	Interchange), C178
change (ASCII), C178	1355-1356	ASCII extended character set,
AMI (American Megatrends)	AOL prefix, 695	C180
BIOS from, 62, 185	APIs (Application Program-	ASCII files, C180
error beeps for, 427–428	ming Interfaces)	ASCII standard character set,
in upgrading, 1247	for 3D video, 987	C180
ammonia and laser printers,	defined, C179	ASD (Automatic Skip Drive
867	and redirectors,	Agent), <b>C139-C140</b>
Ampcast site, 1025	1170-1171	ash particles, dust from, 284
amplification	APM (advanced power man-	ASICs (application-specific
controllers for, 233	agement) systems, 81	integrated circuits),
of signals, 1007	defined, C178	C180
amplitude	handling, <b>81–82</b>	ASPI (Advanced SCSI Program-
in QAM, 1068	Apple bus, 201	ming Interface),
of sound waves,	Apple II computers, clock rate	632-633
<b>1006–1007</b> , 1007	for, 109	defined, C178
amps in power calculations,	applet viruses, 693–694	as standard, <b>633</b>
497	Application Programming	assembly, 88–89
analog camcorders, 1056	Interfaces (APIs)	of cables and edge connec-
analog capture systems,	for 3D video, 987	tors, <b>89-92</b> , <i>91-92</i>
1076-1079	defined, C179	mistakes in, 92-95
analog channel test units, 938	and redirectors,	assembly language, C180-
analog devices, C179	1170-1171	C181
Analog Protection System	application servers, 1145	assumptions in troubleshoot-
(APS), 1058	application-specific integrated	ing, 316
AnandTech site, 1332	circuits (ASICs), C180	AST Research, 212
AND logic gates, C4	applications, system informa-	asterisks (*), C181
Animated Cursor Editor tool,	tion for, C133	asymmetric digital subscriber
C151	APS (Analog Protection Sys-	line (ADSL)
anonymous FTP	tem), 1058	characteristics of, 918, 920
defined, C179	architecture, C180	defined, C181
support for, 1339	archive bits, 673	asynchronous ports, 242–243,
ANSI/TIA/EIA structured	archive file, C180	<b>894–895</b> , <i>895</i> ,
cabling standards,	archiving, C180	900-901
C252	ARCNet network boards, 187,	asynchronous SCSI, 600
antistatic devices	249, 260	Asynchronous Transfer Mode
defined, C179	areal density, 545	(ATM)
spray, 300	ARP (Address Resolution Pro-	defined, C181
wrist straps, 52–54	tocol), 1183	in DSL, 918
AntiVirus program, 702	arrow keys, C180	asynchronous transfers with
antivirus programs, 702,	Ars Technica site, 1332	USB, 246
C179. <i>See also</i> viruses	articles, newsgroup, 1342	asynchronous transmission,
any key kits 321	ARTIST direct Network site	C181

AT Attachment Packet Interface (ATAPI) for CD-ROM drives, 1125-1226 defined, C178 purpose of, 569 AT bus, 204-209, 205-206. See also ISA (Industry Standard Architecture)	attributes defined, C182 in directory entries, 673 ATX cases, 1240-1241 ATX motherboards power supplies for, 490-491, 490-491 for ultimate computer, C36 audio. See sound and sound	average seek time, 541–542 Award BIOS in PC selection, 1247 Award Software International, BIOS by, 62, 185 AWE32 sound cards, 1015 AWE64 sound cards, 1015
bus	cards	
AT computers	audio/video enthusiasts, PC	B value in hexadecimal num-
change-line support in, 787	features for, 1256,	bering system, C169
clock rate for, 109	1260-1261	baby food driver tester
configuring, 408-410	Audiogalaxy site, 1025	method, 328
hard disk drive recognition	AUI (Adapter Unit Interface)	backbones, fiber optic cable
in, 588-589	for hubs, 1217	for, 1160
keyboard for, 946-947	for network interface	background information,
at symbols (@), C181	cards, 1149, <i>1149</i>	online sources of,
ATA (Advanced Technology	for thicknet, 265	1318-1319
Attachment) protocol	auto-answer feature, C182	Background tab, C118
Fast ATA-2, <b>569–570</b>	auto-configure controllers,	backing up, Registry, C158-
specifications for, 568–569	564	C159
ATAPI (AT Attachment Packet	auto-dial feature, C182	backplane design, 103
Interface)	auto-translating for hard disk	backslashes (\), C182
for CD-ROM drives,	drives, 564	backup power supplies,
1125-1226	AutoCAD program, DOS	<b>508-512</b> , <i>509-510</i>
defined, C178	extenders for, 192	Backup Wizard, C10
purpose of, 569	AutoDetect function, 587	backups, <b>709–710</b>
Athlon CPU	autodetection, disk drive, <b>763</b>	of configuration, 62–64
characteristics of, 162	AUTOEXEC.BAT file	defined, C182-C183
defined, C181-C182	in boot process, 446-447	hardware-based, 251
internal cache memory on,	checking, C141-C143	of MBR, 684, 711–714
129	TSRs in, 178-179	for old computer data, <b>C9</b> -
operating frequencies of,	Automatic Reset option, C106	C12, C10-C11
C54-C55	Automatic Skip Drive Agent	options for, 718–724
as Pentium competitor, 156	(ASD), C139-C140	partition information,
for upgrading, 1245	Automatically download	656-657
ATM (Asynchronous Transfer	updates option, C145-	registry, 716–717
Mode)	C146	removable drives for,
defined, C181	AutoOpen macro, 691	720-721
in DSL, 918	autosizing monitors, 992	for security, 1230 software for, <b>722–723</b>
attack in sound ways 1012	AutoUpdate utility, C144- C146	
attack in sound waves, 1013,	availability in digital broad-	strategies for, 723
1014 attenuation, 1007	band communications,	of system files, 715–718 tape drives for, 719
defined, C182	913	before upgrades,
vs. interference, 1153	average latency period,	1277-1278,
ATTRIB command, 673	543–544	1277-1278, 1286-1288
manu, 013	J1J J11	1200-1200

for viruses, 700	caring for, <b>1297–1298</b>	and CMOS configura-
backward compatibility, C183	charging, <b>1298–1299</b>	tion, <b>584</b> – <b>589</b>
bad areas in hard disk drives,	conserving power in,	for DMA support, 521
658	<b>1301-1302</b> , <i>1302</i>	for physical geometry,
"Bad or missing XXXX.DRV"	replacing, <b>1299–1300</b>	533-534
message, 445	baud rate, C183	SCSI, 64
bad sectors, 673-674	BEDO DRAM (Burst Extended	inventory and testing by,
defined, C183	Data Out DRAM)	440-441
report on, 732-733	defined, C186	for keyboards, 952-953
testing for, <b>726-729</b>	development of, 167	manufacturers of, 33
bad track tables, C183	beep codes	MBR loading by, 443
balanced SCSI, 598	for AMI BIOS, <b>427-428</b>	memory for, 185-186
banding with inkjet printers,	for Phoenix BIOS, 428-430	memory tests by, 438-439
827	belts for printers, 794	in notebooks, 1285-1286
bandwidth	bent pins on keyboard con-	in PC selection, 1247
in cable broadband,	nectors, 953	for Plug and Play, 406-407
929-931	Berg connectors	scans for, <b>439-440</b>
of DRAM, 465	for power supplies, 492,	for SCSI, <b>633-634</b>
in sampling, 1011	493	setting up, <b>C66-C69</b> , <i>C67</i>
with switching hubs, 1220	removing, <i>79</i> , 80	setup program in, 410
banks, memory	for sound cards, 1017,	timeouts with, 441
on 64-bit computers,	1017	BIOS extenders for notebooks
463-464	Bernoulli boxes, 719	1285
and memory packaging,	bezels, 1292-1293	bit blitting, 236, 978
165	bidirectional cables, 824-825	bit rate, C184
bar code readers, 956	bidirectional parallel ports,	bit width of SCSI systems,
barium coating on floppy	241-242, 800-801	604-605
diskettes, 775	BIN files, viruses in, 689	bitmaps, 978
Basic Input/Output System.	binary numbering system,	bits
See BIOS (Basic	C183-C184	defined, C184
Input/Output System)	binding interfaces, 1173-1175	for sound cards, C39
BASIC language, 771	BIOS (Basic Input/Output Sys-	bits per inch (bpi)
Basic Rate ISDN (BRI), C183	tem)	defined, C184
Batch98 tool, C151	in boot process, 436-440,	in floppy diskettes, 775
batteries	437	bits per second (bps), C184
in backup power supplies,	for CD-ROM drives, 1128	BitShift translation algorithm
<b>508-512</b> , <i>509-510</i>	CMOS information read by,	562-563
for CMOS configuration,	442	Bitsurfer device, 916
248-249, 409	compatibility of, 185	biz newsgroups, 1344
connecting, 94	DBR loading by, 444-445	black and white TV video,
holders for, 413	defined, C184	<b>1062–1069</b> , <i>1063</i>
identifying, 256, <i>256</i>	diagnostic program for,	black wires
in motherboard	336	in AC supplies, 83-84
removal, 86-87	disk drive size limitations	in DC supplies, 489
replacing, <b>412-414</b>	in, 558–565	in phone lines, 937
for notebooks, <b>1275–1276</b> ,	in flash RAM, <b>186</b>	blank partition tables,
1297	for hard disk drives	763-764
buying, 1300-1301	autodetection by, 763	bleeder fuses, 507

block-addressable memory,	system file execution, 445	brownouts
973	timeouts in, 441	backup power supplies for
block PIO (BPIO) transfer, 567	boot records	509
block transfers for bitmaps,	backing up, <b>711-714</b>	defined, C185
978	loading, 443	problems from, 296-297
blue color	for logical drives, 678,	browsers
in CCD chips, pixels for,	678-679	defined, C259-C260
1050-1051, <i>1051</i>	program in, 444	for World Wide Web,
in TV video, <b>1062-1069</b> ,	reading, <b>758-763</b>	1325-1326
1063-1066,	boot sector viruses, 444	buffer overruns, firewalls for,
1068-1069	characteristics of, 690	1234
in VGA, pages for, 183	defined, C184	buffer underruns in CD-ROM
in video capture board,	bootable disks	recording, 1129-1130
1085	defined, C185	buffers. See also caches
blue wires in AC supplies,	floppy, <b>724–726</b> , 758	for CD-ROM drives, 1123
83-84	hard, SCSI software for,	conflicts in, <b>396–398</b>
Bluetooth specification, 1162	632-634	defined, C185
BNC connectors	bootable partitions, 444	in flow control, 903
defined, C184	booting, C184	memory for, <b>187–188</b>
identifying, 259-260, 259,	bpi (bits per inch)	for SDRAM, 469
264	defined, C184	in UARTs, 896-897
for LANs, 1163, 1163-1164	in floppy diskettes, 775	BUFFERS statements, execut-
boards. See expansion boards	BPIO (block PIO) transfer, 567	ing, 445
BohTech site, 1332	bps (bits per second), C184	bugs
bombs, 697	braces and brackets for RFI	defined, C185
boot devices, setting up, C71	suppression, 291	in video capture,
boot floppies, preparing,	brain damaged products, C185	1098-1099
<b>724-726</b> , C72	branch prediction technique,	building code requirements,
boot process, 435-436	127	1196
AUTOEXEC.BAT file in,	brand name PCs, <b>1239-1244</b>	building computers. See ulti-
446-447	brass, triboelectric value of,	mate computer
CMOS information read in,	298	bulk floppy erasers, 287
442	breakout boxes, 871-872,	bulk transfers with USB, 246
COMMAND.COM loading,	<b>938-939</b> , C185	burn-in, 333
446-447	BRI (Basic Rate ISDN), C183	burned-in addresses, C185
CONFIG.SYS file in, 445	bridge circuits for PCI bus,	burning MP3 files to CDs,
DBR loading, 444-445	216	1026-1027
from floppy disks, 758	brightness with video capture	burst counters, 469
hardware in, 436	boards, 1085	Burst Extended Data Out
initialization in, 438–441	broadband communications	DRAM (BEDO DRAM)
inventory and testing by,	systems. <i>See</i> digital	defined, C186
440-441	broadband communi-	development of, 167
lockups in, 442	cations	bus mastering
MBR loading, 443	Broadcast.com site, 1033	with CardBus, 226
on Plug and Play systems,	broadcast video for video cap-	defined, C186
406-408	ture, <b>1060</b>	in EISA bus, 213
power in, 436	brown wires in AC supplies,	in MCA bus, 211-212
ROM in, <b>436–440</b> , <i>437</i>	83-84	

with network interface	С	fiber optic, 1158–1161,
cards, 1208	C value in hexadecimal num-	1158, 1160
operation of, <b>382–383</b> , <i>383</i>	bering system, C169	installing, 1190-1197
with PC Card, 224	cable broadband, 912, <b>927</b>	interference vs. attenua-
in PCI bus, <b>218–219</b>	bandwidth sharing in,	tion in, 1153
in SCSI, <b>610</b>	929-931	summary, 1166
bus mouse, I/O addresses for,		twisted-pair,
371	installing and configuring, 928–929	1153–1157,
bus width of DRAM, 465		1154
buses, <b>27–30</b> , <i>27</i> , <b>32–33</b> ,	operation of, 927-928	noise from, 288
199-201	satellite communications,	for parallel ports, 801
address, C178	931-935	for power supplies, 499
AGP, <b>219–221</b> , <i>220</i>	cable modems, C41, C186	for printers, 799-800,
Altair, <b>201</b>	cable ripper cases, 67	806-807
AT, <b>204–209</b> , <i>205–206</i>	cables. <i>See also</i> connectors	removing, <b>79-80</b>
CardBus, 226	for breakout boxes, 939	routing, 94
data paths for, <b>201-202</b>	for CD-ROM drives, 1127,	in satellite communica-
defined, C186	1136, C83	tions, 933-934
DMA controllers on, 380	for communications sys-	screws for, 324-325
EISA, 212-213	tems, <b>941</b>	for SCSI
FireWire, 227-229	connecting, <b>89–92</b> , <i>91–92</i>	data path in, 602
for hard disk drives, 523	in cover removal, 67-68	issues in, 608
improving, <b>208–209</b>	diagrams for, <b>70-71</b>	length of, 603
for interrupts and Direct	disconnecting, <b>79–80</b> , <i>79</i>	noise in, 596
Memory Access,	for DVD decoder cards, C76	size of, 634-635
202-203	for EIDE adapters, C16	types of, <b>616–621</b> ,
MCA, 210-212	for floppy disk drives, 80,	617-620
and memory size, 202	<b>777–778</b> , <i>778</i> , 784,	for serial communications,
Mini PCI, 225-226	C64, <i>C64</i>	<b>804</b> , <b>897</b> , <i>904</i> – <i>905</i>
for network interface	for hard disk drives	for serial ports, 243
cards, <b>1149-1150</b>	IDE, <b>582–584</b> , <i>583–584</i>	for sound cards, 1017,
PC Card, <b>221–225</b> , <i>222</i>	in troubleshooting, 761	1017
in PC selection, <b>1246–1247</b>	for home networks,	for speaker, 86
PCI, <b>215-219</b> , <i>216</i>	C26-C27	in video capture, 1071,
speed of, <b>207–210</b> ,	for hubs, 1215	<b>1073-1074</b> , <i>1073</i> ,
410-411	for keyboards, 949-951,	1082
summary, 227	954-955	cache memory
Universal Serial Bus,	for laser printers, 864-866	defined, C187
243-247, 245	for MIDI, 1019	in upgrading, C22, <i>C23</i>
VESA local bus, 209,	for modems, 910	cache program, TSRs for, 179
214-215	for network interface	caches, 37. <i>See also</i> buffers
for video boards, 971–972	cards, 1149	for CD-ROM drives, 1123
in video capture,	for networks, 1150-1153	on CPUs, <b>124–130</b>
1079-1081	coaxial, <b>1157-1158</b> ,	defined, C186-C187
buttons for mouse, 957	1157	error beeps for, 428
bytes	connectors for,	for hard disk drives, 522,
defined, C186	1163–1166,	556–558
on disks, 526	1163-1166	for instructions, 119
on dioko, 520		ioi monactiono, 113

with LX chip set, 463	capture boards for video cap-	CAV (constant angular veloc-
for memory	ture, <b>1074</b>	ity), C193
matching, 473-474	analog, <b>1076–1079</b>	CCDs (charge-coupled
for SCSI devices, 610	digital, 1075-1076	devices)
and system speed, <b>169</b>	installing, <b>1081–1082</b>	defined, C189
in multiprocessor systems,	off-line compression in,	operation of, <b>1050–1052</b>
474	1093-1097	CD modem light, 940
in PC selection, 1247	overlays and previews	CD Read/Write (CD-RW)
in Pentium Pro, 151-152	with, 1078-1079	drives, 1107–1108
for SCSI, 610	real-time compression in,	
	_	for backups, <b>721</b>
for SDRAM, 469	1077-1078,	defined, C188
caddies for CD-ROM, 1119	<b>1088-1093</b> , <i>1091</i>	disk composition for,
Cakewalk Pro Audio sequenc-	carbonic acid, 304	1113-1114
ing program, 1036,	card services manager, 398	for MP3 files, <b>1026–1027</b>
1038	Card Services standard, 224	for OUM memory, 466-467
calculator for hexadecimal	CardBus, 226	software for, 722
numbers, 1207	CardDeluxe MIDI cards, 1036	CD-recordable (CD-R) drives,
calendars, system, 38, 229,	cards. See expansion boards	34, <b>1107-1108</b>
247-249	carpets, static from, 300	defined, C188
call preferences for modems,	Carrier Detect lines in RS-232	disc composition for, 1113
C126	sessions, 901-902	CD-ROM discs
call waiting, problems with,	carrier signals	burning MP3 files to,
1338	defined, C187	1026-1027
CAM (Common Access	in QAM, 1068	composition of, 1112
Method) SCSI stan-	carrying cases for notebooks,	defined, C188, C192
dard, 631	1302-1303	loading, 1119
camcorders for video capture,	cartridges for inkjet printers,	reading, 1111
1049–1056, 1054	817-818, 832-833	recording, 1119–1130
Camera Pro Max product,	carriers for, 818	viruses in, 701
1057	recharged, 796	CD-ROM drives, 34, <b>1104</b>
cameras	cascading techniques, C187	BIOS configuration for,
modems for, C41	cases	1128
serial ports for, 243	for generic computers,	as boot devices, C71
Universal Serial Bus for,	1240-1241	buffers for, 1123
246	for inkjet printers,	cables for, 79–80, 1127,
for video capture,	815-816	1136
1049-1052	for notebooks, 1302-1303	compatibility of,
"Cannot reload	preparing, <b>C47-C49</b> , <i>C48</i>	1108-1109
COMMAND.COM, sys-	for ultimate computer,	connectors for, 261, 266
tem halted" message,	C33-C36, <i>C34</i>	controllers for, 238-239
447	cassettes, 771	data modes for, 1117
capacitive keyboards, 949	categories of network cable,	defined, C188-C189
capacitors	1155-1156, C187-	drivers for, 1128-1129,
in power supplies, 488	C188	1136
replacing, 452	Cathode-Ray Tubes (CRTs).	frame padding for, 1097
Caps Lock key, sound with,	See also monitors	heat from, 275
C101	dust on, 284	identifying, 252
<del>*-</del> *-	magnetism from 205	

magnetism from, 285

installing, 1105-1106,	pipelines in, 120, 136	checkerboard memory tests,
1127-1129, C69-	slots for, 139	478-479
C70, C70, C82-C83,	specifications for, 141	Checkit diagnostic program
C83	for upgrading, 1245	evaluation of, 335-336
interface types for,	word size for, 121	for memory tests, 479
1123-1126	central office (CO) for DSL,	Checklinks tool, C151
internal and external,	918	checksums
1119-1120	central processing units. See	defined, C189
maintaining, 1134-1135	CPUs (central process-	error beeps for, 428-429
multimedia kits for, 1126	ing units)	for ROM, 448
multisession capability of,	Centronics cables and connec-	chip creep, 339, 431, 452
1118	tors, <b>258-259</b> , <i>259</i> ,	chip inserters, 58, 59
in PC selection, 1249	<i>266</i> , 616-621, <i>617</i>	chip removers
audio/video enthusiast,	Centronics interface, 799-802	for keyboard keys, 952
1260	Centronics port, 241-242	problems with, <b>58</b> , <i>58</i>
home, 1258	certified files, C139	chip sets
road warriors, 1262	CGA (Color/Graphics Adapter)	for 3D video boards, 987
student, 1259	characteristics of, 997	defined, C189
performance characteris-	connectors for, 261	and DIMM slots, 462-463
tics of, 1120-1123	horizontal scan frequency	chips, 447–448
physical characteristics of,	for, 988	defined, C189
1119-1120	resolution and colors with,	families of, 299
reading CDs with, 1111	980	identifying, 449-450
and sound cards, 1017	CGMS (Copy General Manage-	memory. See memory chips
speed of, 1121-1122	ment System), 1059	noise damage in, 503
standards for, <b>1114–1118</b>	chaining SCSI devices,	pins on, <b>452–453</b> , <i>453</i>
troubleshooting,	<b>616-621</b> , <i>616-618</i>	recalls of, 448
1135-1136	change-support lines,	size of, 460
types of, <b>1107-1109</b>	785-787	sockets for, 186, <b>452-453</b>
for ultimate computer,	channel test units, 938	soldering and desoldering,
C44-C45	channels	450-452
Zone Bit Recording with,	in IRC, 1353-1355	temperature of, 275, 449
533	in ISDN, 914-915	testing, <b>448–449</b>
CD-ROM I/O port, 371	character scanners, 251	CHK files, 744
CD-ROM/XA standard,	charge-coupled devices	CHKDSK program
<b>1117-1118</b> , C189	(CCDs)	for cross-linked clusters,
CDFS (Compact Disc File Sys-	defined, C189	<b>749-751</b> , <i>749-750</i>
tem), 1116	operation of, <b>1050–1052</b>	for FAT allocation errors,
CDs. See CD-ROM discs	charging batteries, 1298–1299	<b>747</b> , <i>747</i>
Celeron CPU	chassis, C189	for invalid clusters,
data path for, 123	chat	748-749
defined, C189	defined, C216	for invalid subdirectories,
heat in, 152, 276	finding channels in, 1354	745-747
internal cache memory on,	operation of, <b>1353–1354</b>	for lost clusters, <b>741–745</b>
129	for technical information,	operation of, 732–733
introduction of, 154	1354-1355	with subdirectories, 676
operating frequencies of, C53	cheater lines, 415	chloride, triboelectric value of, 298

chrominance signals, 1068	clock/calendar boards, 409	identifying, 256, <i>256</i>
circuit design, microprocessor	clock doublers, 110-112	in motherboard removal,
development for, C4	clock triplers, 112	86-87
CISC (complex instruction set	clocks	replacing, <b>412-414</b>
computing)	and bus speed, 207-208	CMOS memory
in Cyrix 6x86, 161	CPU, <b>108–117</b>	backing up, 62-64
defined, C192	defined, C190	on clock/calendar chip,
cladding in fiber optic cable,	error beeps for, 430	247-249
1158, <i>1158</i>	IRQ for, 389	configuring, 408-412
clarity of signals, 1007	speed of	error beeps for, 428-429
Class A certification, C189	for CPUs, 108-109, <b>C53</b> -	evolution of drive tables
Class B certification, 290-291,	C55	for, 586-587
C190	defined, C190	hard disk drive problems
clean command for laser	for DRAM, 465	from, <b>760–761</b>
printers, 882-883	in EISA bus, 213	for hard drive disk type,
clean up piece in pipelines,	system, 38, 229, 247-249	710-711
135	clones, C190	purpose of, <b>585-586</b>
cleaning	closed control systems, 539	reading information in,
CD-ROM discs, 1135	cloudy laser printer output,	442
connectors, 339	859	in XT computers, 586-587
floppy disk drive heads,	clustering, C190	CMPnet site, 1332
779	clusters, 664, <b>668–670</b>	CNET site, 1332
inkjet printers, 821-822,	bad, <b>726-729</b>	CO (central office) for DSL,
827 <b>, 831-832</b>	cross-linked, <b>749–751</b> ,	918
keyboards, 949, 952-953	749-750	coating on floppy diskettes,
laser printer blades, 844	defined, C190	775
laser printer drums,	in directory entries,	coaxial arresters, 507
844-845	673-677	coaxial cable
mice, <b>960</b>	FAT entries for, 672-674	connectors for, 1163-1164,
printers, 793-794, <b>882-885</b>	in FCSI, <b>606–607</b>	1163-1164
cleaning fluids, 304	invalid, <b>748–749</b>	defined, C190
cleaning pads in laser print-	lost, <b>741–745</b> , <i>742</i> , <i>745</i>	for networks, <b>1157-1158</b> ,
ers, 852-853	in partitioning, 644–647	1157, C26-C27
Clear To Send (CTS) lines	size of, <b>644-647</b> , 668-670	cobalt coating on floppy
defined, C190	in unerasing files, 733-738	diskettes, 775
in flow control, 903	CLV (constant linear velocity),	Code Page Changer tool, C151
in RS-232 sessions,	C193	code requirements for net-
901-902	CM (Configuration Manager),	work cable, 1196
CLECs (competitive local	407-408	codecs, 1025
exchange carriers), 918	CMOS (Complementary Metal	in capture boards
Click & Learn site, 1332	Oxide Semiconductor)	for off-line compres-
clicks in speakers, 426–427	chips	sion, 1094-1095,
client/server networks, 1143	defined, C192	1095
clients	ESD damage to, 299	for real-time compres-
in IRC, 1354	setting up, C67-C69	sion, 1088-1093,
on networks, 1145	CMOS battery, 248–249, 409	1091
redirectors as, 1169	connecting, 94	defined, C190-C191
ClipTray tool, C151	holders for, 413	for fiber optic cable, 1159

178, 446-447

security of, 1025	command line, C191	Compaq computers
coffee, board damage from,	command-line arguments,	and bus speed, 208-209
304	C191	setup with, 62
cold boots, C191	command processors, C191	static column RAM in, 167
"COLD RESET" message, 874	command prompt, C191	compatibility. See also stan-
collisions	command shell, 178	dards
defined, C191	COMMDLG.DLL file, 329	of BIOS, 185
repeaters for, <b>1225</b> , 1227	commercial online services,	of buses, 204, 206-207
colons (:), C191	C231	of CD-ROM drives,
color depth	Common Access Method	1108-1109,
compatibility of, C120	(CAM) SCSI standard,	<b>1114-1118</b> , 1136
setting, C118	631	of color depth, C120
of video cards, C38-C39	common grounds, 502-503,	controllers for, 231-233
Color Display monitor, 996	505-506	of CPUs, 113
Color/Graphics Adapter (CGA)	common outlet line, 501	of Cyrix CPUs, 160
characteristics of, 997	communication options in	defined, C183, C192
connectors for, 261	upgrading, C25-C27	of DVD drives, C44
horizontal scan frequency	communications parameters,	of DVD formats, 1131
for, 988	C191	of FireWire bus, 228
resolution and colors with,	communications protocols,	of floppy disk drives, 238
980	C191	of hard disk drive hard-
color monitors, 995-998	communications systems,	ware, <b>579</b>
color printers	892-893	of hardware, 28–30
inkjet. See inkjet printers	cables for, 941	of integrated mother-
laser, <b>847-849</b>	controllers for, 242-243,	boards, 233-234
color sub-sampling compres-	243	of IRQ levels, 391-392
sion, 1090, 1091	digital broadband, 911	of keyboards, 947, 950
colorkey overlay technique,	cable broadband,	of local buses, 214
1059	927-931	of MCA bus, 210
colors	DSL, <b>917-927</b>	of microprocessors, C18
with CCD chips,	ISDN, <b>914-916</b>	of MMX processors,
<b>1050–1052</b> , <i>1051</i>	selecting type, 912-914	132-133
connectors for, 262	ports for, <b>938-939</b>	modularity for, 98, 103
in inkjet printers, <b>823</b>	serial. See serial communi-	with multiple displays, 994
in TV video, <b>1062-1069</b> ,	cations	of Nx586 CPU, 161
1063-1066,	comp newsgroups, 1344	of PCI bus, 218
1068-1069	Compact Disc File System	of proprietary PCs, <b>1243</b>
and video boards, 236,	(CDFS), 1116	in protected mode, 189,
979-983	compact discs. See also CD-	191-192
in video capture,	ROM drives	of SCSI devices, <b>608</b> ,
1084-1085	composition of, 1112	630-631
COM files, viruses in, 689	defined, C188, C192	in software, 30–31
COM ports, C192. See also	loading, 1119	of sound card interfaces,
serial ports	reading, 1111	1017
Command AntiVirus for Win-	recording, 1129–1130	of sound cards, C40
dows 95/98, 702	viruses in, 701	of television signals,
COMMAND.COM program,	Compaq Computer in Watch-	1068-1069

zone group, 212

Compatibility Warning dialog box, 994 competitive local exchange carriers (CLECs), 918	computers building. <i>See</i> ultimate com- puter evolution of, <b>C2-C6</b> , <i>C3</i>	of LPT ports, 415-417 method of, 39 of satellite communica- tions, 933-934
Complementary Metal Oxide	old. See old computers	of SCSI devices, 607-609
Semiconductor (CMOS)	computertalkshop mailing	software setup for,
chips. See also CMOS	list, 1352	408-412
memory	Computing.Net site, 1333	of System Restore, <b>C149</b> -
defined, C192 ESD damage to, <b>299</b>	Concept virus, 691–692 conditioning laser printers	C150
9 .		Configuration Manager (CM), 407-408
setting up, C67-C69 complex instruction set com-	drums, <b>845–846</b> conductors in coaxial cable,	conflicts
puting (CISC)	1157, <i>1157</i>	8-bit vs. 16-bit boards,
in Cyrix 6x86, 161	conduits	415-417
defined, C192	for network cable, 1192,	and Add New Hardware
component video interface,	1195	Wizard, C107
1061, <b>1069–1071</b> ,	for Palm devices, 1307	with buffers, 396-398
1069	"CONFIG LANGUAGE" mes-	with CD-ROM drives, 1024,
components, system informa-	sage, 878	1136
tion for, C133	CONFIG.SYS file	DIP switches in, 364-365
composite monitors, 995	CD-ROM drivers in, 1128	with I/O addresses,
composite video interface,	checking, C141-C143	<b>372–375</b> , <i>373</i>
1061, <b>1069–1071</b> ,	device drivers in, 177	from integrated mother-
1069	loading and executing, 445	boards, 417
composite video signals, 263	configuration	with IRQ levels, 390-396
compressed air	backing up, 62-64	and LPT ports, 415
for expansion boards, 284	of cable broadband,	MSI for, C133
for flooded computers, 303	928-929	with PC Card boards,
for keyboard cleaning, 951	of DSL, <b>923-924</b>	398-401
compression	of expansion boards,	resolving, <b>362–365</b> ,
defined, C192	356-358	401-403
MMX processors for, 132	addresses and buffers	scenarios for, 358–362
for MP3 audio files, 1022	in, <b>396–398</b>	with versions, C143-C144
status of, C131	bus mastering in,	with video capture cards,
TSRs for, 179	382-383	1081
in video capture,	conflicts in, 358–365,	connecting to modems, C125-
1088-1093	401-403	C126
in capture boards, <b>1077-1078</b>	DMA channels in,	connection speed, C193
lossy and lossless,	<b>377-383</b> , <i>377-378</i>	connectors, 32, <i>41. See also</i> cables
1088y and 1088less, 1088-1093,	IRQ levels in, <b>383-396</b>	BNC, <b>259–260</b> , <i>259</i>
1088-1093, 1091	MCA, 211	for CD-ROM drives, C83
off-line, <b>1093–1097</b>	network interface cards,	Centronics, <b>258–259</b> , <i>259</i>
compuhelp mailing list, 1352	1201-1208,	checking, 323–325
CompuServe online service,	1201-1206,	cleaning, 329
1356	PC Cards, <b>398-401</b>	corrosion on, 304
Computer Hope site, 1333	with Plug and Play,	D, <b>257-258</b> , <i>258</i>
computer viruses. <i>See</i> viruses	404-417	DIN, 260, <i>260</i>
1		,,

for DSL, 923	contrast	control transfers with USB,
for DVD decoder cards,	accessibility options for,	246
C76	C103-C104, <b>C104</b>	controllers, 24-25, <b>231</b> ,
FireWire, 262	with video capture boards,	251-252
for home recording stu-	1085	autoconfigure, 564
dios, 1038	control characters, C193	caches for, 558
HP, <b>258</b> , <i>258</i>	CONTROL INI files, backing	for CD-ROM drives,
identifying, 257-266	up, 715	238-239
for keyboards, <b>949-951</b> ,	control lines for printers, 241	for communications,
950, 953, C70, <i>C71</i>	Control Panel, C97, C97	<b>242-243</b> , <i>243</i>
for LAN adapters, 1295	for accessibility options,	for floppy disk drives,
for MIDI, 1035-1036	C97-C98, C98	237-238, 777
miniature D shell, 258	display, C103-C104,	for hard disk drives, 33,
miniature DIN, 260-261,	C104	239-240
260	general, <b>C106</b> , <i>C106</i>	buffer addresses for,
miniplug, 261	keyboard, C98-C101,	398
for mouse, C70, <i>C71</i>	C99-C100	defined, C211
for network interface	mouse, C104-C105,	I/O addresses for,
cards, 1149, <i>1149</i>	C104-C105	370-371
for networks, <b>1163-1166</b> ,	sound, C101-C103,	identifying, 256, <i>256</i>
1163-1166	C102	for isolation, 231–233
for PC Card slots, 222-223	for boot floppies, 725	for laser printers, 837
for ports, C86-C87	for COM ports, 395	for memory, 169
for power supplies, 73–74,	for date and time, C116-	memory for, 187
74, 80-85, 82,	C117, C117	for monitors, 997
<b>488-493</b> , <i>490-491</i> ,	for display, C117-C123,	on motherboards, 233-234
493	C118-C123	for networks, 249
RCA jacks and plugs, 261	for hardware, C106-C107	for printers, <b>241–242</b> , 801
RJ-13 and RJ-45, <b>260</b>	not found by system,	SCSI interface, 237
for SCSI, 612, <i>612</i>	C110-C112,	for sound, 250
for serial communications,	C110-C111	for tape drives, 240-241
895, <i>895</i>	wizard for, <b>C107-C112</b> ,	video adapters, 235–237,
standards for, 201-202	C107	235-236
USB, 261, <i>261</i>	for modems, C123-C126,	conventional memory
constant angular velocity	C124-C126	and GP faults, 1098-1099
(CAV), C193	for programs, C113-C116,	location of, 174-175
constant linear velocity (CLV),	C113	conversions
C193	installing, C114-C116,	controllers for, 232
contacts for keyboard, 949	C115	digital-to-analog, 236, <i>236</i> ,
contaminants in laser print-	removing, C114	978-979
ers, <b>869</b>	Windows, C115-C116,	hexadecimal numbers,
Content Scrambling System	C115	1207, C172-C174
(CSS), 1059	quick steps for, C93-C96	"Convert directory to file
contiguous memory blocks,	for sound cards, C74	(Y/N)?" message,
180-181	for System settings, C127-	745-746
continuous diagnostic modes,	C131	"Convert lost chains to files"
333		message, 743

converters for ISDN, 916 coolant for chip testing, 449 copiers	from liquids, 303–304 corruption in Registry, repairing, C160	in laser printers, <b>839</b> memory addressing by, <b>138–139</b>
in all-in-one combos,	with repeaters, 1227-1228	microcode efficiency in,
796-797	costs in computer evolution,	118
noise from, 502	C2	MMX, <b>130-133</b>
copper wire for networks,	cotton, triboelectric value of,	multipliers for, C55, C56
1151	298	numeric coprocessors for,
Coppermine chip set, 155	counting in hexadecimal,	130-133
coprocessors, 130	C169	in PC selection, <b>1244-1246</b>
for displays, 977–978	counts, repeater, 1227	audio/video enthusiast,
error beeps for, 430	covers	1260
for Intel 80486, 147	keyboard, 302, 951	corporate, 1262
IRQ for, 389	removing, <b>65–69</b> , <i>66–68</i>	gamer, 1259
MMX, 130-133	CP/M (Control Program for	home, 1258
for Pentium 4, 157–158	Microcomputers) oper-	small business, 1261
COPY command, 753	ating system, 786	student, 1259
Copy General Management	CPS (cycles per second), 1008	with PCI bus, 216-217
System (CGMS), 1059	CPUReview.com site, 1333	Pentium challengers,
copy protection	CPUs (central processing	158-162
and DVDs, <b>1058–1059</b>	units), 24, <b>27–30</b> , <i>27</i> ,	pipelines in, 118–120,
and floppy disk drive	<b>106–108</b> . See also spe-	<b>133-137</b> , 159
speed, 785	cific CPUs by name	plugging in, C56-C59, <i>C57</i> -
problems with, 196	for accelerators, 977	C59
copy stands, magnetism from,	caches on, 124–130	removing, 85
286	clock speed for, 108–109, C53-C55	size of, C6, <i>C7</i> slots for, <b>138–139</b>
copying files 752		sockets for, 138-139, C24,
files, 753 hard disk drives, <b>724</b> , <b>C11</b> -	compatibility of, <b>113</b> Cyrix, <b>159-160</b>	C24
C12	data paths for, 121-124	specifications for, 139–143
copyright laws, 1338	development of, C3-C5, C3	speed of, 32, <b>108-117</b> ,
copyright notice, C72	and energy consumption,	133-137, 146-150
copyrighted material, music	495	type of, 32
files, 1024	error beeps for, 428	for ultimate computer, C36
cords and lightning protec-	fans on, 498	upgrading, C18
tion, 514	heat from, 275–276	value of, C6
core voltages for CPUs, C51	for home recording stu-	and video boards, 971
corona in laser printers, 845,	dios, 1037	in video capture,
846, 848	identifying, <b>253–254</b> , <i>254</i>	<b>1079–1081</b> , 1087
cleaning, 859, <b>883–884</b>	installing, 2–3, <i>2–3</i> ,	voltages for, C51-C52, C52
defined, C193	<b>100–101</b> , C <b>50</b> , <i>C50-</i>	word size for, <b>120–121</b> ,
in image transfer, 851-852	C52	140-143
and vertical white streaks,	Intel 8088, <b>143-144</b>	crackers, 925
857-858	Intel 80286, <b>145</b>	Crash Guardian, C155
corporate PCs, features for,	Intel 80386, <b>146</b>	crash-prevention tools, limita-
1257, 1262	Intel 80486, <b>146-148</b>	tions of, 337
corrosion	Itanium, <b>162–164</b>	crashes
from heat, 280	in keyboards, 947	defined, C193

troubleshooting, 345-346	CyberNOT filtering service,	with SCSI, <b>616-621</b> ,
CrashGuard tool, 337	926	616-618
CRCs (cyclical redundancy	cycles per second (CPS), 1008	with Universal Serial Bus,
checks), C194	cyclical redundancy checks	244-245
Create a Restore Point option,	(CRCs), C194	daisywheel printers, 793
C147	cylinders in hard disk drives,	DALnet IRC channel, 1355
credit card hard drives,	520, <b>525-532</b> ,	data areas on disks, 658, 671,
1293-1294	529-530	672
credit card purchases,	for absolute sectors,	data bits
1265-1266	665-668, <i>665</i>	defined, C194-C195
cross-linked clusters	in disk drive geometry, 534	for serial ports, 808
causes of, <b>749-751</b> ,	documenting, 64	data buses for hard disk
749-750	and head skew, 553	drives, 523
defined, C193	with IDE addressing,	data cables and connectors
cross-posts on newsgroups,	561-562	diagrams for, <b>70–71</b>
1343	INT 13 BIOS interface for,	for floppy disk drives, 80
crossover cables, 1165	559	Data Carrier Detect (DCD)
crosstalk, <b>288–289</b> , C193	in sector translation,	lines
CRTs (Cathode-Ray Tubes).	535-536	defined, C195
See also monitors	Cyrix CPUs, 24, 106, <b>159–160</b>	in flow control, 903
dust on, 284	386DRU2, <b>149</b>	in RS-232 sessions,
magnetism from, 285	internal cache memory on,	901-902
crystals, 503-504	129	Data Circuit-terminating
CSS (Content Scrambling Sys-	pipelines in, 120	Equipment (DCE),
tem), 1059	specifications for, 141-142	900-902
Ctrl key, C194		data compression
Ctrl+Alt+Del key combination,	D	defined, C195
C193-C194		MMX processors for, 132
CTS (Clear To Send) lines	D/A (digital-to-analog) conver-	for MP3 audio files, 1022
defined, C190	sions, 236, <i>236</i> ,	TSRs for, 179
in flow control, 903	978-979	in video capture,
in RS-232 sessions,	D channels, C195	1088-1093
901-902	D shell connectors	in capture boards,
Cubase VST sequencing pro-	identifying, <b>257-258</b> , <i>258</i> ,	1077-1078
gram, 1036, 1038	262-263	lossy and lossless,
curling of laser printer paper,	for monitors, 996	1088-1093,
870	for SCSI, 618, <i>618</i>	1091
current in power calculations,	for twisted-pair cable,	off-line, 1093–1097
497	1165, 1165	data conversions
cursor, C194	D value in hexadecimal num-	controllers for, 232
cursor-movement keys, C194	bering system, C169	digital-to-analog, 236, <i>236</i> ,
Custom Font Size window,	DAC (digital-to-analog) con-	978-979
C120, <i>C119-C120</i>	versions, 236, <i>236</i> ,	hexadecimal numbers,
cut-through switching	978-979	1207, C172-C174
defined, C194	DACK line, 378	data dependency in 6x86, 159
vs. store-and-forward,	daisy chaining with FireWire bus, 227	"Data error reading drive" message, 751-755,
1221-1222, <i>1221</i>	WITH FIREWIRE DIE 22/	message /51-/55
CuteFTP client, 1340	with The whe bus, 227	782

