Entries in italics refer to titles of standards and specifications.

2-D and 3-D graphics acceleration alpha blending, 209, 210 double buffers, 206, 210 Entertainment PC 97, 84 frame buffer access, 205 graphics adapter requirements, 205-11 hardware stretching, 203 hidden surface removal, 210 low-resolution modes, 206 Microsoft Direct3D, 199 OpenGL technology, 199 palettized textures, 210 parallelism between controller and rasterizer, 210 programmable blter stride, 207 RGB mode rasterization, 208-9 scan lines, 206 shading and texture mapping, 208-9 transparency effects, 209-10 transparent blter, 206 triangle setup, 211 VGA destination color keying, 207 Workstation PC 97, 66, 67 YUV off-screen surfaces, 203 3-D rendering. See 2-D and 3-D graphics acceleration 4-bit planar VGA mode, 43 7-bit codes for text telephones, 276 12-bit I/O decoding, 33 16-bit I/O decoding, 33, 120, 248 16-bit protected-mode components, 36 32-bit protected-mode components, 36 386- and 486-based computers. See x86-based systems 1284-1994. See IEEE 1284-1994 1394. See IEEE 1394 1394 Plug and Play Design Reference, 104 1394 Power Specification, 104 8024 controllers and devices, 118, 119 8042 chips, 187, 189 16550 UART chips, 167 80486-class systems. See x86-based systems 82365-compatible mode, 150-51

A

ABR (Average Bit Rate), 302 acceleration. See 2-D and 3-D graphics acceleration; OpenGL acceleration Accessibility Design Guide I, 372 accessibility guidelines accessibility defined, 352 Basic PC 97 systems, 29 disabilities defined, 351 documentation, 360-61 Entertainment PC 97 systems, 29 in PC design, 16 input components and controls, 357-59 labeling, 360 manipulation and physical design, 355-56 references, 372-74 software guidelines, 349 sound devices, 354 visual displays and indicators, 353 Workstation PC 97 systems, 60 ACE-compliant platforms, 12, 59 ACK (acknowledgement signals) 187, 190, 379 ACPI (Advanced Configuration and Power Interface) ACPI bus device IDs. 339 ACPI control methods, 25 Advanced Configuration and Power Interface (ACPI) specification, 20 Basic PC 97 and mobile systems, 24-25 defined, 379 description tables, 24 docking stations, 48 Entertainment PC 97 systems, 24-25 feedback address, 53 overview, 17-18 power buttons, 24 power management (see power management) power management timers, 24 Real-Time Clock alarm, 24 role in Plug and Play issues, 9 Smart Battery support, 25 Status and Enable (STS/EN) bits, 24 system BIOS (see BIOS) system control interrupts, 24 system sleep states, 24 thermal model and fan control, 25 Windows 95 and Windows NT, 5 Workstation PC 97 systems, 24-25, 60 AC-powered devices, 99-100 AC power supplies, 97

ACT (Audio Compatibility Tests), 243 ActiveMovie. See Microsoft ActiveMovie active terminators, 139 ActiveX, 74 adaptive connections, 278-80 adding on technologies and capabilities. See extensibility add-on devices. See also names of add-on device types defined, xx, 22 general PC 97 requirements, 29-37 multifunction devices, 37 Advanced audio capabilities Basic PC 97 and mobile systems, 42 Entertainment PC 97 systems, 82 full duplex audio capabilities, 245 line-in and line-out capabilities, 245 MIDI support, 245 PC 97 design requirements, 242, 245-46 stream synchronization, 246 Workstation PC 97 systems, 42 Advanced Configuration and Power Interface. See ACPI (Advanced Configuration and Power Interface) Advanced Configuration and Power Interface (ACPI) specification, 53 Advanced Power Management (APM), 379 Advanced RISC computing, 12, 59. See also **RISC-based** systems agents, 379 AGP (Intel Accelerated Graphics Port), 43, 199 alert lights, 353 alert sounds, 354 alias I/O addressing, 33 allergic reactions to part materials, 356 allocated fields (CardBus), 155 alpha buffers, 209 Alternating Voice and Data (AVD), 281 Alternating Voice or Data (VoiceView) Modem, 282 analog cellular phones, 285-86 analog composite video input connectors, 85, 213Analog Simultaneous Voice and Data (ASVD), 281 animation support, 210 Annex A, ITU V.25ter, 274, 278 ANSI communications standards, 289 ANSI/SMPTE 12M time code standard, 232 answering machines, 26, 272 APIs defined, 379 display monitor APIs, 6 ICC color matching, 233, 316, 322

APIs (continued) Int 13h Extensions API, 134 Microsoft ActiveMovie, 6 Microsoft Direct3D, 6 Microsoft DirectDraw, 6 Microsoft DirectInput, 182, 193 Microsoft DirectSound, 6 SMART IOCTL API specification, 132, 134 telephony APIs, 6 Win32 API, 385 Windows 95 and Windows NT common API set, 5 APM (advanced power management), 379 Application keys, 191 applications. See operating systems; software and utilities application-specific integrated circuits (ASIC), 379 Applications programming interface. See APIs arbitration gap counts, 103 arbitrators, 379 ARC (Advanced RISC computing), 12, 59. See also RISC-based systems ARC Query Config functions, 12 arithmetic stretching, 203, 229 ASCII documentation text files, 360 ASCII text telephones, 276 ASIC (application-specific integrated circuits), 379 assistive technology programs, 374 ASVD (Analog Simultaneous Voice and Data), 281 async-to-sync data conversion, 297 ATA (AT Attachment interchange) 133, 379. See also IDE (Integrated Drive Electronics) ATA-2 specification, 127, 134 ATA-3 specification, 127 ATA/IDE interface. See IDE (Integrated Drive Electronics) ATA Packet Interface for CD-ROMs (SFF 8020i), 133, 134 ATAPI (AT Attachment Packet Interface) ATAPI CD-ROM, 129 BIOS recognition, 128 cabling, 129, 132 checklist, 135-36 defined, 379 design requirements, 131-33 Media Status Notification Specification, 127, 131, 134 overview, 126 references. 134 SFF 8020i compliance, 128, 131, 134 ATAPI RESET command, 132 ATA STANDBY command, 126, 131

389

Index

AT Attachment interchange, 133, 379. See also IDE (Integrated Drive Electronics) AT Attachment Packet Interface. See ATAPI (AT Attachment Packet Interface) AT command set, 274, 297 ATM adapters. See also network communications devices bridges, 301 buffer chaining, 302 cable sense, 301 checklist, 308-10 device drivers and installation, 305 external clocking, 302 NDIS 4.0 miniport driver, 301 operation and maintenance support, 302 Plug and Play, 303-4 power management issues, 304 receive and send buffers, 301 references, 307 traffic shaping, 302 VPI and VCI ranges, 301 Workstation PC 97 systems, 65 ATM User Network Interface Specification v 3.1, 307 AT-style keyboard ports, 189 AT&T Enhanced Cellular Protocol (ECP), 285 AT+V command set, 277, 284 audible noise requirements, 28-29, 60, 77 audio acceleration, 242 Audio Compatibility Tests (ACT), 243 audio components accessibility guidelines, 354, 367 audio acceleration, 242 audio and video decode performance, 228 audio clocks, 232 buses and I/O types, 248-49 checklist, 252-53 codec, 246, 380 conflict resolution, 247 consumer electronics devices, 101 device drivers and installation, 250-51 device IDs, 335, 346-47 Digital Audio and Performance Data Transmission Protocol and Connection Management for Electronic Musical Environment, 102 digital-to-analog audio converters, 82 DVD playback requirements, 230 echo cancellation, 245 full duplex operation, 245 input standards, 244

audio components line-in and line-out capabilities, 244, 245 MIDI playback, 243 output standards, 243, 245 overview, 242 PC 97 systems Advanced audio capabilities, 42, 82, 242, 245-46 baseline audio capabilities, 242, 243-44 Basic PC 97 and mobile systems, 42, 47 Entertainment PC 97 systems, 82 Workstation PC 97 systems, 64 Plug and Play requirements, 247 power management, 250 pulse-code modulation digital audio, 243 Red Book audio, 384 references, 251 signal-to-noise ratios, 244 sound port icons, 332 synchronized audio and video, 224 Unique IDs, 248 wave audio capture, 232 Win32 Audio Class, 102 AUI transceivers, 296 automated attendant modem features, 272 automatic device configuration. See device configuration automatic termination circuits, 139, 143 AVC Command set, 101, 102 AVD (Alternating Voice and Data), 281, 282 Average Bit Rate (ABR), 302 Average Frame Rate Achieved property, 228

В

back buffers, 206 background task interference, 231 bandwidth, 10-11, 98 BANDWIDTH_AVAILABLE register, 103 bank-switched frame buffers, 216 BARs (Base Address Registers) closing BAR windows, 108 graphics adapters, 215 PC Card 16-bit Interface Legacy Mode BAR, 110, 151 random values, 112 baseline audio capabilities, 242, 243-44 basic input/output system. See BIOS Basic PC 97 requirements ACPI support, 24-25 audio components, 42, 242, 244, 245-46 boot device BIOS support, 28 bus requirements, 38-39

Basic PC 97 requirements (continued) checklist, 54-56 CPUs, 23 definition, 4 display monitors, 42-43, 44, 200 general device requirements, 29-37 graphics adapters, 42-44, 198, 199, 200-211 industrial design requirements, 28-29 input components, 28, 40, 182-83 I/O device requirements, 40-42 L2 cache, 24 modems, 272, 273, 277-78 multimedia PC guidelines, 51-52 network communications, 42, 294 OnNow support, 25-26, 27 operating system installation, 41 overview, 22-23 references, 53 serial, parallel, and wireless connections, 40, 41, 164, 183 storage device requirements, 44-45 system memory, 24 system requirements, 23-28 video components, 212-14, 225-26, 229-31, 264 batteries Battery Voltage Detection bits, 157 Intel/Duracell Smart Battery System Specification, 25, 53 mobile systems, 46 PC Cards with batteries, 157 terminator power, 140 Battery Voltage Detection bits, 157 Baudot text telephones, 276 beep sounds, 354 Bellcore Custom Local Area Signaling Services. See CLASS services Bellcore Technical References Bellcore SR-TSV-002275, 284 Bellcore SR-TSV-002476, 280 Bellcore TR-NWT-000030, 280 Bellcore TR-NWT-000031, 284 Bellcore TR-NWT-00426, 284 Bellcore TR-NWT-000575, 284 Bellcore TR-NWT-001188, 284 Bellcore TR-NWT-001401, 280 Bellcore TR-TSY-000219, 283 Bellcore TR-TSY-000571, 284 BOC Notes on the Network, 284 obtaining publications, 289 bilinear filtered textures, 209 binding manuals, 360

BIOS ATAPI device recognition, 128 BIOS flags, 112 boot device BIOS support, 28 boot support for keyboards, 90, 189 Clarifications to the Plug and Play BIOS Specification v. 1.0a, 123 Compaq, Intel, Phoenix BIOS Boot Specification, 53, 128 device IDs, 340 enumeration (see also enumeration) ATAPI devices, 131 CardBus controllers, 150-51 Int 13h Extensions, 44, 127 IRQ routing support (PCI), 112 logical block addressing, 128 No Emulation mode, 263 non-Plug and Play operating systems, 39, 120 option ROM usage, 32 PCI interrupt sharing, 112 Plug and Play BIOS device IDs, 340 Plug and Play BIOS Specification v. 1.0a, 123 POST (power-on self test), 27, 384 ROM scans, 123 run-time functions, 32 USB keyboard support, 28, 90 bit-blters, 198 bitmaps (DIBs), 380 blacklisted numbers feature, 286 blindness, 351 block-mode device drivers, 260 block reads, 103 blters bit-blters, 198 hardware blters (block transfers), 67, 84, 198 programmable blter stride, 207 transparent blters, 206 Blue Book format, 263, 264 Blue Book Specifications for Consumer-Use Digital VCRs Using 6.3mm Magnetic Tape, 101 BNC transceivers, 296 board-unique numbers, 121 BOC Notes on the Network Bellcore document, 284 bong tones, 284 boot devices boot device BIOS support, 28 ISA card requirements, 122-23 option ROMs, 120

PCI interrupt sharing, 112

boot process boot drive determination, 132 Compaq, Intel, Phoenix BIOS Boot Specification, 53, 128 ISA Write Data Port addresses, 110 "legacy" boot process, 123 POST (power-on self test), 27 TV vs. VGA output, 212 Boulav terminators, 139 BPBs (BIOS Parameter Blocks), 260 bpp, 202, 206 Braille, 352, 360 bridges bridge connectors, 109 network adapters, 296 PCI-to-CardBus bridges, 149 PCI-to-ISA bridges, 109 PCI-to-PCI bridges, 111 south bridge multifunction devices, 127 brightness display controls, 353 broadcast satellite subsystems, 83 buffer chaining, 302 buffering, 379 buffer positions, 246 buffers alpha buffers, 209 back buffers, 206 bank-switched frame buffers, 216 buffer chaining, 302 buffering, 379 buffer positions, 246 buffers defined, 379 DirectDraw access, 205 double buffer support, 206, 210 packed-pixel frame buffers, 202, 215-16, 383 bus enumerators, 379 buses. See also bus mastering; expansion buses and cards; local buses; names of specific bus types avoiding legacy adapters, 199 bandwidth requirements, 10-11, 98 Basic PC 97 and mobile systems, 38-39, 47 bus enumerators, 379 bus-powered devices, 99-100 choices for extensibility, 10-11 device IDs, 339 EISA buses, 339, 381 Entertainment PC 97 systems, 79 enumeration (see enumeration) OnNow requirements, 17 PC 97 design, 6, 30 power management support, 17, 26 primary graphics adapter, 43, 66

buses (continued) reducing bus off-time, 98 Workstation PC 97 systems, 62 bus-manager capabilities, 102-3 bus mastering ATAPI CD-ROM, 129 bus master privileges, 109 graphics and display requirements, 65 high-performance components, 67 network communications devices, 294 PCI IDE bus master DMA, 129 Programming Interface for Bus Master IDE, 134 SCSI host adapters, 138 storage device requirements, 45, 68, 86, 256 virtual DMA services (VDS), 139 bus parity signals, 142 buttons and controls accessibility guidelines, 357 buttons on remote controls, 188 byte buffer alignment, 296

С

cable modems. See also network communications devices basic features, 299-301 bridges, 300 cable sense, 300 checklist, 308-10 developing standards, 301 device drivers and installation, 305 Entertainment PC 97 systems, 82-83 Ethernet network adapters, 300 low-cost solutions, 300 NDIS 4.0 miniport driver, 300 PC 97 systems, 295 Plug and Play, 303-4 power management issues, 304 receive and send buffers, 300 references, 307 transceiver sensing, 300 Workstation PC 97 systems, 65 cable power distribution, 96, 99, 103 Cable Power Distribution model, 99 cable-powered devices, 99-100 cables cable sense, 296, 297, 300, 301 CSEL support, 129, 132, 262 icons, 331-32 internal terminators, 140 master-slave configuration, 129, 132, 262 Pin 1 orientation, 129, 132

cables (continued) plugging in incorrectly, 142 SCSI requirements, 139, 142 Cable Select (CSEL), 129, 132, 262 cable sense, 296, 297, 300, 301 cable TV HSCDS (High Speed Cable Data Services), 299-301 tuner design requirements, 84 cache (L2 cache), 24, 59, 76 calibration utilities for monitors, 233, 316, 322 Call Indication signals, 279 calling-card prompt tones, 284 Calling Identity Delivery on Call Waiting Bellcore document, 284, 289 Calling Name Delivery Generic Requirements Bellcore document, 284, 289 Calling Number Delivery Bellcore document, 284, 289 calling tones, 279, 284 Call Modality Discrimination, 278 Call Modality Discrimination (ITU V.8bis), 280, 289 call mode discrimination signaling, 278-80 Call Waiting Bellcore document, 284, 289 Call Waiting Deluxe Bellcore document, 284, 289 camcorders bus requirements, 79 connections, 213 Win32 Imaging Class, 101 cameras. See digital cameras capacitance-based controls, 358 Caption Center, 374 captioning video, 231, 374 capturing video. See video input and capture CardBus devices allocated fields, 155 checklist, 160-61 ConfigSpace initialization, 150 configuration space, 155 controllers as multifunction PCI devices, 110 device drivers and installation, 158 device IDs, 340 initializing in 82365-compatible mode, 150-51 mobile systems, 46 PCI interrupts, 150 Plug and Play requirements, 155-57 power management, 157-58 R2 memory windows, 151 references, 159 requirement revisions and updates, 148

CardBus devices (continued) **RESERVED** fields, 156 socket controllers, 149 "Yenta" specification, 149 card information structures (CIS), 154 cards. See names of specific card types card select numbers, 122, 380 card services, 379 casing design, 361-62 CD-Audio format, 263, 264 CD changers, 263 CD-E format, 263 CD Enhanced support, 262 CDFS (compact disc file system), 379 CDMA (Code Division Multiplexed Access), 285, 286 CD-R format, 263 CD-R2 format, 263, 264 CD-ROM devices. See also CDs accessibility guidelines, 369-70 ATA Packet Interface for CD-ROMs (SFF 8020i), 133, 134 ATAPI CD-ROM, 129 (see also ATAPI) audio device resource allocation, 247 Basic PC 97 and mobile systems, 41 boot device BIOS support, 28 CD changers, 263 CDFS (compact disc file system), 379 checklist, 267-69 device drivers and installation, 259-60 DVD formats, 264 El Torito-Bootable CD-ROM Format Specification Version 1.0, 53 IDE requirements, 133 inserting and ejecting discs, 355 logical and physical formats, 263 multisession CD-ROMs, 133, 262 PC 97 design requirements, 262-63 Plug and Play requirements, 257-58 power management issues, 258 proprietary adapter device IDs, 346 READ_TOC command, 133 references, 265-66 speed, 262 storage component basic features, 256-57 Workstation PC 97 systems, 64 CDs ejecting and inserting, 355 Enhanced Music CD Specification, 265 multisession CD-ROMs, 133, 262 cellular data services, 275 cellular phone modem support, 285-86 central processing units. See microprocessors certification for RF devices, 176

channels allocation and deallocation, 101 dual channel controllers, 128 CHANNELS AVAILABLE register, 103 checklists audio components, 252-53 Basic PC 97 systems, 54-56 Entertainment PC 97 systems, 87-88 graphics adapters, 220-22 IDE and ATAPI, 135-36 IEEE 1394, 105 input components, 195-96 ISA cards and devices, 124 modems, 290-91 network communications devices, 308-10 PC Cards, 160-61 PCI, 113 printers, 319-20 scanners and digital cameras, 328-29 SCSI adapters and peripherals, 144-45 serial, parallel, and wireless devices, 177-79 storage devices, 267-69 USB buses, 93 video components, 238-39 Workstation PC 97 systems, 70-71 Checklists for Implementing Accessibility in Computer Laboratories at Colleges and Universities, 372 CIP Headers, 101 circuit breakers, 140 CIs (Call Indication signals), 279 CIS (card information structures), 154. See also tuples CISC-based platforms, 12 CISTPL_BAR, 156 CISTPL CFTABLE ENTRY, 152, 153 CISTPL_CFTABLE_ENTRY_CB, 156 CISTPL_CONFIG, 152, 153 CISTPL_CONFIG_CB, 156 CISTPL_DEVICE, 152, 153 CISTPL_END, 156 CISTPL_FUNCID, 153, 154, 156 CISTPL_LINKTARGET, 156 CISTPL_MANFID, 153, 154, 156 CISTPL_VERS_1, 152, 153, 156 Clarification to Plug and Play BIOS Specification v. 1.0a, 30, 119, 123 Clarification to Plug and Play ISA Specification v. 1.0a, 30 Class 1 (TIA-578-A) command set, 275 Class Code field (CardBus), 155 Class Code Register (09h), 112 class drivers, 19 classes, 380

CLASS key, 171 ClassName PNP field, 324 CLASS services blacklisted and delayed number clearing, 286 Caller ID services, 283-84 cellular phone support, 285-86 compound Voice Mode responses, 284 dial string modifiers, 284 distinctive ringing class service, 283 in-band Voice Mode responses, 284 speakerphones, 277 telephone wave device compression methods, 285 closed captioning, 231, 374 closing BAR windows, 108 closing DVD devices, 265 CMP (Connection Management Protocol), 101 codec, 246, 380 Code Division Multiplexed Access (CDMA), 285, 286 cognitive impairments, 351 cold docking, 380 color color-blind users, 361 color depth, 202, 219 color ordering, 202 color space conversion, 229 designing accessible displays, 352 image color matching, 202 shading and texture mapping, 208-9 VGA destination color keying, 207 color-blind users, 361 color depth (graphics adapters), 202, 219 color index mode rasterization, 208 color monitors. See also display monitors; entertainment monitors Basic PC 97 and mobile systems, 42-44 Entertainment PC 97 systems, 83-84, 85 Workstation PC 97 systems, 66, 67 color ordering, 202 color space conversion, 229 Command and Status Register protocol (CSR), 100, 101 command protocol requirements (IEEE), 100-102 Command register, 150 command sets. See also ITU communications standards AT command set, 274, 297 DVD devices, 264 TIA-578-A (Class 1) command set, 275 TIA-602 command set, 274

TIA-695 (AT+V) command set, 277, 284

command sets (continued) V.25, V.8 and V.8bis call mode signaling, 274.278-80 V.25ter Annex A commands, 274, 278 Common Isochronous Packet Headers, 101 Common Silicon Guidelines, 155 Communications Device Class, 166, 288 compact disc file system, 379 compact discs, 133, 262, 265, 355 Compaq, Intel, Phoenix BIOS Boot Specification, 53, 134 Compatibility mode defined. 380 Dual IDE adapters, 127 IEEE 1284 printers, 313 parallel ports and devices, 170 storage components, 259 compatibility tests, xxii, 381 CompatibleIDs CompatibleID keys, 171, 314 numerical listing, 336-47 obtaining vendor codes, 32, 333 overview, 334-35 Complex Event Detection Reports, 284 component audio, 102 COM ports, 338. See also serial ports and devices composite video connectors, 213 compound Voice Mode responses, 284 compression codec, 246, 380 telephone wave device compression methods, 285 computers. See PC 97 design; PCs Config state (ISA), 122 configuration. See resource configuration configuration space. See PCI Configuration Space configuration tuples, 152, 153, 154, 156 configuring resources. See resource configuration conflict resolution. See resource conflicts Connection Management Protocol (CMP), 101 connectivity. See network communications devices connectors analog composite video connectors, 85, 213 European TV connectors, 213 high-density connectors, 140, 143 icons, 331-32 keyed or shrouded connectors, 34

mobile systems connectors, 46 parallel port connectors, 170

connectors (continued) PCI docking bridge connectors, 109 preventing incorrect connections, 34 RCA-style composite video connectors, 213 S-Video connectors, 84, 213 Consideration in the Design of Computers and **Operating Systems to Increase Their** Accessibility to Persons with Disabilities, 372 consumer electronics devices bus requirements, 79 connectivity, 6 Digital Interface for Consumer Electronic Audio/Video Equipment, 104 IEEE buses, 96, 101 optimizing PC 97 design, 74 SIPC initiative, 7 consumer IR support, 173 consumers. See users contrast (display controls), 353 contrast (printed manuals), 361 controllers. See also names of controller types bus mastering, 45, 68, 86 fixed I/O address assignments, 377-78 host controllers, 44, 68 OpenHCI compliance, 91, 96, 97 controls, 188, 353, 357-59 convenience features. See ease of use coprocessors. See math coprocessors copy protection, 265 cordless peripherals, 175 core chip sets and PCI IDs, 111 costs of cable modems, 300 CPE (customer's premise equipment), 280 CPE Compatibility Considerations for the Voiceband Data Transmission, 280 CPUs. See microprocessors CRC (16-bit cycle redundancy check), 153, 154 CSEL (Cable Select), 129, 132, 262 CS (Cable Select) hard disk setting, 262 CSNs (card select numbers), 122, 380 CSRs (Command and Status Register), 100, 101 current limiting in devices, 140 customer's premise equipment (CPE), 280 cycle master capabilities, 102-3 cyclic redundancy check (CRC), 153, 154