data input for laser printers,	defined, 521	for logical drives, 678,
843	external transfer rate	678-679
Data Link Control (DLC) pro-	dependencies in,	purpose of, <b>670-671</b>
tocol, 805	556	DBS (direct broadcast satellite)
Data-Link layer devices, 1223	internal, 544-546	systems, 1060
data modes for CD-ROM, 1117	optimizing, 555–556	DC bias in laser printers, 850
Data Over Cable Service Inter-	in ultimate computer,	DC power supplies for laser
face Specification	C43	printers, <b>871</b>
(DOCSIS), 928, 930	and interleave factor,	DCD (Data Carrier Detect)
data paths, <b>121-124</b>	546-552	lines
for buses, 201–202	for network interface	defined, C195
for CardBus, 226	cards, <b>1150</b>	in flow control, 903
for EISA bus, 213	of SCSI systems, 604-605	in RS-232 sessions,
in Intel 80386, 146	date codes on chips, 450	901-902
for MCA bus, 210	Date/Time Properties window,	DCE (Data Circuit-terminating
for PC Card bus, 225	C116-C117, <i>C117</i>	Equipment), 900-902
for PCI bus, 217	dates	DDR (double data rate)
for RDRAM, 466	in BIOS, C67	SDRAM, <b>471</b>
data protection. See also	in chip codes, 450	defined, C200
viruses	quick steps for, <b>C95</b>	development of, 171
backups for, <b>709–710</b> ,	setting, <b>C116-C117</b> , <i>C117</i>	for video, 974
718-724	system clock/calendar for,	dead fans, 278
boot floppies for, <b>724–726</b>	247–249	dead hard disk drives, resur-
firewalls for, 1234	time zones in, C117	recting, 755
media tests for, 726-729	DATs (Digital Audio Tapes)	booting from floppy disks
data rate in off-line video	defined, C197	for, 758
compression,	with SCSI, 603, 1018	checking cables, 761
1096-1097	daughterboards, 138	checking CMOS, <b>760–761</b>
data recovery. <i>See</i> recovering	Dazzle Digital Video Creator,	data recovery services for,
Data Set Ready (DSR) lines	1077	764-765
defined, C195	DB connectors, C195	modern drives, 761-763
in flow control, 903	DB9 connectors, 41, 258	priorities in, 755-756
in RS-232 sessions,	defined, C195	reading MBR in, 758–763
901-902	diagrams for, 904, <i>904–905</i>	recovering partition table
Data Terminal Equipment	for RS-232, 900	in, 763-764
(DTE), 900-902	for video adapters,	temperature problems, 761
Data Terminal Ready (DTR)	262-263, <i>262</i>	tracing failures in,
lines	DB15 connectors, 263	756-757, <i>757</i>
in laser printers, 843	DB25 connectors, 41	dead machines, troubleshoot-
in RS-232 sessions,	defined, C195	ing, 424-425
901-902	diagrams for, 904, <i>904-905</i>	boot process in, 435–447,
data transfer methods with	for ports, 262, 263, 895,	437
USB, 246	895	expansion boards, <b>431</b>
data transfer rates	for RS-232, 900	power supplies, 425–427
for CD-ROM drives,	DB37 connectors, C195	DEBUG program, <b>712–714</b>
1120-1121	DBRs (DOS Boot Records)	decay in sound waves, 1013,
for hard disk drives, 541	loading, 444–445	1014
caches for, <b>556–558</b>	10001115, 111 115	decibels, C195
cacines 101, 550 550		accincio, C100

decimal numbering system,	device drivers. See drivers	Dialing Properties dialog box,
369, C168, <b>C172-C174</b> ,	device independence, C197	C124, C125
C195	Device Manager, C108-C111,	dialing with modems, C124,
decode instructions, 119-120	C108	C125
decode piece in pipelines, 135	for COM ports, 395	Diamond Multimedia MP3
decoders for DVD drives, C45	for I/O addresses, 372	players, 1029
dedicated servo positioning,	for keyboards, 952-953	dictionaries in VCE, 1089
540	for mice, 961	dielectrics in coaxial cable,
Default Printer tool, C151	for network interface	1157, <i>1157</i>
Defrag utility	cards, 1203-1206,	differential backups, 723,
lost data from, 752-753	<i>1204, 1206</i>	C197
for video capture, 1086	organization of, C127-	differential SCSI, 598, C197
defragmentation, C195-C196	C128, C127	digests in mailing lists, 1350
defragmenters, C196	for removing devices, 363	Digital Audio Tapes (DATs)
Deja.com site, 1348	devices, C196	defined, C197
delayed writes, 558	DHCP (Dynamic Host Configu-	with SCSI, 603, 1018
delays with repeaters, 1227	ration Protocol), 1183	digital broadband communi-
Dell Computer setup, 62	diagnostic programs, 331-332	cations, 911
Dell Inspiron 7500 computer,	defined, C197	cable broadband, 927-931
102	for expansion boards,	DSL, <b>917-927</b>
delta encoding technique,	403-404	ISDN, <b>914-916</b>
1089-1091	features in, <b>332–334</b>	selecting type, 912-914
demagnetizing floppy drive	for laser printers, 872-873	digital camcorders, 1056
heads, 779	for modems, C126, C126	digital cameras
demand paging, C196	third-party, 335-337	serial ports for, 243
demodulation, C196	Windows, <b>337–338</b> . <i>See</i>	still cameras, 1060
denial-of-service (DoS) attacks,	<i>also</i> Windows utili-	Universal Serial Bus for,
1233	ties	246
density, hard disk drive, 545	diagnostic startups, C141-	for video capture,
dependencies	C142, C141	1049-1052
in 6x86, 159	Diagnostics tab, C126, C126	digital devices, C197
in pipelines, 136	diagonal cutters, <b>56</b> , <i>56</i>	digital interface for capture
Dependency Walker tool,	diagrams	boards, 1075–1076
C151	for DIP switches, 72, 73	digital monitors, 990–991
Deschutes chip, 115	using documentation with,	Digital Signal Processing
Deskpro 286/12, <b>208–209</b>	95-96	(DSP), C197
desktop case style	for expansion boards,	digital sound, 1030
description, C34-C35	71-72	Digital Subscriber Line (DSL),
disassembling, <b>66-68</b> ,	for floppy disk drives, 80	912, <b>917</b>
66-67	for jumpers, 73	configuring, 923–924
Desktop Manager Interface	for motherboards, 73-74,	defined, C197-C198
(DMI), C196	87, 87	installing, 922–923
desktop video, C196	for notebooks, 1279	operation of, <b>917-918</b>
desoldering chips, 450–452	for power connectors, 82	security for, 925–927
developing cylinders in laser	for power switches, 84–85	speed and distance in, 921
printers, 850, <i>851</i>	for ribbon cables, <b>70–71</b>	types of, 918-920
device conflicts. See conflicts	in troubleshooting,	digital temperature probes,
device dependence, C196	315-316	280, 449

digital-to-analog (D/A) conversions, 236, 236, 978-979 digital video capture and transfer, 1083-1084 Digital Video Disk drives, See DVD (Digital Video Disk drives See DVD (Digital Video Disk drives) digital video disk-rescable (DVD-E), C198 digital video disk-resordable (DVD-R), C198 digital video disk-recordable (DVD-R), C198 d	digital thormometers 200	diagrams for 72 72	diagagamble, 44
sions, 236, 236, 978-979 digital video capture and transfer, 1083-1084 Digital Video Disk drives, See DVD (Digital Video disk-reseable (DVP-B, C198) digital video disk-recordable (DVP-B, C198 defined, C198 vs. DVD-video, 1110 recordable, 1110-1111 Digital8 format, 1052-1054, 461-462 digitizing in audio, 1008 DIMMs (Dual In-line Memory Modules), 165, 166, 461-462 for 64-bit computers, 463-464 and chip sets, 462-463 defined, C200 installing, C59-C60 for notebooks, 1281-1282 for SDRAM, 469-470 in upgrading, C22-C23, C23 DIN plugs and connectors identifying, 260 for keyboards, 949-950, 950, C21 for parallel ports, 263 diodes, replacing, 452 DIP (Dual In-line Packages) for CPUs, 144, 145 defined, C200 extractors for, 58, 58 for memory, 165 DIP memory chips, 460-461 DIP memory chips, 460	digital to analog (D/A) conver	diagrams for, 72, 73	disassembly, 44
digital video capture and transfer, 1083–1084 Digital Video Disk drives, See DVD (Digital Video Disk drives, See DVD (Digital Video disk-eraseable (DVD-E), C198 digital video disk-eraseable (DVD-B), C198 digital video disk-eraseable (DVD-B), C198 digital video disk-erordable (DVD-R), C198 digital video disk-erordable (DVD-R), C198 digital video disk-recordable (DVD-R), C198 dijetal video disk-recordable (DVD-R), C1			
digital video capture and transfer, 1083-1084 pigital Video Disk drives, See DVD (Digital Video Disk drives, See DVD (Digital Video Disk) drives digital video disk-eraseable (DVD-E), C198 digital video disk-ercordable (DVD-R), C198 digital video disk-ercordable (DVD-R), C198 digital video disk-ercordable (DVD-R), C198 digital video disk-ROM (DVD-R), C198 digital video disk-ROM (DVD-R), C198 digital video disk-ROM (DVD-R), C198 direct broadcast satellite (DBS) systems, 1060 Direct Cable Connection utility, 1305 system, 931-932 keyboards, 955-956 laser printers, 855, 856 monitor removal in, 65 motherboard removal, 77-80 expansion board removal, 78-70 for passion board removal, 78-00 for expansion board removal, 78-70 for passion board			
transfer, 1083–1084 Digital Video Disk drives, See DVD (Digital Video Disk) drives digital video disk-reaseable (DVD-E), C198 digital video disk-recordable (DVD-B), C198 digital video disk-recordable (DVD-B, C198 disc tronsition util- ity, 1305 disc cronsection util- ity, 1305 montror removal, 65 motherboard encourter parts storage in, 61 power supply removal, disk caches, C199 disk controllers defined, C199 disk cortollers defined, C199 disk cortollers defined, C199 disk drives. See also CD-ROM drives; floppy disk drives. See also CD-ROM drives; floppy			
Digital Video Disk drives, See DVD (Digital Video Disk) drives Direct Common addresses, 396 Direct Common addresses, 286 Direct Memory Access. See DMA (Direct Memory Acce			
DVD (Digital Video Disk) drives   DirectDus system, 932   T5-77, 75-76   keyboards, 955-956   laser printers, 855, 856   monitor removal, 955-956   laser printers, 855, 856   monitor removal, 956-956   laser printers, 855, 856   monitor removal in, 65   monitor removal i			
Disk) drives digital video disk-eraseable (DVD-E), C198 digital video disk-recordable (DVD-R), C198 direct broadcast satellite (DBS) systems, 1060 Direct Cable Connection utility, 1305 direct-drive TTL monitors, 996 direct-drive TTL monitors, 996 vs. DVD-video, 1110 recordable, 1110–1111 Digital8 format, 1052–1054, 1056 direct-drive TTL monitors, 996 vs. DVD-video, 1110 recordable, 1110–1111 Digital8 format, 1052–1054, 1056 direct-drive TTL monitors, 996 defined, C198  DMA (Direct Memory Access) channel Direct-drive TTL monitors, 996 notebooks, 1288–1290 parts storage in, 61 power supply removal, 80-85, 82-83 quick steps for, 45-48 workspace for, 60 disconnects in SCSI-2, 601 disk caches, C199 disk controllers defined, C200 installing, C59-C60 for notebooks, 1281–1282 for SDRAM, 469-470 in upgrading, C22-C23, C23 DIN plugs and connectors identifying, 260 for keyboards, 949–950, 950, C21 for parallel ports, 263 diodes, replacing, 452 DIP (Dual In-line Packages) for CPUs, 144, 145 defined, C200 extractors for, 58, 8 for memory, clips, 460-461 DIP switches. See also jumpers  Direct Varience Direct Varience Direct Varience System Restore Option, C149 disk drives. See cables for, 79-80, 79-780, 78-18 Screws for, 77-78 Disk Manager program, 588-588 place printers, 855, 86 monitor removal in, 65 motherboard circuitry, C37 motherboard circuitry, C37  keyboards, 95-60 notebooks, 128-129 parts storage netos, C187 phoret Memory Access) channel power supply removal, 80-85, 82-83 quick steps for, 45-48 workspace for, 60 disconnects in SCSI-2, 601 disk caches, C199 for hard disk drives. See hard disk drives. See hard disk drives see, C199 geometry in, 533-534 power supplies and c			
digital video disk-eraseable (DVD-E), C198 direct broadcast satellite (DBS) systems, 1060 priect Cable Connection utility, 1305 system, 1060 priect System, 1060 priect System, 1060 priect System systems, 1060 priect System, 1075 priect Memory Access. 2ee DMA (Direct Memory Access. 2ee DM			
digital video disk-recordable (DVD-R), C198 digital video disk-recordable (DVD-R), C198 digital video disk-ROM (DVD-ROM) ROM) defined, C198 vs. DVD-video, 1110 recordable, 1110-1111 Digital8 format, 1052-1054, 1056 digitizing in audio, 1008 DIMMs (Dual In-line Memory Modules), 165, 166, 461-462 for 64-bit computers, 463-464 and chip sets, 462-463 defined, C200 installing, C59-C60 for notebooks, 1281-1282 for SDRAM, 469-470 in upgrading, C22-C23, 201N plugs and connectors identifying, 260 for keyboards, 949-950, 950, C21 for mouse, C21 for mouse, C21 for parallel ports, 263 diodes, replacing, 452 DIP (Dual In-line Packages) for CPUs, 144, 145 defined, C200 extractors for, 58, 58 for memory, clips, 460-461 DIP switches. See also jumpers  direct-broadcast satellite (DBS) systems, 1060 systems, 1060 systems, 1060 systems, 1060 chreat cable connection utility, 1305 direct-drive TTL monitors, 996 direct-mapped caches, C187 DMA (Direct Memory Access. See DirectDraw test, C135 DirectBusic test, C136 direct-rive TTL monitors, 996 direct-drive TTL monitors, 996 notebooks, 128-1290 parts storage in, 61 power supply removal, 0isk caches, 19 power supplies and oconnectors			
digital video disk-recordable (DVD-R), C198 Direct Cable Connection utiligital video disk-ROM (DVD-ROM) defined, C198 996 so. DVD-video, 1110 direct-mapped caches, C187 per defined, C198 per disk-recordable, 1110-1111 Direct Memory Access. See DMA (Direct Memory Modules), 165, 166, 461-462 Direct-to-Drum laser printing Memory Modules), 165, 166, 461-462 DirectBase (DirectMusic test, C135 DirectMusic test, C135 DirectMusic test, C136 directories defined, C200 entries in, 664 directories defined, C200 entries in, 664 for notebooks, 1281-1282 for SDRAM, 469-470 invalid, 745-747 in upgrading, C22-C23, C23 directory bits, 673 DirectSound test, C136 for keyboards, 949-950, DirectSound SAPI, post of mouse, C21 for mouse, C21 for mouse, C21 for mouse, C21 for parallel ports, 263 diodes, replacing, 452 DIP (Dual In-line Packages) for CPUs, 144, 145 defined, C200 extractors for, 58, 58 for memory, t165 DIP memory chips, 460-461 DIP switches. See also jumpers System Restore, C149 gram, 656, 659	0		*
digital video disk-ROM (DVD-ROM) ROM) defined, C198 vs. DVD-video, 1110 Digital8 format, 1052-1054, 1056			
digital video disk-ROM (DVD-ROM)         ity, 1305         85-88, 87-88 necessity of, 59-60 notebooks, 1288-1290 notebooks, 1288-1290 notebooks, 1288-1290 parts storage in, 61 parts storage in, 61 power supply removal, 1056 notebooks, 1288-1290 parts storage in, 61 power supply removal, 1056 Access) channels digitizing in audio, 1008 DIMMs (Dual In-line Memory Modules), 165, 166, 461-462 Direct-to-Drum laser printing method, 848 disconnects in SCSI-2, 601 disk caches, C199 disk controllers defined, C200 entries in, 664 caches, C204 directories defined, C200 entries in, 664 caches, C29-C23, phantom, 785-787 directory bits, 673 DirectPlay test, C136 directory bits, 673 DirectSound test, C136 defined, C290 geometry in, 533-534 power supply removal, 80-85, 82-83 disk corts lers workspace for, 60 disk caches, C199 disk controllers defined, C199 disk controllers defined, C199 disk controllers defined, C199 disk controllers defined, C199 disk drives. See also CD-ROM for notebooks, 1281-1282 internet, 1328-1331 drives; floppy disk drives; floppy disk drives; for SDRAM, 469-470 invalid, 745-747 invalid, 745-747 drives; floppy disk drives; for SDRAM, 469-470 invalid, 745-747 drives; floppy disk drives; for SDRAM, 469-470 invalid, 745-747 drives; floppy disk drives; for sidentifying, 260 DirectSound test, C136 defined, C199 geometry in, 533-534 power supplies and connectors identifying, 260 DirectSound test, C136 defined, C199 geometry in, 533-534 power supplies and connectors for Romouse, C21 DirectX Diagnostics Tool, 781 power supplies and connectors object. The properties of the properties			
ROM) defined, C198 vs. DVD-video, 1110 recordable, 1110-1111 Digital8 format, 1052-1054, 1056 DIMMs (Dual In-line Memory Modules), 165, 166, 461-462 For 64-bit computers, defined, C200 installing, C59-C60 for sDRAM, 469-470 in upgrading, C22-C23, DIN plugs and connectors identifying, 260 DIN plugs and connectors identifying, 260 for keyboards, 949-950, 950, C21 for parallel ports, 263 diodes, replacing, 452 DIP memory chips, 460-461 DIP switches. See also jumpers  digitizer in audio, 1008 Direct Memory Access. See power supply removal, party enterod, 848 workspace for, 60 disk caches, C199 disk controllers defined, C198 defined, C198-C199 entries in, 664 disk drives. See defined, C198-C199 entries in, 664 disk drives. See also CD-ROM drives; Gloppy disk drives; Gloppy disk drives; Gloppy disk drives cables for, 79-80, 79-80, 79 removing, 77-78 Disk Manager program, for memory, 165 DIP memory chips, 460-461  direct-mapped caches, C187 parts storage in, 61 portect Memory Access. See power supply removal, party enterod, 10 porter Memory Access. See power supply removal, party enterod, 10 power supply removal, power supply removal, party enterod, 10 power supply removal, power supply removal, duics teps for, 45-48 disk caches, C199 disk caches, C199 disk controllers defined, C199 for hard disk drives. See Disk Doctor utility, C154 disk drives. See also Disk drives; Groppy disk drives; Gloppy disk drives; Groppy disk drives; Gloppy disk drives; Groppy disk drives; Groppy disk drives; Groppy disk drives; Groppy disk drives; Gloppy disk drives; Gloppy disk drives; Gloppy disk drives; Groppy disk drives; Gr			
defined, C198 vs. DVD-video, 1110 recordable, 1110-1111 Digital8 format, 1052-1054, Installing, C59-C60 for notebooks, 1281-1282 for SDRAM, 469-470 in upgrading, C22-C23, C23 DIN plugs and connectors identifying, 260 DIN plugs and connectors identifying, 260 For keyboards, 949-950, For parallel ports, 263 for CPUs, 144, 145 DIP memory, chess DIP memory, chips, 460-461 DIP switches. See also jumpers  direct memory Access. See parts storage in, 61 powrs upply removal, powre supply removal, power supplies and con- post of care in the power supplies and con- nectors for, 79-80, power supplies of the for hard disk			
vs. DVD-video, 1110 recordable, 1110-1111 Direct Memory Access. See Digital8 format, 1052-1054, 1056 Access) channels digitizing in audio, 1008 DIMMs (Dual In-line Memory Modules), 165, 166, 461-462 DirectDraw test, C135 A63-464 and chip sets, 462-463 defined, C200 for notebooks, 1281-1282 for SDRAM, 469-470 in upgrading, C22-C23, identifying, 260 DIN plugs and connectors identifying, 260 for keyboards, 949-950, 950, C21 for mouse, C21 DIP (Dual In-line Packages) for CPUS, 144, 145 DIP (Dual In-line Packages) DIP memory chips, 460-461 DIP switches. See also jumpers  directory bits, 673 DIP memory chips, 460-461 DIrectX Are, 987 DIP (Dual In-line Packages) DIP memory chips, 460-461 DIP switches. See also jumpers  defined, C209 DirectX Are, 987 DIP (Dual In-line Packages) DIP memory chips, 460-461 DIP switches. See also jumpers  defired, C199 DirectMemory Access. See DMA (Direct Memory Access. Clannels Direct Memory Access. Ceannels Direct Memory Access. Clannels DMA (Direct Memory Access. Clannels Access) channels Quick steps for, 45-48 disconnects in SCSI-2, 601 disconnects in SCSI-2, 601 disc caches, C199 defisconnects in SCSI-2, 601 disc caches, C199 defined, C199 for hard disk drives. See hard disk drives. See hard disk drives. See hard disk drives. See also CD-ROM drives; floppy disk drives; flopp			
recordable, 1110-1111 Digital8 format, 1052-1054, 1056 Digital8 format, 1052-1054, 1056 Access) channels digitizing in audio, 1008 DIMMs (Dual In-line Memory Modules), 165, 166, 461-462 DirectDraw test, C135 for 64-bit computers, 463-464 and chip sets, 462-463 defined, C200 for notebooks, 1281-1282 for SDRAM, 469-470 in upgrading, C22-C23, indentifying, 260 DirectSound test, C136 for keyboards, 949-950, for mouse, C21 for mouse, C21 for parallel ports, 263 diodes, replacing, 452 DIP (Dual In-line Packages) for CPUs, 144, 145 DIP memory chips, 460-461 DIR wwitches. See also jumpers Direct Memory Access. See DMA (Direct Memory Access) channels DMA (Direct Memory Access) channels duicted Memory Rob-80, 82-83 quick steps for, 45-48 disconnects in SCSI-2, 601 disk caches, C199 disk controllers defined, C199 for hard disk drives. See hard disk drives. See DirectNaise test, C136 disk Caches, C199 disk controllers defined, C199 for hard disk drives. See hard disk drives. See Disk Doctor utility, C154 disk drives: See also CD-ROM drives; hard disk drives DirectNainant, 785-787 directsound3D API, power supplies and con- nectors for, 79-80, 78-79, removing, 77-80, 78-79, removing, 77-80, 78-79, removing, 77-780, 78-79, removing, 77-80, 78-79, removing, 77-80, 78-79, removing, 77-80, 78-79, removing, 76-66-65 removing, 76-61 removing			
Digital8 format, 1052–1054, 1056  Access) channels  Direct-to-Drum laser printing method, 848  Direct-to-Drum laser printing method, 848  Modules), 165, 166, 166, 461–462  for 64-bit computers, 463–464  and chip sets, 462–463  defined, C200  for notebooks, 1281–1282  for SDRAM, 469–470  in upgrading, C22-C23, C23  DIN plugs and connectors identifying, 260  for keyboards, 949–950, 1060, 276  for mouse, C21  for parallel ports, 263  diodes, replacing, 452  DIP (Dual In-line Packages)  for CPUs, 144, 145  DIP (Dual In-line Packages)  for memory, 165  DIP memory chips, 460–461  DIP wwitches. See also jumpers  DIMA (Direct Memory Access) channels  Access) channels  Direct-to-Drum laser printing method, 848  workspace for, 45–48  workspace for, 60  disconnects in SCSI-2, 601  disk caches, C199  disk controllers  defined, C199  for hard disk drives. See  defined, C199  for hard disk drives. See  hard disk drives.			
digitizing in audio, 1008 DIMMs (Dual In-line Memory Modules), 165, 166, 461-462 Direct3D test, C135 Modules), 165, 166, 463-464 Direct4Draw test, C135 Modules), 165, 166, 461-462 DirectDraw test, C135 Misk controllers defined, C199 disk controllers defined, C200 for notebooks, 1281-1282 for SDRAM, 469-470 in upgrading, C22-C23, DirectPlay test, C136 Modules, 166, 461 Direct3D test, C135 DirectAD test, C135 Misk controllers defined, C199 disk controllers defined, C199 for hard disk drives. See hard disk drives. See also jumpers  Modules), 165, 166, DirectWusic test, C136 DirectNavic test, C136 DirectAD test, C199 disk controllers defined, C199 disk drives. See also jumpers  Modules), 165, 166, DirectSDraw test, C136 DirectSound3D API, DirectSDraw test, C136 DirectSDraw t	· · · · · · · · · · · · · · · · · · ·		
digitizing in audio, 1008 DIMMs (Dual In-line Memory Modules), 165, 166, 461-462 Direct3D test, C135 disk caches, C199 disk controllers for 64-bit computers, 463-464 directories defined, C200 installing, C59-C60 for sDRAM, 469-470 in upgrading, C22-C23, in upgrading, C22-C23, identifying, 260 DirectSound test, C136 for keyboards, 949-950, for parallel ports, 263 DirectX API, 987 DIP (Dual In-line Packages) For Edwiss (DirectX API, 987 DIP (Dual In-line Packages) DIP memory, 165 DIP memory, 165 DirectSound destrore, C149- DirectSound cert, C136 DirectSound cisk caches, C199 disk caches, C199 disk caches, C199 disk caches, C199 disk caches, C199 for hard disk drives. See also CD-ROM drives; floppy disk drives. See also Disk Doctor utility, C154 disk drives. See also jumpers  workspace for, 60 disconnects in SCSI-2, 601 disk caches, C199 for hard disk drives. Disk Doctor utility, C154 disk drives. See also jumpers  for API, C199 for hard disk drives. See hard disk drives. See also jumpers  for API, C199 disk drives, See hard disk drives. See also jumpers  for API, C199 disk drives, See Disk Doctor utility, C154 disk drives, See also jumpers  defined, C199 disk drives, See Disk Doctor utility, C154 disk drives. See also jumpers  C23 C134-C136, C134 Disk Drives; ladish drive	_		
DIMMs (Dual In-line Memory Modules), 165, 166, 461-462 Direct3D test, C135 disk caches, C199 disk controllers for 64-bit computers, 463-464 directories defined, C200 entries in, 664 disk drives. See also controllers in stalling, C59-C60 FAT for, 671-674, 672, 674 for notebooks, 1281-1282 for SDRAM, 469-470 in upgrading, C22-C23, c23 directory bits, 673 dientifying, 260 DirectSound test, C136 for keyboards, 949-950, 250, C21 for parallel ports, 263 for CPUs, 144, 145 defined, C200 extractors for, 58, 58 for memory, 165 DIM memory chips, 460-461 DIP switches. See also jumpers method, 848 disconnects in SCSI-2, 601 disk caches, C199 defined, C199 for hard disk drives See also CD-ROM drives floppy disk drives. See also Disk Doctor utility, C154 disk drives. See also CD-ROM drives; floppy disk drives; hard disk drives also bisk drives. See also Disect Vala for, 674-674, 672, 674 disk drives. See also CD-ROM drives; floppy disk drives also pisk drives also context or solution. Test also pisk drives also cables for, 79-80, 79 defined, C199 geometry in, 533-534 power supplies and connectors for parallel ports, 263 disabling screws for, 77-80, 78-79, also bisk drives. See also jumpers bisk drives. See also jumpers bisk drives and context or solution and provided probability. Test also pisk drives are solved probability. Test also pisk drives are solved probability. Test also pisk drives are solved probability. Test also pisk drives also pisk drives are solved probability. Test also pisk drives are solved pro			
Modules), 165, 166, 461-462 Direct3D test, C135 disk caches, C199 461-462 DirectDraw test, C135 disk controllers for 64-bit computers, 463-464 directories defined, C199 hard disk drives. See and chip sets, 462-463 defined, C199 hard disk drives defined, C200 entries in, 664 Disk Doctor utility, C154 disk drives. See also CD-ROM for notebooks, 1281-1282 Internet, 1328-1331 drives; floppy disk in upgrading, C22-C23, phantom, 785-787 directory bits, 673 cables for, 79-80, 79 defined, C199 identifying, 260 DirectSound test, C136 for keyboards, 949-950, DirectSound test, C136 for mouse, C21 DirectX API, 987 for parallel ports, 263 disabling for CPUs, 144, 145 DIP (Dual In-line Packages) for CPUs, 144, 145 disabling extractors for, 58, 58 for memory, 165 BIOS for SCSI, 634 pirectSound circuitry, C37 DIP switches. See also jumpers System Restore, C149-  Misk caches, C199 disk controllers defined, C199 defined, C199 hard disk drives. See disabling disk controllers defined, C199 hard disk drives. See disabling disk drives See also Disk Manager DiskGo! program, 656, 659			_
461-462DirectDraw test, C135disk controllersfor 64-bit computers,DirectMusic test, C136defined, C199463-464directoriesfor hard disk drives. Seeand chip sets, 462-463defined, C198-C199hard disk drivesdefined, C200entries in, 664Disk Doctor utility, C154installing, C59-C60FAT for, 671-674, 672, 674disk drives. See also CD-ROMfor notebooks, 1281-1282Internet, 1328-1331drives; floppy diskfor SDRAM, 469-470invalid, 745-747drives; floppy diskin upgrading, C22-C23,phantom, 785-787drivesC23directory bits, 673cables for, 79-80, 79DIN plugs and connectorsDirectPlay test, C136geometry in, 533-534identifying, 260DirectSound test, C136geometry in, 533-534for keyboards, 949-950,DirectSound test, C136power supplies and connectors for nouse, C21for mouse, C21DirectX API, 98779for parallel ports, 263DirectX Diagnostics Tool, diodes, replacing, 452C134-C136, C134781DIP (Dual In-line Packages)DirectX drivers, C123screws for, 77-78for CPUs, 144, 145Disable System RestoreZone Bit Recording in, option, C149532-533, 537extractors for, 58, 58disablingDisk Manager program, 588-589DIP memory chips, 460-461motherboard circuitry, C37Disk Manager DiskGo! pro- gram, 656, 659DIP switches. See also jumpersSystem Restore, C149-Disk Manager DiskGo! pro-			
for 64-bit computers, 463–464 directories defined, C198-C199 defined, C200 entries in, 664 installing, C59-C60 for notebooks, 1281–1282 for SDRAM, 469–470 in upgrading, C22-C23, indentifying, 260 DIN plugs and connectors identifying, 260 por nouse, C21 for mouse, C21 DIP (Dual In-line Packages) for CPUs, 144, 145 DIP (Dual In-line Packages) for memory, 165 DIP memory chips, 460–461 DIP switches. See also (C199 centries in, 664 DirectMusic test, C136 defined, C199 hard disk drives. See also CD-ROM for hard disk drives for hard disk drives bits hard disk drives. See also CD-ROM disk drives; floppy dis			
463-464directoriesfor hard disk drives. Seeand chip sets, 462-463defined, C198-C199hard disk drivesdefined, C200entries in, 664Disk Doctor utility, C154installing, C59-C60FAT for, 671-674, 672, 674disk drives. See also CD-ROMfor notebooks, 1281-1282Internet, 1328-1331drives; floppy diskfor SDRAM, 469-470invalid, 745-747drives; hard diskin upgrading, C22-C23,phantom, 785-787drivesC23directory bits, 673cables for, 79-80, 79DIN plugs and connectorsDirectPlay test, C136defined, C199identifying, 260DirectSound test, C136geometry in, 533-534for keyboards, 949-950,DirectSound3D API,power supplies and con-950, C211031-1032nectors for, 79-80,for mouse, C21DirectX API, 98779for parallel ports, 263DirectX Diagnostics Tool,removing, 77-80, 78-79,diodes, replacing, 452C134-C136, C134781DIP (Dual In-line Packages)DirectX drivers, C123screws for, 77-78for CPUs, 144, 145Disable System RestoreZone Bit Recording in,defined, C200option, C149532-533, 537extractors for, 58, 58disablingDisk Manager program,for memory, 165BIOS for SCSI, 634Disk Manager DiskGo! pro-DIP switches. See also jumpersSystem Restore, C149-Disk Manager DiskGo! pro-			
and chip sets, 462-463 defined, C198-C199 hard disk drives defined, C200 entries in, 664 Disk Doctor utility, C154 disk drives. See also CD-ROM for notebooks, 1281-1282 Internet, 1328-1331 for SDRAM, 469-470 invalid, 745-747 invalid, 745-747 drives; floppy disk drives; hard disk in upgrading, C22-C23, phantom, 785-787 directory bits, 673 DIN plugs and connectors identifying, 260 DirectSound test, C136 for keyboards, 949-950, for mouse, C21 for mouse, C21 for parallel ports, 263 DirectX API, 987 DIP (Dual In-line Packages) for CPUs, 144, 145 Disable System Restore defined, C200 extractors for, 58, 58 DIP memory chips, 460-461 DIP switches. See also jumpers  defined, C199 defined, C199 defined, C199 geometry in, 533-534 power supplies and con- nectors for, 79-80, power supplies and con- nectors for, 79-80, premoving, 77-80, 78-79, removing, 77-80, 78-79, disable System Restore option, C149 Disk Manager program, Disk Manager DiskGo! pro- Disk Manager DiskGo! pro- Disk Manager DiskGo! pro- Disk Manager DiskGo! pro-	_		
defined, C200 entries in, 664 installing, C59-C60 for notebooks, 1281–1282 for SDRAM, 469-470 in upgrading, C22-C23, C23 DIN plugs and connectors identifying, 260 for keyboards, 949–950, for mouse, C21 for mouse, C21 DirectX API, 987 for parallel ports, 263 DirectX Diagnostics Tool, diodes, replacing, 452 DIP (Dual In-line Packages) for CPUs, 144, 145 Disk Doctor utility, C154 disk drives. See also CD-ROM director, 671–674, 672, 674 disk drives. See also CD-ROM drives; floppy disk drives; hard disk drives; hard disk drives cables for, 79–80, 79 defined, C199 defined, C199 geometry in, 533–534 power supplies and con- nectors for, 79–80, 79 removing, 77–80, 78–79, diodes, replacing, 452 DirectX drivers C134-C136, C134 DirectX API, 987 DirectX drivers, C123 for CPUs, 144, 145 Disable System Restore option, C149 extractors for, 58, 58 disabling for memory, 165 BIOS for SCSI, 634 DIP memory chips, 460–461 DIP switches. See also jumpers System Restore, C149- Disk Manager DiskGo! pro-			
installing, C59-C60 for notebooks, 1281–1282 for SDRAM, 469-470 invalid, 745–747 invalid, 745–747 drives; floppy disk drives; hard disk drives; hard disk drives; hard disk drives drives cables for, 79–80, 79  DIN plugs and connectors identifying, 260 pirectSound test, C136 for keyboards, 949–950, for mouse, C21 for parallel ports, 263 DirectX API, 987 DIP (Dual In-line Packages) for CPUs, 144, 145 poisable System Restore defined, C200 extractors for, 58, 58 for memory, 165 DIP memory chips, 460–461 DIP switches. See also jumpers  FAT for, 671–674, 672, 674 Internet, 1328–1331 Idrives; floppy disk drives; hard disk drives; floppy disk drives; floppy disk drives; hard disk drives; floppy disk drives; hard disk drives; floppy disk drives; hard disk drives; floppy disk drives dr			
for notebooks, 1281–1282 Internet, 1328–1331 drives; floppy disk for SDRAM, 469–470 invalid, 745–747 drives; hard disk in upgrading, C22-C23, phantom, 785–787 directory bits, 673 DIN plugs and connectors identifying, 260 DirectPlay test, C136 for keyboards, 949–950, portion of mouse, C21 for mouse, C21 DirectX API, 987 DirectX API, 987 DirectX drivers, C123 For CPUs, 144, 145 Disable System Restore defined, C200 extractors for, 58, 58 DIP memory chips, 460–461 DIP switches. See also jumpers  Invalid, 745–747 drives; floppy disk drives; hard disk drives; hard disk drives; floppy disk drives; hard disk drives; floppy disk drives dri			
for SDRAM, 469–470 invalid, 745–747 drives; hard disk in upgrading, C22-C23, phantom, 785–787 drives  C23 directory bits, 673 cables for, 79–80, 79  DIN plugs and connectors DirectPlay test, C136 defined, C199 identifying, 260 DirectSound test, C136 geometry in, 533–534 power supplies and con- 950, C21 1031–1032 nectors for, 79–80, for mouse, C21 DirectX API, 987 79 for parallel ports, 263 DirectX Diagnostics Tool, removing, 77–80, 78–79, diodes, replacing, 452 C134-C136, C134 781  DIP (Dual In-line Packages) DirectX drivers, C123 screws for, 77–78 for CPUs, 144, 145 Disable System Restore Zone Bit Recording in, defined, C200 option, C149 532–533, 537 extractors for, 58, 58 disabling Disk Manager program, for memory, 165 BIOS for SCSI, 634 588–589  DIP memory chips, 460–461 motherboard circuitry, C37 DIP switches. See also jumpers System Restore, C149- gram, 656, 659			
in upgrading, C22-C23, phantom, 785-787 drives  C23 directory bits, 673 cables for, 79-80, 79  DIN plugs and connectors DirectPlay test, C136 defined, C199 identifying, 260 DirectSound test, C136 geometry in, 533-534 for keyboards, 949-950, DirectSound3D API, power supplies and con- 950, C21 1031-1032 nectors for, 79-80, for mouse, C21 DirectX API, 987 79 for parallel ports, 263 DirectX Diagnostics Tool, removing, 77-80, 78-79, diodes, replacing, 452 C134-C136, C134 781  DIP (Dual In-line Packages) DirectX drivers, C123 screws for, 77-78 for CPUs, 144, 145 Disable System Restore Joseph System Restore activates for, 58, 58 disabling Disk Manager program, for memory, 165 BIOS for SCSI, 634  DIP memory chips, 460-461 motherboard circuitry, C37 DIP switches. See also jumpers System Restore, C149-  dirives cables for, 79-80, 78 defined, C199			
C23directory bits, 673cables for, 79-80, 79DIN plugs and connectors identifying, 260DirectSound test, C136defined, C199for keyboards, 949-950, for keyboards, 949-950,DirectSound3D API, 1031-1032power supplies and con- power supplies and con- nectors for, 79-80,for mouse, C21 for parallel ports, 263DirectX API, 987 DirectX Diagnostics Tool, C134-C136, C134removing, 77-80, 78-79,diodes, replacing, 452C134-C136, C134 T81781DIP (Dual In-line Packages)DirectX drivers, C123 Disable System Restore option, C149screws for, 77-78 Zone Bit Recording in, 532-533, 537defined, C200 extractors for, 58, 58 for memory, 165disabling BIOS for SCSI, 634 motherboard circuitry, C37Disk Manager program, 588-589DIP memory chips, 460-461 DIP switches. See also jumpersmotherboard circuitry, C37 System Restore, C149-Disk Manager DiskGo! program, 656, 659			
DIN plugs and connectors identifying, 260 DirectSound test, C136 geometry in, 533–534 geometry in, 533–534 power supplies and congeton power supplies and connectors for mouse, C21 power supplies and congeton parallel ports, 263 DirectX API, 987 power supplies and congeton parallel ports, 263 DirectX API, 987 power supplies and congeton parallel ports, 263 power supplies and connectors for, 79–80, 79 power supplies and congeton power supplies and connectors for power supplies an			
identifying, 260 DirectSound test, C136 geometry in, 533–534 for keyboards, 949–950, DirectSound3D API, power supplies and congeton 950, C21 1031–1032 nectors for, 79–80, for mouse, C21 DirectX API, 987 79 for parallel ports, 263 DirectX Diagnostics Tool, removing, 77–80, 78–79, diodes, replacing, 452 C134-C136, C134 781 DIP (Dual In-line Packages) DirectX drivers, C123 screws for, 77–78 for CPUs, 144, 145 Disable System Restore option, C149 532–533, 537 extractors for, 58, 58 disabling Disk Manager program, for memory, 165 BIOS for SCSI, 634 588–589 DIP memory chips, 460–461 motherboard circuitry, C37 Disk Manager DiskGo! pro-DIP switches. See also jumpers System Restore, C149-			
for keyboards, 949–950,  950, C21  1031–1032  nectors for, 79–80, for mouse, C21  for parallel ports, 263  diodes, replacing, 452  DirectX Diagnostics Tool, cfor CPUs, 144, 145  defined, C200  extractors for, 58, 58  for memory, 165  DIP memory chips, 460–461  DIP switches. See also jumpers  DirectSound3D API, power supplies and connectors for, 79–80, 1031–1032  nectors for, 79–80, removing, 77–80, 78–79, removing, 77–80, 79 removing, 79 removing, 79–80, 79 removing, 79			
950, C211031-1032nectors for, 79-80,for mouse, C21DirectX API, 98779for parallel ports, 263DirectX Diagnostics Tool,removing, 77-80, 78-79,diodes, replacing, 452C134-C136, C134781DIP (Dual In-line Packages)DirectX drivers, C123screws for, 77-78for CPUs, 144, 145Disable System RestoreZone Bit Recording in,defined, C200option, C149532-533, 537extractors for, 58, 58disablingDisk Manager program,for memory, 165BIOS for SCSI, 634588-589DIP memory chips, 460-461motherboard circuitry, C37Disk Manager DiskGo! pro-DIP switches. See also jumpersSystem Restore, C149-gram, 656, 659			
for mouse, C21 DirectX API, 987 79 for parallel ports, 263 DirectX Diagnostics Tool, removing, 77–80, 78–79, diodes, replacing, 452 C134-C136, C134 781 DIP (Dual In-line Packages) DirectX drivers, C123 screws for, 77–78 for CPUs, 144, 145 Disable System Restore Zone Bit Recording in, defined, C200 option, C149 532–533, 537 extractors for, 58, 58 disabling Disk Manager program, for memory, 165 BIOS for SCSI, 634 588–589 DIP memory chips, 460–461 motherboard circuitry, C37 DIP switches. See also jumpers System Restore, C149- gram, 656, 659			= = =
for parallel ports, 263 DirectX Diagnostics Tool, diodes, replacing, 452 C134-C136, C134  DIP (Dual In-line Packages) for CPUs, 144, 145 Disable System Restore defined, C200 option, C149 extractors for, 58, 58 for memory, 165 DIP memory chips, 460-461 DIP switches. See also jumpers DirectX drivers, C123 DirectX drivers, C123 Screws for, 77-78 Zone Bit Recording in, Street System Restore Disk Manager program, Disk Manager program, Disk Manager DiskGo! program, System Restore, C149- gram, 656, 659			
diodes, replacing, 452  DIP (Dual In-line Packages)  for CPUs, 144, 145  Disable System Restore  defined, C200  extractors for, 58, 58  for memory, 165  DIP memory chips, 460-461  DIP switches. See also jumpers  C134-C136, C134  DirectX drivers, C123  DirectX drivers, C123  screws for, 77-78  Zone Bit Recording in,  Zone Bit Recording in,  Disk Manager program,  588-589  Disk Manager DiskGo! program,  Disk Manager DiskGo! program,  System Restore, C149-  gram, 656, 659	· · · · · · · · · · · · · · · · · · ·	· ·	
DIP (Dual In-line Packages) for CPUs, 144, 145 Disable System Restore defined, C200 option, C149 option, C149 extractors for, 58, 58 for memory, 165 DIP memory chips, 460-461 DIP switches. See also jumpers DIP system Restore, C149- Screws for, 77-78 Zone Bit Recording in, option, C149 532-533, 537 Disk Manager program, 588-589 Disk Manager DiskGo! program, Disk Manager DiskGo! program, Option, C149 System Restore, C149- Option, C149 Option, C1			
for CPUs, 144, 145 Disable System Restore Zone Bit Recording in, defined, C200 option, C149 532-533, 537 extractors for, 58, 58 disabling Disk Manager program, for memory, 165 BIOS for SCSI, 634 588-589 DIP memory chips, 460-461 motherboard circuitry, C37 DIP switches. See also jumpers System Restore, C149- gram, 656, 659			
defined, C200 option, C149 532-533, 537 extractors for, 58, 58 disabling Disk Manager program, for memory, 165 BIOS for SCSI, 634 588-589 DIP memory chips, 460-461 motherboard circuitry, C37 DIP switches. See also jumpers System Restore, C149- gram, 656, 659			
extractors for, <b>58</b> , <i>58</i> disabling Disk Manager program, for memory, 165 BIOS for SCSI, <b>634</b> 588–589 DIP memory chips, <b>460–461</b> motherboard circuitry, C37 DIP switches. <i>See also</i> jumpers System Restore, <b>C149</b> - gram, 656, 659			
for memory, 165 BIOS for SCSI, <b>634</b> 588–589 DIP memory chips, <b>460–461</b> motherboard circuitry, C37 DIP switches. <i>See also</i> jumpers System Restore, <b>C149</b> - gram, 656, 659		. ,	
DIP memory chips, <b>460-461</b> motherboard circuitry, C37 Disk Manager DiskGo! pro- DIP switches. <i>See also</i> jumpers System Restore, <b>C149</b> - gram, 656, 659			
DIP switches. See also jumpers System Restore, C149- gram, 656, 659			
, , ,			
defined, C198 C150 disk optimizers, C199	0 1		
	defined, C198	C150	disk optimizers, C199