D

D3d*.dll, 218 DACs (digital-to-analog audio converters), 82, 243, 245 data modems. *See also* modems calling tones, 279 data/fax/voice modems, 82–83 data modems (continued) speed and protocols, 274 synchronous access, 275 DB15 game ports, 191 DDC2B support Display Data Channel DDC 2.0, 219 entertainment monitors, 235 graphics adapters, 216 DDC (display data channel), 380 DDI support, 317 DDKs (device driver kits) DirectX DDK, 219 Infrared Communications for Windows 95 DDK, 176 Microsoft contact information, xxii Microsoft Device Driver Kits (DDKs for Windows Operating Systems, 20 Win32 Driver Model DDK, 101 Windows 95 DDK, 104, 134, 176 Windows NT DDK, 104, 134, 176 Ddraw.dll, 218 deafness, 351, 354 debugging configuration registers, 111 defect management (DVD), 265 Deferred Procedure Calls (DPC), 19 delayed numbers feature, 286 delayed transactions, 109 depth-cueing operations, 209 DESCRIPTION key, 171 description tables (ACPI), 24 "Designed for Microsoft Windows" program "Designed for Microsoft Windows 95" logo, 3 "Designed for Microsoft Windows" logo, 3-4 overview of requirements, xv testing tools for hardware, xxii Design Guidelines for DirectX, 219 designing PC hardware. See PC 97 design desktop size (virtual desktop), 219 destination alpha blending, 209 detecting. See sensing development of PC hardware. See PC 97 design Device Class Power Management Reference Specification, 176, 194 device command protocols, 96, 100-102 device configuration audio components, 247 graphics adapters, 214 input components, 184 mobile systems, 48-49 modems, 287

device configuration (continued) network communications devices, 303 PC 97 Plug and Play requirements, 30 port replicator requirements, 50 serial, parallel, and wireless devices, 165, 167-68, 169, 174 storage components, 257-58 video components, 226 Device Configuration ROMs, 99, 101 device driver kits. See DDKs (device driver kits) device drivers. See also minidrivers; miniports and miniport drivers; VxDs (device drivers); WDM (Win32 Driver Model) audio components, 250-51 block-mode device drivers, 260 built-in drivers, 5 DirectSound driver, 242 game control ports and peripherals, 193 graphics adapters, 218 input components, 186 installation requirements, 36 interrupt sharing services, 121 message support, 36, 167, 228, 259, 289 Microsoft Device Driver Kits (DDKs), xxii, 20 (see also DDKs) Microsoft Windows Driver Library, xxii minidrivers. See miniports and miniport drivers; minidrivers modems, 288-89 network adapter detecting, 306 network communications devices, 305 OnNow requirements, 17 PC 97 design requirements, 29, 35-36 PC Cards, 158 Plug and Play IRPs, 36 printer device drivers, 315-18 scanner and digital camera requirements, 326-27 serial, parallel, and wireless devices, 166 storage components, 259 testing, 35 Unidriver, 318 Unimodem, 83, 272, 278, 288, 385 USB Human Input Device driver, 186 USB support, 90 video components, 227-28 virtual device drivers (VDDs), 11 VxDs (device drivers) (see VxDs) WDM (Win32 Driver Model) (see WDM) Device IDs. See also IDs audio components, 247 Basic PC 97 systems, 31 CardBus cards, 155

Device IDs (continued) defined, 380 Entertainment PC 97 systems, 31 graphics adapters, 214 IDE devices, 130 input components, 184 mobile systems, 31 modems, 286 multifunction devices, 37 network communications devices, 303 numerical listing, 336-47 overview, 334-35 parallel port device ID requirements, 171 PCI device identifiers, 110-13 PNP suffix, 122, 334 registering device IDs, 10 registering vendor IDs, 33 required information, 10 scanner and digital camera requirements, 325 SCSI device identifiers, 140 serial, parallel, and wireless devices, 165 storage components, 257 video components, 226 Workstation PC 97 systems, 31 device-independent bitmaps, 380 device information tuples, 152, 153 device interrupts. See interrupt signals Device Manager, 35 device nodes, 380 devices. See also add-on devices; device drivers; device IDs; legacy ports and peripherals; system devices; names of specific device types automatic resource assignment, 141 connecting incorrectly, 34 definitions, 22, 380 differential devices, 139 dynamic detection, 381 dynamic disable capabilities, 35, 48-49, 50 electrical isolation requirements, 97 enumeration, 111 (see also enumeration) general PC 97 requirements, 29-37 hardware compatibility tests, xxii, 13, 381 IEEE 1394 high-bandwidth support, 98 installation and configuration, 34-35 legacy devices (see legacy ports and peripherals) limiting current, 140 master and slave devices, 129, 132, 262 multifunction devices, 37 OnNow requirements, 16, 17 primary input and output devices, 122 self- and cable-powered devices, 99-100

DEVMODE structure, 316 devnodes, 380 diagnostic utilities. See software and utilities dial string modifiers, 284 DIBs, 380 difficulty in PC usage. See ease of use DIFFSENS, 139 Digital Alpha systems. See RISC-based systems Digital Audio and Performance Data Transmission Protocol and Connection Management for Electronic Musical Environment, 102 digital broadcast satellite subsystems, 83 digital cameras checklist, 328-29 device drivers and installation, 326-27 ICC color matching, 322 IEEE 1394 requirements, 324 overview, 322 parallel requirements, 324-25 Plug and Play requirements, 325 port labels and icons, 322 power management, 326 references, 327 SCSI requirements, 323 serial requirements, 324 USB requirements, 323 Win32 Imaging Class, 101 digital cellular data services, 275 digital cellular phones, 285-86 digital game ports or joysticks, 191 digital image input devices, 6. See also digital cameras; scanners Digital Interface for Consumer Electronic Audio/Video Equipment, 104 digital signal processors (DSPs), 380 Digital Simultaneous Voice and Data (DSVD), 273, 279, 281 Digital Simultaneous Voice/Data (V.70-series) recommendations, 273 digital-to-analog audio converters, 82, 243, 245 Digital VCR, 101 digital video. See DVD devices and playback digital voice/data modems, 275 digitizers, 63 DIP switches, 35 Direct3D. See Microsoft Direct3D DirectDraw. See Microsoft DirectDraw direct frame buffer access, 205 DirectInput, 82, 182, 192, 193, 194 direct memory access. See DMA (direct memory access)

397

DirectSound, 6, 242 DirectX, 74, 158, 199, 219, 251 DirectX DDK, 219, 251 disabilities, 351. See also accessibility guidelines disabling devices dynamic disable capabilities, 35 mobile systems, 48-49 Plug and Play requirements, 30 port replicators, 50 disabling VGA resources, 205 disk drives. See FDC (floppy disk drive controllers); floppy disk drives and controllers diskettes, 355 disk I/O controllers, 338, 380 display adapters. See also display monitors; graphics adapters DDC, 380 device IDs, 338-39 RAMDAC, 202, 384 Display Data Channel DDC 2.0, 219 Display Data Channels DDC2B (see DDC2B support) DDC, 380 Display Device Class, 217, 227 display monitors. See also entertainment monitors; graphics adapters; video components accessibility guidelines, 353, 365-66 APIs, 6 Basic PC 97 and mobile systems, 42-44, 47 calibration utilities, 233, 316, 322 contrast and brightness controls, 353 DDC2B support, 43, 202, 225, 234 DDC, 380 default VGA mode, 43, 66, 84 desktop display monitors, 233-34 display adapter device IDs, 338-39 dot pitch limits, 236 entertainment monitors, 85, 211, 234-36 Entertainment PC 97 systems, 83-84, 224 ergonomic timings rate (scan rates), 201, 234 glare, 353 high-performance components, 65 ICC color matching, 233 icons, 331 multiple monitor support, 43, 66, 84, 204-5, 353 Plug and Play requirements, 214-16 position adjustment, 353 refresh rates, 201, 218, 230, 235, 353 resolution, 42, 66, 67, 83, 201 VGA or SVGA monitor sensing, 202 Workstation PC 97 systems, 66

display RAM Basic PC 97 and mobile systems, 42 Entertainment PC 97 systems, 42 high-performance components, 65 requirements, 201 Workstation PC 97 systems, 66 Distinctive Ringing/Call Waiting Bellcore document, 283, 289 distinctive ringing class service, 283 DLE-shielded in-band commands, 277 DLLs (dynamic link libraries), 380 DMA (direct memory access) defined, 380 device IDs, 336 DMA channels legacy disk drives, 261 modems, 287 network communications devices, 303 parallel ports and devices, 169 Type F DMA, 248 DMA controllers fixed resources, 30 ISA devices, 118 static resources, 119 DMA page registers, 30, 119 legacy ISA DMA assignments, 376 PCI IDE bus master DMA, 129 RISC- and x86-based systems, 12 SCSI requirements, 141 VDS (virtual DMA services), 139 docking, 380 docking stations. See also mobile systems ACPI, 48 automatic configuration and dynamic disable capability, 48-49 defined, 381 fail-safe docking, 49 icons, 332 mobile systems, 48-49 PCI docking, 109 port replicator requirements, 50 WHQL testing, 48 documentation, 360-61, 373 Dolby AC-3 audio, 230 Dolby ProLogic-encoded stereo, 230 dongles, 381 dot pitch limits, 236 double-buffer swaps (2-D acceleration), 206 doubling (pixel replication), 203 DPCs (Deferred Procedure Calls), 19 drawing tablets, 63 drivers. See device drivers; minidrivers; miniports and miniport drivers dropped DVD frames, 230 .DRV files, 218