disk quotas, 682	DMA (Direct Memory Access)	Domain Name Service (DNS)
DISKCOPY command, 753	channels, 40	servers, 1181
DiskEdit program, 758	bus lines for, 203	DoS (denial-of-service) attacks,
disks. See also CD-ROM drives;	and bus mastering,	1233
disk drives; floppy	211-212	DOS (Disk Operating System)
disk drives; floppy	for CD-ROM drives, 1136	and disks, <b>662–665</b>
diskettes; hard disk	defined, C198	absolute and DOS sectors,
drives	in diagnostic programs,	665-668
absolute and DOS sectors	333-334	clusters, 668-670
on, 665-668	in EISA bus, 213	DBR, <b>670-671</b>
CD-ROM. See compact	error beeps for, 429	disk errors, <b>726–729</b> , <i>727</i>
discs	for hard disk drives, 521	FAT, <b>671-674</b> , <i>672</i> , <i>674</i>
clusters on, <b>668–670</b>	for network interface	FAT32, <b>679–681</b>
DBR on, <b>670-671</b>	cards, 1202, <b>1208</b>	logical drive structure,
FAT on, <b>671–674</b> , <i>672</i> , <i>674</i>	operation of, 377–380,	677-679, 678-679
hardware structure of,	377-378	NTFS, <b>681-683</b>
525-532, <i>526</i> ,	with PC Card bus, 224	subdirectories, 675–677
529-531	vs. PIO, <b>567–568</b>	DOS Boot Records (DBRs)
logical drive structure of,	with Plug and Play,	loading, 444-445
677-679, 677-679	404-405	for logical drives, 678,
subdirectories on, <b>675–677</b>	for SCSI adapters, 611	678-679
DISKTOOL utility, 64	for sound cards, 1016	purpose of, <b>670–671</b>
display chips, 976–979	using, 381–382	DOS extenders, 192
Display Properties window,	DMA controllers, I/O	DOS extenders, 192 DOS partitions, <b>647–657</b> ,
C117-C119, <i>C118</i>	addresses for, 370	648-652
Display tab, C103, <i>C103</i>	DMI (Desktop Manager Inter-	DOS sectors, <b>665–668</b>
DisplayMate diagnostic pro-	face), C196	DOSKEY utility, 178
	DMV virus, 691	dot-matrix printers, 793–795
gram, 336	DNS (Domain Name Service)	
displays. <i>See</i> monitors; video and video boards		dot pitch for LCD displays, 990
	servers, 1181	
distance	DNS IP numbers, 924	dot pitch for monitors,
in DSL, <b>921</b>	docking stations, C199-C200	988-989
in ESD, 299	DOCSIS (Data Over Cable Ser-	dotted quad format, 1182
distorted laser printer images,	vice Interface Specifi-	double data rate (DDR)
881	cation), 928, 930	SDRAM, 471
dithering with capture boards,	documentation	defined, C200
1078	using diagrams with,	development of, 171
DIV operator, 667	95-96	for video, 974
DIX (DEC-Intel-Xerox) connec-	for network cable, 1196	double-density floppy
tors, 265	online sources of, 1318	diskettes, 775
DLC (Data Link Control) pro-	for SETUP program access,	double-sided printing, 862
tocol, 805	63	double slashes (//), C200
DLLs (dynamic link libraries)	for switch settings,	doubler chips, 110–112
defined, C201	364-365	downloading files
operation of, 328–330	in troubleshooting, 312,	defined, C200
viruses in, 689	316-317	FTP sites for, <b>1338-1341</b>
DM manufacturer code, 450	Dolby Digital processors,	patches, drivers, and utili-
	1030	ties, 1338

downstream rates	on Internet and online	in RS-232 sessions,
in cable broadband, 928	services, 1320,	901-902
in DSL, 920	1338, C112-C113	DTE (Data Terminal Equip-
in satellite communica-	manufacturer Web sites	ment), 900-902
tions, 931	for, 1328	DTR (Data Terminal Ready)
DPTs (Drive Parameter	memory for, 177-178	lines
Tables), 564	for network cards,	in laser printers, 843
Dr. Watson tool, 337, C140	1173-1175,	in RS-232 sessions,
draft mode with inkjet print-	<b>1199–1201</b> , <i>1200</i>	901-902
ers, 825	for partitioning hard disk	dual-booting, 643
DRAM (Dynamic RAM),	drives, <b>654-656</b>	dual displays, 992-994
167-168, 464-468	for Plug and Play, 406-407	Dual In-line Memory Modules
defined, C201	problems with, 326-330	(DIMMs), 165, 166,
ECC, <b>470</b>	for SCSI, <b>609</b> , <b>630–631</b> ,	461-462
FPM and EDO, 468	631	for 64-bit computers,
interleaving, 464, <b>472–473</b>	for super VGA boards, 235	463-464
refreshing, 379	version conflicts for, <b>C143</b> -	and chip sets, 462-463
SDRAM, <b>469–473</b>	C144	defined, C200
vs. SRAM, <b>124–125</b>	for video, 999	installing, C59-C60
drawer-type cases, <b>86</b>	Drivers.com site, 1328, 1333	for notebooks, 1281–1282
DREQ line, 378	drives. See CD-ROM drives;	for SDRAM, 469-470
drive cards, 1293-1294	disk drives; floppy	in upgrading, C22-C23,
Drive Copy program, 1287	disk drives; hard disk	C23
"Drive failure, Hard disk fail-	drives	Dual In-line Packages (DIP).
ure" message, 759	dropped frames in video cap-	See also DIP switches
drive letters	ture, 1087-1088	for CPUs, 144, <i>145</i>
defined, C200	drums in laser printers, <b>844</b> ,	defined, C200
for networks, 1169	844	extractors for, <b>58</b> , <i>58</i>
for partitions, 653–654	cleaning, <b>844-845</b>	for memory, 165
drive motors, heat from, 275	conditioning, <b>845–846</b> , <i>846</i>	dual-layer DVD discs, 1113
Drive Parameter Tables	writing on, <b>846–847</b> , <i>847</i>	dual-ported memory chips,
(DPTs), 564	DRV files, viruses in, 689	973
drive tables, CMOS, <b>586–587</b>	DSL (Digital Subscriber Line),	dumb terminals, 250
Drive Up program, 656, 659	912, <b>917</b>	duplex
DriveCopy program, C12	configuring, <b>923–924</b>	defined, C200
DriveImage software, 724	defined, C197-C198	for MIDI, 1036
DriverGuide.com site, 1328,	installing, 922-923	Duron CPU, 1245
1333	operation of, <b>917-918</b>	dust
drivers	security for, 925-927	covers for, 284
for adapters, <b>C121</b> , <i>C121</i>	speed and distance in, <b>921</b>	floppy disk drive damage
for CD-ROM drives,	types of, 918-920	from, 780
<b>1128-1129</b> , 1136	DSL access multiplexers	handling, 283–285
for compatibility, <b>30–31</b>	(DSLAMs), 917-918	duty cycles, <b>281–282</b>
defined, C196-C197	DSP (Digital Signal Process-	DVD (Digital Video Disk)
for FireWire bus, 228	ing), C197	drives, 34, 239
for hard disk drives, 589	DSR (Data Set Ready) lines	for backups, 721
for inkjet printers, 825,	defined, C195	decoder cards for, C75-
828	in flow control, 903	C76, <i>C76</i>

defined, C198	operation of, 328-330	EDC (Error Detection Code),
for digital audio, 1030	viruses in, 689	1117
installing, 18–19, <i>18–19</i> ,	dynamic linking, 329-330	edge connectors
1105-1106, C69-	Dynamic RAM (DRAM),	cleaning, 339
C70, C70, C82-C83	167-168, 464-468	connecting, <b>89-92</b> , <i>91-92</i>
for MP3 files, 1027	defined, C201	Edit Input/Output Range dia-
for notebook/laptop com-	ECC, <b>470</b>	log box, C129, <i>C129</i>
puters, <b>1294-1295</b>	FPM and EDO, 468	Edit Value window, C161
in PC selection, <b>1249</b>	interleaving, 464, <b>472–473</b>	editing Registry, C160-C163,
audio/video enthusiast,	refreshing, 379	C161
1260	SDRAM, 469-473	EDO (Extended Data Out)
gamer, 1260	vs. SRAM, <b>124-125</b>	memory
home, 1258		defined, C201
road warriors, 1262	E	development of, 167
small business, 1261	1.00	vs. FPM, 468
troubleshooting, 1137	e-business, 163	EDPTs (Enhanced Drive Para-
types of, 1109–1110	e-mail	meter Tables),
for ultimate computer,	defined, C216	564-565
C44-C45	firewalls for, 1233	eDualHead feature, 993
for video capture,	LANs for, 1147	EEPROM (electrically erasable
1058-1059	mailing lists, 1350–1352	programmable read
DVD discs	viruses in, <b>692–693</b> , 699	only memory). See
composition of, 1113	E (exa-) prefix, C204	flash memory
formats for, 1131-1133	E value in hexadecimal num-	efficiency
producing, 1133-1134	bering system, C169	in microcode, 118
recording, 1130–1134	E771 monitors, 992	pipelines for, 118–120
DVD-E (digital video disk-	EarthWeb site, 1334	efficient partitions, 644–647
eraseable), C198	EAX extensions for 3D audio,	EFnet IRC channel, 1355
DVD-R (digital video disk-	1031	EGA (Enhanced Graphics
recordable), 1132,	EB (exabytes), C204	Adapter), 235
C198	"EC LOAD" message, 878	buffer addresses for, 398,
DVD-RAM format, 1132	ECC (Error Correcting Codes)	974
DVD-ROM (digital video disk-	for CD-ROM, 1117	characteristics of, 997
ROM)	and disk errors, 727–728	connectors for, 262
defined, C198	in hard disk drives, 523	horizontal scan frequency
vs. DVD-video, 1110	operation of, 548–549, <i>549</i> , <b>554–555</b>	for, 988
recordable, 1110–1111		monitors for, 996
DVD-RW format, <b>1132–1133</b> DVD+RW format, <b>1133</b>	ECC (Error Correction Code)	resolution and colors with, 980
· · · · · · · · · · · · · · · · · · ·	memory, 172-173	
DVD-video, 1110	evaluating, <b>470</b>	EIA (Electronics Industry
Dvorak keyboard, 956	setting up, C68 ECHS (Extended CHS) mode,	Association), cable
dynamic execution, 151–152		grading by, 1155–1156
Dynamic Host Configuration	536, 538	EIDE (Enhanced Integrated Drive Electronics) disk
Protocol (DHCP), 1183 dynamic IP addresses,	eClassical site, 1025 ECP ports (enhanced capabili-	interface, 239–240
1181-1182	ties ports), 242	for CD-ROM drives,
dynamic link libraries (DLLs)		10r CD-ROM drives, 1125-1126
defined, C201	characteristics of, 800-801	
uerineu, C201	defined, C204	data transfer rates in, 555

defined, C202	defined, C202	Enhanced Drive Parameter
and Fast ATA-2, <b>569–570</b>	from desoldering, 451	Tables (EDPTs),
popularity of, 30	with memory chips, 475,	564-565
ROM on, 397	479	<b>Enhanced Graphics Adapter</b>
upgrading, <b>C16-C17</b> , <i>C17</i>	preventing, 300-302	(EGA), 235
EISA (Extended Industry Stan-	in workspace, 60	buffer addresses for, 398,
dard Architecture) bus,	ELF (extremely low-frequency)	974
212-213	emissions, C204	characteristics of, 997
bus mastering on, 382	Elvis in laser printers,	connectors for, 262
defined, C204	886-887	horizontal scan frequency
description of, 524	embedded servo positioning,	for, 988
DMA controllers on, 380	539	monitors for, 996
setting up, 410	emergency boot floppies,	resolution and colors with,
eJay MP3 Station Plus MP3	724-726	980
players, 1027	EMI (electromagnetic interfer-	Enhanced Integrated Drive
electric screwdrivers, 51	ence)	Electronics (EIDE) disk
electrically erasable program-	crosstalk, <b>288–289</b>	interface, 239-240
mable read only mem-	defined, C201	for CD-ROM drives,
ory (EEPROM). See	RFI, <b>289–292</b>	1125-1126
flash memory	EMM386.EXE device driver,	data transfer rates in, 555
electro magnetic pulses	177	defined, C202
(EMPs), 299	EMPs (electro magnetic	and Fast ATA-2, <b>569–570</b>
electromagnetic interference	pulses), 299	popularity of, 30
(EMI)	EMS (Expanded Memory Stan-	ROM on, 397
crosstalk, 288–289	dard)	upgrading, C16-C17, C17
defined, C201	development of, 196–197	enhanced keyboard, 946–947
RFI, 289-292	operation of, 197–199	enhanced parallel ports (EPP
electromagnetism, 285–287	emulation	ports), 242
EMI, 287-292	printer, <b>807</b> , C240	characteristics of, 801
ESD, 297–302	terminal, C250	defined, C202
power noise, 292–297	emulation boards and pro-	ENQ/ACK flow control, 903
electronic mail (e-mail)	grams, 251-252	envelopes with laser printers,
defined, C216	EMusic site, 1025	854-855
firewalls for, 1233	encoding, C202	environmental considerations
LANs for, 1147	encryption in NTFS, 682	for laser printers, <b>866–868</b>
mailing lists, 1350–1352	End Of File (EOF) FAT entries,	for satellite communica-
viruses in, <b>692–693</b> , 699	673	tions, 933
Electronics Industry Associa-	energy, <b>494–496</b> , 504	EOF (End Of File) FAT entries,
tion (EIA), cable grad-	Energy Star ratings, 494	673
ing by, 1155-1156	"ENGINE TEST" message, 875	EPP ports (enhanced parallel
electrostatic charges, C201-	engineers, C3	ports), 242
C202	enhanced capabilities ports	characteristics of, 801
electrostatic discharge (ESD)	(ECP ports), 242	defined, C202
anti-static wrist straps for, 52–54	characteristics of, 800-801 defined, C204	EPROM (erasable programma- ble read-only memory)
causes of, 297–299	Enhanced Color Display moni-	for 4004 microprocessor,
damage from, 299	tor, 996	C5
uamage mom, 200	101, 330	CJ

programmers for, 184	anti-static wrist straps for,	EXE files, viruses in, 689
Epson America, 212	52-54	execute piece in pipelines, 135
EPTs (extended partition	causes of, 297-299	execution
tables), 678-679,	damage from, 299	dynamic, 151–152
678-679	defined, C202	of instructions, 120
erasable programmable read-	from desoldering, 451	execution trace caches,
only memory (EPROM)	with memory chips, 475,	156-157
for 4004 microprocessor,	479	exit trays in inkjet printers,
C5	preventing, 300-302	818-819
programmers for, 184	in workspace, 60	expanded memory, 175,
erase lamps in laser printers,	Ethernet addresses, C203-	196-199, 197
844-845	C204	Expanded Memory Standard
erased files, recovering,	Ethernet cards and networks,	(EMS)
733-738, <i>735</i>	249	development of, <b>196–197</b>
error-checking in TCP/IP,	conflicts with, 372–375,	operation of, 197–199
1179	373, 401-403	expansion boards
Error Correcting Codes (ECC)	connectors for, 259, 260,	8-bit vs. 16-bit, <b>415-417</b>
for CD-ROM, 1117	264, 265	Add New Hardware Wizard
and disk errors, 727-728	defined, C203	for, C107-C112,
in hard disk drives, 523	in Dell Inspiron 7500 com-	C107
operation of, 548–549, <i>549</i> ,	puters, 102	addresses for, 366-377,
554-555	for homes, 1187-1188,	396-398
Error Correction Code (ECC)	C26-C27	
memory, 172-173	I/O addresses for, 371	attaching, <b>C79-C82</b> , <i>C79-</i> <i>C82</i>
evaluating, 470	memory for, 187	buffers for, <b>396–398</b>
	network interface cards	
setting up, C68 error detection and correc-		configuring. <i>See</i> configura- tion
	for, 1148-1149	
tion, C202	for offices, 1185	conflicts with, 358–365,
Error Detection Code (EDC),	PC Cards, 400	401-403
1117	for ultimate computer, C46	connecting, <b>89-92</b> , <i>91-92</i>
error handling, C203	UTP cable in, 1154	for controllers, 233–234
error messages	Ethernet connections for DSL,	diagrams for, 71–72
defined, C203	924	DMA channels for,
for inkjet printers,	Ethernet packets, C204	<b>377-383</b> , <i>377-378</i>
829-831	EtherTalk protocol, 805	drivers for, C112-C113
for laser printers, 873–879	etiquette	failures in, 431
list of. See messages	defined, C228	fixing vs. repairing,
"ERROR" messages, 875–877	in newsgroups, 1345–1346	433-434
error rate, C203	even parity	handling, 93
errors, C202	defined, C233	identifying, <b>75-77</b> , <i>76</i> ,
false messages, 474–476	for serial ports, 808	257-266
on hard disk drives, 658	event logging	installing, 352–354
with SCSI, 615	setting up, C69	IRQ levels for, 383-396
"Errors found. F parameter	in SNMP, 1213	for MCA, 211
not specified" mes-	events, sounds for, C74	memory, 209, 214
sage, 743	exa- (E) prefix, C204	not found by system,
"ERRORUNIT" message, 876	exabytes (EB), C204	C110-C112, C110-
ESD (electrostatic discharge)	Excel8_Extras virus, 695	C111

PC Card board setup,	extended capabilities ports	external network numbers,
398-401	(ECPs)	1178, <i>1178</i>
with Plug and Play,	characteristics of, 800-801	external SCSI devices, sample
404-417	defined, C204	setup with, <b>627-629</b> ,
quick steps for, C93-C94	Extended CHS (ECHS) mode,	627-629
removing, <b>75–77</b> , <i>75–76</i>	536, 538	external SCSI terminators,
repairing, 454	Extended Data Out (EDO)	<b>623-625</b> , <i>624</i>
chip insertion and	memory	external tape drives, 251, 719
removal,	defined, C201	external transfer rate depend-
452-453	development of, 167	encies <b>, 556</b>
chip testing, <b>448–450</b>	vs. FPM, <b>468</b>	Extra Hands Work Station,
soldering and desolder-	extended DOS partitions,	451
ing, 450-452	648-654	extra high density floppy
ROM on, <b>439</b>	Extended Graphics Array	diskettes, 775
slots for. See expansion	(XGA)	Extract One File From Installa-
slots	characteristics of, 981-983,	tion Disk option, C139
speed of, 207	997	extractors, <b>57–58</b> , <i>57–58</i> , 85
swapping, 425	video RAM for, 976	extremely low-frequency (ELF)
testing, <b>403–404</b>	Extended Industry Standard	emissions, C204
troubleshooting, 338-340,	Architecture (EISA)	EZ Drive program, 656, 659
417-418, 420-424,	bus, 212-213	EZ-SCSI system, 632-633
431	bus mastering on, 382	
video. See video and video	defined, C204	F
boards	description of, 524	
expansion buses, 523	DMA controllers on, 380	/F option for CHKDSK, 743
expansion buses, 523 expansion chassis, 371	DMA controllers on, 380 setting up, 410	F-Secure Anti-Virus, 702
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser	DMA controllers on, 380 setting up, 410 extended memory, 175	F-Secure Anti-Virus, 702 F-Secure site, 703
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, <b>188–196</b> , <i>193</i>	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal num-
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839 expansion slots, 28	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, <b>188–196</b> , <i>193</i> for video, 975–976	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, <b>188–196</b> , <i>193</i> for video, 975–976 extended partition tables	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169 fabrics in FCSI, 606
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839 expansion slots, 28 buses for, 199-201, 205-206	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, <b>188–196</b> , <i>193</i> for video, 975–976 extended partition tables (EPTs), 678–679,	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169 fabrics in FCSI, 606 fading, C204
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839 expansion slots, 28 buses for, 199-201, 205-206 for CPUs, 138-139	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, <b>188–196</b> , <i>193</i> for video, 975–976 extended partition tables (EPTs), 678–679, <i>678–679</i>	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169 fabrics in FCSI, 606 fading, C204 fall back technique, C204
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839 expansion slots, 28 buses for, 199-201, 205-206 for CPUs, 138-139 for generic computers,	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, <b>188–196</b> , <i>193</i> for video, 975–976 extended partition tables (EPTs), 678–679, <i>678–679</i> extenders	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169 fabrics in FCSI, 606 fading, C204 fall back technique, C204 fans, 41
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839 expansion slots, 28 buses for, 199-201, 205-206 for CPUs, 138-139 for generic computers, 1241	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, <b>188–196</b> , <i>193</i> for video, 975–976 extended partition tables (EPTs), 678–679, 678–679 extenders BIOS, 1285	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169 fabrics in FCSI, 606 fading, C204 fall back technique, C204 fans, 41 on CPUs, 498
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839 expansion slots, 28 buses for, 199-201, 205-206 for CPUs, 138-139 for generic computers, 1241 identifying, 255, 255	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, <b>188–196</b> , <i>193</i> for video, 975–976 extended partition tables (EPTs), 678–679, 678–679 extenders BIOS, 1285 DOS, 192	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169 fabrics in FCSI, 606 fading, C204 fall back technique, C204 fans, 41 on CPUs, 498 dead, 278
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839 expansion slots, 28 buses for, 199-201, 205-206 for CPUs, 138-139 for generic computers, 1241 identifying, 255, 255 number of, 39	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, <b>188–196</b> , 193 for video, 975–976 extended partition tables (EPTs), 678–679, 678–679 extenders BIOS, 1285 DOS, 192 parallel port, 806	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169 fabrics in FCSI, 606 fading, C204 fall back technique, C204 fans, 41 on CPUs, 498 dead, 278 failures in, 494
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839 expansion slots, 28 buses for, 199-201, 205-206 for CPUs, 138-139 for generic computers, 1241 identifying, 255, 255 number of, 39 for PC Card bus, 225	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, <b>188–196</b> , 193 for video, 975–976 extended partition tables (EPTs), 678–679, 678–679 extenders BIOS, 1285 DOS, 192 parallel port, 806 vs. repeaters, <b>1227</b>	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169 fabrics in FCSI, 606 fading, C204 fall back technique, C204 fans, 41 on CPUs, 498 dead, 278 failures in, 494 importance of, 274-276
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839 expansion slots, 28 buses for, 199-201, 205-206 for CPUs, 138-139 for generic computers, 1241 identifying, 255, 255 number of, 39 for PC Card bus, 225 RFI from, 291	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, <b>188-196</b> , 193 for video, 975-976 extended partition tables (EPTs), 678-679, 678-679 extenders BIOS, 1285 DOS, 192 parallel port, 806 vs. repeaters, <b>1227</b> extensions in directory	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169 fabrics in FCSI, 606 fading, C204 fall back technique, C204 fans, 41 on CPUs, 498 dead, 278 failures in, 494 importance of, 274–276 for Pentium II CPU, 152,
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839 expansion slots, 28 buses for, 199-201, 205-206 for CPUs, 138-139 for generic computers, 1241 identifying, 255, 255 number of, 39 for PC Card bus, 225 RFI from, 291 speed of, 209	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, <b>188–196</b> , 193 for video, 975–976 extended partition tables (EPTs), 678–679, 678–679 extenders BIOS, 1285 DOS, 192 parallel port, 806 vs. repeaters, <b>1227</b> extensions in directory entries, 672–674	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169 fabrics in FCSI, 606 fading, C204 fall back technique, C204 fans, 41 on CPUs, 498 dead, 278 failures in, 494 importance of, 274–276 for Pentium II CPU, 152, 153
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839 expansion slots, 28 buses for, 199-201, 205-206 for CPUs, 138-139 for generic computers, 1241 identifying, 255, 255 number of, 39 for PC Card bus, 225 RFI from, 291 speed of, 209 for ultimate computer,	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, <b>188–196</b> , 193 for video, 975–976 extended partition tables (EPTs), 678–679, 678–679 extenders BIOS, 1285 DOS, 192 parallel port, 806 vs. repeaters, <b>1227</b> extensions in directory entries, 672–674 external cache, 125–126	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169 fabrics in FCSI, 606 fading, C204 fall back technique, C204 fans, 41 on CPUs, 498 dead, 278 failures in, 494 importance of, 274–276 for Pentium II CPU, 152, 153 for power supplies, 497
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839 expansion slots, 28 buses for, 199-201, 205-206 for CPUs, 138-139 for generic computers, 1241 identifying, 255, 255 number of, 39 for PC Card bus, 225 RFI from, 291 speed of, 209 for ultimate computer, C36-C37	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, 188-196, 193 for video, 975-976 extended partition tables (EPTs), 678-679, 678-679 extenders BIOS, 1285 DOS, 192 parallel port, 806 vs. repeaters, 1227 extensions in directory entries, 672-674 external cache, 125-126 external CD-ROM drives,	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169 fabrics in FCSI, 606 fading, C204 fall back technique, C204 fans, 41 on CPUs, 498 dead, 278 failures in, 494 importance of, 274–276 for Pentium II CPU, 152, 153 for power supplies, 497 startup problems in, 426
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839 expansion slots, 28 buses for, 199-201, 205-206 for CPUs, 138-139 for generic computers, 1241 identifying, 255, 255 number of, 39 for PC Card bus, 225 RFI from, 291 speed of, 209 for ultimate computer, C36-C37 in upgrading, C21-C23,	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, 188-196, 193 for video, 975-976 extended partition tables (EPTs), 678-679, 678-679 extenders BIOS, 1285 DOS, 192 parallel port, 806 vs. repeaters, 1227 extensions in directory entries, 672-674 external cache, 125-126 external CD-ROM drives, 1119-1120	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169 fabrics in FCSI, 606 fading, C204 fall back technique, C204 fans, 41 on CPUs, 498 dead, 278 failures in, 494 importance of, 274–276 for Pentium II CPU, 152, 153 for power supplies, 497 startup problems in, 426 FAQs (Frequently Asked Ques-
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839 expansion slots, 28 buses for, 199-201, 205-206 for CPUs, 138-139 for generic computers, 1241 identifying, 255, 255 number of, 39 for PC Card bus, 225 RFI from, 291 speed of, 209 for ultimate computer, C36-C37 in upgrading, C21-C23, C22-C23	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, 188-196, 193 for video, 975-976 extended partition tables (EPTs), 678-679, 678-679 extenders BIOS, 1285 DOS, 192 parallel port, 806 vs. repeaters, 1227 extensions in directory entries, 672-674 external cache, 125-126 external CD-ROM drives, 1119-1120 external data transfer rates	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169 fabrics in FCSI, 606 fading, C204 fall back technique, C204 fans, 41 on CPUs, 498 dead, 278 failures in, 494 importance of, 274–276 for Pentium II CPU, 152, 153 for power supplies, 497 startup problems in, 426 FAQs (Frequently Asked Questions), 1319, 1342
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839 expansion slots, 28 buses for, 199-201, 205-206 for CPUs, 138-139 for generic computers, 1241 identifying, 255, 255 number of, 39 for PC Card bus, 225 RFI from, 291 speed of, 209 for ultimate computer, C36-C37 in upgrading, C21-C23, C22-C23 ExpertCity.com site, 1334	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, 188-196, 193 for video, 975-976 extended partition tables (EPTs), 678-679, 678-679 extenders BIOS, 1285 DOS, 192 parallel port, 806 vs. repeaters, 1227 extensions in directory entries, 672-674 external cache, 125-126 external CD-ROM drives, 1119-1120 external data transfer rates for NICs, 1150	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169 fabrics in FCSI, 606 fading, C204 fall back technique, C204 fans, 41 on CPUs, 498 dead, 278 failures in, 494 importance of, 274–276 for Pentium II CPU, 152, 153 for power supplies, 497 startup problems in, 426 FAQs (Frequently Asked Questions), 1319, 1342 far-end crosstalk (FEXT), C204
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839 expansion slots, 28 buses for, 199-201, 205-206 for CPUs, 138-139 for generic computers, 1241 identifying, 255, 255 number of, 39 for PC Card bus, 225 RFI from, 291 speed of, 209 for ultimate computer, C36-C37 in upgrading, C21-C23, C22-C23 ExpertCity.com site, 1334 Experts Exchange site, 1334	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, 188-196, 193 for video, 975-976 extended partition tables (EPTs), 678-679, 678-679 extenders BIOS, 1285 DOS, 192 parallel port, 806 vs. repeaters, 1227 extensions in directory entries, 672-674 external cache, 125-126 external CD-ROM drives, 1119-1120 external data transfer rates for NICs, 1150 external hard disks, 1287	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169 fabrics in FCSI, 606 fading, C204 fall back technique, C204 fans, 41 on CPUs, 498 dead, 278 failures in, 494 importance of, 274–276 for Pentium II CPU, 152, 153 for power supplies, 497 startup problems in, 426 FAQs (Frequently Asked Questions), 1319, 1342 far-end crosstalk (FEXT), C204 Fast ATA-2, 569–570
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839 expansion slots, 28 buses for, 199-201, 205-206 for CPUs, 138-139 for generic computers, 1241 identifying, 255, 255 number of, 39 for PC Card bus, 225 RFI from, 291 speed of, 209 for ultimate computer, C36-C37 in upgrading, C21-C23, C22-C23 ExpertCity.com site, 1334 Experts Exchange site, 1334 Extend my Windows desktop	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, 188-196, 193 for video, 975-976 extended partition tables (EPTs), 678-679, 678-679 extenders BIOS, 1285 DOS, 192 parallel port, 806 vs. repeaters, 1227 extensions in directory entries, 672-674 external cache, 125-126 external CD-ROM drives, 1119-1120 external data transfer rates for NICs, 1150 external hard disks, 1287 external modems, 906-907,	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169 fabrics in FCSI, 606 fading, C204 fall back technique, C204 fans, 41 on CPUs, 498 dead, 278 failures in, 494 importance of, 274–276 for Pentium II CPU, 152, 153 for power supplies, 497 startup problems in, 426 FAQs (Frequently Asked Questions), 1319, 1342 far-end crosstalk (FEXT), C204 Fast ATA-2, 569–570 Fast Ethernet, C205
expansion buses, 523 expansion chassis, 371 expansion I/O ports in laser printers, 839 expansion slots, 28 buses for, 199-201, 205-206 for CPUs, 138-139 for generic computers, 1241 identifying, 255, 255 number of, 39 for PC Card bus, 225 RFI from, 291 speed of, 209 for ultimate computer, C36-C37 in upgrading, C21-C23, C22-C23 ExpertCity.com site, 1334 Experts Exchange site, 1334	DMA controllers on, 380 setting up, 410 extended memory, 175 operation of, 188-196, 193 for video, 975-976 extended partition tables (EPTs), 678-679, 678-679 extenders BIOS, 1285 DOS, 192 parallel port, 806 vs. repeaters, 1227 extensions in directory entries, 672-674 external cache, 125-126 external CD-ROM drives, 1119-1120 external data transfer rates for NICs, 1150 external hard disks, 1287	F-Secure Anti-Virus, 702 F-Secure site, 703 F value in hexadecimal numbering system, C169 fabrics in FCSI, 606 fading, C204 fall back technique, C204 fans, 41 on CPUs, 498 dead, 278 failures in, 494 importance of, 274–276 for Pentium II CPU, 152, 153 for power supplies, 497 startup problems in, 426 FAQs (Frequently Asked Questions), 1319, 1342 far-end crosstalk (FEXT), C204 Fast ATA-2, 569–570

Fast Page Mode memory, 167	Class A, C189	Fibre Channel System Initia-
Fast SCSI interface, 602, 611,	Class B, 290-291, C190	tive (FCSI), <b>605–607</b>
C205	defined, C205-C206	File Allocation Table (FAT),
Fast-Wide SCSI interface, 602,	FCSI (Fibre Channel System	644-647, 664-665,
611, C205	Initiative), <b>605–607</b>	<b>671–674</b> , <i>672</i> , <i>674</i>
FASTDISK driver, 565	FDDI (Fiber Distributed Data	allocation errors in, 747,
FAT (File Allocation Table),	Interface), C206	747
644-647, 664-665,	FDISK program	cross-linked clusters in,
671-674, 672, 674	for MBR, 444, 758	<b>749–751</b> , <i>749–750</i>
allocation errors in, 747,	for partitioning drives, 643,	damaged, 732-733
747	<b>648-654</b> , <i>648-652</i>	defined, C206-C207
cross-linked clusters in,	FDM (Frequency Division Mul-	entries in, <b>734</b> , <i>734–735</i>
<b>749-751</b> , <i>749-750</i>	tiplexing), 1162	erased files in, 733-738,
damaged, 732-733	FDX (full-duplex)	735
defined, C206-C207	defined, C209	in formatting, 657
entries in, <b>734</b> , <i>734–735</i>	for MIDI, 1036	invalid clusters in,
erased files in, 733-738,	"FE CARTRIDGE" message,	748-749
735	879	lost clusters in, 741-742,
in formatting, 657	feature connectors	742, 745
invalid clusters in,	with capture boards, 1079	recovering, 740
748-749	for coprocessors, 978	for subdirectories,
lost clusters in, 741-742,	Federal Communications	675-677
742, 745	Commission (FCC) cer-	file compression, C207. See
recovering, 740	tification, 290	<i>also</i> data compression
for subdirectories,	Class A, C189	"File creation error" message,
675-677	Class B, 290-291, C190	744
FAT16 file system	defined, C205-C206	file format, C207
cluster size in, 644-647	feed guide assemblies in laser	file fragmentation, C207
defined, C205	printers, <b>868–869</b> , 884	file infectors
FAT32 Conversion Informa-	feed rollers in laser printers,	characteristics of, 689-690
tion tool, C152	868-869	defined, C207
FAT32 file system, <b>679–681</b>	female connectors, C206	file sharing with DSL, 926
cluster size in, 644-647	fetch instructions, 119-120	file systems, status of, C131
defined, C205	FEXT (far-end crosstalk), C204	file transfer protocol (FTP)
fault tolerance in Pentium,	Fiber Distributed Data Inter-	defined, C207-C208
150	face (FDDI), C206	sites, 1338-1341
fax modems, C205	fiber optic cable	FILE0000.CHK files, 744
faxback services, 1314	benefits of, 288	FileCopy program, 1287, C12
faxes in all-in-one combos,	connectors for, <b>1166</b> , <i>1166</i>	filenames
796-797	defined, C206	defined, C207
FC-AL (Fibre Channel Arbi-	for networks, 1151,	in directory entries,
trated Loop), 606	<b>1158-1159</b> , <i>1158</i>	672-674
"FC" message, 878	multimode, 1159-1161,	files
FCBS statements, executing,	1160	defined, C206
445	single-mode, 1159-1160	fragmented, <b>729-731</b> , <i>729</i> ,
FCC (Federal Communications	Fibre Channel Arbitrated Loop	731
Commission) certifica-	(FC-AL), 606	read-only, C241
tion, <b>290</b>	Fibre Channel networks, 1160	recovering, <b>733-738</b> , <i>735</i>

. =20 =20	m	G 11.1 ==4.==6
saving, <b>738–739</b>	floating-point coprocessors,	floppy diskettes, 774–776,
sharing, 926	130	775
size of, 673, 747	error beeps for, 430	backing up hard drives to,
synchronizing, 1305–1307	I/O addresses for, 370	718
FILES statements, executing,	for Intel 80486, 147	boot floppies, 724-726
445	IRQ for, 389	booting from, 758
FileWise tool, C152	MMX, 130-133	cluster sizes on, 668-669
FilterKeys option, C99-C100,	for Pentium 4, 157-158	hardware structure of,
C100-C101	flooding, 303	<b>525–532</b> , <i>526</i> ,
filters, packet, 1235	floppy disk drives, 38, 768,	529-531
finding	776	and magnetism, 285-287
IRC channels, 1354	in 80486 computers, C8	protecting, 780-781
mailing lists, 1351	cables for, 80, 777-778,	reading, <b>782-783</b>
newsgroups, 1346-1349	778, 784, C64, <i>C64</i>	flow control, <b>900-904</b> , C208
text on disks, 738	change line support in,	fluorescent lights, crosstalk
Web sites, 1326-1331	785-787	from, 288-289
fire code requirements for	cleaning heads on, 779	FM (frequency modulation)
network cable, 1196	controllers for, 237-238,	synthesis
fire hazards, 84	371, <b>777</b> , <b>C18</b> , <i>C18</i>	defined, C208
firewalls, 296, <b>1232-1236</b>	dust in, 284	process of, <b>1013–1014</b> ,
FireWire bus	environmental factors	1013
for capture boards,	with, <b>780-781</b>	FM synthesis interface, I/O
1075-1076	future of, 773-774	addresses for, 371
connectors for, 262	in generic computers, 1242	"FONT PRINTOUT" message,
defined, 35	heat from, 275	874
description of, 525	history of, 771–773	fonts
development of, 227–229	I/O addresses for, 371	for laser printers, <b>861</b>
installing hard disk drives	identifying, 252	setting, <b>C119-C120</b> , <i>C119-</i>
for, 570-571	installing, 12-13, <i>12-13</i> ,	C120
for ultimate computer, C47	781-782, C64, <i>C64</i> ,	footprints, C208
for video capture, 1061,	C84	forced perfect termination,
1071-1072	interleave factor for,	C208
firmware, C208	546-547, <i>547</i>	forceps, 55-56
First Aid tool, 337, <b>C155-C156</b>	IRQs for, 389	format conversions, con-
fixed disk drives. See hard	maintaining, <b>778–781</b>	trollers for, 232
disk drives	motors in, 282	format problems with inkjet
FixWindows.com site, 1334	in notebooks, 1304	printers, 828
flash memory	in PC selection, 1248	FORMAT program
benefits of, 186	power supplies and con-	for formatting, 657
defined, C208	nectors for, 492	recovering from, 739–741
on PC Cards, 222	removing, <b>781</b>	formatting
with Plug and Play, 406	replacing, 769–770	CD-RW disks, 1114
for setup information, 414	rotation speed of, <b>785</b>	defined, C208
flashable ROM, 448–449	troubleshooting, 433,	hard disk drives, <b>638</b>
flat-panel displays	782–788	bad areas in, <b>658</b>
benefits of, <b>990-991</b>	for ultimate computer, C43	low-level, <b>641–642</b> ,
defined, C208	in XT computers, 777	726-729
flicker, <b>984–986</b>	iii A1 Computers, 111	process for, 657-658
IIICKEI, 30 <b>7</b> -300		process 101, 037-036

quick steps in, <b>639-640</b>	of wireless devices,	fusing assemblies in laser
third-party tools for,	803-804, 961-962	printers, 884
658-659	frequency bands in DSL, 917	-
troubleshooting,	Frequency Division Multiplex-	G
659-660	ing (FDM), 1162	
recovering data from,	frequency modulation (FM)	G (giga-) prefix, C210
739-741	synthesis	games
forward error correction,	defined, C208	3D audio for, <b>1031–1032</b>
C208	process of, 1013-1014,	optical mice for, 959
four-layer boards, 434, 452	1013	PC features for,
four-wire circuits, C209	Frequency Shift Keying (FSK),	1255-1256,
Fourier decompositions, 1005	1161-1162	1259-1260
FPM DRAM, 468	Frequently Asked Questions	upgrading for, C27-C28
fps (frames per second)	(FAQs), <b>1319</b> , 1342	viruses in, 700-701
defined, C209	fried hardware, C209	garbled output with inkjet
for display, 187	friends for technical support,	printers, 828
fragmented files, 729-731,	1316	gas discharge tubes, 506-507
729, 731	front panel lights, installing,	gate A20, error beeps for, 430
fragmented memory, 180-181	C87-C88	gateway IP numbers, 924
frame buffer chips, 977	front-side bus (FSB) for DDR	gateways for LANs, 251
frame captures, <b>1086–1087</b>	memory, 471	gauges, C210
frame rates of video cards,	FSK (Frequency Shift Keying),	gauss, 286
C38	1161-1162	Gb (gigabits), C210
frames	FTP (file transfer protocol),	GB (gigabytes), 137, C210
defined, C209	C207-C208	gears in inkjet printers, 817
in delta encoding,	ftp command, C209	GeForce chip set, 987
1089-1090	FTP sites, <b>1338-1341</b>	gender changers, C210
memory for, 187-188	FTPFind site, 1340	"General failure reading drive
in off-line compression,	Fujitsu, DDR memory by, 471	message, 782
<b>1095–1096</b> , <i>1095</i>	full backups	General Protection (GP) faults
removable, C33, C34	in backup strategies, 723	causes of, 191
in video capture,	defined, C209	with video capture,
<b>1085-1086</b> , <i>1086</i>	full-duplex (FDX)	1098-1099
frames per second (fps)	defined, C209	General tab
defined, C209	for MIDI, 1036	for accessibility options,
for display, 187	full height hard disk drives,	<b>C106</b> , <i>C106</i>
framing with switching hubs,	1285	for display settings, C119-
1221	full-page displays, C209	<b>C120</b> , <i>C119</i>
free memory, C209	full tower case style, C34-C35	for modems, C124-C126
freeware, 1338	fully-associative caches, C187	for System Configuration
frequencies	function keys	Utility, C141-C142,
monitor, <b>991–992</b>	in 101-key keyboard, 946	C141
and network interference,	defined, C210	for System Properties,
<b>1151-1152</b> , <i>1152</i>	fur, triboelectric value of, 298	C108, <i>C108</i>
in QAM, 1068	fuser rollers in laser printers,	generic PCs, <b>1239-1244</b>
sound waves, 1004,	852-854, <i>854-855</i> , 884	geometry in disk drives,
<b>1007–1008</b> , <i>1008</i>	fuses for surge suppressors,	533-534
	507	GetMusic site, 1025

Ghost program, <b>724</b> , 1287,	green wires in phone lines,	boot records on. <i>See</i> boot
C12	937	records
giga- (G) prefix, C210	groaning sounds in laser	cables for
Gigabit Ethernet, C210	printers, 881	disconnecting, <b>79–80</b>
gigabits (Gb), C210	ground straps, 300-302	IDE, <b>582–584</b> , <i>583–584</i>
gigabytes (GB), 137, C210	grounds	in troubleshooting, 761
glare screens, 985	for notebook upgrades,	caches for, 522, <b>556–558</b>
glass	1278-1279	in CD-ROM recording, 1130
for camera lenses, 1049	for power supplies,	CMOS configuration for,
triboelectric value of, 298	502-503, 505-506	63-64, <b>584-589</b>
Glide API, 987	in RS-232 communications,	compatibility of, 579
GoBack utility, C147	901	controllers for, 33,
Gobi CPU, <b>160</b>	for serial communications,	239-240
gold, triboelectric value of,	937	buffer addresses for,
298	group scheduling, 1146-1147	398
Google Groups site,	guarantees for network cable	defined, C211
1348-1349	installation, 1197	I/O addresses for,
Google search engine, 1330	gummed media with laser	370-371
GP (General Protection) faults	printers, 853	identifying, 256, <i>256</i>
causes of, 191 with video capture,		copying, 724 crashes, troubleshooting,
1098–1099	<u>H</u>	345-346
graded index fiber optic cable,	H.323 standard, C210	data transfer rates of, 541
1159-1160, 1160	hackers, 925	caches for, <b>556–558</b>
gradients in encoding, 1092	hair, triboelectric value of,	defined, 521
graphics	298	external transfer rate
3D video boards for,	hair dryers for chip testing,	dependencies in,
986-987	449	556
AGP bus for, <b>219–221</b> , <i>220</i>	half-duplex (HDX)	internal, <b>544–546</b>
MMX processors for,	defined, C210-C211	optimizing, 555–556
131-132	for MIDI, 1036	in ultimate computer,
graphics accelerator boards.	hand-held computers, serial	C43
See accelerators	ports for, 243	dead. <i>See</i> resurrecting hard
graphics coprocessors,	handshaking	disk drives
977-978 grayscale video images,	defined, C211 with SCSI, 600	defined, C211 ECC codes for, <b>554–555</b>
1062-1063, <i>1063</i>	handwriting recognition, 116	energy savings in, 495-496
green color	hangs, C211	with FAT damaged,
in CCD chips, pixels for,	hard disk drives, 27, <b>518</b>	732-733
1050-1051, 1051	in 80486 computers, C8	formatting, 638
in TV video, <b>1062–1069</b> ,	access time of, 541–544	bad areas in, 658
1063-1066,	activity lights for, C87	low-level, <b>641–642</b> ,
1068-1069	ATA for, <b>568–569</b>	726-729
in VGA, pages for, 183	for backups, <b>721-722</b>	process for, <b>657-658</b>
in video capture board,	backups for, <b>709–710</b> ,	quick steps in, 639-640
1085	718-724	third-party tools for,
green PCs, <b>494-496</b>	bad areas on, 658	658-659

troubleshooting,	road warriors, 1262	not found by system,
659-660	small business, 1261	C110-C112,
future of, <b>519</b>	student, 1259	C110
in generic computers, 1241	PIO transfer in, 566-567	quick steps for, C93-
hardware structure of,	and power surges, 294–295	C94
<b>525–532</b> , <i>529–531</i>	protecting data. <i>See</i> data	wizard for, C107-C112,
heat from, 275	protection; viruses	C107
for home recording stu-	recovering data. <i>See</i> recov-	controllers for, 231-233
dios, 1037-1038	ering	defined, C212
identifying, 252	rotational latency period	in diagnostic programs,
installing. <i>See</i> installing	of, 543-544	334
interfaces for, 520–525,	searching for text on,	installation problems,
C211	737-738	344–345
interleave factor for,	sector translation in,	in reading MBR, <b>758-763</b>
<b>546-552</b> , <i>547-551</i>	535-538	software faults from, 330
IRQs for, 389	seek time of, <b>542–543</b>	system information for,
logical, 643-644	size limitations in,	C133
cluster size in, <b>644-647</b>	558-565	hardware addresses, C212
partitioning, 651-653	stepper motors for, <b>540</b>	hardware compatibility list,
structure of, <b>677–679</b> ,	for System Restore, C149	C212
677-679	terms for, <b>520–522</b>	hardware decoders for DVD
logical block addressing	testing, 1290–1291	drives, C45
for, 536-538,	timeouts with, 441	hardware-dependence, C212
564-565	tracing failures in,	hardware-independence, C212
with lost clusters, <b>741–745</b> ,	756-757, <i>757</i>	hardware interrupts, C212
742, 745	type information for,	Hardware Interrupts, C212 HardwareCentral site, 1334
master/slave jumpers in,	<b>710–711</b> , C212	Hare virus, 695
580–584	for ultimate computer,	Hawking, Stephen, C106
media errors on, 751-755	C42-C43	Hayes modems, 898
media tests for, 726–729	unfragmenting files on,	HD manufacturer code, 450
motors in, 282	729–731, 729, 731	"HDD Configuration Error"
mounting, 1286	in video capture,	message, 1291
in notebooks, 1274-1275,	1080-1081	HDD label, C87
1284-1294	viruses on. <i>See</i> viruses	
		HDSL (high-bit-rate digital subscriber line)
for old computer data, C11-C12, C11	voice coils for, <b>538-540</b> , 539	characteristics of, 919-920
operating system limita-		defined, C213
tions for, 565–566	Hard Disk tab, C149	
parking heads in, 540	hard errors on hard drives, 658	HDTV (High Definition Televi-
		sion), 1054, 1056 HDX (half-duplex)
partitioning. See partition-	hard resets, C212	* *
ing hard disk drives	hard rubber, triboelectric value of, 298	defined, C210-C211
for PC Card bus, 223,	· · · · · · · · · · · · · · · · · · ·	for MIDI, 1036
1293-1294	hardware	heads
in PC selection, 1248	in boot process, 436	disk, 525–526, <i>526</i>
audio/video enthusiast,	compatibility in, 28–30	for absolute sectors,
1260	Control Panel for, C106-	665-668, <i>665</i>
corporate, 1262	C107	cleaning, 779 and cylinder skew, 553
gamer, 1260		and cylinder skew, 553

in disk drive geometry,	for CPUs, 145, 254	high-resolution mode with
534	installing, C58, C59	inkjet printers,
documenting, 64	purpose of, <b>276–277</b>	825-826
with IDE addressing,	for RIMMs, C59	High Sierra format, 1116,
561-562	hemostats, 55-56	C213
INT 13 BIOS interface	Hercules Graphics Controller	HIMEM.SYS device driver, 177
for, 559	(HGC), 997	Hitachi America, prefix for,
number of, 520	hertz (Hz), 1008, C212	450
parking, 540	Hewlett-Packard in Watchzone	hits, C113
positioning, 521	group, 212	hive files, backing up, 716
in sector translation,	Hewlett-Packard ScanJet inter-	HKEY_ keys, <b>C162-C163</b>
535-536	face card, <b>C171-C172</b>	hoaxes, virus, 698
inkjet printer	hexadecimal (hex) numbering	holographic storage, 519
aligning, 832	system, C168	home networks, 1187-1190,
cleaning, 821-822,	addresses in, 368-370,	C26-C27
831-832	C170-C172	home PCs, features for, 1255,
hearing problems, accessibil-	converting in, 1207, C172-	1258
ity options for, C102-	C174	home recording studios,
C103, C102	counting in, C169	1037-1039
heartbeat function, 511	defined, C213	home theater systems, 1020
heat, 274	HFS (Hierarchical File System)	HomeConnect PC Digital Cam
and box design, 277-278	format, 1116	era, 1057
from brownouts, 297	HGC (Hercules Graphics Con-	HomeFree wireless networks,
and CD-ROM discs, 1135	troller), 997	1189
for chip testing, 449	Hi8 camcorders, 1052-1054,	HomePNA networks, 1162,
and CPU speed, 113-117	1056	1188
and duty cycles, 281–282	hidden bits, 673	hooked vectors, C213
fans for, <b>274–276</b>	hidden files	horizontal resolution in video
with floppy disk drives,	defined, C213	capture, <b>1055–1056</b>
780	executing, 445	horizontal scan frequency of
heat sinks for, 145,	Hierarchical File System (HFS)	monitors, 988
276-277	format, 1116	horizontal streaks on laser
hot spots, 498	hierarchies in newsgroups,	printer pages,
for inkjet printers, 819	1344-1345	<b>858-859</b> , <i>859</i>
in Intel 80286, 145	high-bit-rate digital subscriber	horizontal synchronization in
in linear power supplies,	line (HDSL)	video, 1071
485	characteristics of, 919-920	host adapters for SCSI, 597
and modems, 910	defined, C213	choosing, <b>610–611</b>
in Pentium CPUs, 150, 152	high-contrast mouse pointers,	controllers in, 240
and printers, 795, 797-798,	C98	installing, <b>611-612</b> , <i>612</i>
852-853 <b>, 866</b>	High Definition Television	issues in, <b>607-608</b>
sensor devices for,	(HDTV), 1054, 1056	ROM on, 397
<b>278-280</b> , <i>279</i>	high-density floppy diskettes,	hot spots, 498
from sunbeams, 283	775	hot swaps on PC Card bus,
and temperature ranges,	high-frequency radio commu-	223
280-281	nications, C261	hot wires
thermal shock, 282-283	high-level formatting,	in AC supplies, 83-84
heat sinks	657-658	in outlets, 501

HotPot goardh angina 1220	havadagimal numbers for	master/aloue jumpers in
HotBot search engine, <b>1330</b> HotHardware site, 1334-1335	hexadecimal numbers for, 368-370	master/slave jumpers in, 580–584
HotKeys, 948	for network interface	sector translation with, 535
HP connectors, 258, <i>258</i> , 618,	cards, 1202,	identifying parts, 252–253
618	1206–1207	chips, 449-450
	for parallel ports, 801-802	circuits boards and connec-
HP ScanJet interface card, C171-C172	for PC Cards, 398-400	tors, 257–266
hubs, 1209	with Plug and Play,	expansion boards, 75–77,
architecture of,	404-405	76
1214-1218, 1214,	for SCSI adapters, 611	on motherboard, 253-256,
1214-1216, 1214, 1216-1217	uses of, 370–372	253-256
categories of, <b>1212–1214</b>	I/O boards in generic comput-	IDs
defined, C213	ers, 1241-1242	for chips, 450
in Ethernet networks, 1187	I/O bound condition, C215	for SCSI devices, 598,
switching, <b>1218–1222</b> ,	"I/O CONFIG ERR" message,	612-614, 635
1219–1221	875	for sectors, 546
types of, <b>1209–1211</b> ,	I/O voltages for CPUs, C51	IDSL (ISDN digital subscriber
1210-1211,	I signals, 1068–1069	line), 919–920
for ultimate computer, C46	IBM	IEEE 1284 ports, 242
for USB bus, 246	DDR memory by, 471	IEEE 1394 bus
hue of color, 1085	MCA bus by, 210–212	for capture boards,
Huffman technique	site for, 641	1075-1076
for compression, 1089	IBM Data Connectors, 1165,	connectors for, 262
defined, C213	1165	defined, <b>35</b> , C214
humanities newsgroups, 1344	IBM PC computers. See PC	description of, 525
humidity	computers	development of, 227–229
and CD-ROM discs, 1135	IBM PC/AT computers. See AT	installing hard disk drives
and printer paper, 862, 868	computers	for, 570-571
and static, 297, 300	IBM PC/XT computers. See XT	for ultimate computer, C47
hyper-pipelined technology,	computers	for video capture, 1061,
136-137	IBM PS/2 computers, 210–212	1071-1072
hyperlinks in World Wide	IBM twisted-pair cable, <b>1156</b>	images in laser printers
Web, 1325-1326	icons in system tray, C120	development of, 849-851,
Hyundai, DDR memory by,	ICs (integrated circuits), C215	851, 885-886
471	ICS (Internet Connection Shar-	fusion process for,
Hz (hertz), 1008, C212	ing), <b>1190</b>	<b>852-855</b> , <i>854-855</i>
	ICSA site, 703	problems with, 880-881
1	IDE (Integrated Drive Electron-	transferring, <b>851-852</b> , <i>852</i>
<u> </u>	ics) disk interface	imaging chips, 976–979
I/O (input/output), C215	addressing in, 561-562	impact printers, 793–795
I/O addresses, <b>202–203</b> ,	cables for, <b>582–584</b> ,	impedance, C214
<b>367-368</b> , <i>368</i>	583-584	in-line bar code readers, 956
for CD-ROM drives, 1136	for CD-ROM drives,	incremental backups
conflicts in, <b>372–375</b> , <i>373</i>	1124-1125	in backup strategies, 723
in diagnostic programs,	data transfer rates in, 556	defined, C214
333-334	defined, C215	Indeo codec, 1092-1093
in EISA bus, 213	installing drives, 8-9, 8-9	indicator lights, 331

Industry Standard Architec-	paper for, <b>829-831</b>	floppy disk drives, 12-13,
ture (ISA) bus,	paper-feed mechanisms	12-13, <b>781-782</b> ,
<b>204–209</b> , <i>205–206</i>	for, <b>816-817</b>	<b>C64</b> , <i>C64</i> , C84
bus mastering on, 383, 610	poor quality with,	front panel lights, C87-C88
description of, 524	<b>826-828</b> , <i>826</i>	hard disk drives, 574, C65,
DMA controllers on, 380	printing problems in,	C65
for network interface	<b>820-823</b> , <i>821-822</i>	cables for, <b>582–584</b> ,
cards, <b>1149–1150</b>	slow and intermittent	583-584
support for, 28-29	printing with,	configuration informa-
in upgrading, C21, C22	824-825	tion for,
infections, C214. See also	troubleshooting, 820-829,	584-589
viruses	833-834	formatting in, 657-658
Infrared Data Association	inner conductors in coaxial	hardware compatibility
(IrDA), C214	cable, 1157, <i>1157</i>	in, <b>579</b>
infrared (IR) devices	inoculating, C215	IDE, 8-9, 8-9
input, <b>961-962</b>	input interface for laser print-	IEEE 1394, <b>570–571</b>
printers, <b>803-804</b>	ers, <b>837-839</b>	master/slave jumpers
infrared line of sight commu-	input jacks for sound cards,	in, <b>580–584</b>
nications, C261	C40, <i>C41</i>	in notebooks,
infrared (IR) signals	input/output, C215. See also	1288-1293
defined, C214-C215	I/O addresses	partitioning in. See par-
for wireless networks,	input/output bound condi-	titioning hard
1162, 1197	tion, C215	disk drives
.INI files, backing up, 715-716	inrush current, 293	steps in, <b>575-579</b>
initialization	inserters, chip, 59	in ultimate computer,
in boot process, 438-441	Install/Uninstall tab, C113-	C84-C85, C85
of CD-ROM drives, 1136	C114, <i>C113</i>	hardware, problems from,
initiators in SCSI, 614	installing	344-345
ink	cable broadband, 928–929	heat sinks, C58, <i>C59</i>
in inkjet printers, 827	capture boards, 1081-1082	keyboards, mice, and track-
removing from fabric, 794	CD-ROM drives,	balls, <b>945</b>
"Ink Low" message, 830	1105–1106,	memory, 457–459,
inkjet printers, 814–815	1127-1129, C69-	479-481, C59-C60
cartridge carriers for, 818	C70, C70, C82-C83,	modems, C75
cartridges for, 817-818,	C83	motherboards, 408, C77-
832-833	CPUs, 2-3, 2-3, <b>100-101</b> ,	C78, <i>C77</i>
cases for, <b>815–816</b>	C50, C50-C52	network cables, <b>1190-1197</b>
cleaning, <b>831-832</b>	defined, C215	network card drivers,
color problems in, 823	in digital broadband com-	<b>1199–1201</b> , <i>1200</i>
dead, <b>824</b>	munications, 913	network interface cards,
defined, C215	DSL, 922-923	1141-1142,
error messages for,	DVD decoder cards, C75-	1198-1199
829-831	C76, C76	operating system, C71-C72
exit trays in, <b>818-819</b>	DVD drives, 18-19, 18-19,	PC cams, <b>1045</b>
garbled output with, 828	1105-1106, C69-	power supplies, 6-7, <i>6-7</i> ,
maintaining, 795–796,	<b>C70</b> , <i>C70</i>	<b>C78</b> , <i>C79</i>
831-832	expansion boards, 352-354	programs, C114-C116,
operation of, 819		C115

satellite communications,	operation of, 914-915	Intel OverDrive microproces-
933-934	requirements for, 915-916	sor, 114
SCSI cards, 10-11, 10-11,	Intel 4004 microprocessor,	data path for, 124
593-595	<b>C3-C5</b> , <i>C3</i>	introduction of, 147-148
SCSI hardware, 609	Intel 8008 microprocessor, C5	Intel Pentium. See Pentium
SDRAM, 4-5, <i>4-5</i>	Intel 8041 microprocessor,	CPU and computers
sound cards, 16-17, <i>16-17</i> ,	230	intelligent hubs, 1212-1213,
1003, 1021, C73-	Intel 8042 microprocessor,	<b>1216</b> , <i>1216</i>
C75, C74	230	intelligent power supplies,
video boards, 14-15,	Intel 8048 microprocessor,	426-427
14-15, <b>968-969</b> ,	230	IntelliMouse Explorer, 957,
C60-C63	Intel 8086 CPU and computers	958
video capture boards,	characteristics of, 144	interface controllers for laser
1044-1045	data path for, <b>121-122</b>	printers, 837
Windows programs, C115-	specifications for, 140	interface to system bus in
<b>C116</b> , <i>C115</i>	Intel 8087 coprocessor, 130	hard disk drives, 523
Zip drives, <b>C83-C84</b> , <i>C84</i>	Intel 8088 CPU and comput-	interfaces, <b>30</b> , 256, <i>256</i> . <i>See</i>
instruction sets, C215	ers, 118	<i>also</i> controllers
instructions	characteristics of, 143-144	for CD-ROM, <b>1123–1126</b>
cache memory for,	data path for, <b>121-122</b>	defined, C215-C216
473-474	memory addresses in, 176	for hard disk drives,
CPU, <b>118–120</b>	specifications for, 140	520-522
INT 13 BIOS interface	Intel 8259 interrupt con-	for keyboard, 425, <i>950</i>
and disk errors, 728	troller, 386-388,	for mouse, 960
extensions to, <b>560</b>	391-394	for printers, 241-242, 799,
operation of, 559–560	Intel 80186 CPU, <b>144</b>	837-839
with SCSI, 631	Intel 80188 CPU, 118, <b>144</b>	RS-232. See RS-232 ports
integrated circuits (ICs), C215	Intel 80286 CPU and comput-	SCSI. See SCSI (Small Com-
Integrated Drive Electronics	ers	puter Systems
(IDE) disk interface	characteristics of, 145	Interface)
addressing in, 561–562	data path for, 123	for sound cards,
cables for, <b>582–584</b> ,	protected mode in,	1017-1018
583-584	189-192	for ultimate computer,
for CD-ROM drives,	specifications for, 140	C46-C47, C47
1124-1125	Intel 80386 CPU and comput-	for video capture,
data transfer rates in, 556	ers	1061-1072
defined, C215	characteristics of, 146	interference
installing drives, 8–9, <i>8</i> –9	data path for, 122–123	vs. attenuation, 1153
master/slave jumpers in,	efficiency of, 118	EMI
580-584	specifications for, 140	crosstalk, <b>288–289</b>
sector translation with, 535	Intel 80486 CPU and comput-	defined, C201-C202
integrated motherboards	ers	RFI, 289-292
compatibility of, 224	cache memory on, 125	with fiber optic cable, 1158
conflicts from, 417	characteristics of, 146–148	with laser printers, 863
maintenance of, 434	components in, C7-C9	in networks, 1151-1152
Integrated Services Digital	data path for, 123	power noise, 292–297
Network (ISDN)	efficiency of, 118	from wireless input
defined, C215	specifications for, 140	devices, 962

interlaced displays, 984-985	for computer purchases,	Internet Service Providers
interleaved memory, C216	1264, 1266	(ISPs), C217
interleaving	convenience of, 1322-1323	Internet streaming, 1097
DRAM, 464, <b>472–473</b>	costs of, 1320-1322	internets, C217
hard disk drives, 546-552,	defined, C216-C217	Internetwork Packet Exchange
547-551	for drivers, C112-C113	(IPX), C217
intermittent problems	followups on, 1324-1325	InterNIC organization, 1182
chips, 449	FTP sites, <b>1338-1341</b>	interprocess communication
inkjet printers, 824–825	information on, 1318–1319	(IPC), C217
internal cache memory		interrupt handlers, C218
	mailing lists, 1350–1352	
on Athlon CPUs, 162	misinformation on, 1357	interrupt masks, error beeps
on Intel 80486 CPU and	newsgroups, 1341-1350	for, 429
computers, 125	patches, drivers, and utili-	interrupt service routines, 386
on Itanium CPU, <b>130</b>	ties on, 1338	interrupt vector tables, C218
in laptops, <b>126</b>	personal information on,	interrupt vectors, memory for,
on Pentium CPU, <b>126-127</b>	1358	176-177
on Pentium III, <b>128-129</b> ,	proprietary, 1355-1357	interrupts and IRQ levels, 39
128	quick steps in, 1311-1312	bus lines for, 203
on Pentium 4, 157	streaming media on,	for CD-ROM drives, 1136
on Pentium Pro, 151-152	1032-1034	choosing, <b>388-391</b>
SRAM for, <b>124–125</b>	vs. traditional support	for COM ports, <b>358–365</b> ,
internal CD-ROM drives,	methods,	394-395
1119-1120	1313-1317	conflicts with, 390-396
internal data transfer rate,	troubleshooting,	defined, C217-C218
545-546	1359-1360	Device Manager for, C129
internal modems, 906, C25-	viruses on, 1358	in diagnostic programs,
C26, C41-C42, C216	World Wide Web. See World	333-334
internal network numbers,	Wide Web (WWW)	for disk access, 385-386,
1178, <i>1178</i>	Internet commerce, 163	385-386
internal SCSI cables, 620-621,	Internet Connection Sharing	in EISA bus, 213
620	(ICS), <b>1190</b>	in MCA bus, 211
internal SCSI devices, sample	Internet Gateway product, 927	for mice, 960
setup with, <b>625–627</b> ,	Internet Guard Dog program,	for network interface
<i>626-627</i> , <b>629-630</b> ,	702	cards, 1202-1206,
629	Internet-over-cable. <i>See</i> cable	1204-1206
internal SCSI terminators,	broadband	operation of, 386
623-625	Internet Packet Exchange (IPX)	for PC Cards, 398-400
internal tape backups, 251	protocol	with Plug and Play,
international capability of	defined, C217	404-405
printers, 807	operation of, 1177–1178	vs. polling, 383–385
Internet and online services,	Internet Protocol (IP), 1179,	for SCSI adapters, 611
1310	C217	sharing, 395–396
addresses on, C216	Internet Relay Chat (IRC)	software, 184-185
advantages in, 1320-1325	defined, C216	for sound cards, 1016
cautions in using,	finding channels in, 1354	with UARTs, 896
1357-1358	operation of, 1353–1354	with Universal Serial Bus,
chat, <b>1353-1355</b>	for technical information,	246

1354-1355

for video capture cards,	finding channels in, 1354	specifications for, 141
1081	operation of, <b>1353–1354</b>	IUMA site, 1025
in XT computers, 387–388	for technical information,	
intranets, C218	1354-1355	J
intranetworking, 1122-1123	IrDA (Infrared Data Associa-	
invalid clusters, 748–749	tion), C214	jackets in coaxial cable, 1157,
"Invalid CMOS information-	iron oxide	1157
run SETUP" message,	coating on floppy	jacks
62	diskettes, 775	for network interface
"Invalid configuration" mes-	in toner, 887	cards, 1149, <i>1149</i>
sage, 759	IRQ (interrupt request) levels.	for sound cards, C40, C41
invalid subdirectories,	See interrupts and IRQ	jam sensors in laser printers,
745-747	levels	869
inventory functions	ISA (Industry Standard Archi-	jams in inkjet printers, 829,
in boot process, 440-442	tecture) bus, <b>204-209</b> ,	831
in diagnostic programs,	205-206	Java prefix, 695
332-333	bus mastering on, 383, 610	Java scripts, viruses in, 693,
IO.SYS file	description of, 524	699-700
executing, 445	DMA controllers on, 380	JavaScript scripts, viruses in,
loading, 444	for network interface	693, 699-700
ionizers, 284	cards, <b>1149–1150</b>	Jaz drives
IP (Internet Protocol), 1179,	support for, 28-29	for backups, 720-721
C217	in upgrading, C21, C22	benefits of, 241
IP addresses, 1181-1183,	ISDN (Integrated Services Digi-	for old computer data, C9-
1190, C218-C219	tal Network)	C10, <i>C10</i>
IP numbers for DSL, 924-925	defined, C215	JenniCam, 1057
IP session hijacking, 1233	operation of, <b>914-915</b>	JetDirect card, 804
IP spoofing, 1233	requirements for, 915-916	jeweler's screwdrivers, 1272
IPC (interprocess communica-	ISDN digital subscriber line	Joint Photographic Experts
tion), C217	(IDSL), 919-920	Group (JPEG), C219
IPX (Internet Packet Exchange)	ISO 9660 standard, <b>1116</b>	Joshua CPU, <b>160</b>
protocol	ISO 10149 standard, <b>1116</b>	journaling in NTFS, 683
defined, C217	isolation	joystick ports on sound cards
operation of, 1177-1178	controllers for, 231-233	C40, <i>C41</i>
IPX/SPX protocol	of power supplies,	joysticks
for network printers, 805	504-505	connectors for, 41, 258,
operation of, 1177-1178,	of printer problems,	258, 264
1178	805-806	for gamer computers, 1260
IQ ISDN modems, 916	segment, 1225-1226	I/O addresses for, 370
IR (infrared) devices	isolation devices, C239	with Universal Serial Bus,
input, 961-962	isolation transformers, 502,	246
printers, <b>803–804</b>	509	JPEG (Joint Photographic
IR (infrared) signals	ISPs (Internet Service	Experts Group), C219
defined, C214-C215	Providers), C217	JPEG compression technique,
for wireless networks,	Itanium CPU, <b>162–164</b>	1089
1162, 1197	internal cache memory on,	jumpers
IRC (Internet Relay Chat)	130	for CD-ROM drives, 1127
defined C216	slots for 139	defined C219

diagrams for, 73 for I/O addresses, 374 for master/slave controllers, <b>580–584</b> for resource conflicts, <b>359</b> , 360 for ROM addresses, 396 for ZIF sockets, C24	disassembling, 955–956 Dvorak, 956 enhanced, 946–947 error beeps for, 430 I/O addresses for, 370 installing, 945 interfaces for, 425, 950 IRQ for, 387, 389 maintaining, 951–952 for mouse actions, C104-	for horizontal scan frequency, 988 for MP3 audio files, 1022-1023 kits for hard disk drives, C43 Kmp3 MP3 players, 1029 knots in cords for lightning protection, 514
K (kilobytes), C220 K5/K6 CPU characteristics of, 161 K6/III CPU, C50, C50 operating frequencies of, C54 pipelines in, 120 k12 newsgroups, 1344 k56 flex modem standard, 909 Kbps (kilobits per second) defined, C220 for MP3 audio files, 1022-1023 Kbs (kilobits), C220 kernels, 326, C220-C221 key frames in delta encoding, 1089-1090 in off-line compression, 1095-1096, 1095 "Keyboard failure" message, 952 "Keyboard not present" message, 952 keyboards, 38, 230, 944 accessibility options for, C98 FilterKeys, C100-C101 StickyKeys, C99, C99 ToggleKeys, C101 cables for, 949-951, 954-955	c105, C104-C105 in PC selection, 1251 small business, 1261 student, 1259 problems with, 432 replacing, 949, 956-957 setup for, 411 spills on, 302, 951 switch design for, 949 troubleshooting, 952-957, 963 types of, 946-948, 947 in ultimate computer, C70- C71, C71 with Universal Serial Bus, 246 upgrading, C21 wireless, 962 keyed cables, 89 keylock connection, 74, 86, 94 KEYLOCK label, C88 keypads, numeric, 946 keys in Registry, C161-C163, C161 keystrokes, C220 kHz (kilohertz) for horizontal scan frequency, 988 for MP3 audio files, 1022-1023 kilo- prefix, C220 kilobits (Kbs), C220 kilobits per second (Kbps) defined, C220	L1 (level 1) cache memory, 125 defined, C220-C221 in Pentium 4, 157 in Pentium Pro, 151-152 L2 (level 2) cache memory, 37, 125-126 defined, C221 in Pentium 4, 157 in Pentium Pro, 151-152 setting up, C68 L2F (Layer 2 Forwarding), 1186 L2TP (Layer 2 Tunneling Protocol), 1186 label bits, 673 labels for DIP switches, 364-365 for expansion boards, 77 for network cable, 1194 for parts in disassembly, 61 LADDR (Layered Device Driver Architecture) SCSI standard, 631 LAN (local area network) boards. See network interface cards (NICs) landing zones, 64 lands on CD-ROM disks, 1112 languages in printers, 807 LANs (local area networks), 1143-1144, C220. See
954–955 connectors for, 41, 260, 261, <b>949–951</b> , 950, 953 covers for, 302, 951	for MP3 audio files, 1022–1023 kilobytes (K), C220 kilohertz (kHz)	also networks LapLink program, 1287 LapLinkFTP client, 1340

laptop computers. See note-	maintaining, 798–799	LBA (logical block addressing)
book/laptop comput-	memory in, 839-840, 860	522 <b>, 536-538</b>
ers	multiple sheets picked up	with CHS, <b>564-565</b>
Large fonts setting, C119	by, <b>862</b>	defined, C221
laser diodes in laser printers,	operation of, <b>842-843</b> ,	LC1800 power conditioners,
846-847	842-843	509
laser printers, <b>836</b>	paper feed in, <b>849</b> , <i>849</i>	LCCs (leadless chip carriers),
blank line down side of	paper issues with,	C220
page, 859	<b>868-870</b> , 885	LCD monitors, <b>990–991</b>
cable and ports for,	paper jams in, 862,	LCD panels, 496
864-866	869-870	LCNs (Logical Cluster Num-
charting problems in, 872	power for, 502, <b>863</b>	bers), 682
cleaning, <b>882–885</b>	print quality in, 885–886	lead, triboelectric value of,
cloudy, faded output from,	printer control languages	298
859	for, <b>840-841</b>	leadless chip carriers (LCCs),
color, <b>847–849</b>	resetting, <b>863–864</b>	C220
contaminants in, 869	rumors about, 886-887	LEDs (light-emitting diodes)
CPUs in, <b>839</b>	smearing on page, 858	for fiber optic cable, 1159
data input for, <b>843</b>	squeaking and groaning	in optical mice, 959
defined, C220	sounds in, 881	for panel lights, C87-C88
diagnostics for, 872-873	startup problems in,	legacy devices, 355
disassembling, 855, 856	860-861	lenses for camcorders, 1049
drum preparation in,	testing, <b>863</b>	level 1 (L1) cache memory,
<b>844-849</b> , <i>844</i> , <i>847</i>	toner cartridges for,	125
environmental considera-	879-880	defined, C220-C221
tions for, <b>866–868</b>	vertical white streaks on	in Pentium 4, 157
errant toner in, 881-882	page, <b>857-858</b> , 880	in Pentium Pro, 151-152
error messages for,	voltage test for, <b>870–871</b>	level 2 (L2) cache memory, 37
873-879	lasers for reading CD-ROM	125-126
fonts for, <b>861</b>	disks, 1112	defined, C221
horizontal streaks on page,	Last Mile in DSL, 918	in Pentium 4, 157
<b>858-859</b> , <i>859</i>	LASTDRIVE statements, exe-	in Pentium Pro, 151-152
host interface testing,	cuting, 445	setting up, C68
871-872	latches for memory chips,	Lfnback tool, C152
images in	1282	LHARC program, 1089
development of,	latency	libraries, DLL
<b>849-851</b> , <i>851</i> ,	defined, C220	defined, C201
885-886	in satellite communica-	operation of, 328-330
fusion process for,	tions, 933	viruses in, 689
852-855,	latency period, 543-544	licenses for network applica-
854-855	Layer 2 Forwarding (L2F),	tions, 1145
problems with, 880-881	1186	LIF (low insertion force) sock-
transferring, 851-852,	Layer 2 Tunneling Protocol	ets, 85
852	(L2TP), 1186	light
input interface for,	Layered Device Driver Archi-	and infrared printers,
837-839	tecture (LADDR) SCSI	803-804
interface controllers for,	standard, 631	and laser printers, 866
837	laziness, well-planned, 313	light-emitting diodes (LEDs)

for fiber optic cable, 1159	local buses, 209, <b>213-214</b>	lossless compression,
in optical mice, 959	for hard disk drives, 523	<b>1088-1093</b> , C221-
for panel lights, C87-C88	VESA, 214-215	C222
lightning	for video, 972	lossy compression,
and phone lines, 910-911	local computer stores, 1264	1088-1093, C222
protection from, 292–293,	LocalTalk networks, 261	lost clusters, <b>741–745</b> , <i>742</i> ,
512-515	locking latches for memory	745
LIM (Lotus Intel Microsoft)	chips, 1282	Lotus 1-2-3
standard, 174,	locking resources, 407	copy protection for, 196
<b>196–199</b> , <i>197</i>	lockups, 343-344	DOS extenders for, 192
line analyzers, C221	logarithms, 1009	expanded memory for,
line noise, <b>936-938</b>	logging	196-197
linear power supplies, 484	setting up, C69	loudness in sound waves,
linear sector addresses, 535,	in SNMP, 1213	<b>1006–1007</b> , 1007
668	logging modes in diagnostic	Love Bug virus, 692-693
lines vs. pixels, 1055-1056	programs, 333	low insertion force (LIF) sock-
link editors, 329	Logic Audio sequencing pro-	ets, 85
linked lists in FAT entries, 674	gram, 1036	low-level formatting
linking	logic bombs, <b>697</b> , C221	need for, <b>641-642</b>
DLLs, 329	logic gates, C4	with SpinRite, 726-729
in World Wide Web,	logical block addressing (LBA),	LPT ports, C222. See also par-
1325-1326	522 <b>, 536–538</b>	allel ports
Linux, MP3 players for, 1029	with CHS, <b>564-565</b>	LSI-11 CPUs, data paths for,
Liquid Audio format, 1025	defined, C221	122
Liquid Audio site, 1025	Logical Cluster Numbers	LSL program, 1174
liquids, 302-304	(LCNs), 682	LSUNs (logical sub-unit num-
Listen.com site, 1026	logical drives, 643-644	bers) in SCSI, 614
Listz	cluster size in, 644-647	LT 1086 chip, 622-623, <i>622</i>
for IRC channels, 1354	defined, C221	lumens, 1065
for mailing lists, 1351	partitioning, 651-653	luminance signals, 1065-1069
lithium batteries	structure of, 677-679,	LUNs (logical unit numbers)
for CMOS, 409	677-679	defined, C221
replacing, 413-414	logical geometry in disk	in SCSI, <b>614-615</b>
LLC (Logical Link Control)	drives, 533-534	LX chip set, 462-463
layer, 1223	Logical Link Control (LLC)	Lycos MP3 Search site, 1026
loading	layer, 1223	
CD-ROM discs, 1119	logical sub-unit numbers	M
COMMAND.COM file,	(LSUNs) in SCSI, 614	
446-447	logical unit numbers (LUNs)	M (mega-) prefix, C223
CONFIG.SYS file, 445	defined, C221	m (milli-) prefix, C225
DBR, 444-445	in SCSI <b>, 614-615</b>	M1 CPUs, 120
MBR, 443	loopbacks	M2 CPUs, 160
local area network (LAN)	defined, C221	MAC (Media Access Control)
boards. See network	for diagnostic programs,	layer, 1223
interface cards (NICs)	335-336	machine language, C222
local area networks (LANs),	for LAN boards, 404	Macintosh computers, expan-
<b>1143-1144</b> , C220. <i>See</i>	for serial communications,	sion slots in, 199-200
<i>also</i> networks	938, 940	Macintosh SCSI cabling, 617