DSPs (digital signal processors), 380 DSVD (Digital Simultaneous Voice and Data), 279.281 DTE-DCE commands, 284 DTMF (Dual Tone MultiFrequency) devices DTMF bursts, 279 TDD devices, 276 Dtpl.exe, 159 dual asynchronous channels, 128 dual IDE adapters, 127, 128 Dual Tone MultiFrequency devices (DTMF), 276 duplicated DVD frames, 230 DVCR data, 101 DVC standard definition, 98 DVD devices and playback. See also video components audio requirements, 230 background task interference, 231 Basic PC 97 and mobile systems, 44 checklist, 267-69 closing devices, 265 command sets, 264 copy protection, 265 defect management, 265 device drivers and installation, 259-60 dropped or duplicated frames, 230 DVD Alliance specification, 265 DVD data format audio/video decoding, 229 DVD-Video playback, 225, 229-31 Entertainment PC 97 systems, 85 expansion bus speeds, 264 file systems, 265 IDE requirements, 133 independent audio/video streams, 230 PC 97 design requirements, 6, 264-65 Plug and Play requirements, 257–58 power management issues, 258 references, 265-66 storage component basic features, 256-57 subpicture compositing, 231 supported media formats, 264 synchronized audio and video, 230 video component requirements, 225, 229 WDM minidrivers, 230 Workstation PC 97 systems, 68 DVD-ROM drives, 86, 225, 229-31 DVD-ROM format, 264 DVD-Video playback capabilities, 225, 229-31 dynamic detection, 381 dynamic disable capabilities, 30, 35, 48-49, 50 dynamic-link libraries, 380 dynamic resource configuration. See resource configuration

Ε

ease of use. See also accessibility guidelines designing PCs, 16 device installation and configuration, 34-35 evolving PC hardware, 2 PC Cards, 158 preventing incorrect device connections, 34 sealed case PCs, 8-9, 77 SIPC initiative, 7-9 Eastman Kodak Color Management Group, 318 echo cancellation IR devices, 173 microphones, 245 echo canceller taps (speakerphones), 277 ECP (AT&T Enhanced Cellular Protocol), 285 ECPs (extended capabilities ports) defined, 381 device IDs, 337 ECP mode, 170, 313 ECP protocols, 170 EDID (Extended Display Identification Data) structure, 43, 225, 235 EDT (European Deaf Telephone), 276 EISA buses, 339, 381 EISA IDs. See device IDs ejecting removable media, 126, 355 electrical isolation requirements, 97 electromagnetic fields, 356 electronic program guide software, 84 El Torito-Bootable CD-ROM Format Specification Version 1.0, 53 EMI interference, 175 Energy Star program, 381 engineering system components, 66 Enhanced Music CD Specification v. 1.0, 265 Enhanced Parallel Ports (EPP), 170 entertainment monitors. See also display monitors DDC2B support, 235 dot pitch limits, 236 Entertainment PC 97 systems, 85, 224 geometry control, 235 ICC color matching, 235 refresh rates, 235 video component requirements, 234-36 Entertainment PC 97 requirements ACPI support, 24-25, 76 audio, 80-83, 242, 244, 245-46 boot device BIOS support, 28, 76 bus requirements, 47, 79-80 checklist, 87-88 CPUs, 76 definition, 4

Entertainment PC 97 requirements (continued) display monitors DDC2B support, 85, 235 display adapters, 83-84 entertainment monitors, 234-36 multiple adapters or monitors, 200 resolution, 201 VGA mode driver compatibility, 200 general device requirements, 29-37, 78 graphics adapters, 84, 198, 199, 200-211 industrial design requirements, 77 input components, 28, 76, 80-83, 182-83 I/O device requirements, 80-83 key design issues, 75 L2 cache, 76 modems, 82-83, 273, 277-78 Multimedia PC guidelines, 51-52 network communications, 294, 295 OnNow support, 25-26, 27, 76 operating system installation, 82 overview, 74-76 references, 86 serial, parallel, and wireless connections, 82, 164, 183 storage device requirements, 85-86 system memory, 24, 76 video components cable TV tuners, 84 digital broadcast satellite subsystems, 83 DVD playback requirements, 85, 86, 229-31, 264 hardware stretching, 229 input and capture, 85 MPEG-1 playback, 84 NTSC/PAL support, 84, 200 TV output, 211, 212-14 video component requirements, 224, 225-26 enumeration ATAPI devices, 131 CardBus controllers in legacy mode, 150 defined, 381 device IDs, 31 enumerators, 381 MPEG device enumeration, 227 PCI enumerator (Pci.vxd), 151 registers in configuration space headers, 111 EPA Energy Star program, 381 EPG software (electronic program guide), 84 epilepsy and seizure disorders, 351, 353 EPP support, 170 ergonomic timings rate (scan rates), 201, 234

error notification (printers), 314, 316Ethernet network adapters, 299, 300 European Deaf Telephone (EDT), 276 European TV connectors, 213 events (in-band responses), 284 evolution of PC hardware, 2-3 ExCA (Exchangeable Card Architecture) ExCA base-register set, 149 ExCA-compatible socket controllers, 149-51 programming model, 110 execution priorities in WDM, 19 expansion buses and cards. See also add-on devices; ISA buses and devices; PCI; PCMCIA; USB (universal serial buses) bus master privileges, 109 defined, 381 device IDs, 31 DVD speed requirements, 264 EISA buses, 339, 381 high speed buses, 38, 47, 62, 80 icons, 332 port replicator requirements, 50 expansion capabilities. See extensibility expansion headers (Plug and Play), 32 expansion ROM. See option ROMs expansion slots Basic PC 97 systems, 28 Entertainment PC 97 systems, 77 mobile systems, 46 Workstation PC 97 systems, 60 Extended BIOS Parameter Blocks, 260 Extended Capability Ports (ECP) defined, 381 device IDs. 337 ECP mode, 170, 313 ECP protocols, 170 Extended Display Identification Data (EDID), 43, 225, 235 Extended Display Identification Data Standard 2.0.237 Extended Industry Standard Architecture (EISA), 339, 381 Extended System Configuration Data Specification, 30 extensibility bus choices, 10-11 designing PCs, 16 ease of use issues, 7 expansion slots, 28, 46, 60, 77 Plug and Play, 9-11 external clocking, 302 external ISDN adapters, 297

F

Facsimile Digital Interfaces - Voice Control Standard for Asynchronous DCE, 280 fail-safe docking, 49 fans, 25, 26 Fast Incremental Reset Protocol, 104 fast IR devices, 172 fast PIO modes, 129 FAT32 partition types, 260 fax modems. See also modems calling tones, 279 Entertainment PC 97 systems, 82-83 Facsimile Digital Interfaces - Voice Control Standard for Asynchronous DCE, 280 requirements, 275 FCP (Function Control Protocol), 101 FDC (floppy disk drive controllers). See also floppy disk drives and controllers Basic PC 97 and mobile systems, 45 conflict resolution, 261 defined, 381 device IDs, 338 disabling conflicting devices, 261 Entertainment PC 97 systems, 45 as ISA devices, 118 PC 97 design requirements, 260-61 resource allocation, 261 Workstation PC 97 systems, 45 feedback from controls, 358 FIFO, 128, 381 files and file names device driver requirements, 36 file name requirements, 36 INI files, 35 online Help files, 306, 361 PC 97 online files, xviii file systems, 265 FilterKeys feature, 359 filter taps (speakerphones), 277 firewire. See IEEE 1394 first in, first out processing (FIFO), 128, 381 fixed DMA channels, 376 fixed ISA interrupts, 376 fixed resources, 30, 185 fixed strides, 207 flat shading, 208 flicker filters, 212 flicker rates, 353. See also refresh rates flight yokes. See joysticks and steering devices floppy disk drives and controllers accessibility guidelines, 355, 368-69 Basic PC 97 and mobile systems, 41, 45 checklist, 267-69

floppy disk drives and controllers (continued) conflict resolution, 261 device drivers and installation, 259-60 device IDs, 338 disk I/O controllers, 380 dynamic disable capabilities, 261 floppy disk controllers (FDC), 381 IDE requirements, 133 as ISA devices, 118 legacy disk drives, 260 PC 97 design requirements, 260-61 Plug and Play requirements, 257-58 power management issues, 258 references, 265-66 resource allocation, 261 storage component basic features, 256-57 floptical drives, 133 FM synthesis register, 249 fog coloring operations, 209 force root note assignment protocol, 103 foreground tasks, 231 frame buffers bank-switched frame buffers, 216 DirectDraw access, 205 double buffer support, 206, 210 packed-pixel frame buffers, 202, 215-16, 383 full duplex audio capabilities, 245 Function Control Protocol (FCP), 101 function identifier tuples (CISTPL_FUNCID), 153, 154 function selection (remote controls), 81 function tuples, 156 fuses, 140 future development of PC hardware, 2-3

G

game control ports and peripherals audio device resource allocation, 247 device drivers, 193 device IDs, 347 DirectInput support, 193 icons. 332 installation, 193 I/O addresses, 192 IRQs, 192 MIDI ports, 193 multifunction cards, 193 PC 97 design requirements, 183, 192-93 USB ports, 192 Game Developers Kit for Windows 95, 242 game pad devices connection requirements, 79, 183 Entertainment PC 97 systems, 81

green wire, 97 ground fault potential between devices, 97 GSM 7.05 and 7.07 standards, 286 GSM digital cellular system, 285 GUIDs, 99, 103 н standards

H.324, 279, 281. See also ITU communications HAL (hardware abstraction layer), 12 handicaps and disabilities, 351. See also accessibility guidelines hard disk drives and controllers Basic PC 97 and mobile systems, 44-45 checklist, 267-69 device drivers and installation, 259-60 device IDs, 338 dynamic disable capabilities, 258 Entertainment PC 97 systems, 85 logical block addressing, 128 M, S, and CS settings, 262 Plug and Play requirements, 257-58 power management issues, 258 references, 265-66 spin up and spin down, 142, 262, 384 storage component requirements, 256-57, 261-62 Workstation PC 97 systems, 68 hardware. See PC 97 design; PCs; names of specific devices hardware abstraction layer (HAL), 12 hardware acceleration. See 2-D and 3-D graphics acceleration; audio acceleration hardware arithmetic stretching, 203, 229 hardware blters (block transfers), 67, 84, 198 hardware classes, 380 hardware compatibility tests, xxii, 13, 381 hardware manufacturers Microsoft contact information, xxii OEMs, 383 OEM splash screens, 27 hardware overlays, 67, 84, 198 hardware testing tools, xxii hardware trees defined, 381 device nodes, 380 Hayes modem compatibility, 274 HCL (Windows Hardware Compatibility List), xxii HCT (hardware compatibility tests), 381 HDC (disk I/O controllers), 380 HD DVCR data, 101 HDLC framing, 275, 297

game pad devices (continued) PC 97 design requirements, 191 USB ports, 191 games, designing PCs for, 74 gamma correction, 202 Gdi.exe, 218 General Input Device Emulating Interface, 372 generalized trilinear MIP-mapped textures, 209 genlock capabilities, 232 geometry control (monitors), 235 GetIRQRouting function, 150 GET MEDIA STATUS command, 126 ghost cards, 108 glare (display monitors), 353 Global Unique IDs (GUID), 99, 103 Gouraud shading, 208 graphics adapters. See also display monitors; video components; video playback and output 2-D and 3-D hardware acceleration, 67, 84, 205 - 11ActiveMovie support, 199 arithmetic stretching, 203 basic features, 200-203 Basic PC 97 and mobile systems, 42-44, 47 bus adapters, 199 checklist, 220-22 color depth, 202 conflict resolution, 214 DDC2B support, 202 device drivers and installation, 217-18 device IDs, 214, 338-39 Direct3D support, 199 DirectDraw support, 198 Entertainment PC 97 systems, 83-84 ergonomic timings rate (scan rates), 201 extended resources, 215 high-performance components, 65 image color matching, 202 minimum resolution, 201 multiple adapters and monitors, 200, 204-5 NTSC or PAL output, 200 off-screen surfaces, 203 OpenGL, 67, 199, 208 overview, 198-99 packed-pixel frame buffers, 215-16 PCI base address registers, 215 Plug and Play requirements, 214-16 power management issues, 217 primary graphics adapters, 43, 66 references, 219 relocatable registers, 201 system requirements, 199-200 TV output, 211-14 VGA mode driver compatibility, 200 Workstation PC 97 systems, 66