macro viruses	defined, C228	maximum correctable error
defined, C222	in newsgroups, 1345–1346	burst length, 523
operation of, <b>690–692</b>	manufacturer chip recalls,	Maxtor site, 642
magazines, 1316-1317	448	Mb (megabits), C223
MagicMover tool, 724	manufacturer codes on chips,	MB (megabytes), 137, C223
MAGIX MP3 players, 1027	450	Mbps (megabits per second),
magnetic disks, 519	manufacturers, Web sites for,	C223
magnetic tip screwdrivers, 54	1327-1328	MBRs (Master Boot Records)
magnetism	maps	backing up, <b>684</b> , <b>711-714</b>
with floppy diskettes,	defined, C222	loading, 443
780-781	in notebook upgrades,	for logical drives, 678,
problems from, 285-287	1279	678-679
from speakers, 1019	in SNMP, 1213	program in, 444
magnifiers, C98	mark parity, C233	reading, <b>758-763</b>
mail, electronic	mask registers, I/O addresses	MCA (Micro Channel Architec-
defined, C216	for, 370	ture) bus, <b>210-212</b>
firewalls for, 1233	masks, C223	bus mastering on, 382
LANs for, <b>1147</b>	Master Boot Records (MBRs)	description of, 524
viruses in, <b>692-693</b> , 699	backing up, <b>684</b> , <b>711-714</b>	DMA controllers on, 380
mail order companies, 1264	loading, 443	setting up, 410
mailing lists, C216	for logical drives, 678,	McAfee Internet Guard Dog
finding, 1351	678-679	program, 702
operation of, <b>1350-1351</b>	program in, 444	McAfee Office, C155
for technical information,	reading, <b>758–763</b>	McAfee Utilities, C155
1352	master controllers in IDE	McAfee VirusScan program,
mainboards. See mother-	drives, <b>580–584</b>	702
boards	master DMA register, error	MCGA (Multi Color Graphics
mainframe computers, emu-	beeps for, 429	Array), 997
lating, <b>251–252</b>	master drives, C17	MDA (Monochrome Display
maintaining. See also preven-	Master File Table (MFT),	Adapter)
tive maintenance con-	681-682	characteristics of, 997
cerns	math coprocessors, 130	memory for, 181
CD-ROM drives,	error beeps for, 430	MDRAM (Multibank DRAM)
1134-1135	I/O addresses for, 370	for video, 974
floppy disk drives,	for Intel 80486, 147	mean time between failures
778-781	IRQ for, 389	(MTBF), C223
inkjet printers, <b>795-796</b> ,	MMX, 130-133	mean time to repair (MTTR),
831-832	for Pentium 4, 157-158	C223
keyboards, <b>951-952</b>	Matrix Math (MMX) CPUs and	Media Access Control (MAC)
mice, <b>960</b>	technology	layer, 1223
modems, <b>910–911</b>	implementation of,	media errors, 751–755
notebooks, <b>1302–1305</b>	150-151	media tests
power supplies, 494	numeric coprocessors for,	operation of, 726–729
printers, <b>793–799</b>	130-133	pattern testing in, 728–729
male connectors, C222	specifications for, 141	Media Type settings, 826
managed hubs, 1212-1213,	Matrox Millennium G450	meg, C223
<b>1216</b> , <i>1216</i>	graphics cards, 993	mega- (M) prefix, C223
manners		megabits (Mb), C223

megabits per second (Mbps),	installing, 457–459, C59-	for user programs,
C223	C60	179-180
megabytes (MB), 137, C223	interleaving, 472-473	for video, <b>180–183</b> , 182,
megahertz (MHz), 108-117,	internal cache, 124–130	235, <i>236</i> , <b>972-976</b> ,
C223	for interrupt vectors,	980-983, C38-C39
Melissa virus, 691	176-177	in video capture, 1081
memory, 27, 27, 37, 164, 456.	in laser printers, 839-840,	virtual, C258-C259
See also buffers;	860	memory boards
caches	lockups from, 343-344	defined, C224
addresses for, 193-196	for motherboards, C59-C60	local buses for, 214
CPU limits, <b>137–138</b>	in notebooks, 221-223,	speed of, 209, 214
defined, C224	1273-1274,	memory chips
vs. I/O addresses,	1277-1284	caches for, <b>473–474</b>
202-203	with PC Card, 224	defined, C224
planning for, 176	in PC selection, 1247	heat from, 275
boards for. See memory	audio/video enthusiast,	installing, <b>479–481</b>
boards	1260	packages for, <b>164-165</b> ,
in boot process, 438-439	corporate, 1262	<i>166</i> , <b>460–462</b>
and buses, <b>202–203</b>	gamer, 1259	size of, <b>462-463</b>
chips for. See memory	home, 1258	speed of, <b>460–463</b> ,
chips	road warriors, 1262	472-473, 476
CMOS. See CMOS memory	small business, 1261	testing, 448, <b>476-479</b> , <i>478</i>
defined, C223	PIO with, <b>375–377</b> ,	"MEMORY CONFIG" message,
for device drivers, 177-178	376-377	875
ECC, <b>172-173</b> , <b>470</b> , C68	quantity vs. speed,	memory leaks, C224
energy consumption by,	169-170	memory management, C224
496	RDRAM, <b>170–172</b> , <i>171</i>	memory management units
errors in	reserved memory area,	(MMUs), C224
beeps for, 428-430	<b>184-188</b> , <i>188</i>	memory managers, 174, 177,
false messages,	ROM. See BIOS (Basic	397
474-476	Input/Output Sys-	memory maps, C224
expanded, <b>196-199</b> , <i>197</i>	tem); ROM (Read	memory-resident programs
extended, <b>188–196</b> , <i>193</i> ,	Only Memory)	in AUTOEXEC.BAT file,
975-976	SDRAM, <b>469-473</b>	178-179
first megabyte, 175–176	in setup, 411	defined, C224
flash, <b>186</b> , 222, 406, 414	speed of, <b>166–172</b> , 411,	viruses in, 696
for frame captures,	465-466	"MENU RESET" message, 874
1085-1088	static vs. dynamic, 379,	"MENUS LOCKED" message,
for frames, <b>187–188</b>	464	879
for games, C27	status of, C131	Merced CPU, <b>162–164</b>
and GP faults, 1098–1099	for Super VGA boards, 181	messages
for hard disk drive caches,	testing, 403-404, <b>438-439</b>	"0 hard disk(s) found", 759
556-558	troubleshooting, 481-482	"1701", 759
for home recording stu-	for TSRs, <b>178–179</b>	"1780", 759-760
dios, 1037	types of, 173–175	"1781", 759–760
identifying, <b>254–255</b> , <i>255</i>	for ultimate computer, C36	"1790", 759–761
for inkjet printers, <b>830</b>	in upgrading, C22-C23, <i>C23</i>	"1791", 759-761

"Bad or missing	"Non-system disk or disk	connectors for, <i>260</i> , 261,
XXXX.DRV", 445	error", 445	264
"Cannot reload COM-	"Out of Memory", 830	defined, C226
MAND.COM, system	"Out of Paper", <b>830-831</b>	I/O addresses for, 371
halted", 447	"PAPER JAM", 831, 874	installing, 945
"COLD RESET", 874	"PAPER OUT", 874	interfaces for, <b>960</b>
"CONFIG LANGUAGE", 878	"PC LOAD", 878	IRQ for, 389
"Convert directory to file	"PE FEED", 878	in PC selection, 1251
(Y/N)?", 745-746	"PE TRAY", 878	ports for, 243
"Convert lost chains to	"Print Head Failure", 831	positioning methods for,
files", 743	"PRINT OVERRUN", 875	958-959
"Data error reading drive",	"PRINTER OPEN", 874	troubleshooting, <b>961</b>
<b>751-755</b> , 782	"PRINTING TEST", 874	types of, 957
"Drive failure, Hard disk	"READY", 874	in ultimate computer, C70-
failure", 759	"recording inhibited", 1059	C71, <i>C71</i>
"EC LOAD", 878	"REMOVE PAGE", 876	upgrading, C21
"ENGINE TEST", 875	"RESET", 874	Micro Channel Architecture
"ERROR", 875–877	"RESET TO SAVE", 874	(MCA) bus, 210-212
"Errors found. F parameter	"Run SETUP - configuration	bus mastering on, 382
not specified", 743	lost", 759	description of, 524
"ERRORUNIT", 876	"Sector not found", 782	DMA controllers on, 380
"FC", 878	"SELF TEST", 874	setting up, 410
"FE CARTRIDGE", 879	"SERVICE", 876-878	microcode, C224
"File creation error", 744	"SKIP SELF TEST", 875	microcode efficiency in CPUs,
"FONT PRINTOUT", 874	"TONER LOW", 875	118
		_
"General failure reading drive", 782	"USER MAINTENANCE",	Micron, DDR memory by, 471
	879	microns, C224-C225
"HDD Configuration Error",	"WARMING UP", 874	microphones, connectors for,
1291	metal detectors, 285–286	261
"I/O CONFIG ERR", 875	Metal Oxide Varistors (MOVs),	microprocessors, C225. See
"Ink Low", <b>830</b>	504–505, 507, 509	also CPUs (central pro-
"Invalid CMOS information-	metal standoffs for mother-	cessing units)
run SETUP", 62	boards, 88	Microsoft bus mouse, 960
"Invalid configuration",	meters	Microsoft File Information
759	for laser printer testing,	tool, C152
"Keyboard failure", 952	871	Microsoft Network (MSN),
"Keyboard not present",	for power, 497	1356
952	"MF FEED" message, 878	Microsoft Personal Support
"MEMORY CONFIG", 875	MFT (Master File Table),	Center site, 1335
"MENU RESET", 874	681-682	Microsoft System Information
"MENUS LOCKED", 879	MHz (megahertz), C224	(MSI), C132-C133,
"MF FEED", 878	mice, 230, 944	C133
"MIO NOT READY", 875	accessibility options for,	microswitches in keyboards,
"Missing operating sys-	C104-C105, C104-	949
tem", 444	C105	mid-sized tower case style,
"NO EP CART", 874	buttons and wheels for,	C34-C35
"NO FONT", 879	<b>957</b> , <i>958</i>	MIDI (Music Instrument Digi-
	cleaning, <b>960</b>	tal Interface)

boards for, 1016	Mitsubishi, DDR memory by,	testing, C12
cables for, 1019	471	troubleshoo
defined, C227	mixing for musicians,	for ultimate
for FM synthesis, 1013	1037-1039	C41-
for games, 1031	Mixman Studio sequencing	for upgradii
for musicians, <b>1035–1037</b>	program, 1036	modes for CD-
sound cards for, C40	MJ (modular jacks), C225	modular hubs,
Midi files, sound cards for,	MMUs (memory management	modular jacks
C40	units), C224	modularity for
MIDI ports, I/O addresses for,	MMX CPUs and technology	98, 103
371	implementation of,	modulation
military specification, chip	150-151	defined, C22
prefix for, 450	numeric coprocessors for,	frequency, o
milli- (m) prefix, C225	130-133	1013
milliseconds (ms), 164, C225	specifications for, 141	modules, NetW
millivolts (mv), C225	mobile computing, C225	Mojave CPU, 16
min/max troubleshooting	MOD operator, 667	Molex connecte
technique, 426	modal dispersion, 1160	492, <i>49</i>
Mini PCI bus, 225-226	MODE command, 809	Monitor tab, C
mini-tower case style, C34-	modem isolators, 910	monitors, 987-
C35	Modem on Hold feature, 909	video a
miniature D shell connectors,	Modem Ready (MR) light, 940	boards
<b>258</b> , <i>258</i>	Modem Saver tester, 937	descriptions
miniature DIN connectors,	modems, 894. See also serial	in disassem
260-261, 260	communications	dot pitch fo
for keyboards, 949-950,	cable, C186. <i>See also</i> cable	energy cons
950, C21	broadband	495-
for mouse, C21	connectors for, 41, 264,	flat-panel, 9
miniDV format, 1052, 1054,	265	for games, (
1056	Control Panel for, C123-	horizontal-s
Minimalist computers, 1016	C126, C124-C126	of, 9
miniplug connectors, 261	defined, C225	multi-freque
MiniSCSI Plus interface, 611	external, 906–907	multiple dis
Minitel TTF Files tool, C152	indicator lights for, 331	noninterlace
"MIO NOT READY" message, 875	installing, C75	for noteboo
	ISDN, 915-916	old type, 99
mIRC client, 1354	lightning damage to, 293 maintaining, 910–911	in PC selecti
mirroring and mirror sets defined, C225	operation of, <b>897-898</b>	audio/vio 1
in MFT, 682	on PC Card bus, 223	_
software for, 721	in PC selection, <b>1252–1253</b>	corporate home, 12
mirrors in laser printers, 880	ports for, 242–243	small bu
misc newsgroups, 1344	problems with, 935–936,	settings for,
misinformation on Internet,	939–941	size of, 989
1357	quick steps for, <b>C96</b>	troubleshoo
"Missing operating system"	settings for, C125-C126	vertical-scar
message, 444	speed of, 906-908	of, 9
message, 111	standards for 000 010	01, 5

standards for, 909-910

**26**, *C126* oting, 347-348 te computer, 1-C42, *C42* ling, C25-C26 )-ROM, 1117 , 1210, *1211* s (MJ), C225 or compatibility, 225 of, **1013-1014**, 3 Ware, 1174 60 tors, 79-80, *79*, 93 C**122**, *C122* **7–988**. See also and video ns of, C118 nbly, 65 or, 988-989 sumption by, -496 990-991 C28 scan frequency 988 uency, **991-992** isplays, **992-994** ced, **984-985** oks, 1304-1305 95-998 tion, 1250 rideo enthusiast, 1260 te, 1262 258 usiness, 1261 r, **C122**, *C122* 9-990 oting, 346-347 an frequencies of, 984-986

and brownouts, 297

monochrome adapters, I/O	duty cycles in, 282	software for, <b>1027-1029</b>
addresses for, 371	heat from, 275	MP3.com site, 1026
Monochrome Display Adapter	magnetism from, 285-286	mp3blaster MP3 players, 1029
(MDA)	noise from, 288, 502	MPEG (Motion Picture Experts
characteristics of, 997	power for, 484	Group), C226
memory for, 181	stepper, 540	MPEG (Moving Picture Experts
Monochrome Display moni-	turning off, 294-295	Group) compression
tors, 996	mountain/valley memory	technique, C75-C76
monochrome monitors, 996	tests, <b>478-479</b> , <i>478</i>	mpg123 MP3 players, 1029
monochrome video,	mounting hard disk drives,	MPU-401 interface, 1035
<b>1062-1069</b> , 1063	1286	MR (Modem Ready) light, 940
Monster cables, 1073	mouse, 230, 944	ms (milliseconds), 164, C225
Monterey sound cards, 1040	accessibility options for,	MS-DOS and disks, <b>662–665</b>
Moore's Law, C226	C104-C105, C104-	absolute and DOS sectors,
motherboards	C105	665-668
in 80486 computers, C9	buttons and wheels for,	clusters, <b>668-670</b>
components on, 102-104,	<b>957</b> , <i>958</i>	DBR, <b>670–671</b>
104-106	cleaning, <b>960</b>	disk errors, <b>726–729</b> , <i>727</i>
controllers on, 233-234	connectors for, <i>260</i> , 261,	FAT, <b>671-674</b> , <i>672</i> , <i>674</i>
CPUs for, <b>C49-C60</b> , <i>C50-</i>	264	logical drive structure,
C52, C56-C59	defined, C226	<b>677-679</b> , <i>678-679</i>
defined, C226	I/O addresses for, 371	subdirectories, 675-677
diagnostic program for,	installing, 945	MSCONFIG tool, 338
336	interfaces for, 960	MSDOS.SYS file, 444
diagrams for, 73-74	IRQ for, 389	MSI (Microsoft System Infor-
in generic computers, 1241	in PC selection, 1251	mation), C132-C133,
identifying parts on,	ports for, 243	C133
<b>253–256</b> , <i>253–256</i>	positioning methods for,	MSN (Microsoft Network),
installing, 408, C77-C78,	958-959	1356
C77	troubleshooting, 961	MTBF (mean time between
integrated, 224	types of, 957	failures), C223
IRQ for, 389	in ultimate computer, C70-	MTTR (mean time to repair),
memory on, C59-C60	C71, C71	C223
in PC selection, 1248	upgrading, C21	Multi Color Graphics Array
in proprietary computers,	mouse pointers, high-con-	(MCGA), 997
1242	trast, C98	multi-frequency monitors,
removing, <b>85-88</b> , <i>87-88</i>	MOUSE.SYS device driver, 177	991-992
seating, <b>92–93</b>	Mouse tab, C104, <i>C105</i>	Multi-Functions printers, 797
for ultimate computer,	Moving Picture Experts Group	Multibank DRAM (MDRAM)
C36-C37	(MPEG) compression,	for video, 974
upgrading, C15-C16	C75-C76	multibranch prediction in
in XT computers, 408	MOVs (Metal Oxide Varistors),	6x86, 159
motion detection by mice,	504–505, 507, 509	multichannel SCSI host
958-959	MP3 audio files, <b>1022–1023</b>	adapters, <b>603</b> , 611
Motion Picture Experts Group	benefits of, 1023-1025	multifinger tools, 55, <i>55</i>
(MPEG), C226	burning to CDs,	multimedia. See also CD-ROM
motors	1026-1027	drives; sound and

hardware for, 1029-1030

	Maria Instrument Digital	Notice al Comico e de otor en
sound cards; video	Music Instrument Digital	National Semiconductor, pre-
capture defined, C226	Interface (MIDI) boards for, 1016	fix for, 450 National Television Standards
MMX technology for,	cables for, 1019	Committee (NTSC),
130–133	defined, C227	C227
MP3 audio files,	for FM synthesis, 1013	National Television Standards
1022–1030	for games, 1031	Committee (NTSC)
multimedia keys, 948	for musicians, <b>1035–1037</b>	interface, <b>1064</b>
multimedia kits, 1126	sound cards for, C40	Native Macintosh CD format,
multimeters	musicians	1116
for laser printer testing,	MIDI for, <b>1035–1037</b>	Natural Keyboards, 947, <i>947</i> ,
871	recording and mixing for,	950, 957
for power, 497	1037-1039	NCPs (NetWare Control Proto-
multimode fiber optic cable	sound for, <b>1034–1035</b>	cols), 1169
defined, C226	MUSICMATCH Jukebox MP3	NDIS (Network Driver Inter-
operation of, <b>1159–1161</b> ,	players, 1027	face Specification)
1160	MUSICMATCH site, 1026	defined, C229
multipartite viruses	mv (millivolts), C225	vs. ODI, 1174-1175
defined, C227	My Briefcase feature,	near-end crosstalk (NEXT),
operation of, <b>695-696</b>	1305-1306	C227
MultiPass printers, 797	My Computer for removing	neatness in network cable
multiple-channel information,	devices, 363	installation,
digital audio for, 1030	MZR (multiple zone record-	1193-1194
multiple displays, 992-994	ing), C227	NEC
multiple transport stacks,		CPU specifications, 141
<b>1184-1185</b> , <i>1184</i>	N	DDR memory by, 471
1184–1185, 1184 multiple zone recording	<del></del>	DDR memory by, 471 in Watchzone group, 212
1184–1185, <i>1184</i> multiple zone recording (MZR), C227	n (nano-) prefix, C227	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical
1184–1185, 1184 multiple zone recording (MZR), C227 multipliers for CPUs, C55,	n (nano-) prefix, C227 N chip prefix, 450	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Associ-
1184–1185, 1184 multiple zone recording (MZR), C227 multipliers for CPUs, C55, C56	n (nano-) prefix, C227 N chip prefix, 450 N-ports in FCSI, 606	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Associ- ation), cable grading
1184–1185, 1184 multiple zone recording (MZR), C227 multipliers for CPUs, C55, C56 multiprocessor systems, 474	n (nano-) prefix, C227 N chip prefix, 450 N-ports in FCSI, 606 name resolution, C227	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Associ- ation), cable grading by, 1155–1156
1184–1185, 1184 multiple zone recording (MZR), C227 multipliers for CPUs, C55, C56 multiprocessor systems, 474 multiscan monitors, 996	n (nano-) prefix, C227 N chip prefix, 450 N-ports in FCSI, 606 name resolution, C227 names	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Association), cable grading by, 1155-1156 NetBEUI (NetBIOS Extended
1184–1185, 1184 multiple zone recording (MZR), C227 multipliers for CPUs, C55, C56 multiprocessor systems, 474 multiscan monitors, 996 multisession CD-ROM drives,	n (nano-) prefix, C227 N chip prefix, 450 N-ports in FCSI, 606 name resolution, C227 names of 6x86 registers, 159	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Association), cable grading by, 1155–1156 NetBEUI (NetBIOS Extended User Interface)
1184–1185, 1184 multiple zone recording (MZR), C227 multipliers for CPUs, C55, C56 multiprocessor systems, 474 multiscan monitors, 996 multisession CD-ROM drives, 1118	n (nano-) prefix, C227 N chip prefix, 450 N-ports in FCSI, 606 name resolution, C227 names of 6x86 registers, 159 for partitions, <b>653-654</b>	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Association), cable grading by, 1155-1156 NetBEUI (NetBIOS Extended User Interface) benefits and limitations of,
1184–1185, 1184 multiple zone recording (MZR), C227 multipliers for CPUs, C55, C56 multiprocessor systems, 474 multiscan monitors, 996 multisession CD-ROM drives, 1118 Multisync monitor, 991–992	n (nano-) prefix, C227 N chip prefix, 450 N-ports in FCSI, 606 name resolution, C227 names of 6x86 registers, 159 for partitions, 653–654 for viruses, 694–695	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Association), cable grading by, 1155-1156 NetBEUI (NetBIOS Extended User Interface) benefits and limitations of, 1176-1177
1184–1185, 1184 multiple zone recording (MZR), C227 multipliers for CPUs, C55, C56 multiprocessor systems, 474 multiscan monitors, 996 multisession CD-ROM drives, 1118 Multisync monitor, 991–992 multitasking, 146	n (nano-) prefix, C227 N chip prefix, 450 N-ports in FCSI, 606 name resolution, C227 names of 6x86 registers, 159 for partitions, 653–654 for viruses, 694–695 nano- (n) prefix, C227	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Association), cable grading by, 1155-1156 NetBEUI (NetBIOS Extended User Interface) benefits and limitations of, 1176-1177 defined, C228
1184–1185, 1184 multiple zone recording (MZR), C227 multipliers for CPUs, C55, C56 multiprocessor systems, 474 multiscan monitors, 996 multisession CD-ROM drives, 1118 Multisync monitor, 991–992 multitasking, 146 cross-linked clusters from,	n (nano-) prefix, C227 N chip prefix, 450 N-ports in FCSI, 606 name resolution, C227 names of 6x86 registers, 159 for partitions, 653–654 for viruses, 694–695 nano- (n) prefix, C227 nanoseconds (ns), 164, C227	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Association), cable grading by, 1155-1156 NetBEUI (NetBIOS Extended User Interface) benefits and limitations of, 1176-1177 defined, C228 NetBIOS (Network Basic
1184–1185, 1184 multiple zone recording (MZR), C227 multipliers for CPUs, C55, C56 multiprocessor systems, 474 multiscan monitors, 996 multisession CD-ROM drives, 1118 Multisync monitor, 991–992 multitasking, 146 cross-linked clusters from, 749	n (nano-) prefix, C227 N chip prefix, 450 N-ports in FCSI, 606 name resolution, C227 names of 6x86 registers, 159 for partitions, 653–654 for viruses, 694–695 nano- (n) prefix, C227 nanoseconds (ns), 164, C227 Napster site, 1026	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Association), cable grading by, 1155-1156 NetBEUI (NetBIOS Extended User Interface) benefits and limitations of, 1176-1177 defined, C228 NetBIOS (Network Basic Input/Output System)
1184–1185, 1184 multiple zone recording (MZR), C227 multipliers for CPUs, C55, C56 multiprocessor systems, 474 multiscan monitors, 996 multisession CD-ROM drives, 1118 Multisync monitor, 991–992 multitasking, 146 cross-linked clusters from, 749 memory protection for,	n (nano-) prefix, C227 N chip prefix, 450 N-ports in FCSI, 606 name resolution, C227 names of 6x86 registers, 159 for partitions, 653–654 for viruses, 694–695 nano- (n) prefix, C227 nanoseconds (ns), 164, C227 Napster site, 1026 narrow SCSI, C227	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Association), cable grading by, 1155–1156 NetBEUI (NetBIOS Extended User Interface) benefits and limitations of, 1176–1177 defined, C228 NetBIOS (Network Basic Input/Output System) defined, C228
1184–1185, 1184 multiple zone recording (MZR), C227 multipliers for CPUs, C55, C56 multiprocessor systems, 474 multiscan monitors, 996 multisession CD-ROM drives, 1118 Multisync monitor, 991–992 multitasking, 146 cross-linked clusters from, 749 memory protection for, 189–192	n (nano-) prefix, C227 N chip prefix, 450 N-ports in FCSI, 606 name resolution, C227 names of 6x86 registers, 159 for partitions, 653–654 for viruses, 694–695 nano- (n) prefix, C227 nanoseconds (ns), 164, C227 Napster site, 1026 narrow SCSI, C227 NAT (Network Address Trans-	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Association), cable grading by, 1155–1156 NetBEUI (NetBIOS Extended User Interface) benefits and limitations of, 1176–1177 defined, C228 NetBIOS (Network Basic Input/Output System) defined, C228 development of, 1176
nultiple zone recording (MZR), C227 multipliers for CPUs, C55, C56 multiprocessor systems, 474 multiscan monitors, 996 multisession CD-ROM drives, 1118 Multisync monitor, 991–992 multitasking, 146 cross-linked clusters from, 749 memory protection for, 189–192 UARTs for, 896	n (nano-) prefix, C227 N chip prefix, 450 N-ports in FCSI, 606 name resolution, C227 names of 6x86 registers, 159 for partitions, 653-654 for viruses, 694-695 nano- (n) prefix, C227 nanoseconds (ns), 164, C227 Napster site, 1026 narrow SCSI, C227 NAT (Network Address Translation)	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Association), cable grading by, 1155-1156 NetBEUI (NetBIOS Extended User Interface) benefits and limitations of, 1176-1177 defined, C228 NetBIOS (Network Basic Input/Output System) defined, C228 development of, 1176 NetBurst microarchitecture,
1184–1185, 1184 multiple zone recording (MZR), C227 multipliers for CPUs, C55, C56 multiprocessor systems, 474 multiscan monitors, 996 multisession CD-ROM drives, 1118 Multisync monitor, 991–992 multitasking, 146 cross-linked clusters from, 749 memory protection for, 189–192 UARTs for, 896 music	n (nano-) prefix, C227 N chip prefix, 450 N-ports in FCSI, 606 name resolution, C227 names of 6x86 registers, 159 for partitions, 653–654 for viruses, 694–695 nano- (n) prefix, C227 nanoseconds (ns), 164, C227 Napster site, 1026 narrow SCSI, C227 NAT (Network Address Translation) defined, C229	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Association), cable grading by, 1155-1156 NetBEUI (NetBIOS Extended User Interface) benefits and limitations of, 1176-1177 defined, C228 NetBIOS (Network Basic Input/Output System) defined, C228 development of, 1176 NetBurst microarchitecture, 136, 156-158
nultiple zone recording (MZR), C227 multipliers for CPUs, C55, C56 multiprocessor systems, 474 multiscan monitors, 996 multisession CD-ROM drives, 1118 Multisync monitor, 991–992 multitasking, 146 cross-linked clusters from, 749 memory protection for, 189–192 UARTs for, 896 music four-part cycle, 1013–1014,	n (nano-) prefix, C227 N chip prefix, 450 N-ports in FCSI, 606 name resolution, C227 names of 6x86 registers, 159 for partitions, 653-654 for viruses, 694-695 nano- (n) prefix, C227 nanoseconds (ns), 164, C227 Napster site, 1026 narrow SCSI, C227 NAT (Network Address Translation) defined, C229 for IP addresses, 927	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Association), cable grading by, 1155-1156 NetBEUI (NetBIOS Extended User Interface) benefits and limitations of, 1176-1177 defined, C228 NetBIOS (Network Basic Input/Output System) defined, C228 development of, 1176 NetBurst microarchitecture, 136, 156-158 netiquette
nultiple zone recording (MZR), C227 multipliers for CPUs, C55, C56 multiprocessor systems, 474 multiscan monitors, 996 multisession CD-ROM drives, 1118 Multisync monitor, 991–992 multitasking, 146 cross-linked clusters from, 749 memory protection for, 189–192 UARTs for, 896 music four-part cycle, 1013–1014, 1013	n (nano-) prefix, C227 N chip prefix, 450 N-ports in FCSI, 606 name resolution, C227 names of 6x86 registers, 159 for partitions, 653-654 for viruses, 694-695 nano- (n) prefix, C227 nanoseconds (ns), 164, C227 Napster site, 1026 narrow SCSI, C227 NAT (Network Address Translation) defined, C229 for IP addresses, 927 National Electrical Manufac-	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Association), cable grading by, 1155-1156 NetBEUI (NetBIOS Extended User Interface) benefits and limitations of, 1176-1177 defined, C228 NetBIOS (Network Basic Input/Output System) defined, C228 development of, 1176 NetBurst microarchitecture, 136, 156-158 netiquette defined, C228
nultiple zone recording (MZR), C227 multipliers for CPUs, C55, C56 multiprocessor systems, 474 multiscan monitors, 996 multisession CD-ROM drives, 1118 Multisync monitor, 991–992 multitasking, 146 cross-linked clusters from, 749 memory protection for, 189–192 UARTs for, 896 music four-part cycle, 1013–1014, 1013 MIDI for, 1016	n (nano-) prefix, C227 N chip prefix, 450 N-ports in FCSI, 606 name resolution, C227 names of 6x86 registers, 159 for partitions, 653–654 for viruses, 694–695 nano- (n) prefix, C227 nanoseconds (ns), 164, C227 Napster site, 1026 narrow SCSI, C227 NAT (Network Address Translation) defined, C229 for IP addresses, 927 National Electrical Manufacturers Association	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Association), cable grading by, 1155-1156 NetBEUI (NetBIOS Extended User Interface) benefits and limitations of, 1176-1177 defined, C228 NetBIOS (Network Basic Input/Output System) defined, C228 development of, 1176 NetBurst microarchitecture, 136, 156-158 netiquette defined, C228 in newsgroups, 1345-1346
nultiple zone recording (MZR), C227 multipliers for CPUs, C55, C56 multiprocessor systems, 474 multiscan monitors, 996 multisession CD-ROM drives, 1118 Multisync monitor, 991–992 multitasking, 146 cross-linked clusters from, 749 memory protection for, 189–192 UARTs for, 896 music four-part cycle, 1013–1014, 1013	n (nano-) prefix, C227 N chip prefix, 450 N-ports in FCSI, 606 name resolution, C227 names of 6x86 registers, 159 for partitions, 653–654 for viruses, 694–695 nano- (n) prefix, C227 nanoseconds (ns), 164, C227 Napster site, 1026 narrow SCSI, C227 NAT (Network Address Translation) defined, C229 for IP addresses, 927 National Electrical Manufacturers Association (NEMA), cable grading	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Association), cable grading by, 1155-1156 NetBEUI (NetBIOS Extended User Interface) benefits and limitations of, 1176-1177 defined, C228 NetBIOS (Network Basic Input/Output System) defined, C228 development of, 1176 NetBurst microarchitecture, 136, 156-158 netiquette defined, C228 in newsgroups, 1345-1346 NetWare Control Protocols
nultiple zone recording (MZR), C227 multipliers for CPUs, C55, C56 multiprocessor systems, 474 multiscan monitors, 996 multisession CD-ROM drives, 1118 Multisync monitor, 991–992 multitasking, 146 cross-linked clusters from, 749 memory protection for, 189–192 UARTs for, 896 music four-part cycle, 1013–1014, 1013 MIDI for, 1016 MP3 audio files,	n (nano-) prefix, C227 N chip prefix, 450 N-ports in FCSI, 606 name resolution, C227 names of 6x86 registers, 159 for partitions, 653–654 for viruses, 694–695 nano- (n) prefix, C227 nanoseconds (ns), 164, C227 Napster site, 1026 narrow SCSI, C227 NAT (Network Address Translation) defined, C229 for IP addresses, 927 National Electrical Manufacturers Association	DDR memory by, 471 in Watchzone group, 212 NEMA (National Electrical Manufacturers Association), cable grading by, 1155-1156 NetBEUI (NetBIOS Extended User Interface) benefits and limitations of, 1176-1177 defined, C228 NetBIOS (Network Basic Input/Output System) defined, C228 development of, 1176 NetBurst microarchitecture, 136, 156-158 netiquette defined, C228 in newsgroups, 1345-1346

Network Address Translation	Network layer devices, 1223	defined, C213
(NAT)	Network Monitor Service tool,	switching, 1218-1222,
defined, C229	C152	1219-1221
for IP addresses, 927	network numbers in IPX/SPX,	types of, 1209-1211,
Network Associates site, 703	1178, <i>1178</i>	1210-1211
Network Basic Input/Output	network operating system	for ultimate computer,
System (NetBIOS)	(NOS), C229	C46
defined, C228	network printers	for USB bus, 246
development of, 1176	defined, C229	in IRC, 1353
network binding interfaces,	operation of, <b>804-805</b>	LANs, <b>1143-1144</b> , C220
1173-1175	network protocols, C229-C230	memory frames for, 187
network device drivers, C229	network shells, TSRs for, 178	models of, 1223
Network Driver Interface	network transport protocols,	NICs for. See network inter-
Specification (NDIS)	1175-1176	face cards (NICs)
defined, C229	IPX/SPX, <b>1177-1178</b> , <i>1178</i>	for office interaction,
vs. ODI, 1174-1175	multiple transport stacks,	1146-1147
network file system drivers,	<b>1184–1185</b> , <i>1184</i>	PC Cards for, 399-400
1167, <b>1171-1173</b>	NetBEUI, 1176–1177	protocols for. See protocols
network interface cards	TCP/IP, 1179-1183	repeaters in, 1224
(NICs), 40-41, 249	networks, 1140	benefits of, 1225-1226
for cable broadband, 929	backups on, 1287	for coaxial cable, 1158
categories of, <b>1148-1150</b>	cables for, 1150-1153	for collisions, 1225,
configuring, <b>1201–1208</b> ,	coaxial, 1157-1158,	1227
1204-1206	1157	vs. extenders, 1227
conflicts in, 401–403	connectors for,	operation of,
connectors on, 258, 258	1163-1166,	1226-1228
defined, C229	1163-1166	for segment isolation,
DMA channels for, 1208	fiber optic, 1158-1161,	1225-1226
drivers for, 1173-1175,	1158, 1160	routers in, 1228-1230
<b>1199–1201</b> , <i>1200</i>	installing, 1190-1197	security for, 1230
for DSL, 923	interference vs. attenua-	firewalls for, <b>1232-1236</b>
grounding problems with,	tion in, <b>1153</b>	passwords for,
503	summary, <b>1166</b>	1231-1232
I/O addresses for,	twisted-pair,	tips for, <b>1230-1231</b>
1206-1207	1153-1157,	sharing on
installing, <b>1141-1142</b> ,	1154	applications,
1198-1199	choosing, 1185-1190	1144-1145
interrupts requests for,	connectors for, 259–260,	peripheral devices,
1202-1206,	<i>259</i> , <i>264</i> , 265	1145-1146
1204-1206	crosstalk in, 289	in ultimate computer, C45-
for notebooks, 1295-1296,	defined, C228-C229	C46
1296	in FCSI, <b>606-607</b>	in upgrading, C26-C27
in PC selection, 1252-1253	hubs in, 1209	wireless, 1161-1162, 1197
ROM on, 397	architecture of,	neutral outlet line, 501
testing, 404	1214-1218,	new product information,
for ultimate computer, C46	1214, 1216-1217	online sources of,
network interface in laser	categories of,	1317
printers, 838	1212-1214	news newsgroups, 1344

newsgroups, 1341	with SCSI, 596	charging, <b>1298–1299</b>
defined, C216, C230, C257	in serial communications,	conserving power in,
finding, 1346-1349	936-938	1301-1302,
hierarchies in, 1344-1345	from serial ports, 243	1302
netiquette in, 1345-1346	and signals, 1007	replacing, <b>1299–1300</b>
operation of, 1342-1343	nominal velocity of propaga-	cases for, 1302-1303
for technical information,	tion, C230	defined, C230-C231
1349-1350	"Non-system disk or disk	DVD drives for, <b>1294–129</b> 5
newsreaders, C230	error" message, 445	energy savings in, 495
NexGen CPUs	noncontiguous files, unfrag-	flash RAM in, 186
characteristics of, 161	menting, <b>729-731</b> ,	hard disk drive upgrades
pipelines in, 120	729, 731	in, 1274-1275,
NEXT (near-end crosstalk),	none parity setting	1284-1294
C227	defined, C233	internal cache memory in,
NiCad batteries for CMOS, 409	for serial ports, 808	126
nicknames in IRC, 1354	noninterlaced monitors,	keyboards in, 948
NICs. See network interface	984-985	LAN adapters for,
cards (NICs)	nonvolatile memory (NVRAM),	<b>1295–1296</b> , <i>1296</i>
NNTP newsgroups, 1341	184	maintaining, <b>1302–1305</b>
defined, C216	OUM, <b>467</b>	memory modules in,
finding, 1346-1349	for Plug and Play, 406	461-462
hierarchies in, <b>1344–1345</b>	for setup information, 414	memory upgrades in,
netiquette in, 1345–1346	normal mode with inkjet	1273-1274,
operation of, 1342-1343	printers, 825	1277-1284
for technical information,	Northern Light search engine,	PC Card bus for, 221-225,
1349-1350	1330	222
"NO EP CART" message, 874	Norton AntiVirus program,	synchronizing files for,
"NO FONT" message, 879	702	1305-1307
node numbers in IPX/SPX,	Norton Utilities, C154-C155	troubleshooting,
1178	for CMOS information, 64	1307-1308
Node ports in FCSI, 606	for file size, 747	Universal Serial Bus for,
nodes in cable broadband,	for reading MBR, 758	246
929-930	for restoring files, 735-736	Notification option, C106
noise	for searching for text on	Notify me before downloading
in bus, 209	disks, <b>738</b>	any updates option,
defined, C230	NOS (network operating sys-	C146
with fiber optic cable, 1158	tem), C229	nozzles in inkjet printers,
with laser printers, 863	NOT logic gates, C4	819, 821-822, 827
memory errors from, 476	notches on chips, 453, <i>453</i> ,	NRAM, 414
in modem connections,	1283	ns (nanoseconds), 164, C227
C25	notebook/laptop computers,	NT File System (NTFS), cluster
power conditioners for,	1270-1272	size in, 647
509	access to, 1280-1281	NT1 devices, 916
in power line, 292-297	batteries for, <b>414</b> ,	NTFS file system, <b>681–683</b>
and power supplies,	1275-1276, 1297	NTSC (National Television
503-504	buying, 1300-1301	Standards Committee)
RFI, 289-292	caring for, <b>1297-1298</b>	C227