402

Index

headgear for virtual reality. See joysticks and steering devices headphones accessibility guidelines, 354, 367 cordless RF devices, 175 port icons, 332 hearing aids and RF fields, 356 hearing impairments, 351, 354 Help files, 306, 361 HFC cable networks, 299 hidden surface removal, 210 HID minidrivers, 192 high-capacity drives, 127 High Definition (HD) DVCR data, 101 high-density connectors, 140, 143 high-precision input devices, 63 high-resolution TV, 74 High Speed Cable Data Services, 299-301, 307 High-Speed Cable Data Service (HSCDS) RFP, 307 high-speed expansion ports. See CardBus devices; IEEE 1394; PCI high-speed printer data transfers, 312 hook-switch telset state, 280 host controllers, 44, 68. See also controllers; OpenHCI controller implementation standard host memory, 103 hot docking, 382 hot plugging, 33 HSCDS (High Speed Cable Data Services), 299-301, 307 Human Input Device Class, 102 hybrid fiber-coax cable networks, 299

IBM Personal System/2 Common Interfaces, 194 IBM Personal System/2 Mouse Technical Reference, 194 IBM PowerPC Architecture. See RISC-based systems ICC color matching desktop monitors, 233 entertainment monitors, 235 graphics adapter support, 202 mobile systems, 47 printers, 316 scanners and digital cameras, 322 ICC Profile Format Specification, 318, 327 icons controls, 360 device connections, 34, 331-32, 360 mobile systems connectors, 46 scanner or digital camera ports, 322

icons (continued) SCSI icons, 139 USB buses, 91 IDE (Integrated Drive Electronics). See also ATA (AT Attachment interchange) 32-bit PIO adapters, 129 ATA-2 specification, 127 cabling, 129, 132 CD-ROM devices, 133 checklist, 135-36 defined, 382 device IDs, 338 dual IDE adapters, 127-28 DVD peripherals, 133 dynamic resource configuration, 130 floppy disk drive requirements, 133 hard drives, 262 high-capacity drive support, 128 logical block addressing, 128 master-slave configuration, 129, 262 Native mode, 127 non-standard IDE hardware, 128 overview, 126 PCI IDE bus mastering, 127 Plug and Play requirements, 130 power management, 131 references, 134 requirements, 127-29 SMART commands, 132 storage device requirements, 68 IDE and SCSI Interface Specifications, 266 identifiers. See IDs IDs CompatibleIDs, 334-47 device IDs allocated fields, 155 Logical Device IDs, 122 multifunction devices, 37 numerical listing, 336-47 overview, 334-35 PC 97 design requirements, 31 registering device IDs, 10, 33 required device ID information, 10 Global Unique IDs (GUID), 99, 103 ISA board-unique numbers, 121 Node IDs, 103 PNP suffix, 122, 334 Product IDs, 39, 121 Revision IDs, 155 Serial IDs, 122 serial number fields, 121 SubSystem IDs, 111, 130, 156 SubSystem Vendor IDs, 111, 130, 156 tuples, 152-54

IDs (continued) Unique IDs, 248 Vendor IDs, 39, 121, 155 IEEE 802.14, 300 IEEE 1212 standards IEEE 1212-1991 Control Status Register Format, 97 IEEE 1212 Control and Status Register Format Specification, 10 IEEE 1284-1994 ECP protocols, 170 parallel port device ID requirements, 171 port connector compliance, 170 printers, 313-14 IEEE 1394. See also IEEE 1394 standards audio components, 249 bus-manager capabilities, 102-3 Cable Power Distribution model, 99 checklist, 105 consumer electronics devices, 101 defined, 6 design issues, 96 device command protocol requirements, 100-102 Entertainment PC 97 systems, 79 high-bandwidth support, 98 host controller requirements, 102-3 host memory, 103 OpenHCI compliance, 97 overview, 96 peak data rates, 98 PHY layer protocol, 98 Plug and Play requirements, 99 power management, 99-100 printers, 312 references, 104 required device identifier information, 10 role in extensibility issues, 9 scanners and digital cameras, 324 SCSI-3 protocol support, 102 Win32 Audio Class, 102 Win32 Imaging Class, 101 IEEE 1394 standards 1394 Plug and Play Design Reference, 104 1394 Power Specification, 100, 104 IEEE 1394-1995, 97 IEEE 1394 Standards, 104 IHVs (independent hardware vendors), 382 illiteracy and computer accessibility, 351 IMA ADPCM, 278 Image Class device requirements, 323 Image Color Matching. See ICC color matching image quality (video), 224

imaging devices. See camcorders; digital cameras; printers; scanners iManufacturer and iProduct strings, 323 impairments and disabilities, 351. See also accessibility guidelines IMTC (International Multimedia Telecommunications Consortium), 281 in-band messages (modems), 275 in-band Voice Mode responses, 284 independent audio/video streams, 230 independent hardware vendors (IHVs), 382 indicator lights LED indicators, 353 safe undocking lights, 49 visual cues for warning sounds, 354 warning lights, 353 Industry Standard Architecture. See ISA buses and devices INF files defined, 382 manufacturer-provided files, 36 multifunction adapters, 335 printers, 315 Infrared Communications for Windows 95 DDK, 176 Infrared Data Association. See IrDA (Infrared Data Association) infrared (IR) support. See IR (infrared) devices INI files, 35 Initial Program Load (IPL), 28, 122, 382 input components. See also game pad devices; joysticks and steering devices; keyboard ports and peripherals; pointing device ports and peripherals accessibility guidelines, 352, 357-59, 363-65 checklist, 195-96 conflict resolution, 184-85 connection requirements, 182-83 device drivers and installation, 186 General Input Device Emulating Interface, 372 Human Input Device Class, 102 movement impairments, 351 overview, 182 Plug and Play requirements, 184-85 power management, 185 primary input devices, 122 references, 194 system requirements, 182-83 input guards, 359 input speed (IR devices), 173 inserting removable media, 355

installation device drivers, 36 ease of installation, 34-35 multifunction card minidrivers, 193 multiple ISA cards, 39 operating system installation, 41, 64, 82 printer device drivers, 315-18 Int 13h Extensions Basic PC 97 and mobile systems, 44 Int 13h partition types, 260 option ROM support, 126, 127, 256 SCSI host adapter support, 138 Workstation PC 97 systems, 44, 68 Int 13h Extensions API, 134 Integrated Device Electronics. See ATA (AT Attachment interchange); IDE (Integrated Drive Electronics) integrated devices, 382. See also names of specific devices Intel 80486-class systems. See x86-based systems Intel 82365-compatible mode, 150-51 Intel Accelerated Graphics Port, 43, 199 Intel/Duracell Smart Battery System Specification, 25, 53 Intel PCIC compatible controllers, 150 interactive voice response (IVR), 272 Internal clocking, 302 internal ISDN adapters, 297 internal terminators, 140, 142 International Color Consortium (ICC), 233 International Multimedia Telecommunications Consortium, 281 Internet communication support, 74 interpolation (graphics adapters), 203 interrupt controllers device IDs, 336 fixed resources, 30 as ISA devices, 118 static resources, 119 Interrupt Line Register, 113, 150, 151, 155 interrupt request lines. See IRQs interrupt signals enhancing system response, 19 ISA cards and devices, 121 primary boot interrupts, 120 interrupts. See interrupt signals I/O addresses 3F7h and 377h, 258 12-bit I/O decoding, 33 16-bit I/O decoding, 33, 120, 248 fixed resources, 118 IDE resource configuration, 130

I/O addresses (continued) I/O defined, 382 ISA auto-configuration registers, 33 ISA-compatible addresses, 37 legacy I/O assignments, 375-78 PCI interrupt sharing, 112 phantom or alias addressing, 33 PIO (Programmed Input/Output), 127-28 I/O devices audio components, 248 Basic PC 97 and mobile systems, 40-42, 47 Entertainment PC 97 systems, 80 game control ports and peripherals, 192 graphics adapters, 215 high-performance components, 63 IR (infrared) devices, 174 legacy disk drives, 261 modems, 287 network communications devices, 303 parallel ports and devices, 169 SCSI requirements, 141 serial ports, 168 Workstation PC 97 systems, 63 I/O port dongles, 381 I/O request packets (IRP). See IRP (I/O request packets) IPL (initial program load), 28, 122, 382 IPX/SPX protocol, 306 IrDA (Infrared Data Association) defined. 382 device IDs, 338 Infrared Data Association Serial Infrared (SIR) Physical Layer Specification, 176 IrDA and consumer IR support, 173 keyboard ports and peripherals, 190 miniport drivers, 173 pointing device compliance, 187 support, 173 IR (infrared) devices automatic device configuration, 174 echo cancellation, 173 Entertainment PC 97 systems, 81 Infrared Communications for Windows 95 DDK, 176 input speed, 173 IR remote control devices, 81-82, 174, 183, 188 keyboard ports and peripherals, 190 NDIS 4.0 IrDA miniport drivers, 173 PC 97 requirements, 172-75 pointing devices, 187 resource allocation, 174 SIR (serial infrared) specification, 176 unicast packet filtering, 174

IRP (I/O request packets) defined, 382 device driver IRP support, 36 IRO Routing Register bits, 149 IRQs. See also interrupt controllers; interrupt signals; IRQ sharing; PICs (programmable interrupts) audio components, 248 available in WDM. 19 configuring, 113 defined, 382 fixed ISA interrupts, 376 game control ports and peripherals, 192 graphics adapters, 215 IR (infrared) devices, 174 IRQ 2(9) usage, 216 IRQ routing (PCI), 112, 150 legacy disk drives, 261 modems, 287 network communications devices, 303 parallel ports and devices, 169 PS/2 ports, 187, 189 SCSI requirements, 141 serial ports, 168 IRQ sharing ISA cards and devices, 39, 120-21 PCI devices, 112, 113 IS-101. See TIA communications standards ISA buses and devices audio components, 248 auto-configuration registers, 33 Basic PC 97 and mobile systems, 39 basic system requirements, 119-20 boot device requirements, 122-23 checklist, 124 Clarification to Plug and Play ISA Specification v. 1.0a, 30 Config state, 122 conflict resolution, 119 defined, 382 device IDs, 10, 31, 39, 339 Entertainment PC 97 systems, 80 fixed ISA interrupts, 376 I/O addresses, 120, 377-78 IRQ sharing, 120-21 isolation, 122, 382 legacy DMA assignments, 376 migration away from ISA, 119 network adapters, 294 non-Plug and Play operating systems, 39, 120 option ROMs, 120 overview, 118 PC 97 design issues, 11

ISA buses and devices (continued) PC Card interrupts, 150 PCI-to-ISA docking station bridges, 109 Plug and Play specifications, 119-23 PNP vendor code, 32 references, 123 resource data, 122, 384 serial ID numbers, 39, 122 system device addresses, 37 types of devices, 118 Workstation PC 97 systems, 62, 294 ISA Write Data Port addresses, 110 ISDN devices. See also network communications devices async-to-sync data conversion, 297 AT command set, 297 bridges, 297 cable sense, 297 checklist, 308-10 device drivers and installation, 305 Entertainment PC 97 systems, 82-83 HDLC framing, 297 high-speed ports, 298 multilink PPP, 298 NDIS 4.0 miniport drivers, 297 NDIS WAN miniport, 298 NT-1, 298 PC 97 systems, 295 Plug and Play, 303-4 power management issues, 304 receive and send buffers, 297 references, 307 video conferencing modems, 281 Windows 95 and Windows NT device driver compatibility, 298 Workstation PC 97 systems, 65 isochronous data handling, 101 isochronous resource managers, 102-3 ISO/IEC 13818-2, 229 ISO/IEC 13818-4, 230 isolation schemes (ISA), 122, 382 ITU communications standards ITU H.223, 281 ITU H.324, 279, 281 ITU T.120, 281 ITU V.8, 274, 278-80 ITU V.8bis, 274, 278-80, 281 ITU V.18, 276 ITU V.25, 274, 278-80 ITU V.25ter, 274, 278, 280 ITU V.34Q, 281 ITU V.42, 281 ITU V.61, 281 ITU V.70, 273, 279, 281

ITU communications standards ITU V.75, 281 ITU V.80, 275, 281 obtaining standards, 289 IVR (interactive voice response), 272

Index

J

joysticks and steering devices bus requirements, 79 connection requirements, 183 cordless RF devices, 175 device IDs, 347 Entertainment PC 97 systems, 81 icons, 332 Microsoft DirectInput 3.0, 182 PC 97 design requirements, 192 jumper settings, 34

Κ

kernel, 382 kernel mode threads, 19 keyboard ports and peripherals 8024 controllers and devices, 118 accessibility guidelines, 352, 357, 364 Basic PC 97 and mobile systems, 40, 47 BIOS USB keyboard support, 28, 90 connection requirements, 182 cordless RF devices, 175 device IDs, 336-37 Entertainment PC 97 systems, 80 fixed resources, 30 icons, 331 multiple keyboard support, 190 PC 97 design requirements, 189-91 power switches, 26 static resources, 119 USB ports, 189 Windows Logo keys, 190-91 Workstation PC 97 systems, 63 keyed connectors, 34 keyguards, 359 keys Application keys, 191 nibs or locator ridges, 358 remote control keys, 81, 188 Windows Logo keys, 190-91

L

L2 cache Basic PC 97 and mobile systems, 24 Entertainment PC 97 systems, 76 Workstation PC 97 systems, 59 labels. See also icons controls, 360 device connectors, 34, 331-32, 360 mobile system connectors, 46 scanner or digital camera ports, 322 language impairments, 351 LANs. 302 laptop computers. See mobile systems large-screen monitors. See entertainment monitors latch accessibility guidelines, 355 Latency Timer values, 155 LBA (logical block addressing), 128, 261 LCD indicators, 42, 233, 353 least-significant bit (LSB), 202 LED indicators, 353 left- and right-handed users, 359 LegacyBaseAddress, 150, 151 legacy ports and peripherals AT-style keyboard ports, 189 audio I/O registers, 249 BIOS USB keyboard support, 28 CardBus controller initialization, 150 defined, 382 floppy disk drives, 45, 260 game control ports and peripherals, 183, 191, 192-93 IDE resource configuration, 130 I/O assignments, 375-78 ISA PC 97 design requirements, 39 memory PC Cards, 148 parallel port requirements, 118, 164, 169-72 PC Card 16-bit Interface Legacy BAR, 110, 151 PNP vendor code, 32 PS/2-compatible ports, 34 serial port requirements, 118, 164, 167-68 level 1 version/product information tuples, 152, 153 Level 2 cache, 24, 59, 76 linear-mapped low resolution modes, 206 linear memory, 207 linear packed pixel frame buffers, 215-16 line-in and line-out audio, 244, 245 living room PCs, 75, 80, 81-82 local area networks, traffic shaping, 302

local buses, 108, 382. *See also* PCI local ground reference, 97 logical block addressing, 128, 261 logical CD formats, 263 Logical Device IDs, 122 logo program, 3–4 low-resolution modes (2-D acceleration), 206 LPT devices. *See* parallel ports and devices LPT mode, 170 LSB (least-significant bit), 202 LUN implementation, 263 LVE (DirectDraw Live Video Extensions), 158

Μ

M (master) hard disk setting, 262 Making Software more Accessible to People with Disabilities, 372 manual accessibility guidelines, 360-61 manual task impairments, 351, 355-56 manufacturer identifier tuples (CISTPL_MANFID), 153, 154, 156 MANUFACTURER key, 171 manufacturers (OEMs) defined, 383 Microsoft contact information, xxii OEM splash screens, 27 marking hardware. See icons; labels master devices CSEL support, 132 hard disk configuration, 262 IDE/ATAPI devices, 129 math coprocessors device IDs, 340 fixed resources, 30 as ISA devices, 118 static resources, 119 Max_Lat field (CardBus), 155 MediaLink technology, 281 Media Status Notification Specification, 134 Media Status Notification Specification for SCSI and ATAPI Devices, 143 memory Basic PC 97 and mobile systems, 24 buffers (see buffers) DMA (see DMA) Entertainment PC 97 systems, 24, 76 IEEE 1394 host memory, 103 linear memory, 207 memory interleaving, 67 Workstation PC 97 systems, 59 write combining memory type support, 65 memory PC Cards, 148 memory-type range registers, 65

message support for VxDs, 36 mice. See mouse ports and pointing devices Micro Channel bus device IDs, 339 Microcom MNP 10 protocol, 285 microphones accessibility guidelines, 354, 367 Advanced audio, 245 echo cancellation, 245 port icons, 332 microprocessors ACE-compliant platforms, 12 Basic PC 97 and mobile systems, 23 CISC-based platforms, 12 Entertainment PC 97 systems, 76 multiple processor support, 19 running Windows NT, 11-13 Workstation PC 97 systems, 59 x86- and RISC-based systems, 11-13 Microsoft "Designed for Microsoft Windows" logo requirements, xv Microsoft Developer Network (MSDN), xxii specifications and information Microsoft Broadcast PC specification, 83 Microsoft contact address, xxii Microsoft Device Driver Kits (DDKs) for Windows operating systems, 13 Microsoft Media Status Notification specifications, 143 Microsoft Windows 95 Driver Development Kit, xxii Microsoft Windows Guidelines for Accessible Software Design, 372, 373 Microsoft Windows Hardware Compatibility List, xxii Microsoft Windows NT Driver Development Kit, xxii PC Card Support in Windows 95, 159 testing tools, specifications, and information, 114 Windows 95 DDK, 134 Windows NT DDK, 134 Microsoft ActiveMovie ActiveMovie APIs, 6 audio and video decode performance, 228 Basic PC 97 and mobile systems, 44 defined, 199 Entertainment PC 97 systems, 84 MPEG-1 playback, 225 Workstation PC 97 systems, 67 Microsoft ActiveX, 74

Microsoft Broadcast PC specification, 83 Microsoft Developer Network (MSDN), xxii Microsoft Direct3D APIs, 6 defined, 199 Entertainment PC 97 systems, 84 guidelines for support, 207-8 Workstation PC 97 systems, 67 Microsoft DirectDraw 2-D graphics acceleration, 67, 84, 205-7 APIs, 6 defined, 198 DirectDrawX. 194 Live Video Extensions (LVE), 158 Microsoft DirectInput, 82, 182, 192, 193, 194 Microsoft DirectSound, 6, 242 Microsoft DirectX, 74, 158, 199, 219 Microsoft Media Status Notification specifications, 143 Microsoft Network Monitor Agent, 305 Microsoft Sound System device ID, 335 Microsoft Win32 Driver Model. See WDM (Win32 Driver Model) Microsoft Windows 95 2-D graphics acceleration, 206 basic system requirements, xvi, 1 DDI support, 317 defined, xx designing PCs for, 5-6 Device Manager, 35 FilterKeys feature, 359 IRQ sharing (PCI), 112 Microsoft Device Driver Kits (DDKs) for Windows operating systems, 13 Microsoft Windows 95 Driver Development Kit, xxii PC Card Support in Windows 95, 159 PCI enumerator (Pci.vxd), 151 SerialKeys software, 358 SlowKeys feature, 358 SMART commands, 132 Smartvsd.vxd, 132 Socket Services driver, 150 StickyKeys feature, 358 virtual desktop size, 219 WDM (Win32 Driver Model), 5, 18 Windows 95 DDK, 134 x86- and RISC-based systems, 11-13 Microsoft Windows Driver Library, xxii Microsoft Windows Guidelines for Accessible Software Design, 372, 373 Microsoft Windows Hardware Compatibility List, xxii

Microsoft Windows Hardware Quality Labs. See WHQL (Windows Hardware Quality Labs) Microsoft Windows Logo keys, 190-91 Microsoft Windows NT 2-D graphics acceleration, 206 basic system requirements, xvi, 1 DDI support, 317 defined, xx, 384 designing PCs for, 5-6 differential devices, 139 hardware recognizer (Ntdetect), 12 installing on Basic PC 97 and mobile systems, 41 installing on Workstation PC 97 systems, 64 ISDN device driver compatibility, 298 Microsoft Device Driver Kits (DDKs) for Windows operating systems, 13 Microsoft Windows NT Driver Development Kit, xxii network adapter detection DLL, 305 obtaining DDKs, xxii OpenGL acceleration, 67 system startup differences, 12 Unimodem driver, 277 VDM (Virtual Device Manager), 11 virtual desktop size, 219 virtual device drivers (VDDs), 11 WDM (Win32 Driver Model), 5, 18 Win32 Driver Model (WDM), 5 Windows NT DDK, 134 Workstation PC 97 systems, 58 x86- and RISC-based systems, 11-13 MIDI support Advanced audio standards, 245 MIDI playback, 243 Sound Blaster pin-out compatibility, 193 Min_Gnt field, 155 minidrivers defined, 382 device driver requirements, 36 HID minidrivers, 192 IEEE 1394 device command protocols, 100 WDM (Win32 Driver Model), 5, 19 miniports and miniport drivers defined, 383 NDIS miniport drivers IrDA miniport drivers, 173 ISDN devices, 297 network adapters, 295-96 operating system-specific calls, 306 NDIS WAN miniport, 298 RISC- and x86-based systems, 13 system board devices, 111

Minitel text telephones, 276 MIP-mapped textures, 209 MIPS R4000 processors. See RISC-based systems misconnecting devices, 34 misinsertion of media, 356 MMC (SCSI-3 Multimedia Command Set), 102 Mmsystem.dll, 218 mobile systems ACPI support, 24-25 batteries, 46 bus requirements bus compliance, 30 CardBus slots, 46 high-speed expansion, 38, 47 ISA expansion buses, 39 PCI buses, 38 USB implementation, 38, 47 closing lids, 46 CPUs, 23 definition, 4 device connections and requirements audio support, 42, 47 boot device BIOS support, 28 general device requirements, 29-37, 46 graphics adapters, 203 input components, 182 keyboards, 28, 40, 47, 190 mobile system connections, 46 modem features, 273 network communications devices, 42 pointing devices, 40, 47 serial, parallel, and wireless devices, 40, 41, 47, 64 storage device requirements, 44, 45, 68 video components, 43, 44, 47, 200 display monitors color matching, 47 DDC and EDID support, 43 LCD panel resolution, 233 requirements, 42-43, 47 resolution, 201 docking defined, 382 docking station requirements, 48-49 PCI docking, 109 port replicator requirements, 50 industrial design requirements, 28-29, 46, 60 L2 cache, 24, 76 OnNow support, 27, 46 operating system installation, 41, 64 PC 97 design exceptions and requirements, 46-47

mobile systems (continued) system memory, 24 system requirements, 23-28 Windows Logo keys, 191 MODEL key, 171 Modem Developers Kit (MDK), 272 modems. See also Unimodem driver; voice and voice/data modems adaptive connection technology, 277-82 Basic PC 97 and mobile systems, 42 call modality discrimination, 278-80 cellular phone support, 285-86 checklist. 290-91 CLASS services, 283-86 conflict resolution, 287 device drivers and installation, 288-89 device IDs, 335, 347 dynamic disable capabilities, 287 Entertainment PC 97 systems, 82-83 fax modems, 82-83, 275, 279 Hayes compatibility, 274 I/O addresses, 287 overview, 272-73 parallel ports, 287 PCI buses, 287 Plug and Play requirements, 286-87 power management issues, 288 real-time wave encoder/decoders, 278 references, 289 adaptive connections, 280 Caller ID services, 284 distinctive ringing class service, 283 telset capabilities, 280 VoiceView, 282 speakerphone capabilities, 83, 277-78 speed and protocols, 274 synchronous access, 275 system requirements, 273 TAPI, 6, 295, 384 TDD or text telephones, 276 telephone line icons, 332 telset capabilities, 280 TIA-602 command set, 274 USB buses, 287 voice and voice/data modems, 277-82 voice/data integration, 281 VoiceView, 282 wireline modems, 273 Workstation PC 97 systems, 65 modulated alpha coloring, 209 monaural output, 243 monaural port icons, 332 monitors. See display monitors most-significant bit (MSB), 202 motherboards. See system boards