NTSC (National Television	for serial ports, 808	ports, C19-C20, C19-
Standards Committee)	ODI (Open Datalink Interface),	C20
interface, 1064	1174-1175	slots, C21-C23, C22-C23
Nuclear virus, 691	OEMs (original equipment	video and sound, C21
null characters, C231	manufacturers), C232	Olivetti, 212
null modems, 905, C231	off-line compression in video	omnibus connectors, 201-202
numbering systems, hexadeci-	capture, <b>1093–1094</b>	on-board caches, 522, 557-558
mal, <b>C168</b>	codecs for, <b>1094–1095</b> ,	one and a half clock speeds,
addresses in, 368-370,	1095	113-114
C170-C172	data rate and compression	one-way linked lists in FAT
converting in, 1207, C172-	quality in,	entries, 674
C174	1096-1097	online devices, C231
counting in, C169	key frames in, 1095-1096,	online services, C231-C232.
numeric coprocessors, 130	1095	See also Internet and
error beeps for, 430	padding for CD-ROM with,	online services
I/O addresses for, 370	1097	open control systems, 540
in Intel 80486 CPU, 147	for RealVideo files, 1097	Open Datalink Interface (ODI),
IRQ for, 389	office interaction, networks	1174-1175
MMX, 130-133	for, <b>1146–1147</b>	Open Host Controller Inter-
in Pentium 4, 157-158	OfficeJet printers, 797	face (OHCI), 228
numeric keypads, 946	offline devices, C231	OpenGL API, 987
NumLock key, sound with,	offline UPSs, 512	operands, instruction, 120
C101	OHCI (Open Host Controller	operating systems
nut drivers, 49, <i>51</i>	Interface), 228	defined, C232
nVidia, chip sets from, 987	ohmmeters, 955	and disks, <b>662–665</b>
NVRAM (nonvolatile memory),	OKICOLOR 8 printers, 848	absolute and DOS sec-
184	old computers	tors, <b>665-668</b>
OUM, 467	components in, C7-C9	clusters, <b>668-670</b>
for Plug and Play, 406	determining, <b>C6</b>	DBR, <b>670-671</b>
for setup information, 414	saving data from, C9-C12,	FAT, <b>671-674</b> , <i>672</i> , <i>674</i>
Nx586 CPU	C10-C11	logical drive structure,
characteristics of, 161	upgrading	677-679
pipelines in, 120	communication options	subdirectories, 675-677
nylon, triboelectric value of,	in, <b>C25-C27</b>	functions of, 326
298	EIDE adapters, C16-C17,	and hard disk drives,
Nyquist's Theorem, 1011	C17	565-566
	floppy controllers, C18,	for home recording stu-
0	C18	dios, 1037
	games in, C27-C28	installing, C71-C72
observations in troubleshoot-	home networks in, C26-	partitions for, 642
ing, 317-318	C27	rebuilding, 717–718
obsolete drivers, C112-C113	keyboards and mice,	operator errors, 319–323
OCR (optical character recog-	C21	optical character recognition
nition), C232	microprocessors, C18	(OCR), C232
octal numbering system, C168	modems, C25-C26	optical disks, 519
octets, C231	motherboards, C15-C16	optical drives. See CD-ROM
odd parity	paths for, C12-C13	drives; DVD (Digital
defined, C233	planning, C14-C15	Video Disk) drives

optical fiber standard,	Р	triboelectric value of, 298
605-607	P ( , ) (* 0000 0007	paper guides in inkjet print-
optical mice	P (peta-) prefix, C236-C237	ers, 829
defined, C232	packages	"PAPER JAM" messages, 831,
operation of, 958-959	for CPUs, 145, <i>145</i>	874
optical RS-232 isolators, 910	for memory chips,	"PAPER OUT" message, 874
optional I/O interface in laser	<b>164-165</b> , <i>166</i> ,	Paper Type settings, 826
printers, 839	460-462	parallel communication, C233
OR logic gates, C4	packet filtering, 1235	parallel instruction process-
Orange Book CD-ROM stan-	padding for CD-ROM, 1097	ing, 116
dard, 1115	page frames and paging,	parallel ports, <b>36</b> , <i>41</i> ,
original equipment manufac-	182-183, 187-188	241–242
turers (OEMs), C232	for expanded memory,	for CD-ROM drives, 1114
oscilloscopes, 938	196-199, 197	configuring, 415-417
OUM (Ovonic Unified Mem-	for video memory,	conflicts with, 362–363
	975-976	
ory), 466–467	page-mode RAM, C232	connectors on, 258, <i>258</i> ,
out of band management,	page registers, I/O addresses	262, 263, <b>C86-C87</b>
1218	for, 370	defined, C233
"Out of Memory" message,	paged memory management	Device Manager for, C127
830	units (PMMUs), C232	error beeps for, 430
out-of-order completion	PAL (Programmable Array	extenders for, 806
in 6x86, 159	Logic) components, C4	for generic computers,
in Pentium Pro, 152	Palm Desktop software, 1307	1241
"Out of Paper" message,	Palm devices	I/O addresses for, 371
830-831	defined, C232-C233	IRQ for, 389
outlets	syncing data with,	for laser printers, 865–866
checking, <b>501</b>	1306–1307, 1306	loopback plugs for, 335
for laser printers, 863	panel lights, installing, <b>C87</b> -	LPT2, <b>415</b>
output, C232	C88	in PC selection, 1251-1252
output jacks for sound cards,		polling, <b>383–385</b> , <i>384–385</i>
C40, <i>C41</i>	panic	for printers, <b>799-802</b> ,
overclocking CPUs, 118-119	damage from, 95	807-809, 838
OverDrive chip, 114	in troubleshooting,	for SCSI, 611
data path for, 124	311-312	vs. serial, 894
introduction of, 147-148	paper	support for, 801-802
overflow, flow control for, 903	for inkjet printers,	for upgrading, C19, C19
overlays with capture boards,	829-831	parallel-processing CPUs,
1078-1079	for laser printers, 868–870	133-137
overscan lines, 988	curled and wrinkled,	parasitic viruses, 689
overvoltage conditions, 296,	870	parent subdirectories,
503-504	feeds for, <b>816–817</b> , <b>849</b> ,	675-676
OVL files, viruses in, 689	849	parity
Ovonic Unified Memory	fusing image to,	defined, C233
(OUM), <b>466–467</b>	852-855,	error beeps for, 428-429
oxidation, 303	854-855	for serial ports, 808
ozone from laser printers,	jammed, <b>862</b> , <b>869–870</b>	parity bits
867-868	quality of, 885	defined, C233

for SCSI, 615	vs. active, <b>621-623</b> , <i>622</i>	PC-Technician program, 336,
parity checking, C233	defined, C233	479
parity errors	for SCSI 1 and SCSI-2, 609	PCA (Printed Circuit Assem-
defined, C233	PassPort networking kits,	bly), <b>860-861</b>
lockups from, 173	1188	PCDJ Phat MP3 players, 1028
from power supplies, 475	Password List Editor tool,	pchelp mailing list, 1352
parking heads, 540	C152	pchelp4u mailing list, 1352
partially erased files, recover-	passwords	PCI (Peripheral Component
ing, 737-738	defined, C234	Interconnect) bus,
partitioning hard disk drives,	for network security,	28-30, <b>215-217</b> , <i>216</i>
638, 642-643	1231-1232	bus mastering in, 218-219,
backing up information	setup for, 411	382
for, <b>656-657</b>	patches, downloading, 1338	compatibility of, 218
clusters in, <b>644-647</b>	patience in troubleshooting,	data paths for, 217
with device drivers,	312	defined, C234-C235
654-656	pattern testing methods,	description of, 524
and logical drive structure,	728-729	DMA controllers on, 380
<b>677-679</b> , <i>677-679</i>	pausing printers, 824	I/O addresses for, 371
names in, 653-654	PB (petabytes), C237	IRQ sharing on, 395-396
options in, <b>643–644</b>	PC Camera product, 1057	for network interface
steps in, <b>639-640</b> ,	PC cams	cards, <b>1149–1150</b> ,
<b>647-653</b> , <i>648-652</i>	installing, 1045	1202
third-party tools for,	for video capture, 1057	in PC selection, 1246-1247
658-659	PC Card bus, <b>221–223</b> , <i>222</i>	setting up, <b>219</b> , 410, <b>412</b>
troubleshooting, 659-660	DMA controllers on, 380	speed of, 217-218
PartitionMagic utility, 647,	for notebook hard drives,	for upgrading, C21, C22
658-659	1284, <b>1293-1294</b>	PCI-X standard, C235
partitions and partition tables	socket and card services	PCL (Printer Control Lan-
active, 652	for, 223-224	guages), 41, <b>840-841</b>
blank, <b>763–764</b>	PC Card slots, C234	PCM (Pulse Code Modulation),
bootable, 444	PC Cards	1009–1012,
defined, C233	configuring, 398-401	1009-1012
reading, <b>758-763</b>	defined, C234	PCM Upstream feature, 909
size limitations on,	Plug and Play for, 398-399	PCMCIA (PC Memory Card
565-566	status of, C131	International Associa-
partners in DSL, 922	PC-cillin program, 702	tion), C234
parts, identifying, 252–253	PC computers	PCMCIA cards. See PC Card
chips, <b>449–450</b>	configuring, 408	bus; PC Cards
circuit boards and connec-	memory on, 174-175	PCs (personal computers)
tors, 257-266	UARTs in, 896	development of, C5
expansion boards, 75-77,	PC Guide site, 1335	purchasing. See purchasing
76	"PC LOAD" message, 878	PCs
on motherboard, 253-256,	PC Mechanic site, 1335	PCsupport.com site, 1335
253-256	PC Memory Card International	PCTIPS.com site, 1335
pass-through interfaces, 1017	Association (PCMCIA),	pctoolbin mailing list, 1352
passive hubs, 1212	C234	PDAs (personal digital assis-
passive SCSI termination,	PC Parrot program, 1002	tants), C236
598-599		"PE FEED" message, 878

"PE TRAY" message, 878	specifications for, 141	defined, C236
peer-to-peer architecture,	for video capture, 1081	in subdirectory entries,
C235	Pentium 4 CPU and comput-	675, 740, 747
	ers, 106	Peripheral Component Inter-
peer-to-peer networks,		
1143-1144, C235	data path for, 123	connect (PCI) bus. See
pellet arresters, 507	defined, C236	PCI (Peripheral Com-
pencil erasers, 303–304	internal cache memory on,	ponent Interconnect)
Pentium CPU and computers,	129	bus
24, 27	introduction of, 156–158	peripheral controllers, I/O
cache memory on, 126–127	pipelines in, 136–137	addresses for, 370
challengers to, 158–162	specifications for, 141	peripheral IDs with SCSI,
data path for, 123	for video capture, 1081	612-614, 635
defined, C235	Pentium OverDrive chip	peripheral vision, 985
fault tolerance in, 150	data path for, 124	peripherals
introduction of, 149–151	introduction of, 114	bus mastering for,
motherboards in, 104-106	Pentium Pro CPU and comput-	<b>382–383</b> , <i>383</i>
in multiprocessor systems,	ers	DMA channels for,
474	data path for, 123	<b>377–383</b> , <i>377–378</i>
operating frequencies of,	defined, C236	on networks, <b>1145-1146</b>
C53-C54	internal cache memory on,	programmed input/output
pipelines in, 133-137	128, 151-152	with, 375–377,
specifications for, 140	operation of, <b>151-152</b> , <i>151</i>	376-377
speed of, 114, 133-137	pipelines in, 120, <b>135–136</b> ,	SCSI, <b>608</b>
Pentium II CPU and comput-	151-152	permanent swap files, C236
ers	word size in, 121	persistent connections,
data path for, 123	Pentium programs, 134-135	924-925
defined, C235-C236	Perase setting, 1114	personal area networks, 1162
heat in, 152, <i>153</i> , 276	performance	personal computers (PCs)
internal cache memory on,	of disk drives	development of, C5
128-129	caches for, <b>556–558</b>	purchasing. See purchasing
introduction of, 153	CD-ROM drives,	PCs
MMX technology in, 133	1120-1123	personal digital assistants
motherboards in, 105	data transfer rates in,	(PDAs), C236
pipelines in, 135-136	555-558	peta- (P) prefix, C236-C237
slots for, 139	ECC codes for, <b>554–555</b>	petabytes (PB), C237
specifications for, 141	interleave factor in,	PGA (Pin Grid Array) chips, 57
speed of, 115	546-552	defined, C237
word size for, 121	rotational latency	for Intel 80286, 145, 145
Pentium III CPU and comput-	period, <b>543-544</b>	for Intel 80486, 147
ers	seek time, 542-543	PGA (Professional Graphics
data path for, 123	System Monitor for, C132,	Adapter), 998
defined, C236	C132	phantom directories, 785–787
heat sensors in, 280	of video, C122-C123, C123	phantom disks with SCSI, 635
internal cache memory on,	Performance tab, C122-C123,	phase
<b>128–129</b> , <i>128</i>	C123, C130-C131,	in power calculations, 497
introduction of, 155–156	C130	in QAM, 1068
motherboards in, 105	periodic waves, 1005	phase outlet line, 501
slots for, 139	periods (.)	Phillips screwdrivers, 50, <i>51</i>
· ,	±	1

Phoenix BIOS	operation of, 375-377,	plastic lenses for cameras,
compatibility with, 185	376-377	1049
error beeps for, 428–430	pipeline burst cache, C237	plastic spacers for mother-
in PC selection, 1247	pipeline stalls, C237	boards, 87-88, <i>88</i>
setup with, 62	pipelines	platinum, triboelectric value
phone lines	in CPUs, <b>118–120</b>	of, 298
isolators for, 910	6x86, 159	platters in hard disk drives,
for modems, 908	K5, 161	<i>526</i> , <b>527-529</b> , <i>529</i>
for networks, <b>1162</b> ,	Nx586, 161	PLCCs (Plastic Leadless Chip
1188-1189, C27	Pentium, 133–137	Carriers), 57
noise in, <b>936-938</b>	Pentium 4, 136–137	defined, C237
in satellite communica-	Pentium Pro, <b>135–136</b> ,	for Intel 80286, 145, <i>145</i>
tions, 932	151-152	for Intel 80386, 146
phones, magnetism from, 285	defined, C237	pliers, <b>56</b> , <i>56</i>
PhotoCD standard	in SDRAM, 469	Plug and Play (PnP) standard,
defined, C237	pirated software	33, <b>355–356</b>
multisession drives for,	MP3 audio files,	boot process on, <b>406–408</b>
1118	1024–1025	defined, C237-C238
photodetectors for CD-ROM,	network applications, 1145	ideal operation of,
1112	viruses in, 700–701	404-406
physical devices, C237	pits	
physical drives, C237	on CD-ROM disks, 1112	in operating system instal- lation, C72
physical geometry in disk	on DVD discs, 1113	for PC Cards, 224, <b>398–399</b>
drives, 533–534	pixels, 977-978	in PC selection, 1246
physical interface in commu-	in CCD chips, <b>1051–1052</b> ,	with PCI bus, 219
nications systems, 899	1051	resource conflicts with,
Physical layer devices, 1223	in compression, 1089	363
physical security, 1230	in LCD monitors, 991	setting up, C68
pickup tools, 55, 55	vs. lines, 1055–1056	with Universal Serial Bus,
piconets, 1162	in video capture, <b>1065</b> ,	245
piezo inkjet printers, 819	1065	plugging in CPUs, C56-C59,
pin 1 rule, <b>89-92</b> , <i>91</i>	PKZIP program, 1089	C57-C59
pin counts in SCSI systems,	plain old telephone service	plugs
604-605	(POTS) for DSL,	on anti-static wrist straps,
Pin Grid Array (PGA) chips, 57	917-918	53
defined, C237	planar boards, 103	BNC, 259
for Intel 80286, 145, 145	planning	for keyboards, 949-950,
for Intel 80486, 147	network cable installation,	950
pincushioning, 336	1191	PMMUs (paged memory man-
pinouts, C237	upgrades, C14-C15	agement units), C232
PIO (programmed input/out-	plastic coated media with	PnP standard. See Plug and
put)	laser printers, 853	Play (PnP) standard
BIOS support for, 556	Plastic Leadless Chip Carriers	Point-to-Point Protocol (PPP),
defined, C240	(PLCCs), 57	C238
vs. DMA, <b>567-568</b>	defined, C237	Point-to-Point Protocol over
importance of, 522	for Intel 80286, 145, <i>145</i>	Ethernet (PPPoE), 925
modes in, <b>566–567</b>	for Intel 80386, 146	Point-to-Point Tunneling Pro- tocol (PPTP), 1186

polling, 383–385, 384–385 polyester, triboelectric value of, 298 polygon measurement for video cards, C38 polymorphic viruses, 695, C238 polyurethane, triboelectric value of, 298 polyvinyl, triboelectric value of, 298 POP (Post Office Protocol), C238	positioning methods for mice, 958-959  POST (Power On Self Test) defined, C239 for drive information, 762 for MBR problems, 759  Post Office Protocol (POP), C239 posts, C239  PostScript language, 841, C239  POTS (plain old telephone service) for DSL,	for ATX motherboards, 490-491, 490-491 backup, 508-512, 509-510 on buses, 203 cables and connectors for, 73-74, 74, 81-82, 82 for disk drives, 79-80, 79, 492, 782 from outlet, 82, 83-85 common grounds for, 502-503, 505-506 components of, 488
POP3 IP numbers for DSL, 924	917-918	connections for, 488–493,
port numbers, C238	power	490-491, 493
port replicators, C238	in boot process, 436	cool, 279
portals, C239 ports, <b>36</b> , 231. <i>See also</i> paral-	for CPUs, 114 formula for, 298	damage caused by, <b>425</b> defined, C239
lel ports; serial ports	for hard disk drives, 582,	for disk drives, 784
asynchronous, <b>894–895</b> ,	582	dust in, 284
895	for laser printers, <b>863</b>	and energy savings,
conflicts with, 358-365,	in transmissions, 1007	494-496
390-391	Power applet, 1301, <i>1302</i>	for FireWire bus, 228
connectors for, C86-C87	power conditioners, 297, 505	fluctuations in, 313
defined, C238	benefits of, 508	identifying, 252
Device Manager for, C127-	defined, C239	installing, 6-7, <i>6-7</i> , <b>C78</b> ,
C128	power connection, identifying,	C79
extra, <b>394–395</b>	253, <i>253</i>	isolating, <b>504–505</b>
FireWire bus for, 227–229	Power Good line, 498	for laser printers, <b>870–871</b>
for generic computers,	power line networks,	and lightning, 512–515
1241-1242	1161-1162, 1188	load problems for, 502
in hubs, <b>1214–1218</b> , <i>1214</i> ,	power management, 412	location of, C34
1216-1217	identifying, 80-81	maintaining, <b>494</b>
I/O addresses for, 370–371	for notebooks, <b>1301–1302</b> ,	memory errors from,
infrared, 803–804	1302	475-476
for laser printers, 864–866	switches for, 81–82	and noise, 503–504
loopback plugs for, 335 polling, <b>383–385</b> , <i>384–385</i>	Power Meter product, 497	opening, 488
on power supplies, 511	power meters, 497 power noise, <b>292–297</b>	outlet wiring problems, 501
serial vs. parallel, 894	Power On Self Test (POST)	power conditioners for,
Universal Serial Bus for,	defined, C239	297, 505, <b>508</b>
243-247, 245	for drive information, 762	protecting, <b>500–515</b>
upgrading, <b>C19-C20</b> , <i>C19-</i>	for MBR problems, 759	removing, <b>80-85</b> , <i>82-83</i>
C20	power plugs, 41	replacing, <b>486–487</b> , <b>499</b>
Ports dialog box, 395	power strips, 503	screws for, <i>66</i> , 67
POS (Programmable Option	power supplies, <b>229–230</b> , <i>230</i> ,	for speakers, 1020
Select) feature, 212	484-485	surge suppressors for,
	in 80486 computers, C8-C9	506-508

testing, C61-C62	previews with capture boards,	interfaces for, 241–242,
troubleshooting, 425-427,	1078-1079	799
498-499, 515-516	PRI (Primary Rate ISDN), C240	isolating problems in,
upgrading, <b>496–498</b>	price/performance ratios of	805-806
power surges	proprietary comput-	laser. See laser printers
defined, C240	ers, 1244	magnetism from, 286
protection from, 293-295	primary colors in color video,	maintaining, 793–799
power switches	1064-1065, 1064	network, <b>804–805</b> , C229
rear, 81	primary corona in laser print-	in PC selection, 1253
soft, 74	ers, 845, 883	ports for, <b>799-804</b> ,
PPP (Point-to-Point Protocol),	primary DOS partitions	807-809
C238	creating, 648–654, <i>652</i>	power for, 502
PPPoE (Point-to-Point Protocol	names for, 653–654	print heads in, 794-795
over Ethernet), 925	primary memory, 137. See	troubleshooting, 348-349,
PPTP (Point-to-Point Tunnel-	also memory	805-811, 887-889
ing Protocol), 1186	Primary Rate ISDN (PRI), C240	Printers list, 824
precompensation, disk write,	Princeton Graphics HX12	printing
522	monitor, 996	dynamic linking for, 329
prefixes in chip identification,	PRINT.DLL file, 329	polling for, 383–385,
450	"Print Head Failure" message,	384-385
preformatted tapes, 719	831	"PRINTING TEST" message,
pressure rollers in laser print-	print heads, 794-795	874
ers, 853–854, <i>854</i>	"PRINT OVERRUN" message,	priority of interrupts, 386,
preventive maintenance con-	875	394
cerns, <b>268</b>	print quality in laser printers,	private buses, 209
dust, 283-285	885-886	privilege rings, 190-191, <i>190</i>
electrostatic discharge,	Printed Circuit Assembly	Pro Audio sequencing pro-
297-302	(PCA), <b>860–861</b>	gram, 1037
EMI, 287-292	Printer Control Languages	Pro Tools, 1037-1038
for hard disk drives	(PCLs), 41, <b>840–841</b>	processor core frequency, 111
backups, <b>709-710</b> ,	"PRINTER OPEN" message,	processors. See CPUs (central
718-724	874	processing units)
boot floppies for,	Printer Properties dialog box,	product code, C72
724-726	820-821, <i>821</i>	product documentation and
media tests for,	printers, <b>790</b>	information, online
726-729	in all-in-one combos,	sources of, 1318-1319
unfragmenting files,	796-797	Professional Graphics Adapter
<b>729-731</b> , <i>729</i> ,	cables for, 799-800,	(PGA), 998
731	806-807	PROGMAN.INI files, backing
for viruses. See viruses	cleaning, 793-794	up, 715
heat and thermal shock,	connecting and testing,	program infectors, 689
274-283	791-792	Programmable Array Logic
magnetism, 285-287	connectors for, 258, 259,	(PAL) components, C4
power noise, 292-297	262	Programmable Interrupt Con-
quick steps in, 269–273	dust in, 284	trollers, I/O addresses
troubleshooting tips,	emulation of, <b>807</b> , C239	for, 370
305-306	indicator lights for, 331	programmable keyboards, 956
water and liquids, 302-304	inkjet. <i>See</i> inkjet printers	

Programmable Option Select	communications, C191	parallel ports,
(POS) feature, 212	network card drivers for,	1251-1252
programmed input/output	1173-1175	printers, 1253
(PIO)	network file system drivers	serial ports, 1251
BIOS support for, 556	for, 1171-1173	sound cards, 1250
defined, C240	for network printers,	speakers, 1250-1251
importance of, 522	804-805	USB ports, 1252
modes in, 566–567	network transport,	video boards, 1249
operation of, 375–377,	1175-1176	system comparisons for
376-377	IPX/SPX, 1177-1178,	audio/video enthusiast,
programs	1178	1260-1261
cache memory considera-	multiple transport	categories in,
tions in, 473–474	stacks,	1253-1257
Control Panel for, <b>C94</b> ,	1184-1185,	corporate, <b>1262</b>
C113-C116, C113	1184	gamer, <b>1259–1260</b>
installing, C114-C116,	NetBEUI, <b>1176–1177</b>	home, <b>1258</b>
C115	TCP/IP, <b>1179-1183</b>	road warriors,
memory for, <b>179–180</b>	redirectors in, <b>1168–1171</b>	1262-1263
removing, C114	Protonic.com site, 1336	small business, 1261
PROM blasters, 184	proxy services, 1235	student, 1259
Properties dialog box, 822,	PS/2 computers, <b>210–212</b>	tips for, 1264-1267
822	PS/2 keyboard, 946–947, <i>947</i> ,	vendors for, 1263–1264
proprietary items	950	PWR label, C88
bus slots, 209, 214	PS/2 style connectors, <i>41</i> , C21	Pwrite setting, 1114
computers, 1242–1244	Pulse Code Modulation (PCM),	1 write seeing, 1114
vs. generic, <b>1239–1244</b>	1009–1012,	_
memory, 221	1003-1012,	Q
online services, <b>1355–1357</b>	punch-ins in recordings, 1037	Q signals, <b>1068–1069</b>
protected mode, 189–192	purchasing PCs, 1238	QAM (Quadrature Amplitude
protecting	name brand vs. generic,	Modulation),
data. <i>See also</i> viruses	1239–1244	1068-1069
backups for, <b>709–710</b> ,	parts selection for, 1244	QIC (quarter-inch cartridge)
718-724	BIOS, 1247	standard, C240
boot floppies for, 724-726	buses, 1246–1247	quality
	CD-ROM and DVD	with inkjet printers,
media tests for,	drives, 1249	826–828
726-729	CPUs, 1244–1246	of laser printer printing, 885-886
hard disk drives, 64	floppy disks drives, 1248	
power supplies, 500–515		of off-line video compres-
protection violations, 191	hard disk drives, 1248	sion, 1096-1097
PROTMAN.SYS program, 1174	keyboards, 1251	Quantum site, 641
protocol-based technology,	memory, 1247	quarter-inch cartridge (QIC)
472	modems and network	standard, C240
PROTOCOL.INI file, 407	adapters,	question marks (?), C240
protocol stacks	1252-1253	Quick Connect feature, 909
defined, C240	monitors, 1250	Quick UnDelete program,
TSRs for, 178 protocols, <b>1167–1168</b>	motherboards, 1248	735-737
	mouse, <b>1251</b>	QuickCam product, 1057

random access storage, C241

QuickTime technology,	Ranish Partition Manager	sectors, 530, <b>541–542</b> , <i>541</i>
1033-1034	(RPM), 684	README files, C241
QuikTray tool, C152	rate-adaptive digital sub-	"READY" message, 874
	scriber line (RADSL)	real mode, 192
R	characteristics of, 919-920	real-time compression,
	defined, C241	1077-1078,
R manufacturer code, 450	rayon, triboelectric value of,	<b>1088-1093</b> , <i>1091</i>
radio-controlled wireless key-	298	RealAudio technology, 1033
boards, <b>961-962</b>	RCA jacks and plugs, 261, 262	RealJukebox MP3 players,
Radio Frequency Interference	for sound cards, 1018	1028
(RFI), <b>289–292</b>	for video boards, 263	RealVideo files, 1097
defined, C240-C241	RCDDIAG program, 404	reassembly, 88–89
with fiber optic cable, 1158	RD modem light, 940	cables and edge connec-
memory errors from, 476	RDRAM (Rambus DRAM),	tors, <b>89-92</b> , <i>91-92</i>
in networks, 1151–1152	<b>170–172</b> , <i>171</i>	mistakes in, 92–95
shielding, 505	cost of, 468	rebooting
radio frequency (RF) output	data path of, 466	defined, C242
for video capture, 1061,	and memory banks,	in troubleshooting,
1070	463-464	313-314
for wireless networks,	read-after-write verification,	rec newsgroups, 1345
1162, 1197	C241	recalls, chip, 448
radios for RFI monitoring, 291	read-only bits, 673	receivers, wireless, 962
RADSL (rate-adaptive digital	read-only files, C241	recharged printer cartridges,
subscriber line)	Read Only Memory (ROM). See	796
characteristics of, 919-920	BIOS (Basic Input/Out-	recharging batteries,
defined, C241	put System); ROM	1298-1299
RAID (Redundant Array of	(Read Only Memory)	reconfiguring System Restore,
Inexpensive Disks),	read/write heads, 525-526,	C149-C150
C242-C243	526	recordable CD drives. See CD
raised image media with laser	for absolute sectors,	Read/Write (CD-RW)
printers, 853	665–668, <i>665</i>	drives; CD-recordable
RAM (random access mem-	cleaning, <b>779</b> and cylinder skew, <b>553</b>	(CD-R) drives
ory). <i>See</i> memory RAM chips, C241	in disk drive geometry, 534	recordable DVD drives, 1110–1111
RAM Clips, C241 Rambus DRAM (RDRAM),	documenting, 64	recorders for video capture,
170–172, 171	with IDE addressing,	1052-1056, 1054
cost of, 468	561–562	recording
data path of, 466	INT 13 BIOS interface for,	CD-ROM discs, <b>1129–1130</b>
and memory banks,	559	DVD discs, 1130–1134
463–464	number of, 520	for musicians, 1037–1039
Rambus Inline Memory Mod-	parking, 540	"recording inhibited" mes-
ules (RIMMs), 170–171,	positioning, 521	sage, 1059
171, C59	in sector translation,	recording polarity of floppy
RAMPage memory board, 198	535-536	diskettes, 775
random access, 164	reading	recovering
random access, 104 random-access memory, C241	from CD-ROM, 1111	hard disk data, <b>732</b>
random access storage C241	flonny diskattes 792 792	nara aisk aata, 132

floppy diskettes, **782–783** 

MBR, **758-763** 

cross-linked clusters, 749–751, 749–750 from dead drives. See resurrecting hard disk drives erased files, 733–738, 735 and FAT, 732–733, 747, 747 from formatted hard disks, 739–741 invalid clusters,	defined, C242 in K5 CPU, 161 Redundant Array of Inexpensive Disks (RAID), C242-C243 Reed-Solomon algorithm, 554 reference points for power supplies, 502–503 refilling inkjet printer cartridges, 832–833 refresh rates for adapters, C121-C122 refreshing	release in sound waves, 1013, 1014 reliability of video editing systems, 1075 remainder operator, 667 Remote Registry Service tool, C152 removable drives for backups, 720–721 software for, 722 removable frames, C33, C34 removable media for old computer data, C9-C12,
748-749	dynamic memory, 379, 465	C10
invalid subdirectories, 745-747 lost clusters, 741-742, 742, 745 media errors, 751-755 system data, C146-C147 reconfiguring and disabling System Restore for, C149-C150 restore points in, C147- C148 restoring system, C148- C149 Recycle Bin, 735 recycled toner cartridges, 798 Red, Green, Blue (RGB) monitors, 995-996 Red Book CD-ROM standard,	error beeps for, 428–429 regional newsgroups, 1345 register-to-register transfers, 118 registered SDRAM, 470 registers in 6x86, 159 I/O addresses for, 370 in MMX processors, 131 and word size, 120–121 registration assemblies in laser printers, 884 registration rollers in laser printers, 848, 851 Registry, C156 backing up, 716–717, C158-C159 checking, C139 corrupted, C160	"REMOVE PAGE" message, 876 removing cables, <b>79-80</b> computer cover, <b>65-69</b> , 66-68 CPUs, <b>85</b> disk drives, <b>77-80</b> , <b>78-79</b> , <b>781</b> expansion boards, <b>75-77</b> , 75-76 motherboards, <b>85-88</b> , 87 power supplies, <b>80-85</b> , 82-83 programs, <b>C114</b> renaming registers in 6x86, 159 repair policy for network cable, 1196 repairing expansion boards,
1115-1116	defined, C243	454
red color in CCD chips, pixels for, 1050-1051, 1051 in TV video, 1062-1069, 1063-1066, 1068-1069 in VGA, pages for, 183 in video capture board, 1085 red wires in phone lines, 937 redirect bombs, 1233 redirectors, 1168-1171 reduced instruction set computing (RISC)	editing, C160-C163, C161 keys in, C161-C163 purpose of, C113-C114, C157 restore points for, C147 restoring, C159-C160 Registry Checker, C139, C159-C160 Registry Editor, C156, C161-C162, C161 regulation devices, C239 relative sector numbers, 665-668	chip insertion and removal, 452-453 chip testing, 448-450 soldering and desoldering, 450-452 reparse points in NTFS, 682 repeat rate, keyboard, C100 repeaters, 1224 benefits of, 1225-1226 for coaxial cable, 1158 for collisions, 1225, 1227 vs. extenders, 1227 operation of, 1226-1228

for segment isolation,	resource conflicts, 358-362	retensioning, C243
1225-1226	8-bit vs. 16-bit boards,	retrieving tools, <b>54–55</b> , <i>55</i>
replacing	415-417	return wires, 83-84, 501
configuration batteries,	with buffers, <b>396-398</b>	reviews, online sources of,
412-414	DIP switches in, 364-365	1318
expansion boards, vs.	with I/O addresses,	reviving hard disk drives. See
repairing, <b>433-434</b>	372-375	resurrecting hard disk
keyboards, 949, <b>956-957</b>	with IRQ levels, 390-396	drives
notebook batteries,	and LPT ports, 415	RF (radio frequency) output
1299-1300	with PC Card boards,	for video capture, 1061,
power supplies, 486-487,	398-401	1070
499	resolving, <b>362-365</b> ,	for wireless networks,
rescue disks for CMOS infor-	401-403	1162, 1197
mation, 64	Resource Kit, C151-C154	RFI (Radio Frequency Interfer-
rescue tools, limitations of,	resources, locking, 407	ence), <b>289-292</b>
337	Resources tab	defined, C240-C241
reserved memory area, 174	for COM ports, 395	with fiber optic cable, 1158
buffers and frames in,	for network interface	memory errors from, 476
<b>187-188</b> , <i>188</i>	cards, 1204-1205,	in networks, 1151-1152
flash memory in, 186	1204-1205	shielding, 505
ROM in, <b>184–186</b>	Restore My Computer To An	RGB connectors, 262
Reset lines, 203	Earlier Time option,	RGB (Red, Green, Blue) moni-
"RESET" message, 874	C148	tors, 995-996
"RESET TO SAVE" message,	restore points in System	ribbon cables
874	Restore, C147-C148	connecting, <b>89-92</b> , <i>91-92</i>
resetting laser printers,	restoring	diagrams for, <b>70-71</b>
863-864	defined, C243	for floppy disk drives,
resistance in DC supplies, 492	files, <b>733-738</b>	<b>777-778</b> , <i>778</i> , C64,
resistors	formatted hard disks,	C64
in ground straps, 301	739-741	for SCSI, 620-621, <i>620</i>
replacing, 451	Registry, C159-C160	ribbons for printers, 793, 795
for SCSI termination,	system, C148-C149	Riffage site, 1026
621-622	resurrecting hard disk drives,	RIMMs (Rambus Inline Mem-
resolution	755	ory Modules),
of CCD chips, 1050-1051	booting from floppy disks	170-171, <i>171</i> , C59
with inkjet printers,	for, 758	Ring Indicator signal, 901
825-826	checking cables, 761	RIO MP3 player, 1029
lines vs. pixels in,	checking CMOS, 760-761	RISC (reduced instruction set
1055-1056	data recovery services for,	computing)
of monitors, 988	764-765	defined, C242
of recorders, 1052-1054,	modern drives, 761-763	in K5 CPU, 161
1054	priorities in, 755–756	RJ-11 connectors
setting, C118	reading MBR in, 758-763	defined, C243
of video, 236	recovering partition table	identifying, <i>264</i> , 265
of video boards, 979-983,	in, <b>763–764</b>	RJ-13 connectors, 260
C38-C39	temperature problems, 761	RJ-45 connectors
in video capture, 1049,	tracing failures in,	defined, C243
1085	<b>756–757</b> , <i>757</i>	for DSL, 923

identifying, 260, 264, 265 for network interface cards, 1149, 1149 for twisted-pair cable, 1163, 1165 RMS power, 497 road warrior PCs, features for, 1257, 1262-1263 rocker switches, 364-365, 364 Rockwell Telecommunications, prefix for, 450 ROM (Read Only Memory), 164. See also BIOS (Basic Input/Output System) for 4004 microprocessor, C5 for BASIC language, 771 in boot process, 436-440, 437 conflicts in, 396-398	RPM (Ranish Partition Manager), 684 RS-232 isolators, 910 RS-232 ports, 242-243, 243, 894, 938-939 cables for, 800, 804, 904-905, 941 flow control with, 903-904 operation of, 900-902 RS-232 standard defined, C243-C244 reasons for, 898-900 rubber, triboelectric value of, 298 run length compression, 1089 "Run SETUP - configuration lost" message, 759 runlists in NTFS, 682 runs in NTFS, 682	installing and configuring, 933-934 operation of, 932-933 two-way, 934-935 for video capture, 1060 satellite speakers, 1020 saturation of color, 1085 saving data in old computers, C9-C12, C10-C11 process of, 738-739 SCAM (SCSI Configure AutoMagically), 614 scan codes, keyboard, 949 Scan for Altered Files option, C138 ScanDisk program, C143 bad areas in, 658 for invalid subdirectories, 746 for lost clusters, 744
defined, C241-C242 diagnostic programs for,	S-100 bus, <b>201</b>	operation of, <b>732–733</b> reporting errors by, 563
333-334 on expansion boards, 439 flashable, 448-449 hexadecimal addresses with, C171-C172 identifying, 255 with Plug and Play, 404-405 in reserved memory area, 184-186 for SCSI adapters, 611 testing, 448 in upper memory area, 174 root directories entries in, 671 number of files in, 744 root keys, C162-C163 rotation speed of floppy disk drives, 785 rotational latency period, 543-544 routers, 1228-1230 routing cables, 94 routing tables, 1229 RPC Print Provider tool, C152	S chip prefix, 450 S/PDIF (Sony/Philips Digital Interface Format), 1018–1019, 1030, 1038 S-video interface, 1070–1071 S-video output, 1061 Safe Mode booting in, 314 for restoring Registry, C159 sags, C244 salicylic acid chromium chelate in toner, 887 salt, board damage from, 303 sampling by sound cards, 1008–1012, 1009–1012 SANs (Storage Area Networks) defined, C248 in FCSI, 606–607 SASI (Shugart Associates System Interface), 599 satellite communications, 912–913, 931–932	ScanJet, ROM for, C171-C172 scanners interface cards for, 187, 251 serial ports for, 243 Universal Serial Bus for, 246 scatter/gather DMA transfer, 568 scheduling backups, 723 LANs for, 1146-1147 sci newsgroups, 1345 Scour site, 1026 screen expansion boards for. See video and video boards monitors. See monitors screw-mounted adapters (SMAs), 1166 screwdrivers, 49-52, 51 magnetic tip, 54 for notebooks, 1272 screws

f l.l 224 225		d
for cables, 324–325	issues in, 607-608	characteristics of, 919-920
for disk drives, 77–78	ROM on, 396–397	defined, C247
for expansion boards, 75	installing cards for, 10–11,	Seagate
for inkjet printers, 816	10-11, 593-595	hard disk drives by, servos
for keyboards, 955	parity with, 615	in, 540
for motherboards, 87	peripheral IDs with,	site for, 641
for network interface	<b>612-614</b> , 635	search engines
cards, 1198-1199	sample setup, 625–629	defined, C245
for notebooks, 1288	for scanners, 251	popular, <b>1328–1331</b>
for power supplies, 82	SCSI-1, <b>599-600</b> , <b>616-621</b> ,	searching
removing, 65-69	618, C244	for IRC channels, 1354
retrieving, 54–55	SCSI-2, <b>600-602</b> , 611, 619,	for mailing lists, 1351
storing, 61	619, C244	for newsgroups,
scripting in SCSI-2, 601	SCSI-3, <b>602–604</b> , <b>630</b> , C244	1346-1349
Scroll Lock key, sound with,	sector translation with, 535	for text on disks, 738
C101	single-ended vs. differen-	for Web sites, 1326-1331
SCSI (Small Computer Systems	tial, 598	seating motherboards, 92-93
Interface), <b>592</b> , <b>596</b>	software for, 630-631	SECCs (Single Edge Contact
asynchronous and synchro-	for sound, 1017-1018	Cartridges), 138
nous, <b>600</b>	standards for, 630-631	secondary memory, 137, 164.
benefits of, <b>596-597</b>	summary, <b>604–605</b>	See also disk drives;
BIOS for, <b>633-634</b>	for tape drives, 240, 251	floppy disk drives;
bus mastering with, 610	terminating, 598-599,	floppy diskettes; hard
cables for, 596, 602, <b>608</b> ,	<b>603-604</b> , <b>609</b> , 611,	disk drives
<b>616-621</b> , <i>617-620</i> ,	<b>621-630</b> , <i>624</i>	SECs (Single Edge Cartridges),
634-635	terms for, 597–598	128, 128
CD-ROMs with, 1125	troubleshooting, 634-636	"Sector not found" errors, 782
compatibility in, 608	with video capture, 1080	sector translation, 522,
configurations for,	SCSI bus, C245	535-538
607-609	SCSI Configure AutoMagically	sectors, 525-527, <b>530-532</b> ,
connectors for, 258, 258,	(SCAM), 614	530-531
263, 266	SCSI devices	absolute and DOS,
daisy chaining with,	availability of, 30	665-668
<b>616-621</b> , <i>616-618</i>	BIOS for, 64	bad, 673-674
data transfer rates in, 555	SCSI terminators, C245	defined, C183
defined, C244	SD modem light, 940	report on, 732-733
fast and wide, 602	SDRAM (Synchronous	testing for, <b>726-729</b>
and Fibre Channel,	Dynamic Random	on CD-ROM disks, 1112
605-607	Access Memory),	defined, C245
FireWire bus for, 227	469-470	in disk drive geometry, 534
for hard disk drives,	benefits of, <b>168</b> , <i>168</i>	documenting, 64
239-240	DDR, 171, <b>471</b>	in formatting, 657
hardware installation with,	defined, C249	on hard disk drives, 520
609	installing, 4–5, <i>4–5</i>	with IDE addressing,
host adapters for, 237, 597	introduction of, 165	561-562
choosing, <b>610–611</b>	SLDRAM, 472	IDs for, 546
controllers in, 240	SDSL (single-line digital sub-	INT 13 BIOS interface for,
installing, <b>611-612</b> , <i>612</i>	scriber line)	559
motaming, <b>011-012</b> , 012	SCHINCI IIIIC)	333