Motion Picture Experts Group. See MPEG motor control impairments, 357-59 mouse ports and pointing devices. See also pointing device ports and peripherals accessibility design, 352 Basic PC 97 and mobile systems, 40, 47 cordless RF devices, 175 Entertainment PC 97 systems, 81-82 IBM Personal System/2 Mouse Technical Reference, 194 mouse device IDs, 340-41 mouse icons, 331 multiple pointing devices, 82 wireless and remote control, 81-82, 188 Workstation PC 97 systems, 63 movement impairments, 351, 355-56 movie copy protection, 265 movie viewing, 74 MPEG, 383 MPEG-1 playback. See also video components audio and video decode performance, 228 Basic PC 97 and mobile systems, 44 color space conversion, 229 Entertainment PC 97 systems, 84 hardware arithmetic stretching, 229 Microsoft ActiveMovie, 199, 225 off-screen surfaces, 229 Workstation PC 97 systems, 67 MPEG-2 playback. See also DVD devices and playback MPEG-2 audio, 230 MPEG-2 hardware acceleration, 230 MPEG-2 video stream, 98, 229, 235 MPU-401 register, 249 MSB (most-significant bit), 202 MSDN (Microsoft Developer Network) contact information, xxii multifunction adapters device IDs, 31 dual IDE adapters, 128 game ports, 193 INF files, 335 legacy game ports, 192 minidriver implementation, 19 MPEG device enumeration, 227 multifunction PCI devices, 110 PC 97 design requirements, 37 south bridge multifunction devices, 127 multi-line hardware flicker filters, 212 multilink PPP support, 298 multimedia devices device IDs, 335, 346-47 ease of use issues, 7 multimedia PC guidelines, 51-52

multiple adapters multiple graphics adapters, 204-5 multiple monitors, 204-5 multiple pointing devices, 82 network communications devices, 304 multiple voltage PC Cards, 154 multipoint IR protocols, 174 multiprocessors, 23, 59, 76 Multiprocessor Specification Version 1.4, 53, 69 multisession CD-ROMs, 133, 262 Multisession Compact Disc Specification, 265 multistreaming applications, 98 multitasking, 224 MultiTech PCS, 281 musical instrument support, 102 mute control on remote controls, 81

Ν

National Captioning Institute, 374 National Information System Center for Developmental Disabilities, 374 National Institute for Disability and Rehabilitation Research, 349 National Television System Committee (NTSC). See NTSC systems Native mode (IDE adapters), 127 NDIS miniport drivers defined, 383 IrDA miniport drivers, 173 ISDN devices, 298 NDIS WAN miniport, 298 network adapters, 295-96 operating system-specific calls, 306 NetBEUI compatibility, 306 NetWare compatibility, 306 network adapters. See also network communications devices basic features, 295-96 Basic PC 97 and mobile systems, 41, 42 boot device BIOS support, 28 bridges, 296 cable sense, 296 checklist. 308-10 device drivers and installation, 305 device IDs, 335, 342-45 NDIS 4.0 miniport driver, 295-96 Plug and Play, 303-4 port icons, 332 power management issues, 304 receive and send buffers, 296 references, 307 sensing transceiver types, 296 Workstation PC 97 systems, 64, 65

network communications devices. See also ATM adapters; cable modems; ISDN devices; network adapters ATM adapters, 295, 301-2 Basic PC 97 and mobile systems, 41, 42 cable modems, 295, 299-301 checklist, 308-10 conflict resolution, 303 detecting adapters, 306 device drivers and installation, 305 device IDs, 303, 342-45 Help files, 306 high-performance components, 294 ISDN devices, 295, 297-98 Microsoft network clients and protocols, 306 multiple adapters, 304 NDIS miniport driver, 306 network adapters, 294, 295-96 overview, 294 Plug and Play, 303-4 power management, 304 promiscuous mode, 305 references, 307 software settings, 304 Windows NT detection DLL, 305 Workstation PC 97 systems, 64, 65 Network Device Class, 304 Network Driver Interface Specification. See NDIS miniport drivers network printer installation, 317 network terminators, 298 New Key Support for Microsoft Windows Operating Systems and Applications, 190, 194 nibble mode, 170, 313, 383 NIDRR (National Institute for Disability and Rehabilitation Research), 349 NMIs (nonmaskable interrupts), 383 Node IDs, spoofing, 103 No Emulation mode, 28, 263 noise interference (RF devices), 175 noise requirements, 28-29, 60, 77 non-interlaced refresh rates, 201 non-kernel mode threads, 19 nonmaskable interrupts (NMI), 383 non-Plug and Play operating systems configuring Plug and Play cards, 39, 120 option ROMs, 32 non-spoofable GUIDs, 103 non-VGA standard display resources, 204 non-volatile resource configuration storage, 30 Nordic Guidelines for Computer Accessibility, 372 novice users, designing for. See ease of use NT-1, 298

Ntdetect (hardware recognizer), 12 NTFS (Windows NT file system), 383 NTSC systems Basic PC 97 and mobile systems, 43 defined, 211 Entertainment PC 97 systems, 84 graphics adapters, 200, 212 refresh rates, 235 time code reading, 232 Workstation PC 97 systems, 66 number keys on remote controls, 81

0

OAM (operation and maintenance) support, 302 obsolescence. See extensibility obtaining tools and information. See references **OEMs** defined, 383 Microsoft contact information, xxii OEM splash screens, 27 off-screen surfaces, 203, 229 online Help files, 306, 361 online PC 97 files, xviii OnNow design initiative ACPI design (see ACPI) Basic systems, 25-26 BIOS support, 27 Entertainment PC 97 systems, 25-26 hard disk spin-up time, 262 mobile systems, 46 overview, 16-17 PC Card power states, 157 PCI device power management, 113 as SIPC technology, 8 user perceptions, 16 Workstation PC 97 systems, 25-26, 60 OpenGL acceleration defined, 199 Direct3D device support, 208 engineering workstations, 66 PC 97 design requirements, 67 rasterization, 208 Usenet newsgroup address, 208 OpenGL Architectural Review Board, 208 OpenHCI controller implementation standard controller compliance, 97 IEEE 1394 bus support, 96 USB controllers, 91 Open Host Controller Interface (OpenHCI), 92 Open Host Controller Interface Specification, 104 operating systems ACPI design, 18 BIOS flags, 112

operating systems (continued) device driver requirements, 35-36 disabling devices, 35, 48-49, 50 installation support, 41, 64, 82 miniport driver functions, 306 non-Plug and Play systems, 120 power management, 17 operation and maintenance server support, 302 optical storage devices ATA floptical devices, 133 checklist, 267-69 device drivers and installation, 259-60 PC 97 design requirements, 263 Plug and Play requirements, 257-58 power management issues, 258 references, 265-66 storage component basic features, 256-57 optional hardware features, xix option ROMs Basic PC 97 systems, 31-32 DDC2B support, 216 defined, 383 designing for Plug and Play, 32 detecting during boot process, 123 Entertainment PC 97 systems, 31-32 Int 13h Extensions support, 44, 126, 127, 256 mobile systems, 31-32 non-Plug and Play systems, 32 SCSI host adapter support, 138 virtual DMA services (VDS), 139 Workstation PC 97 systems, 31-32 original equipment manufacturers (OEM) defined, 383 OEM splash screens, 27 **OSLOADER**, 12 output. See audio components; DVD devices and playback; NTSC systems; PAL systems; TV output; video playback and output overcurrent protection, 140 overscan correction (TV output), 212

Ρ

packed-pixel frame buffers, 202, 215-16, 383 page flipping, 67, 84, 198 page registers, 151 palettized textures, 210 PAL systems Basic PC 97 and mobile systems, 43 defined, 211 Entertainment PC 97 systems, 84 graphics adapter requirements, 200, 212 refresh rates, 235

PAL systems (continued) time code reading, 232 Workstation PC 97 systems, 66 parallel ports and devices automatic device configuration, 169 Basic PC 97 and mobile systems, 40, 47 checklist, 177-79 compatibility mode, 170 conflict resolution, 165 connection requirements, 164 device drivers and installation, 166 device IDs, 10, 171, 337 Entertainment PC 97 systems, 82 icons, 332 legacy port requirements, 169-72 LPT mode, 170 modem requirements, 287 Plug and Play requirements, 165 power management, 166 printers, 313-14 references, 176 resource allocation, 169 scanners and digital cameras, 324-25 Standard Signaling Method for a Bidirectional Parallel Peripheral Interface for Personal Computers, 313 Workstation PC 97 systems, 63 Parametrics Technologies Corporation (PTC), 66 partitioned media driver support, 260 PC 97 Advanced audio. See Advanced audio capabilities PC 97 design accessibility guidelines, 361-62 acronyms and abbreviations, xxi add-on devices, 22 buses, 6 categories Basic PC 97 category, 4, 21-56 Entertainment PC 97 category, 4, 73-88 mobile systems, 4 Workstation PC 97 category, 4, 57-71 defined, xix "Designed for Microsoft Windows" logo, 3-4 device support, 6 ease of use issues, 7-9 evolving PC hardware, 2-3 extensibility, 9-11 high-level goals, 3 online files, xviii OnNow design initiative, 16-17 PC evolution, 16 Plug and Play, 9-11 references, 13

PC 97 design (continued) required, recommended, and optional features defined, xix SIPC initiative, 7-9 system devices defined, 22 Windows operating system issues, 5-6 x86- and RISC-based systems, 11-13 PC 97 Hardware Design Guide Microsoft contact information, xxii updates to PC 97 Hardware Design Guide, xviii PC Card 16-bit Interface Legacy Mode Base Address Register, 110, 151 PC Card 32. See CardBus devices PC Cards. See also CardBus devices accessibility guidelines, 362 allocated fields, 155 battery cards, 157 CardBus Plug and Play, 155-57 tuples, 156 card information structures (CIS), 154 checklist, 160-61 device drivers and installation, 158 device identifier information, 10 diagnostic utilities, 159 ExCA-compatible socket controllers, 149-51 IRQ Routing Register bits, 149 ISA and PCI interrupts, 150 memory PC Cards, 148 multiple voltage cards, 154 overview, 148 PC Card 16 fixed configurations, 154 Plug and Play, 152-54 ReqAttn bit and #STSCHG mechanism, 157 tuples, 152-54 power management, 157-58 power-related events, 157 references, 159 ZV-compatible cards, 158 PC Card Standard, 148 PC Card Support in Windows 95, 159 PCCA STD-101, 285 PCI. See also PCI Configuration Space; PCI documents and specifications; PCI IDE bus mastering audio components, 248-49 base address registers, 215 basic design requirements, 108-10 CardBus interrupts, 150