logical block addressing	separation pawls in laser	Comron Mossaga Plasks (CMPs)
logical block addressing		Server Message Blocks (SMBs),
for, 536–538,	printers, 884–885	1169
564-565	Sequenced Package Exchange	servers
reading, 530, <b>541–542</b> , <i>541</i>	(SPX), C245	in client/server networks,
in sector translation,	sequencing, MIDI, 1035-1037	1143
535-536	sequential access, 164, C245	in IRC, 1353
in Zone Bit Recording,	serial communications, 894,	"SERVICE" messages, 876-878
<b>532–533</b> , 537	C246	serviceability of proprietary
Secure Digital Music Initiative,	asynchronous ports for,	PCs, <b>1243</b>
1024	<b>894-895</b> , <i>895</i>	servo systems, 527, 539-540
security	cables for, <b>804</b> , <b>897</b> ,	session hijacking, 1233
in cable broadband,	904-905	Set as Default option, 824
930-931	flow control in, 900-904	set-associative caches, C187
for DSL, <b>925-927</b>	line noise in, 936-938	SET COMSPEC statements, 447
for MP3 audio files,	modems, <b>897–898</b> ,	Settings for High Contrast dia-
1024-1025	905-911	log box, C104, <i>C104</i>
for networks, 1230	RS-232 standard for,	Settings for MouseKeys dialog
firewalls for, 296,	898-903	box, C105, <i>C106</i>
1232-1236	troubleshooting, 935-941	Settings for SoundSentry dia-
passwords for,	UARTs for, <b>895–897</b>	log box, C102, <i>C102</i>
1231-1232	Serial Line Internet Protocol	Settings tab, C118, <i>C118</i>
tips for, 1230–1231	(SLIP), C246	setup
protected mode for,	serial numbers on chips, 450	diagnostic programs for,
189–192	serial ports, <b>36</b> , <b>242–243</b> , <i>243</i>	334
seek time	conflicts with, 358–365,	information for, 408–412
defined, C245	390–391	setup disks, storing, 365–366
of hard disk drives,		
	connectors on, 258, <i>258</i> ,	SETUP programs for CD-ROM drives,
542-543	C86-C87	
segments	defined, C246	1128-1129
address, table of, C170	Device Manager for, C127	for CMOS information,
network	extra, <b>394–395</b>	62-63, 410
with NetBEUI, 1177	for generic computers,	SFP (System File Protection)
repeaters for,	1241-1242	feature, C150
1225-1226	I/O addresses for, 370-371	SGRAM (Synchronous Graph-
Select Device dialog box,	IRQ for, 389	ics RAM)
C111, <i>C111</i>	loopback plugs for, 335	defined, C249
"SELF TEST" message, 874	vs. parallel, 894	for video, 974
self-tests	in PC selection, 1251	shadow packets, terminators
for capture boards,	on power supplies, 511	for, 1164
1081-1082	for printers, 803, 808-809,	ShareFun virus, <b>692</b>
for printers, 805, 872	838	shareware programs, 1338
SelfHelpDesk site, 1336	for serial communications,	third-party tools, C156
sensors	938-939	viruses in, 701
for heat, <b>278-280</b> , <i>279</i>	Universal Serial Bus for,	sharing
in laser printers, 855	<b>243–247</b> , <i>245</i>	interrupts, 211, 395-396
separation pads in laser print-	for upgrading, C19, C19	on networks
ers, 869	serial SCSI, <b>604</b>	applications,
•	SerialKey option, C106	1144-1145

bandwidth, 914	in laser printers, 840	single-layer DVD discs, 1113
peripheral devices,	in notebooks, 1281-1282	single-line digital subscriber
1145-1146	removing, <b>480–481</b> , 480	line (SDSL)
SHELL statements, executing,	for SDRAM, 469	characteristics of, 919-920
446	in upgrading, C22-C23,	defined, C247
shells, 178	C23	single-mode fiber optic cable
shielded cable, C246	Simple Mail Transfer Protocol	defined, C247
shielded speakers, 1019	(SMTP)	operation of, <b>1159–1160</b>
shielded twisted-pair (STP)	defined, C246	SIPP (Single Inline Pin Pack-
cable	with DSL, 924	ages) memory chips
defined, C246	session hijacking, 1233	size of, 460
for networks, 1153-1154,	Simple Network Management	for terminators, 623-624,
1154	Protocol (SNMP), 1213	624
shielding	simplification for trou-	size
in coaxial cable, 1157, 1157	bleshooting, 314	CD-ROM disks, 1112
for crosstalk reduction,	sine-wave power supplies,	chips, 460, <b>462–463</b>
288	510-511, <i>510</i>	clusters, <b>644–647</b> , 668–670
for power supplies, 505	sine waves, <b>1004–1008</b> ,	in computer evolution, C2
shipping laser printers, 882	1004-1008	in directory entries, 673
short circuits, 426, C246	Single Edge Cartridges (SECs),	DVD discs, 1132–1133
Show All Folders option, C158	128, 128	files, 673, 747
Show Settings Icon on Taskbar	Single Edge Contact Car-	
		fonts, <b>C119-C120</b> , <i>C119-</i>
option, C120	tridges (SECCs), 138	C120
ShowSounds feature, C103	single-ended SCSI, 598	frames in video capture,
Shugart Associates System	Single Inline Memory Module	1085-1086
Interface (SASI), 599	(SIMM) memory, 165,	hard disk drives, 558-565
sign-on messages for SCSI	166, <b>460-462</b>	microprocessors, C6, <i>C7</i>
devices, 635	for 64-bit computers,	monitors, 989-990
signal-to-noise ratios, 1007	463-464	partitions and partition
signature bytes, 439	defined, C247	tables, 565–566
Signature Verification Tool,	identifying, 254	screen, 991
C139	installing, C59	screws, 50
silicon, triboelectric value of,	in laser printers, 840	skew, cylinder, <b>553</b>
298	in notebooks, 1281-1282	skin, triboelectric value of,
silk, triboelectric value of, 298	removing, <b>480–481</b> , <i>480</i>	298
silver, triboelectric value of,	for SDRAM, 469	skin resistance and ESD, 298
298	in upgrading, C22-C23,	"SKIP SELF TEST" message,
SIMD (Single Instruction, Mul-	C23	875
tiple Data) technique,	Single Inline Pin Packages	skirts on expansion boards,
131	(SIPP) memory chips	206, <i>206</i>
SIMM (Single Inline Memory	size of, 460	slashes (/), C247
Module) memory, 165,	for terminators, 623-624,	slave controllers, 580-584
<i>166</i> , <b>460–462</b>	624	slave DMA register, error
for 64-bit computers,	Single Instruction, Multiple	beeps for, 430
463-464	Data (SIMD) technique,	slave drives, C17
defined, C247	131	SLDRAM (synchronous link
identifying, 254	Single Large Expensive Disk	DRAM), 472
installing, C59	(SLED), C247	

SILED (Single Large Expensive Disk), C247 slide switches, 364–365, 364 slim-line case style, 66, C34- C25 slim-line hard drives, 1285 SILP (Serial Line Internet Protocol), C246 slots, 28 buses for, 199–201, 205–206 for CPUs, 138–139 for generic computers, 1241 identifying, 255, 255 number of, 39 for peneric computers, 266-C37 speed of, 209 for ultimate computer, C36-C37 in upgrading, C21-C23, C22-C23 slow printing with inkjet printers, 824–825 small bosiness PCs, 1256–1257, 1261 Small Computer Systems Interface, See SCSI (Small Computer Systems Interface, See SCSI (Small Computer Systems Interface, See SCSI (Small Computer Systems Interface) Small fonts setting, C119 Small Outline DiMMs (SODIMMs, 461–462 Smart-UPS 450 product, 512 Smart video Recorder, 1090 SmartModems, 898 SMAs (screw-mounted adapters), 1166 Small Computer Resage Blocks), 1169 smearing on laser printer pages, 858 smoking dust from, 284 floppy disk drive damage  SMPT (Simple Mail Transfer Drift (Simple Mail Transfer Protocol) defined, C246 with DSL, 924 session hijacking, 1233 SMP (Systems Network Architecture), 250 SNMP (Simple Mail Transfer Protocol) session hijacking, 1233 Software edecoders for DVD drives, C45 software have decoders for DVD drives, C45 software Publisher's Association (SPA), 1145 software value decoders for DVD drives, C45 software iterrupts, 184–185 software edecoders for DVD drives, C45 software Publisher's Association (SPA), 1145 software setup in EISA bus, 213 softer jies, 451 solder pads, 90 solder jigs, 451 solder pads, 90 solder jigs, 451 solder pads, 90 solder jigs, 451 solder opper wire for net-work, 165 society of Motion Picture and Television Engineers (SMPTE), 1036 Socket Services standard, 233-431, 763 software interrupts, 184–185 software interrupts, 184–185 software interrupts, 184–185 software interrupts, 184–185 software interrupts, 25 software interrupts, 184–185 software interrupts, 25 s			
slide switches, 364-365, 364 slim-line case style, 66, C34 C35 slim-line hard drives, 1285 SLIP (Serial Line Internet Protocol), C246 slots, 28 buses for, 199-201, 205-206 for CPUs, 138-139 for generic computers, 1241 identifying, 255, 255 number of, 39 for peneric computer, FRI from, 291 speed of, 209 for ultimate computer, C36-C37 in upgrading, C21-C23, C22-C23 slow printing with inkjet printers, 824-825 small Doutline DiMMs (SODIMMs), 461-462 Smart-UP8 450 product, 512 Smart Video Recorder, 1090 Smart Wodens, 898 SMAS (Screw-mounted adapters), 1169 Smearing on laser printer pages, 858 smoking dust from, 284 floppy disk drive damage  SLIP (Serial Line Internet Protocol), Engineers, 1036 silm-line hard drives, 1285 SMTP (Simple Mail Transfer Protocol) cdefined, C246 with DSL, 924 software interrupts, 184-185 software interrupts		SMP (symmetric multiprocess-	
slim-line case style, 66, C34- C35         ture and Television Engineers, 1036         for video capture, 1082-1093, 1082-10		0.7	325-331, C163-
C35         Engineers), 1036         1082-1093, software decoders for DVD defined, C246           SILP (Serial Line Internet Protocol), cool), C246         defined, C246         software decoders for DVD drives, C45           slots, 28         with DSI, 924         software decoders for DVD drives, C45           buses for, 199-201, 205-206         session hijacking, 1233         software rubisher's Associate iton (SPA), 1145           for CPUs, 138-139         son My (Simple Network Architecture), 250         software Publisher's Associate iton (SPA), 1145           for generic computers, 1241         agement Protocol), agement Protocol, 39         solder jigs, 451           identifying, 255, 255         1213         solder jigs, 451           mumber of, 39         SNP Agent tool, C152         solder jigs, 451           for PC Card bus, 225         soc newsgroups, 1345         solder jigs, 451           RFI from, 291         Society of Motion Picture and Television Engineers (SMPTE), 1036         sonique MP3 player, 1028           Gor Ultimate computer, C36-C37         sockets         cokets         Sonique MP3 player, 1028           sow printing with inkjet printers, 824-825         for CPUS, 138-139, C24, C24         sonigrams, 1004, 1004           Small Dusiness PCs, (Small Computer Systems Interface)         452-453, 480         a040           (Small Computer Systems (Small Outline DIMMs (Small Outline DIMs)			
slim-line hard drives, 1285         SMTP (Simple Mail Transfer)         1098-1099           SLIP (Serial Line Internet Protocol) (2246         defined, C246         software decoders for DVD drives, C45           slots, 28         with DSL, 924         software decoders for DVD drives, C45           buses for, 199-201, 205-206         SNA (Systems Network Architecture), 250         SNA (Systems Network Architecture), 250           for CPUs, 138-139         SNMP (Simple Network Management Protocol), 1213         solder pads, 90           identifying, 255, 255         1213         solder jags, 451           number of, 39         SNMP Agent tool, C152         soldering, 339, 431, 450-452           for PC Card bus, 225         Soc newsgroups, 1345         Solider jags, 451           RFI from, 291         Television Engineers         solidering, 339, 431, 450-452           for ultimate computer, C36-C37         Socket Services standard, 223-224         solider jags, 49           grinting with inkjet         on circuit boards, 339, 431         50nique MP3 player, 1028           small business PCs, 1256-1257, 1261         for CPUs, 138-139, C24, 53, 480         50nique MP3 player, 1028           small computer Systems Interface. See SCSI (Small Computer Systems Interface)         for ROM, 186         30 audio, 1031-1032           Smart-UPS 450 product, 512         soft errors on hard drives, 50 product, 512         5	slim-line case style, 66, C34-		for video capture,
SLIP (Serial Line Internet Protocol) ctocol), C246 slots, 28 buses for, 199–201, 205–206 for CPUS, 138–139 for generic computers, 1241			1082-1093,
tocol), C246 slots, 28 buses for, 199–201,		SMTP (Simple Mail Transfer	1098-1099
slots, 28 buses for, 199–201,	SLIP (Serial Line Internet Pro-	Protocol)	software decoders for DVD
buses for, 199–201,         session hijacking, 1233         Software Publisher's Association (SPA), 1145           for CPUS, 138–139         SNA (Systems Network Architecture), 250         software setup in EISA bus, 213           for generic computers, 1241         SNMP (Simple Network Management Protocol), 1213         solder jigs, 451           identifying, 255, 255         1213         solder jigs, 451           number of, 39         SNMP Agent tool, C152         solder pads, 90           for PC Card bus, 225         soc newsgroups, 1345         solder jags, 451           RFI from, 291         society of Motion Picture and Television Engineers (SMPTE), 1036         solide pads, 90           for ultimate computer, C36-C37         Socket Services standard, 23-224         Sonique MP3 player, 1028           gorique, C21-C23, C22-C23         sockets         Sockets           slow printing with inkjet printers, 824-825         on circuit boards, 339, 431         1018-1019, 1030, 1030, 1031           small business PCs, L256-1257, 1261         Gr CPUS, 138-139, C24, 543, 480         Sound and sound cards, 25, 26, 40, 250, 1002           Small Computer Systems Interface. See ScSI (Small Computer Systems Lems Interface. See ScSI (Small Computer Systems Interface)         452-453, 480         30 audio, 1031-1032         accessibility options for, C102-C103, C102         address conflicts with, Signal Outline DIMMs         C102-C103, C102         address conflicts wit	tocol), C246	defined, C246	drives, C45
For CPUs, 138–139 for generic computers, 1241 identifying, 255, 255 number of, 39 for PC Card bus, 225 RFI from, 291 speed of, 209 for ultimate computer, C36-C37 in upgrading, C21-C23, printers, 824–825 small business PCs, I256–1257, 1261 Small Computer Systems Interface. See SCSI (Small Computer Systems Interface) Small Outline DiMMs (SODIMMs), 461–462 Smart-UPS 450 product, 512 Smart Video Recorder, 1090 SmartModems, 898 SMA (Systems Network Architecture), 250 SNMP (Simple Network Manage agement Protocol), 1213 solder jags, 451 solder pads, 90 soldering, 339, 431, 450–452 solder pads, 90 solder pads, 90 soldering, 339, 431, 450–452 soldering, 339, 431, 450–452 solder pads, 90 soldering, 339, 431, 450–452 solde	slots, 28	with DSL, 924	
for CPUs, 138–139 for generic computers, 1241 identifying, 255, 255 number of, 39 for PC Card bus, 225 sRFI from, 291 speed of, 209 for ultimate computer, C36-C37 in upgrading, C21-C23, C22-C23 slow printing with inkjet printers, 824–825 small business PCs, 1256–1257, 1261 Small Computer Systems Interface. See SCSI (Small Computer Systems Interface) Small Outline DIMMs (SODIMMs), 461–462 Smart-UPS 450 product, 512 Smart Video Recorder, 1090 SmartModems, 898 SMAs (screw-mounted adapters), 1166 SMBs (Server Message Blocks), 1169 Smearing on laser printer pages, 858 floppy disk drive damage for SMMP (Simple Network Man- agement Protocol), 1213 solder jigs, 451 solder pads, 90 soldering, 339, 431, 450–452 soldering, 339, 431, 450–452 soldering, 339, 431, 450–452 solder pads, 90 soldering, 339, 431, 450–452 soldering, 339, 431, 450–452 solder pads, 90 soldering, 339, 431, 450–452 solder jags, 451 solder pads, 90 soldering, 339, 431, 450–452 soldering, 39, 431, 450–452 soldering, 39, 411, 4004 soldering, 39, 411, 402 soldering,	buses for, 199-201,	session hijacking, 1233	Software Publisher's Associa-
for generic computers, 1241 agement Protocol), agement Protocol), identifying, 255, 255 1213 solder jigs, 451 solder pads, 90 soldering, 339, 431, 450-452 soc newsgroups, 1345 solid copper wire for net speed of, 209 Television Engineers (SMPTE), 1036 Sonique MP3 player, 1026 Sonique MP3 player, 1026 Sonique MP3 player, 1028 sonograms, 1004, 1004 Sony/Philips Digital Interface Sockets sonograms, 1004, 1004 Sony/Philips Digital Interface Sockets Sonall business PCs, 1256-1257, 1261 for memory chips, (Small Computer Systems Interface. See SCSI (Small Computer Systems Interface) SollMis (Small Outline DIMMs (Simall Outline DIMMs (SODIMMs), 461-462 Smart-UPS 450 product, 512 Smart Video Recorder, 1090 Smarting on laser printer pages, 858 for flow control, 903 smoking flopty disk drive damage for SCSI, 630-631 in PC selection, 1250	205-206	SNA (Systems Network Archi-	tion (SPA), 1145
1241 agement Protocol), identifying, 255, 255 1213 solder pads, 90 soldering, 339, 431, 450-452 soc newsgroups, 1345 solder pads, 90 soldering, 339, 431, 450-452 soc newsgroups, 1345 solderopads, 90 soldering, 339, 431, 450-452 soc newsgroups, 1345 sold copper wire for net-speed of, 209 Television Engineers (SMPTE), 1036 Sonique MP3 player, 1028 sonigue MP3 player, 1028 sonograms, 1004, 1004 s	for CPUs, <b>138–139</b>	tecture), 250	software setup in EISA bus,
number of, 39 SNMP Agent tool, C152 solder pads, 90 soldering, 339, 431, 450-452 soc newsgroups, 1345 soldering, 339, 431, 450-452 soc newsgroups, 1345 soldering, 339, 431, 450-452 soldering, 339, 431 soldering, 359, 450 soldering, 339, 431, 450-452 soldering, 349, 410-452 soldering, 349, 410-452 soldering, 349, 410-452 soldering, 34	for generic computers,	SNMP (Simple Network Man-	213
number of, 39         SNMP Agent tool, C152         soldering, 339, 431, 450-452           for PC Card bus, 225         soc newsgroups, 1345         solid copper wire for net-           RFI from, 291         Society of Motion Picture and speed of, 209         Television Engineers         Sonicnet site, 1026           for ultimate computer, C36-C37         (SMPTE), 1036         Sonique MP3 player, 1028           in upgrading, C21-C23, C22-C23         223-224         Sonograms, 1004, 1004           slow printing with inkjet printers, 824-825         on circuit boards, 339, 431         1018-1019, 1030, 1018-1019, 1030, 1018-1019, 1030, 1018-1019, 1030, 1018-1019, 1030, 1018-1019, 1030, 1018-1019, 1030, 1018-1019, 1030, 1018-1019, 1030, 1018-1019, 1030, 1018-1019, 1030, 1018-1019, 1030, 1031-1032, 1038           Small business PCs, 1256-1257, 1261         for memory chips, 461-462         26, 40, 250, 1002,	1241	agement Protocol),	solder jigs, 451
for PC Card bus, 225 RFI from, 291 Speed of, 209 Television Engineers for ultimate computer, C36-C37 Socket Services standard, in upgrading, C21-C23, C22-C23 Slow printing with inkjet printers, 824-825 Small business PCs, All Computer Systems Interface. See SCSI (Small Computer Systems Interface) SoniMs (Small Outline DiMMs (SODIMMs), 461-462 Small Outline DiMMs (SODIMMs), 461-462 Smart-UPS 450 product, 512 Smart Video Recorder, 1090 SmartModems, 898 Soc newsgroups, 1345 Society of Motion Picture and works, 1151 Sonicnet site, 1026 Sonique MP3 player, 1028 Sony/Philips Diffa Sonique Mpa player,	identifying, 255, <i>255</i>	1213	solder pads, 90
RFI from, 291 speed of, 209 for ultimate computer, C36-C37 socket Services standard, in upgrading, C21-C23, 223-224 solve printing with inkjet printers, 824-825 small business PCs, (Small Computer Systems Interface. See SCSI (Small Computer Systems Interface) Small fonts setting, C119 Small Outline DIMMs (SODIMMs), 461-462 Smart-UPS 450 product, 512 Smart Video Recorder, 1090 SmartModems, 898 SMAs (screw-mounted adapters), 1166 SMBs (Server Message Blocks), 1169 Smoket Services standard, Socket Services standard, Socket Services standard, Sonicnet site, 1026 Sonique MP3 player, 1028 Sonograms, 1004, 1004 Sonograms, 1008, 1018-1019, 1018-1019 installing, 16-17, 16-17, 16-17, 16-17, 1003, 1021, C73- C75, C74 Smoking dust from, 284 lockups from, 343 floppy disk drive damage for SCSI, 630-631 in trace care interplete solve standard, and sound cards, 25, 26, 40, 250, 1002 3D audio, 1031-1032 accessibility options for, 26, 40, 250, 1002 3D audio, 1031-1032 accessibility options for, 26, 40, 250, 1002 3D audio, 1031-1032 accessibility options for, 260 digital and surround, 1030 with DVD drives, 1137 FM synthesis by, 1018-1019 installing, 16-17, 16-17, 16-17, 16-17, 1018-1019 installing, 16-17, 16-17, 16-17, 1018-1019 installing, 16-17, 16-17, 16-17, 1018-1019 installing, 1018-1019	number of, 39	SNMP Agent tool, C152	soldering, 339, 431, <b>450-452</b>
speed of, 209 for ultimate computer, C36-C37 Socket Services standard, in upgrading, C21-C23, 223-224 Sockets Sockets Sockets Sockets Sockets Sockets Sonique MP3 player, 1028 Sonicne tite, 1004, 1004 Sony/Philips Digital Interface Format (S/PDIF), 1018-1019, 1030 1018-1019, 1030 1018-1019, 1030 102-103, 1021 1038 Sound and sound cards, 25, 1038 1018-1019, 1038 1018-1019, 1030 1038 104 player, 1024 1038 1048-1019, 1030 104 player, 1024 1038 1048-1019, 1038 104-1019, 1030 104 player, 1024 1038 1048-1019, 1030 104-1019, 1030 104	for PC Card bus, 225	soc newsgroups, 1345	solid copper wire for net-
For ultimate computer, C36-C37 Socket Services standard, in upgrading, C21-C23, 223-224 Sony/Philips Digital Interface C22-C23 sockets Format (S/PDIF), slow printing with inkjet printers, 824-825 for CPUs, 138-139, C24, 1038 sound and sound cards, 25, 1256-1257, 1261 for memory chips, 26, 40, 250, 1002 Small Computer Systems 150 Interface. See SCSI for ROM, 186 sockets SollMms), 461-462 soft errors on hard drives, SollMms), 461-462 soft errors on hard drives, SollMms), 461-462 soft power switches, 74, 81 software. See also drivers Smart Video Recorder, 1090 Smart Video Recorder, 1090 Smart Modems, 898 for CD-ROM recording, SMBs (Server Message Blocks), 1169 SMBs (Server Message Blocks), 1169 smoking for I/O addresses, 374 dust from, 284 floppy disk drive damage for SCSI, 630-631 in PC selection, 1250	RFI from, 291	Society of Motion Picture and	works, 1151
C36-C37 in upgrading, C21-C23,	speed of, 209	Television Engineers	Sonicnet site, 1026
in upgrading, C21-C23,	for ultimate computer,	(SMPTE), 1036	Sonique MP3 player, 1028
C22-C23         sockets         Format (S/PDIF),           slow printing with inkjet printers, 824-825         on circuit boards, 339, 431 1018-1019, 1030,         11018-1019, 1030,           small business PCs, 1256-1257, 1261         for CPUs, 138-139, C24,         sound and sound cards, 25,           Small Computer Systems Interface. See SCSI (Small Computer Systems Interface)         452-453, 480         3D audio, 1031-1032           Interface. See SCSI (Small Computer Systems Interface)         SODIMMs (Small Outline C102-C103, C102)         accessibility options for, C102-C103, C102           Small fonts setting, C119         soft errors on hard drives, Soft errors on hard drives, C80DIMMs, 461-462         address conflicts with, Somall Outline DIMMs         658         connectors for, 266         digital and surround, 1030         digital and surround, 1030         software. See also drivers Software. See also drivers Software. See also drivers Software. See also drivers Software See also d	C36-C37	Socket Services standard,	sonograms, 1004, 1004
slow printing with inkjet         on circuit boards, 339, 431         1018-1019, 1030,           printers, 824-825         for CPUs, 138-139, C24,         1038           small business PCs,         C24         sound and sound cards, 25,           1256-1257, 1261         for memory chips,         26, 40, 250, 1002           Small Computer Systems         452-453, 480         3D audio, 1031-1032           Interface. See SCSI         for ROM, 186         accessibility options for,           (Small Computer Systems Interface)         DIMMs (Small Outline         C102-C103, C102           Small fonts setting, C119         soft errors on hard drives,         372-374, 373           Small Outline DIMMs         658         connectors for, 266           (SODIMMs), 461-462         soft power switches, 74, 81         digital and surround, 1030           Smart-UPS 450 product, 512         software. See also drivers         with DVD drives, 1137           Smart Video Recorder, 1090         for backups, 722-723         FM synthesis by,           SmartModems, 898         for CD-ROM recording,         1013-1014, 1013           SMAs (screw-mounted         1129         for games, C27-C28           adapters), 1166         for chip testing, 448-449         inputs and outputs for,           SMBs (Server Message Blocks), pages, 858         for flow contro	in upgrading, C21-C23,	223-224	Sony/Philips Digital Interface
printers, 824–825         for CPUs, 138–139, C24,         1038           small business PCs,         C24         sound and sound cards, 25,           1256–1257, 1261         for memory chips,         26, 40, 250, 1002           Small Computer Systems         452–453, 480         3D audio, 1031–1032           Interface. See SCSI         for ROM, 186         accessibility options for,           (Small Computer Systems interface)         SODIMMs (Small Outline DIMMs), 461–462         address conflicts with,           Small fonts setting, C119         soft errors on hard drives,         372–374, 373           Small Outline DIMMs         658         connectors for, 266           (SODIMMs), 461–462         soft power switches, 74, 81         digital and surround, 1030           Smart-UPS 450 product, 512         software. See also drivers         with DVD drives, 1137           Smart Video Recorder, 1090         for backups, 722–723         FM synthesis by,           SmartModems, 898         for CD-ROM recording,         1013–1014, 1013           SMAs (screw-mounted adapters), 1166         for chip testing, 448–449         inputs and outputs for,           SMBs (Server Message Blocks), 1169         DLLs and VxDs, 326–330         installing, 16–17, 16–17,           smearing on laser printer pages, 858         for flow control, 903         C75, C74	C22-C23	sockets	Format (S/PDIF),
small business PCs, 1256-1257, 1261C24sound and sound cards, 25, 26, 40, 250, 1002Small Computer Systems452-453, 4803D audio, 1031-1032Interface. See SCSI (Small Computer Sys- tems Interface)for ROM, 186accessibility options for, C102-C103, C102Small fonts setting, C119SoDIMMs (Small Outline DIMMs), 461-462address conflicts with,Small Outline DIMMs (SODIMMs), 461-462soft errors on hard drives, Soft errors on hard drives, Soft power switches, 74, 81digital and surround, 1030Smart-UPS 450 product, 512software. See also driverswith DVD drives, 1137Smart Video Recorder, 1090for backups, 722-723FM synthesis by,SmartModems, 898for CD-ROM recording,1013-1014, 1013SMAs (screw-mounted adapters), 1166for chip testing, 448-449for games, C27-C28SMBs (Server Message Blocks), 1169DLLs and VxDs, 326-330installing, 16-17, 16-17,smearing on laser printer pages, 858for flow control, 903C75, C74smokingfor I/O addresses, 374MP3, 1022-1030dust from, 284 floppy disk drive damagefor SCSI, 630-631in PC selection, 1250	slow printing with inkjet	on circuit boards, 339, 431	1018-1019, <b>1030</b> ,
1256-1257, 1261 for memory chips, Small Computer Systems Interface. See SCSI Interface. See SCSI Interface. See SCSI Interface. See SCSI Interface. SoDIMMs (Small Outline C102-C103, C102 accessibility options for, Small Computer Systems Interface)  The soft errors on hard drives, Small Outline DIMMs Interface SoDIMMs (Small Outline C102-C103, C102 address conflicts with, Small Outline DIMMs Interface Soft errors on hard drives, Small Outline DIMMs Interface Soft errors on hard drives, Small Outline DIMMs Interface Soft errors on hard drives, Small Outline DIMMs Interface Soft errors on hard drives, Small Outline DIMMs Interface Soft errors on hard drives, Soft error	printers, <b>824-825</b>	for CPUs, 138-139, C24,	1038
Small Computer Systems Interface. See SCSI (Small Computer Systems (Small Outline C102-C103, C102) tems Interface) DIMMs (Small Outline C102-C103, C102) tems Interface) DIMMs (A61-462) Small fonts setting, C119 Small Outline DIMMs G58 (SODIMMs), 461-462 Smart-UPS 450 product, 512 Smart Video Recorder, 1090 SmartModems, 898 For CD-ROM recording, SMAs (screw-mounted adapters), 1166 SMBs (Server Message Blocks), 1169 SMBs (Server Message Blocks), 2169 Smearing on laser printer pages, 858 Smoking dust from, 284 floppy disk drive damage for SCSI, 630-631  Address conflicts with, C102-C103, C102 address conflicts with, ST012-C103, C102 address conflicts with, C102-C103, C102 address conflicts with, ST02-374, 373 connectors for, 266 digital and surround, 1030 spread digital and surround, 1030 for backups, 722-723 FM synthesis by, FM synthesis by, FM synthesis by, SmartModems, 898 for CD-ROM recording, Inought for games, C27-C28 inputs and outputs for, Inought for, Inought for games, C27-C28 installing, 16-17, 16-17, Smearing on laser printer faulty, 330-331 Inought for, Inought for musicians, 1034-1039 in PC selection, 1250	small business PCs,	C24	sound and sound cards, 25,
Interface. See SCSI (Small Computer Systems Interface) SODIMMs (Small Outline tems Interface) DIMMs), 461-462 address conflicts with, Small fonts setting, C119 soft errors on hard drives, 372-374, 373 connectors for, 266 (SODIMMs), 461-462 soft power switches, 74, 81 digital and surround, 1030 smart-UPS 450 product, 512 software. See also drivers with DVD drives, 1137 Smart Video Recorder, 1090 for backups, 722-723 FM synthesis by, SmartModems, 898 for CD-ROM recording, SMAs (screw-mounted 1129 for games, C27-C28 adapters), 1166 for chip testing, 448-449 inputs and outputs for, SMBs (Server Message Blocks), compatibility in, 30-31 1018-1019 installing, 16-17, 16-17, smearing on laser printer faulty, 330-331 1003, 1021, C73-pages, 858 for flow control, 903 C75, C74 smoking for I/O addresses, 374 MP3, 1022-1030 dust from, 284 lockups from, 343 for musicians, 1034-1039 in PC selection, 1250	1256-1257, 1261	for memory chips,	<i>26</i> , <b>40</b> , <b>250</b> , <b>1002</b>
(Small Computer Systems Interface)  DIMMs (Small Outline C102-C103, C102 address conflicts with, Small fonts setting, C119 soft errors on hard drives, 372-374, 373 connectors for, 266 (SODIMMs), 461-462 soft power switches, 74, 81 digital and surround, 1030 Smart-UPS 450 product, 512 software. See also drivers with DVD drives, 1137 Smart Video Recorder, 1090 for backups, 722-723 FM synthesis by, SmartModems, 898 for CD-ROM recording, 1013-1014, 1013 SMAs (screw-mounted 1129 for games, C27-C28 adapters), 1166 for chip testing, 448-449 inputs and outputs for, SMBs (Server Message Blocks), compatibility in, 30-31 1018-1019 installing, 16-17, 16-17, smearing on laser printer faulty, 330-331 1003, 1021, C73-pages, 858 for flow control, 903 C75, C74 smoking for I/O addresses, 374 MP3, 1022-1030 dust from, 284 lockups from, 343 for musicians, 1034-1039 floppy disk drive damage for SCSI, 630-631 in PC selection, 1250	Small Computer Systems	<b>452-453</b> , 480	3D audio, <b>1031-1032</b>
tems Interface) DIMMs), 461-462 address conflicts with,  Small fonts setting, C119 soft errors on hard drives,  Small Outline DIMMs 658 connectors for, 266  (SODIMMs), 461-462 soft power switches, 74, 81 digital and surround, 1030  Smart-UPS 450 product, 512 software. See also drivers with DVD drives, 1137  Smart Video Recorder, 1090 for backups, 722-723 FM synthesis by,  SmartModems, 898 for CD-ROM recording,  SMAs (screw-mounted 1129 for games, C27-C28 adapters), 1166 for chip testing, 448-449 inputs and outputs for,  SMBs (Server Message Blocks),  1169 DLLs and VxDs, 326-330 installing, 16-17, 16-17,  smearing on laser printer faulty, 330-331 1003, 1021, C73-pages, 858 for flow control, 903 C75, C74  smoking for I/O addresses, 374 MP3, 1022-1030 dust from, 284 lockups from, 343 for musicians, 1034-1039 floppy disk drive damage for SCSI, 630-631 in PC selection, 1250	Interface. See SCSI	for ROM, 186	accessibility options for,
Small fonts setting, C119soft errors on hard drives,372-374, 373Small Outline DIMMs658connectors for, 266(SODIMMs), 461-462soft power switches, 74, 81digital and surround, 1030Smart-UPS 450 product, 512software. See also driverswith DVD drives, 1137Smart Video Recorder, 1090for backups, 722-723FM synthesis by,SmartModems, 898for CD-ROM recording,1013-1014, 1013SMAs (screw-mounted1129for games, C27-C28adapters), 1166for chip testing, 448-449inputs and outputs for,SMBs (Server Message Blocks), 1169compatibility in, 30-311018-1019smearing on laser printer pages, 858for flow control, 903installing, 16-17, 16-17,smearing on laser printer pages, 858for flow control, 903C75, C74smoking dust from, 284 floppy disk drive damagefor SCSI, 630-631MP3, 1022-1030for musicians, 1034-1039 in PC selection, 1250	(Small Computer Sys-	SODIMMs (Small Outline	C102-C103, C102
Small Outline DIMMs 658 connectors for, 266 (SODIMMs), 461-462 soft power switches, 74, 81 digital and surround, 1030 Smart-UPS 450 product, 512 software. See also drivers with DVD drives, 1137 FM synthesis by, Smart Video Recorder, 1090 for backups, 722-723 FM synthesis by, SmartModems, 898 for CD-ROM recording, 1013-1014, 1013 for games, C27-C28 adapters), 1166 for chip testing, 448-449 inputs and outputs for, SMBs (Server Message Blocks), compatibility in, 30-31 1018-1019 installing, 16-17, 16-17, smearing on laser printer faulty, 330-331 1003, 1021, C73-pages, 858 for flow control, 903 C75, C74 smoking for I/O addresses, 374 MP3, 1022-1030 dust from, 284 lockups from, 343 for musicians, 1034-1039 floppy disk drive damage for SCSI, 630-631 in PC selection, 1250	tems Interface)	DIMMs), 461-462	address conflicts with,
(SODIMMs), 461–462 soft power switches, 74, 81 digital and surround, 1030 Smart-UPS 450 product, 512 software. See also drivers with DVD drives, 1137 Fmart Video Recorder, 1090 for backups, 722–723 FM synthesis by, SmartModems, 898 for CD-ROM recording, 1013–1014, 1013 For games, C27-C28 adapters), 1166 for chip testing, 448–449 inputs and outputs for, SMBs (Server Message Blocks), compatibility in, 30–31 1018–1019 installing, 16–17, 16–17, smearing on laser printer faulty, 330–331 1003, 1021, C73-pages, 858 for flow control, 903 C75, C74 smoking for I/O addresses, 374 MP3, 1022–1030 dust from, 284 lockups from, 343 for musicians, 1034–1039 floppy disk drive damage for SCSI, 630–631 in PC selection, 1250	Small fonts setting, C119	soft errors on hard drives,	<b>372-374</b> , <i>373</i>
Smart-UPS 450 product, 512software. See also driverswith DVD drives, 1137Smart Video Recorder, 1090for backups, 722-723FM synthesis by,SmartModems, 898for CD-ROM recording,1013-1014, 1013SMAs (screw-mounted1129for games, C27-C28adapters), 1166for chip testing, 448-449inputs and outputs for,SMBs (Server Message Blocks),compatibility in, 30-311018-10191169DLLs and VxDs, 326-330installing, 16-17, 16-17,smearing on laser printerfaulty, 330-3311003, 1021, C73-pages, 858for flow control, 903C75, C74smokingfor I/O addresses, 374MP3, 1022-1030dust from, 284lockups from, 343for musicians, 1034-1039floppy disk drive damagefor SCSI, 630-631in PC selection, 1250	Small Outline DIMMs	658	connectors for, 266
Smart Video Recorder, 1090         for backups, 722-723         FM synthesis by,           SmartModems, 898         for CD-ROM recording,         1013-1014, 1013           SMAs (screw-mounted adapters), 1166         1129         for games, C27-C28           SMBs (Server Message Blocks), 1169         compatibility in, 30-31         1018-1019           Smearing on laser printer pages, 858         for flow control, 903         C75, C74           smoking dust from, 284 floppy disk drive damage         for SCSI, 630-631         in PC selection, 1250	(SODIMMs), 461-462	soft power switches, 74, 81	digital and surround, 1030
SmartModems, 898         for CD-ROM recording,         1013-1014, 1013           SMAs (screw-mounted adapters), 1166         1129         for games, C27-C28           SMBs (Server Message Blocks), 1166         for chip testing, 448-449         inputs and outputs for, inputs and outputs for, puts and outputs for, such patents.           SMBs (Server Message Blocks), 1169         DLLs and VxDs, 326-330         installing, 16-17, 16-17, such pages, 858           Smearing on laser printer pages, 858         for flow control, 903         C75, C74           Smoking dust from, 284 dust from, 284 lockups from, 343         for musicians, 1034-1039 in PC selection, 1250           floppy disk drive damage         for SCSI, 630-631         in PC selection, 1250	Smart-UPS 450 product, 512	software. See also drivers	with DVD drives, 1137
SMAs (screw-mounted adapters), 1166         1129         for games, C27-C28 inputs and outputs for,           SMBs (Server Message Blocks), 1169         compatibility in, 30-31 compatibility in, 30-31 installing, 16-17, 16-17,           Smearing on laser printer pages, 858         for flow control, 903 compatibility in, 30-331 for flow control, 903 compatibility in, 30-331 compatibility installing, 16-17,	Smart Video Recorder, 1090	for backups, <b>722-723</b>	FM synthesis by,
adapters), 1166 for chip testing, 448–449 inputs and outputs for,  SMBs (Server Message Blocks), compatibility in, 30–31 1018–1019  1169 DLLs and VxDs, 326–330 installing, 16–17, 16–17,  smearing on laser printer faulty, 330–331 1003, 1021, C73- pages, 858 for flow control, 903 C75, C74  smoking for I/O addresses, 374 MP3, 1022–1030 dust from, 284 lockups from, 343 for musicians, 1034–1039 floppy disk drive damage for SCSI, 630–631 in PC selection, 1250	SmartModems, 898	for CD-ROM recording,	<b>1013-1014</b> , <i>1013</i>
SMBs (Server Message Blocks),       compatibility in, 30–31       1018–1019         1169       DLLs and VxDs, 326–330       installing, 16–17, 16–17,         smearing on laser printer       faulty, 330–331       1003, 1021, C73-         pages, 858       for flow control, 903       C75, C74         smoking       for I/O addresses, 374       MP3, 1022–1030         dust from, 284       lockups from, 343       for musicians, 1034–1039         floppy disk drive damage       for SCSI, 630–631       in PC selection, 1250	SMAs (screw-mounted	1129	for games, C27-C28
1169       DLLs and VxDs, 326-330       installing, 16-17, 16-17,         smearing on laser printer       faulty, 330-331       1003, 1021, C73-         pages, 858       for flow control, 903       C75, C74         smoking       for I/O addresses, 374       MP3, 1022-1030         dust from, 284       lockups from, 343       for musicians, 1034-1039         floppy disk drive damage       for SCSI, 630-631       in PC selection, 1250	adapters), 1166	for chip testing, 448-449	inputs and outputs for,
1169       DLLs and VxDs, 326-330       installing, 16-17, 16-17,         smearing on laser printer       faulty, 330-331       1003, 1021, C73-         pages, 858       for flow control, 903       C75, C74         smoking       for I/O addresses, 374       MP3, 1022-1030         dust from, 284       lockups from, 343       for musicians, 1034-1039         floppy disk drive damage       for SCSI, 630-631       in PC selection, 1250	SMBs (Server Message Blocks),	compatibility in, 30–31	1018-1019
smearing on laser printer       faulty, 330-331       1003, 1021, C73-         pages, 858       for flow control, 903       C75, C74         smoking       for I/O addresses, 374       MP3, 1022-1030         dust from, 284       lockups from, 343       for musicians, 1034-1039         floppy disk drive damage       for SCSI, 630-631       in PC selection, 1250		DLLs and VxDs, <b>326–330</b>	installing, 16-17, 16-17,
smoking for I/O addresses, 374 MP3, <b>1022–1030</b> dust from, 284 lockups from, <b>343</b> for musicians, <b>1034–1039</b> floppy disk drive damage for SCSI, <b>630–631</b> in PC selection, <b>1250</b>	smearing on laser printer	faulty, 330-331	
smoking for I/O addresses, 374 MP3, 1022–1030 dust from, 284 lockups from, 343 for musicians, 1034–1039 floppy disk drive damage for SCSI, 630–631 in PC selection, 1250			
dust from, 284 lockups from, 343 for musicians, 1034–1039 floppy disk drive damage for SCSI, 630–631 in PC selection, 1250		for I/O addresses, 374	
floppy disk drive damage for SCSI, <b>630–631</b> in PC selection, <b>1250</b>			for musicians, <b>1034–1039</b>
from, 780 system information for, ROM on, 397	from, 780	system information for,	ROM on, 397

C133

installing, C87

sampling for, 1008-1012,	magnetism from, 287	satellite communications,
1009-1012	in PC selection, <b>1250–1251</b>	931
sound characteristics,	for sound boards,	serial ports, 242, 808
1004–1008,	1019-1021	UARTs, 896-897
1004-1008	Universal Serial Bus for,	USB bus, 245
speaker systems for,	246	video, 971-972, <b>976-979</b>
1019-1021	specialist databases, C232	video capture boards, 1077
streaming media,	specifications for CPUs,	video cards, C37-C39
1032-1034	139-143	video editing systems,
with ToggleKeys function,	speculative execution in 6x86,	1075
C101	159	speed codes on chips, 450
troubleshooting,	speech recognition, 116, 132	Speed Disk utility, C154
1039-1040	speed	speed matching, controllers
for ultimate computer,	AGP bus, 219	for, 231-233
C37, <b>C39-C40</b> , <i>C41</i>	buses, 207-210, 410-411	SpeedDisk program, 752-753
upgrading, C21	cable broadband, 928	SpeedStor program, 588-589
in video capture,	CD-ROM drives, 34,	spikes, 503-504
1072-1073	1121-1122	defined, C247
wavetable synthesis for,	communications systems,	surge suppressors for,
1014	941	506-508
Sound Blaster sound cards,	in computer evolution, C2	spills, <b>302</b> , 951
250	CPU, 32, <b>108–117</b> ,	spinning speed of CD-ROM
address conflicts with,	140-143, <b>146-150</b> ,	drives, 1120
<b>372–374</b> , <i>373</i>	C53-C55	SPKR label, C88
installing, C73-C75, C74	in digital broadband com-	spread-spectrum radio com-
introduction of, C39	munications, 913	munications, C261
sampling with, 1015	disk drive access, 541-544	spreadsheets for memory
Sound Blaster Live!, 1015	DSL, <b>917</b> , <b>921</b>	tests, 403-404
Sound tab, C101, <i>C102</i>	EISA bus, 213	spring-loaded twist (ST) con-
sounds in laser printers, <b>881</b>	and energy consumption,	nectors, 1166, <i>1166</i>
Sounds Properties window,	495	springs in keyboards, 949
C74, <i>C74</i>	FireWire bus, 228	SPS (Standby Power Supplies),
SoundSentry feature, C102-	floppy disk drive rotation,	<b>508–512</b> , <i>509–510</i>
C103, C102	785	SPX (Sequenced Package
SPA (Software Publisher's	hard disk drives, C42-C43	Exchange), C245
Association), 1145	ISDN, 914	square solder pads, 90
space parity, C233	memory, <b>166–172</b> , 411,	square wave power supplies,
spacers for motherboards,	465-466	510, <i>510</i>
87-88, 88	memory boards, 209, 214	squeaking sounds in laser
spade lugs, 84	memory chips, <b>460–463</b> ,	printers, 881
spamming, 1343	472-473, 476. See	SRAM (Static RAM)
sparse files in NTFS, <b>683</b>	also caches	cost of, 166
speakers	modems, <b>906–908</b> , C41	on CPU, <b>124–125</b>
clicks in, 426–427	parallel ports, 801	defined, C247
connections for, 25, <i>25</i> , <i>41</i> ,	PC Card bus, 225	vs. DRAM, 379, 464
74, 86, 94	PCI bus, 217-218	ST (spring-loaded twist) con-
for games C27	Pentium 133-137	nectors 1166 <i>1166</i>

ST (straight-tip connector),	static linking, 329	with laser printers,
C248	Static RAM (SRAM)	<b>857-859</b> , <i>859</i> , 880
stacked hubs, 1209	cost of, 166	streaming tape, C248
STACKS statements, execut-	on CPU, <b>124–125</b>	streaming technology,
ing, 445	defined, C247	1032-1034
stand-alone hubs, 1209-1210,	vs. DRAM, 379, <b>464</b>	in MCA, 210
1210	status information for print-	RealVideo files for, 1097
Standard CMOS Setup screen,	ers, 241	stripe masks in CCD chips,
C67, <i>C67</i>	status lights for hubs, 1212	1050, <i>1051</i>
standards. See also compati-	stealth viruses	stripe sets, C248
bility	defined, C247	stripes with inkjet printers,
for CD-ROM, <b>1114–1118</b>	operation of, <b>696</b>	827
for connectors, 201-202	steel wool, triboelectric value	stripping screws, 50
for modems, <b>909–910</b>	of, 298	student PCs, features for,
for SCSI, <b>630–631</b>	Step-By-Step Confirmation	1255, 1259
standby batteries, 414	option, C141	Sturgeon's Law, 335
Standby Power Supplies (SPS),	step-index fiber optic cable,	styrene acrylate copolymer in
<b>508-512</b> , 509-510	<b>1159–1160</b> , 1160	toner, 887
standoffs for motherboards,	stepper motors, <b>540</b>	subdirectories
88, C77-C78, <i>C77</i>	stereo speakers, 1019	defined, C248
Stang, Dave, 332	StickyKeys option, <b>C99</b> , <i>C99</i>	in FAT, <b>675-677</b>
start bits, C247	still cameras for video cap-	invalid, 745–747
starting clusters in directory	ture, <b>1060</b>	subkeys in Registry, <b>C161</b> -
entries, 673-675	still capture boards, 1074	C163, C161
Startup Disk tab, 725, C116,	stop bits	subnet addresses, C248
C116	defined, C248	subnet masks, 1181, 1183,
startup disks, <b>64–65</b> , C72,	for serial ports, 808	C248
C116, <i>C116</i>	Storage Area Networks (SANs)	subnets, C248
startup problems	defined, C248	subscribing to mailing lists,
in laser printers, <b>860–861</b>	in FCSI, <b>606–607</b>	1350
troubleshooting, 341–342	store-and-forward switching	subwoofers, 1020, 1031
Startup tab, C142-C143	vs. cut-through,	suffixes in chip identification,
stateful inspection, 1235	1221-1222, 1221	450
static charge eliminators in	defined, C248	sunbeams, 283
laser printers, 852	STP (shielded twisted-pair)	sunlight and CD-ROM discs,
static column RAM, 167	cable	1135
static electricity	defined, C246	Super VGA adapters, 997
anti-static wrist straps for,	for networks, 1153-1154,	Super VGA boards, 235
52-54	1154	dot pitch for, 989
causes of, <b>297–299</b>	straight-slot screwdrivers,	memory for, 181
damage from, 299	49-50	refresh rates with, 985
from desoldering, 451	straight-through cables, 777	resolution and colors with,
with memory chips, 475,	straight-tip connector (ST),	980, 982
479	C248	super VHS recorders,
preventing, 300–302	stranded copper wire for net-	1052-1053, 1056
in workspace, 60	works, 1151	SuperDisk, 773
static IP numbers for DSL,	streaks	SuperDrives, C43
924-925	with inkjet printers, 827	superpipelining
344-343	with hikjet printers, 647	superpipeming

in 6x86, 159	switching hubs, 1218-1222,	audio/video enthusiast,
defined, C248	1219-1221	1260-1261
superscalar CPUs	switching power supplies,	corporate, 1262
defined, C249	484-485	gamer, 1259-1260
pipelines in, 133–137	switching times for SPS, 510	home, <b>1258</b>
support	Symantec site, 703	road warrior, <b>1262–1263</b>
Internet and online serv-	symmetric multiprocessing	small business, 1261
ices for, 1313-1317	(SMP), 150	student, 1259
newsgroups for,	synchronization	System Configuration Utility,
1341-1350	of notebook files,	C140-C142, C141
proprietary online services,	1305-1307	SYSTEM.DAT file
1355-1357	in video, 1069, 1071	backing up, 716
surfaces, disk, 526	Synchronous Dynamic Ran-	in Registry, C158-C159
SurfDoubler product, 926	dom Access Memory	System File Checker, 337–338,
surge protectors	(SDRAM), <b>469–470</b>	C138-C139, C138
defined, C249	benefits of, <b>168</b> , <i>168</i>	System File Protection (SFP)
for hard disk drives, 708	DDR, 171, <b>471</b>	feature, C150
for notebooks, 1298	defined, C249	system files
for phone lines, 910-911	introduction of, 165	backing up, <b>715–718</b>
for power supplies,	SLDRAM, 472	checking, <b>C138-C139</b> , <i>C138</i>
506-508	Synchronous Graphics RAM	executing, 445
UPS as, 511	(SGRAM)	system information, MSI for,
surges, 503-504	defined, C249	C132-C133, C133
defined, C249	for video, 974	System Information tool,
power-up, 293-295	synchronous link DRAM	337-338
transient, 296	(SLDRAM), 472	SYSTEM.INI file
surround sound, <b>1020</b> , <b>1030</b>	synchronous SCSI, <b>600</b>	backing up, 715
survpc mailing list, 1352	SYS files, viruses in, 689	checking, C142
sustain in sound waves, 1013,	SysReq key, 946	for compatibility, C157
1014	System applet, 395	system inventory functions in
SVGA (Super VGA) adapters,	system bits, 673	diagnostic programs,
997	system boards. <i>See</i> mother-	332–333
SVGA (Super VGA) boards,	boards	System Monitor utility, C132,
235	system boot disks	C132
dot pitch for, 989	creating, 64–65	System Properties window
memory for, 181	preparing, <b>724–726</b> , C72	for Device Manager, C108,
refresh rates with, 985	system bus	C108, C127-C130,
resolution and colors with,	frequency of, 111	C127
980, 982	for video and video boards,	for performance, C130-
swap files, C249	971-972	C131, C130
swapping	system bus interfaces for	for removing devices, 363
defined, C249	hard disk drives, 523	system resources, status of,
expansion boards, 425	system clock/calendar, 38,	C131
switchboxes, 860	229, 247–249	System Restore, C146-C147
switches. See also DIP	System Commander utility,	reconfiguring and dis-
switches; jumpers	659	abling, C149-C150
for keyboard, <b>949</b>	system comparisons, cate-	restore points in, C147-
power, <b>81–85</b>	gories in, 1253–1257	C148
power, or or	801103 III, 1233-1237	C1-10

restoring system with,	for network printers, 805	temporary swap files, C250
C148-C149	TCP ports, C250	tera- (T) prefix, C250
System tab, C134, <i>C134</i>	tea, board damage from, 304	terabytes (TB), C250
system tests, C62-C63, C85-	TEAC America, floppy disk	terminal adapters for ISDN,
C86	drives by, 1248	915-916
System Tools, 337-338	technical information and	terminal emulation, C250
system tray, icons in, C120	support	Terminate and Stay Resident
Systems Network Architecture	Internet and online serv-	(TSR) programs
(SNA), 250	ices for, 1313-1317	in AUTOEXEC.BAT file,
SystemWorks utility, C155	IRC for, <b>1354–1355</b>	178-179
	mailing lists for, 1352	viruses in, 696
Т	newsgroups for,	terminators and termination
	1341-1350	active vs. passive, 621-623,
T (tera-) prefix, C250	proprietary online services	622
T.120 protocols, C249-C250	for, 1355-1357	built-in, 598-599
T-connectors	World Wide Web for,	for CD-ROM drives, 1136
identifying, 259, 259	1331-1338	for coaxial cable, 1163
for network interface	technology, improvements in,	defined, C251
cards, 1163,	<b>C2-C6</b> , <i>C3</i>	SCSI, <b>598–599</b> , <b>603–604</b> ,
1163-1164	TechWeb site, 1336	<b>609</b> , 611, <b>621-630</b> ,
Tahiti sound cards, 1040	teflon, triboelectric value of,	<i>624</i> , C245
talk newsgroups, 1345	298	testing
talking heads, 1089-1090	telcos for DSL, 922-923	by BIOS, 440-441
Tandy, 212	Telecommunications Industry	capture boards, 1081–1082
tannic acids, 304	Association (TIA),	chips, 448-449
tape cartridges, C250	cable grading by,	DirectX Diagnostics Tool
tape drives, 251	1155-1156	for, C135-C136
for backups, 719	telephone lines	expansion boards, 403–404
cables for, 80	isolators for, 910	hard disk drive media,
controllers for, 240–241	for modems, 908	726-729
defined, C250	for networks, <b>1162</b> ,	hard disk drives,
for old computer data, C11	1188-1189, C27	1290-1291
software for, 722	noise in, <b>936-938</b>	laser printers, <b>863</b>
Tarbell interface, 771	in satellite communica-	memory, 438-439
target IDs in SCSI, <b>614-615</b>	tions, 932	memory chips, 476–479,
TB (terabytes), C250	telephones, magnetism from,	478
TBLD label, C88	285	modems, C126, C126
TCO (Total Cost of Owner-	television signals, <b>1062–1069</b> , 1063–1066	network cable, 1195-1196
ship), 218		outlet wiring, 501
TCP (Transmission Control	Telnet protocol, C250	power supplies, C61-C62
Protocol) defined, C254	temperature. <i>See also</i> heat with diskettes, 780	system tests, C62-C63, C85-C86
functions of, 1179	hard disk drive problems	Text File Viewer tool, C152
TCP/IP (Transmission Control	from, 761	text mode, C251
Protocol/Internet Pro-	probes for, 280-281, 449	text mode, C231 text on disks, searching for,
tocol), 1179–1183,	safe ranges, <b>280–281</b>	738
1180	thermal shock, <b>282–283</b>	Text Search program, 738
defined, C254	temperature chip testing, 449	Texwipe product, 304
acinica, C20 i	temperature cuip testing, 443	12.mpc product, 504

thermal inkjet printers, 819	quick steps for, C95	for notebooks, 1288
thermal shock	setting, C116-C117, C117	pliers, <b>56</b> , <i>56</i>
with computers, 282-283	time bombs, 697	retrieving, <b>54-55</b> , <i>55</i>
with diskettes, 780	Time Zone Editor tool, C152	screwdrivers, <b>49–52</b> , <i>51</i>
thermal-transfer printers,	time zones, setting, C117	top-level domains, C253
797-798	timeouts, hard disk drive, 441	topologies, C253
thermistors, 795, 852-853	timers	Torx screwdrivers, 51-52
thermometers	connections for, 74	Toshiba
CPU, 115	error beeps for, 428-430	DDR memory by, 471
PC, 280-281	I/O addresses for, 370	floppy disk drives by, 773
thick Ethernet, C251	IRQ for, 389	Total Cost of Ownership
thickness of floppy diskettes,	TimeThis tool, C153	(TCO), 218
775	tint of color, 1085	tower cases
thicknet cable, 1158	TNT chip set, 987	in building computers,
thicknet networks, 260, 265	TNT2 chip set, 987	C34-C35
thin Ethernet, C251	ToggleKeys function, C101	removing, <b>68</b> , <i>68</i>
thinnet networks, 260, 265	Token Ring network cards,	TP (twisted-pair) cable
third hands, 451	249	connectors for, 1164-1165,
third-party tools, C154	memory for, 187	1165
diagnostic, 335-337	ROM on, 397	for crosstalk reduction,
First Aid, <b>C155-C156</b>	Token Ring networks, 606	288
for formatting and parti-	cable in, 1154	defined, C254-C255
tioning, <b>658-659</b>	defined, C252-C253	for DSL, 918
McAfee Utilities, C155	network interface cards	for networks, 265,
Norton Utilities, C154-	for, 1148-1149	<b>1153-1157</b> , <i>1154</i> ,
C155	token ring networks, C253	C26-C27
shareware, C156	tolerances in SNMP, 1213	TR modem light, 940
thrashing, C251	Tom's Hardware Guide site,	trace caches, 156-157
threads, C251	1336	Traceroute utility, 1229
throughput, C251-C252	toner cartridges	traces, 199
TIA (Telecommunications	problems with, 879-880	track density, 545
Industry Association),	recycled, 798	trackballs, 959-960
cable grading by,	toner in laser printers, 844,	defined, C253-C254
1155-1156	850, <i>851</i>	installing, 945
TIA/EIA 232D ports, <b>242–243</b> ,	ammonia effect on, 867	tracks, <b>525–532</b> , <i>528–529</i>
<i>243</i> , 894, <b>938–939</b>	cleaning, <b>881-882</b>	on CD-ROM disks, 1112
cables for, 800, <b>804</b> ,	composition of, 856-857	defined, C253
<i>904-905</i> <b>, 941</b>	light effect on, 866	on floppy diskettes, 775
flow control with, 903-904	"TONER LOW" message, 875	transfer corona wires,
operation of, <b>900-902</b>	tools, 49	851-852, <i>852</i> , 859,
TIA/EIA 586 standard, C252	anti-static wrist straps,	883
TIA/EIA structured cabling	52-54	transfer rates, 544-545
standards, C252	chip inserters, 59	for CD-ROM drives,
tightening screws, 50	chip removers, 57-58,	1120-1121
time	57-58	for hard disk drives, 541
in BIOS, C67	hemostats, 55–56	caches for, <b>556–558</b>
clock/calendar for,	for notebook upgrades,	defined, 521
247-249	1278	

external transfer rate	troubleshooting, 308,	mice, <b>961</b>
dependencies in,	432-433	modem connections,
556	assumptions in, 316	347-348
internal, <b>545-546</b>	boot process in, 435-447,	monitors, 346-347
optimizing, 555-556	437	notebook computers,
in ultimate computer,	CD-ROM drives,	1307-1308
C43	1135-1136	observations in, 317-318
and interleave factor,	connectors, 323-325	operator errors, 319-323
546-552	dead machines, 424-425	order of steps in, 313
for network interface	boot process in,	panicking in, 311-312
cards, <b>1150</b>	<b>435–447</b> , <i>437</i>	patience in, 312
of SCSI systems, 604-605	expansion boards, 431	power supplies, 425–427,
transformers	power supplies,	498-499, 515-516
isolation, 502, 509	425-427	printers, 348-349,
in power supplies, 484	diagnostic programs for,	805-811, 887-889
transients, 296	331-332	rebooting in, 313-314
transistors, replacing,	for expansion boards,	rules of, 311
451-452	403-404	SCSI, 634-636
Transmission Control Proto-	features in, <b>332-334</b>	serial communications,
col (TCP)	third-party, 335-337	935-941
defined, C254	diagrams in, 315–316	simplification for, 314
functions of, 1179	documentation in, 312,	software, 314, <b>325–331</b> ,
Transmission Control Proto-	316-317	C163-C166
col/Internet Protocol	DVD drives, 1137	sound, 1039-1040
(TCP/IP), <b>1179-1183</b> ,	emergencies, 349-350	startup problems, 341-342
1180	expansion boards,	steps in, 309-310,
defined, C254	338-340, 417-418,	318-319
for network printers, 805	420-424, 431, 454	support for, <b>340–341</b>
transmission media, C254	chip insertion and	ultimate computer installa
transport protocols,	removal,	tion, <b>C89-C90</b>
1175-1176	452-453	video, <b>998-999</b>
IPX/SPX, <b>1177-1178</b> , <i>1178</i>	chip testing, 448–450	video capture, 1099-1101
multiple transport stacks,	soldering and desolder-	viruses, <b>704–705</b>
<b>1184-1185</b> , <i>1184</i>	ing, 450-452	Windows diagnostic pro-
NetBEUI, 1176-1177	external indicators in, 331	grams for, <b>337-338</b>
TCP/IP, 1179-1183	floppy disk drives,	Windows Report Tool for,
transport stacks	782-788	C136-C137, C137
binding interfaces for,	formatting, 659-660	TSR (Terminate and Stay Resi-
1173-1174	hard disk crashes, 345-346	dent) programs
multiple, 1184-1185, 1184	after hardware installation,	in AUTOEXEC.BAT file,
Trend Micro site, 703	344-345	178-179
triboelectric value, 298	inkjet printers, 820-829,	viruses in, 696
tripler chips, 112	833-834	TTL (Transistor-Transistor
Trojan horses, 696-697	Internet and online serv-	Logic) chips, 299
defined, C254	ices, 1359-1360	TTL monitors, 996
firewalls for, 1232	keyboards, 952-957, 963	Tucows site, C156
Trojan prefix, 695	lockups, <b>343–344</b>	tuner cards for video capture,
Troubleshooters, C165	memory, 481-482	1060

Tunes site, 1026	for serial communications,	Zip drives for, C44, C83-
tunneling protocols, 1186	895-897	C84, C84
tunnels for cable broadband,	UDP (User Datagram Protocol),	Ultra HiNote 2000 computer,
928	C256	126
Turbo Cool power supplies,	ultimate computer, C30	Ultra SCSI, <b>602–604</b> , C255
279	BIOS for, <b>C66-C69</b> , <i>C67</i>	Ultra Wide SCSI, C255
Turbo LED, C88	cases for, <b>C33-C36</b> , <i>C34</i> ,	Ultra2 SCSI, C255
Turn off automatic updates	C47-C49, C48	UltraPlayer MP3 player, 1028
option, C146	CD-ROM drives for, C44-	unbalanced SCSI, 598
turning off computers,	C45, C69-C70, C70,	unbuffered SDRAM, 470
293-295	C82-C83, C83	uncertified files, C139
TV tuner cards, 1060	DVD decoder cards for,	uncompressing, C255
TweakUI tool, C153	C75-C76, <i>C76</i>	undelete program, 735
twisted-pair (TP) cable	DVD drives for, C44-C45,	Undernet IRC channel, 1355
connectors for, 1164-1165,	C69-C70, <i>C70</i>	underscanning, 990
1165	expansion boards for, C79-	undervoltage conditions,
for crosstalk reduction,	C82, <i>C79-C82</i>	<b>296–297</b> , 503
288	floppy disk drives for, C43,	unerasing files, <b>733–738</b> , <i>735</i>
defined, C254-C255	<b>C64</b> , <i>C64</i> , C84	unformatters, 740–741
for DSL, 918	front panel lights and	unfragmenting files, 729–731,
for networks, 265,	speaker for, C87-	<i>729, 731,</i> <b>752–753</b>
<b>1153–1157</b> , <i>1154</i> ,	C88	unidirectional ports, 241–242
C26-C27	hard disk drives for, C42-	Uniform Resource Locators
twists in cable, 777, 778, C64,	C43, C65, C65, C84-	(URLs), C255-C256
C64	C85, C85	uninstalling programs, C114
two and a half clock speeds,	interfaces for, C46-C47,	Uninterruptible Power Sup-
114	C47	plies (UPSs)
two-way satellite communica-	keyboards and mouse in,	defined, C256
tions, 934-935	C70-C71, <i>C71</i>	operation of, <b>508–512</b> ,
two-way set-associative	modems for, C41-C42,	509-510
caches, 127	C42, C75	Universal Asynchronous
Type 1-9 cable, 1156, C255	motherboards for, C36-	Receivers/Transmit-
Type 1 PC Card slots, 222–223	C37, C49-C60, C77-	ters (UARTs), 36
Type 2 PC Card slots, 223	C78, C77	defined, C256
Type 3 PC Card slots, 223,	networking in, C45-C46	for modems, 906
1293	operating system for, C71-	for serial communications,
types, CPU, 32	C72	895-897
	port connectors for, C86- C87	universal SCSI drivers, 631, 631
U		Universal Serial Bus. <i>See</i> USB
II ninelines in Pentium	power supplies for, <b>C78</b> , <i>C79</i>	(Universal Serial Bus)
U pipelines in Pentium, 134-135		Universal Undo feature, C155
UARTs (Universal Asynchro-	quick steps for, C31-C32	
nous Receivers/Trans-	sound cards for, C37, C39- C40, C41, C73-C75,	Unix, MP3 players for, 1029 unmoderated newsgroups,
mitters), 36	C40, C41, C73-C73,	1343
defined, C256	troubleshooting, C89-C90	unshielded cable, C256
for modems, 906	video boards for, C37-C39,	unshielded speakers, 1019
101 1110001113, 300	C60-C63	ansinciaca speakers, 1019

C60-C63

unshielded twisted-pair (UTP)	modems in, C25-C26	Use Shortcut option, C105
cable	motherboards, C15-C16	Use SoundSentry option, C102
defined, C256	paths for, C12-C13	Usenet newsgroups, 1341
for network interface	planning, C14-C15	defined, C216, C257
cards, 1149	ports, C19-C20, C19-C20	finding, 1346-1349
for networks, 1153-1154,	power supplies, 496–498	hierarchies in, 1344-1345
1154	slots in, C21-C23, C22-C23	netiquette in, 1345-1346
unused slots, RFI from, 291	video and sound, C21	operation of, <b>1342-1343</b>
Update Device Driver Wizard,	upper memory area, 174	for technical information,
C121, <i>C121</i>	UPS monitoring, C256	1349-1350
update sequence numbering	UPSs (uninterruptible power	USER.DAT file
(USN) journaling, <b>683</b>	supplies)	backing up, 716
Update Settings window, C146	defined, C256	in Registry, C158-C159
Update Wizard Uninstall,	operation of, 508-512,	User Datagram Protocol (UDP)
C137-C138	509-510	C257
updating	upstream rates in broadband	user-definable hard disk drive
with AutoUpdate, C144-	communications,	types, 64, 587
C146	913-914	user-induced power surges,
Update Wizard Uninstall	cable broadband, 928	293-295
for, C137-C138	DSL, 920	"USER MAINTENANCE" mes-
virus protection software,	satellite communications,	sage, 879
699	931	user programs, memory for,
with Windows Update,	URLs (Uniform Resource Loca-	179-180
C144-C145	tors), C255-C256	USN (update sequence num-
upgradability of proprietary	USB (Universal Serial Bus),	bering) journaling, <b>68</b> 3
PCs, <b>1243</b>	<b>36–37</b> , <b>243–246</b> , <i>245</i>	utilities, online sources for,
upgradable PCs, modularity	availability of, 246-247	1320 <b>, 1338</b>
of, 103	benefits of, 246	UTP (unshielded twisted-pair)
upgrading	for CD-ROMs, 1126	cable
communication options in,	connectors for, 261, <i>261</i>	defined, C257
C25-C27	defined, C256	for network interface
DVDs in notebooks,	description of, 524	cards, 1149
1294-1295	for keyboards, 950	for networks, 1153-1154,
EIDE adapters, C16-C17,	for mice, 959	1154
C17	for modems, 897	UUCode tool, C153
floppy controllers, C18,	in PC selection, 1252	
C18	ports for, 41	V
games in, C27-C28	for printers, 802-803	<del>-</del>
hard disk drives in note-	for satellite communica-	V.90 protocol
books, 1284-1294	tions, 934	characteristics of, 920
home networks in, C26-	for ultimate computer,	defined, C257
C27	C36, C46, <i>C47</i>	V-dot modem standards,
keyboards and mice, C21	for upgrading, C20, C20	909-910
LAN adapters, 1295-1296,	USB Viewer tool, C153	V pipelines in Pentium,
1296	Use Automatic Settings	134-135
memory in notebooks,	option, C129	V20 CPUs, 141
1277-1284	Use High Contrast option,	V30 CPUs, 141
microprocessors, C18	C104, C104	vaccines, C257

Variable Content Encoding	DMA controllers on, 380	installing, 14–15, <i>14–15</i> ,
(VCE), 1089	VFM (variable frequency moni-	968-969, C60-C63
variable frequency monitors	tors), 991	memory for, <b>180–183</b> , <i>182</i> ,
(VFM), 991	VGA (Video Graphics Array)	235, <i>236</i> , <b>972-976</b> ,
varistors	boards, 235, <i>236</i>	980-983, C38-C39
in laser printers, 845-846,	buffer addresses for, 398,	monitors for, 987-994
846	974-975	operation of, <b>970</b> , <i>970</i>
in MOVs, 504-505, 507	connectors for, 262	in PC selection, 1249
VBS prefix, 695	defined, 997	problems with, 432-433
VBScript language, C257	dot pitch for, 989	quick steps for, C95-C96
VCE (Variable Content Encod-	horizontal scan frequency	resolution and colors with,
ing), 1089	for, 988	979-983
VCRs (videocassette	memory for, 181–183, 187	speeding up, <b>976-979</b>
recorders),	refresh rates with, 985	troubleshooting, 423–424,
1057-1058,	resolution and colors with,	998-999
1082-1083	979-982	for ultimate computer,
VDSL (very high-bit-rate digi-	VHS recorders for video cap-	C37-C39
tal subscriber line)	ture, <b>1052–1053</b>	for upgrading, <b>C21</b>
characteristics of, 919-920	VHS-C recorders for video	vertical scan frequencies
defined, C257-C258	capture, 1052	in, <b>984-986</b>
vector quantization compres-	video and video boards, 24,	video imaging chips on,
sion technique, 1092	34-35, 235-237,	976-979
vendors for purchasing PCs,	235-236, 966	video cable in laser printers,
1263-1264	3D, <b>986-987</b>	846
ventilation	in 80486 computers, C8	video capture, <b>1042-1043</b> ,
in box design, 277–278	accessibility options for,	1046-1047, 1046
for laser printers, 798	C103-C104, C103-	adjustments in, 1085
for modems, 910	C104	audio interface for,
for power supplies, 494	AGP bus for, <b>219–221</b> , <i>220</i>	1072-1073
for printers, 866	buffer addresses for, 397	broadcast video for, <b>1060</b>
verification data files, C138	and buses, 209, <b>214–215</b> ,	bugs in, 1098-1099
Version Conflict Manager,	971-972	cables for, <b>1073–1074</b> ,
C143-C144	buying, 967	1073
vertical-scan frequencies of	connectors for, 41, 258,	camcorders for,
monitors, 984-986	258, 262, 262	1049-1056, 1054
vertical synchronization, 1071	Control Panel for, <b>C117</b> -	capture boards for,
vertical white streaks on laser	C123, C118-C123	1074-1079
printer pages,	and CPU, <b>971</b>	components for,
857-858, 880	defined, C258	1047-1048, 1047
very high-bit-rate digital sub-	diagnosing problems in,	composite, S-video, and
scriber line (VDSL)		
	403	component inter-
characteristics of, 919–920	diagnostic program for,	face in, <b>1069–1071</b> ,
defined, C257-C258	336	1069
very low-frequency (VLF)	error beeps for, 428, 430	connectors for, 265
emission, C258	for games, C27	CPU, bus, and disk systems
VESA Local Bus (VLB), 209,	for generic computers,	in, 1079–1081
214-215	1241	digital, 1083–1084
description of, 524-525		DVDs for, <b>1058–1059</b>

frame captures in,	videocassette recorders	VLF (very low-frequency)
1086-1087	(VCRs), <b>1057–1058</b> ,	emission, C258
frame size and rate in,	1082-1083	VMS format, CD standard for,
<b>1085-1086</b> , <i>1086</i>	ViewSonic monitors, 992	1116
installing boards for,	virtual device drivers (VxDs),	VMWare, 683
1044-1045	326-330	voice capabilities in modems,
interface for, <b>1061-1072</b>	virtual machine emulators,	C41
MMX processors for, 131	683	voice coils, <b>538–540</b> , <i>539</i>
off-line compression in,	virtual memory	voice recognition, 116, 132
1093-1097	defined, C258-C259	volatile memory, 137, 248
PC cams for, <b>1057</b>	status of, C131	voltages
real-time compression in,	virtual private networking	on buses, 203, 226
<b>1088-1093</b> , <i>1091</i>	(VPN), <b>1186</b>	for CPUs, 114, C51-C52,
software for, <b>1082-1093</b> ,	VirtualDr site, 1336-1337	C52
1098-1099	Virus Bulletin site, 703	for DRAM, 465
still cameras for, 1060	viruses, 686-687	for keyboards, <b>954</b>
troubleshooting,	antivirus software for, 702	for laser printers, 870–871
1099-1101	attack methods of,	low-voltage systems, 495
VCRs for, <b>1057–1058</b>	695-698	for phone line, 937
video modes for, 1084	boot sector, 444, <b>690</b>	in power calculations, 497
video sources for,	defined, C259	for ZIF sockets, C24
1082-1083	downloading, 1338	volume in sound waves, 1004,
video conferencing, C258	example, <b>697–698</b>	<b>1006–1007</b> , 1007
video coprocessors, 977-978	file infectors, 689-690,	Voodoo chip sets, 987
Video Graphics Array (VGA)	C207	VPN (virtual private network-
boards, 235, <i>236</i>	firewalls for, 1232	ing), <b>1186</b>
buffer addresses for, 398,	hoaxes, 698	VRAM (Video RAM)
974-975	on Internet and online	characteristics of, 972-973
connectors for, 262	services, 1358	defined, C258
defined, 997	lockups from, 344	VXD files
dot pitch for, 989	in macros, <b>690–692</b>	for device drivers, 177
horizontal scan frequency	protection against, 178,	viruses in, 689
for, 988	699-702	VxDs (virtual device drivers),
memory for, 181-183, 187	Signature Verification Tool	326-330
refresh rates with, 985	for, C139	
resolution and colors with,	symptoms of, 703	W
979-982	troubleshooting, 704–705	VV
video imaging chips, 976–979	types of, <b>688–689</b>	W32 prefix, 694
video memory aperture,	Web applet, <b>693–694</b>	W95 prefix, 694
974-976	Web sites for information	W97M prefix, 694
video modes for video cap-	on, 702-703	wait states, C259
ture, <b>1084</b>	worms, <b>692–693</b>	Waitfor tool, C153
video RAM (VRAM)	VirusScan program, 702	walking bit errors, 477–478
characteristics of, 972–973	VisiCalc program, C6	WANs (wide-area networks)
defined, C258	VLB (VESA Local Bus), 209,	defined, C260
video sources for video cap-	214–215	vs. LANs, 1143
ture, 1082-1083	description of, 524-525	warm boots, C259
Video Spigot product, 1091	DMA controllers on, 380	
. Into opigot product, 1001	Dia redictionero dii, 500	

WARM (Write And Read Many	WIN.INI file	ScanDisk, C143
times) optical drives,	checking, C142	Signature Verification Tool
632-633	for compatibility, C157	C139
"WARMING UP" message, 874	purpose of, 715	System Configuration Util-
warranties for modems, 910	Win prefix, 694	ity, C140-C143,
Watchzone group, 212	Winamp MP3 player, 1028	C141
water and liquids, 302–304	WinDif tool, C153	System File Checker, C138
wattage ratings for power	WinDoctor utility, C154	C139, C138
supplies, 497-498	Window RAM (WRAM), 973	System Monitor, C132,
wavetable synthesis, 1014,	Windows 3.x operating system	C132
C40, C259	drivers for, 177	Update Wizard Uninstall,
WD manufacturer code, 450	multitasking in, 190-191	C137-C138
WD40 lubricant, 795	Windows 95/98 operating sys-	Version Conflict Manager,
Web applet viruses, 693-694	tems	C143-C144
Web browsers, 1325-1326,	for IEEE 1394 support, 570	Windows Report Tool,
C259-C260	Troubleshooters in, C165	C136-C137, C137
Web cams	Windows 98 INF Installer tool,	WinDrivers.com site, 1337
defined, C260	C153	WINFILE.INI files, backing up,
for video capture, 1057	Windows Boot Editor tool,	715
Web pages, C260	C153	Winmodems, 906-907
Web servers, C260	Windows directory, C72	WINS (Windows Internet Nam
Web sites, C260	Windows Internet Naming Ser-	ing Service) servers,
WebTechGeek site, 1337	vice (WINS) servers,	1181, C260
Western Digital	1181, C260	Winset tool, C153
prefix for, 450	Windows keys, 948	Wintel systems, 106, C261
site for, 642	Windows Media Player, 1028,	wireless communications
wet disk technology, 519	1033	defined, C261
wheels for mouse, 957	Windows programs	networks, 1161-1162,
Where tool, C153	diagnostic, 337-338	1197
white noise, C25	installing, C115-C116,	for homes, 1189
white papers, 1318–1319	C115	for offices, 1186
white streaks on laser printer	Windows Report Tool, C136-	wireless devices
pages, <b>857–858</b> , 880	C137, C137	input, <b>961-962</b>
white wires in AC supplies,	Windows Resource Kit, C151-	printers, <b>803–804</b>
83-84	C154	wiring
Wicked PC site, 1337	Windows Setup tab, C115-	checking, <b>501</b>
wide-area networks (WANs)	C116, <i>C115</i>	in phone lines, 937
defined, C260	Windows Update utility, C144-	with serial communica-
vs. LANs, 1143	C145	tions, 936-937
Wide SCSI, 602, 611, C260	Windows utilities	WM prefix, 694
Wide Ultra SCSI, C260	Automatic Skip Drive	WNT prefix, 695
Wide Ultra2 SCSI, C260	Agent, C139-C140	wool, triboelectric value of,
widescreen format, 1137	DirectX Diagnostics Tool,	298
wildcard characters, C181,	C134-C136, C134	Word, viruses from, 690–692
C240, C260	Dr. Watson, <b>C140</b>	Word Macro Virus Protection
WildList Organization Interna-	MSI, C132-C133, C133	Tool, 691
tional site, 703	Registry Checker, C139	word size

for CPU, **120-121**, 140-143 in MMX processors, 131 workspace for disassembly, 60 for notebook upgrades, 1278 World Wide Web (WWW), 1325 clicking and linking on, 1325-1326 defined, C216, C261 searching for sites on, 1326-1331 for technical information, 1331-1338 WORM (Write Once, Read Many times) disks, 632 worms, operation of, 692-693 WRAM (Window RAM), 973 wrinkling of laser printer paper, 870 Write And Read Many times (WARM) optical drives, 632-633 write-back algorithms, 127 write-back caches, C261-C262 write back instructions, 120 write caching, 558 Write Once, Read Many times (WORM) disks, 632 write precompensation, 522 write precompensation cylinders, documenting, 64 write-protection for viruses, 701-702 write-through algorithms, 127 write-through caches, C262 writing on laser printer drums, 846-847, 847 WWW (World Wide Web), 1325 clicking and linking on, 1325-1326 defined, C216, C261 searching for sites on, 1326-1331

for technical information, 1331–1338 Wyse Technology, 212

## X

X axis motion in mice, 958 X-ray machines, 285–286 X2 modem standard, 909 X97M prefix, 694 XA standard, 1117-1118 XCOPY command, 722 Xenix operating system, 642 Xeon CPU, 115-116 data path for, 123 heat in, 152, 276 internal cache memory on, 129 introduction of, 154 pipelines in, 120, 136 specifications for, 141 word size for, 121 XGA (Extended Graphics Array) characteristics of, 981-983, 997 video RAM for. 976 XGA-2. characteristics of. 981 Xircom PC Cards, 223 XM prefix, 694 XMMS MP3 players, 1029 XON/XOFF flow control, 903, C262 XT computers clock rate for, 109 CMOS in, 586-587 configuring, 408 floppy disk drive controllers in, 777 interrupts in, 387-388 keyboards for, 946-947 UARTs in, 896

## Υ

Y axis motion in mice, 958
Y/C interface, 1070, 1073
Y signals, 1065-1069
Yahoo! directory, 1331
Yahoo! Groups list, 1351
Yellow Book CD-ROM standard, 1116
yellow wires in phone lines, 937
YUV9 compression technique, 1077, 1092

## Z

ZBR (Zone Bit Recording) defined, 520-521, C262 in logical block addressing, 537 sectors in, 532-533 ZDNet site, 1337 Zenith in Watchzone group, 212 Zero-Surge Protector, 508 ZIF (Zero Insertion Force) sockets defined, C262 operation of, 85, C24, *C24*, C57-C58, *C57-C59* for PGAs, 57 Zip drives, 720-721 defined, C262 installing, C83-C84, C84 for old computer data, C9-C10. C10 for ultimate computer, C44 ZIP files, C262 Zone Bit Recording (ZBR) defined, 520-521, C262 in logical block addressing, 537 sectors in. 532-533