PCI (continued) checklist, 113 closing BAR windows, 108 defined, 383 device IDs, 10, 339 modem requirements, 287 overview, 108 PC 97 systems Basic PC 97 and mobile systems, 38 Entertainment PC 97 systems, 80 Workstation PC 97 systems, 62 PCI commands, 294 PCI controllers CardBus controllers, 110 ISA Write Data Port addresses, 110 requirements, 110-12 PCI dual IDE adapters, 127-28 Pci.exe, 111 PCI interrupt sharing, 112 PCI Special Interest Group, 114 PCI-to-CardBus bridges, 149 PCI-to-ISA bridges, 109 PCI-to-PCI bridges, 109, 111 Pci.vxd, 151 Plug and Play requirements, 110-13 power management requirements, 113 primary graphics adapter, 43 references, 114 PCI base address registers, 215 PCIC compatible controllers, 150 PCI commands, 294 PCI Configuration Space CardBus cards, 155 debugging, 111 device-dependent region, 111 ghost cards, 108 header region, 111 PCI Configuration Space bits, 150, 151, 157 PCI-to-CardBus bridges, 149 Plug and Play device identifiers, 108-11 sharing between functions, 108 SubSystem IDs, 111 SubSystem Vendor IDs, 111 PCI documents and specifications PCI Bus Power Management Interface Specification, 114 PCI IDE Controller Specification, 127 PCI Local Bus Specification 2.1, 108 PCI Specification 2.1, 108 references, 114 SFF 8038, 129, 134 PCI enumerator (Pci.vxd), 151 Pci.exe, 111

PCI IDE bus mastering IDE and ATAPI devices, 129 in dual IDE adapters, 127 PCI IDE devices, 130 PCI Special Interest Group, 114 PCI-to-CardBus bridges, 149 PCI-to-ISA bridges, 109 PCI-to-PCI bridges, 109, 111 Pci.vxd. 151 PCMCIA. See also PC Cards card services, 379 controller chip set device IDs, 340 defined. 383 device identifier information, 10 standards, 148 tuples, 152 PCMCIA standards, 159 PCM digital audio, 230, 243 PCRs (Plug Control Registers), 101 PCs. See also Basic PC 97 requirements; Entertainment PC 97 requirements; PC 97 design; RISC-based systems; Workstation PC 97 requirements; x86-based systems accessibility guidelines (see accessibility guidelines) documentation, 360-61 extensibility, 7, 9-11, 16 processor and operating system definitions, xx sealed case PCs, 8-9, 77 user-servicable parts, 7, 9, 77 PC Suspend and Resume functions, 81 peak data rates, 98 peak rate traffic shaping, 302 Pentium- and Pentium Pro-class systems. See x86-based systems Peripheral Component Interconnect. See PCI Peritel sockets, 213 personal communications, designing for, 74 Personal Computer Memory Card International Association. See PCMCIA Personal System/2 Specification, 187, 189 perspective-correct texturing, 208 phantom I/O addressing, 33 Phase Alternation Line (PAL). See PAL systems phone lines. See telephone lines PHY layer protocol, 98 physical CD formats, 263 physical impairments, 351, 355-56 PICs (programmable interrupts) defined, 383 PIC interrupt 9, 216 Pin 1 orientation, 129, 132 PIO (Programmed Input/Output), 127-28, 129

PIT timers, 118 pixels pixel orderings, 202 pixel replication, 203 VGA destination color keying, 207 placement of controls and buttons, 359 planers. See system boards Plug and Play. See also Plug and Play documents ACPI importance, 9 audio components, 247 automatic resource assignment, 30 Basic PC 97 systems, 30 buses and I/O types IDE requirements, 130 IEEE 1394 requirements, 96, 99 ISA device requirements, 39, 120-23 PC Card 16 design, 152-54 PCI controllers and peripherals, 108-11 SCSI adapters and peripherals, 140-41 serial, parallel, and wireless devices, 165, 171 CardBus requirements, 155-57 CSNs (card select numbers), 122, 301 defined, 383 device driver IRP support, 36 device IDs **BIOS**, 340 numerical listing, 336-47 overview, 334-35 PCI Configuration Space, 108-11 registering, 10, 33 required information, 10 dynamic disable capabilities, 30 Entertainment PC 97 systems, 30 enumerators, 382 (see also enumeration) expansion headers, 32 graphics adapters, 214 input component requirements, 184-85 mobile systems, 30 modem requirements, 286-87 network communications devices, 303-4 OnNow requirements, 17 operating system determination, 120 option ROMs, 32 port requirements, 165 printer requirements, 314 resource allocation, 30 role in extensibility, 9-11 scanner and digital camera requirements, 325 storage components, 257-58 tuples, 152-54

Plug and Play (continued) video components, 226-27 WDM importance, 9 Workstation PC 97 systems, 30 Plug and Play documents Clarifications to the Plug and Play BIOS Specification v. 1.0a, 119, 123 Clarification to Plug and Play ISA Specification v. 1.0a. 30 Microsoft contact information, xxii Plug and Play BIOS Specification v. 1.0a, 30, 119, 123 Plug and Play documentation, 176 Plug and Play External COM Device Specification v. 1.0, 10, 30 Plug and Play ISA Specification v. 1.0a, 123 Plug and Play Parallel Port Device Specification v. 1.0b, 10, 30 Plug and Play SCSI Specification v. 1.0, 30, 140.143 Plug and Play specifications, xx, 53 Plug Control Registers, 101 plugging in cables, 142 PnP. See Plug and Play PNP vendor code, 32-33, 333 point and print installation, 317 pointing device ports and peripherals accessibility guidelines, 363 Basic PC 97 and mobile systems, 40, 47 connection requirements, 183 cordless RF devices, 175 Entertainment PC 97 systems, 81-82 high-precision input devices, 63 mouse device IDs, 340-41 mouse icons, 331 multiple pointing devices, 82 PC 97 design requirements, 187-88 USB ports, 187 wireless and remote control, 81-82, 188 Workstation PC 97 systems, 63 point-sampled, perspective-correct texturing, 208 portable computers. See mobile systems port monitor software, 316 port replicators, 50, 383 ports. See also IDE (Integrated Drive Electronics); parallel ports and devices; serial ports and devices defined, 383 ECPs (extended capabilities ports) (see ECPs) fixed I/O address assignments, 377-78 icons, 331-32

ports (continued) scanner or digital camera ports, 322 ZV Ports, 158 positioning controls (TV images), 213, 235 positive-temperature-coefficient devices, 140 POST (power-on self test), 27, 384 POTS lines, 272, 281 power buttons, 24, 26, 357 Power Device Class Specification, 92 power distribution model, 96, 99, 103 powering systems on and off. See also boot process buttons and controls, 24, 26, 357 IEEE 1394 features, 100 instant performance, 7 OnNow initiative requirements, 16 PC 97 requirements, 26 PC power states and user perceptions, 16 powering down PCs, 26, 100 power-on self test (POST), 27, 384 visual displays, 27 power management. See also ACPI (Advanced Configuration and Power Interface); powering systems on and off ACPI design, 17-18 APM, 379 audio components, 250 battery-powered systems, 140 bus requirements, 26 buttons and controls, 26 card batteries, 157 circuit breakers, 140 Command and Status Register protocol (CSR), 100 current limiting, 140 Device Class Power Management Reference Specification, 176 docking mobile systems, 49 electrical isolation requirements, 97 fuses, 140 graphics adapters, 217 IDE devices, 131 IEEE 1394 support, 96, 99-100, 103 input components, 185 modems, 288 multiple voltage PC Cards, 154 network communications devices, 304 OnNow initiative requirements, 16-17, 25-26 PC Cards, 157-58 PCI device power management, 113 positive-temperature-coefficient devices, 140 Power Device Class Specification, 92

power management (continued) power states D2 power states, 157 PC 97 requirements, 24-25 power state changes, 16 user perceptions, 16 printers, 315 references, 20 ReaAttn bit, 157 scanner and digital camera requirements, 326 SCSI adapters and peripherals, 141-42 SCSI terminator power, 140 serial, parallel, and wireless devices, 166, 173 storage components, 258 #STSCHG mechanism, 157 USB buses, 91-92 video components, 227 Power management specifications for device and bus classes, 69, 86 power management timers, 24 power-on self tests, 27, 384 PowerPC Architecture. See RISC-based systems power sink requirements, 99 power source requirements, 99 PPP and PPTP connections, 275 precision input devices, 63 primary input and output devices, 122 printed documentation, 360-61 printer port icons, 332 printers accessibility guidelines, 370-72 checklist, 319-20 device drivers and installation, 315-18 error notification, 314, 316 ICC color matching, 316 IEEE 1284 requirements, 313-14 IEEE 1394 requirements, 312 overview, 312 Plug and Play requirements, 314 power management, 315 printable regions, 317 references, 318 Unidriver, 318 USB requirements, 312 Win32 Imaging Class, 101 Product Identifiers (ISA), 39, 121 programmable blter strides, 207 programmable interrupts (PICs) defined, 383 PIC interrupt 9, 216 Programmed Input/Output (PIO), 127-28, 129 Programming Interface for Bus Master IDE, 134

promiscuous mode (network adapters), 305 proprietary CD adapter device IDs, 335, 346 PS/2-compatible ports labeling, 34 requirements, 187, 189 PS/2-style keyboard scan codes, 190 PSTN (Public Switched Telephone Network) digital cellular systems, 285 PSTN Videophones, 279 PTC (Parametrics Technologies Corporation), 66 publications, obtaining. See references Public Switched Telephone Network (PSTN), 285 pulse-code modulation digital audio. See PCM digital audio push-to-close DVD design, 265

Q

quadlet reads, 103 quad-word buffer alignment, 296

R

R2 memory windows, 151 radio frequency (RF) support. See RF (radio frequency) devices radio station remote controls, 81 random access memory digital-to-analog converters (RAMDAC), 202, 384 range of motion impairments, 355-56 ranges remote control devices, 174 RF devices, 175 rasterization, 208, 210 RCA-style composite video connectors, 213 Read Format Capacities command, 263 READ_TOC command, 133 ReadTOC method, 262 real-mode components, 36 real-mode IRQ sharing (PCI), 112 real-time clocks device IDs, 340 fixed resources, 30 Real-Time Clock alarm, 24 static resources, 119 real-time wave encoder/decoders, 278 receive buffers (network adapters), 296 receptionist modem features, 272 recommended hardware features, xix Recording for the Blind and Dyslexic, Inc., 373

Red Book format, 263, 264, 384 reduced instruction set (RISC) architecture. See **RISC**-based systems references accessibility guidelines, 372-74 ACPI initiative, 20 audio components, 251 Basic PC 97 systems, 53 Entertainment PC 97 systems, 86 graphics adapters, 219 IDE and ATAPI, 134 IEEE 1394, 104 input components, 194 ISA cards and devices, 123 Microsoft contact information, xxii modems, 289 adaptive connections, 280 cable modems, 307 Caller ID services, 284 distinctive ringing class service, 283 telset capabilities, 280 VoiceView, 282 network communications devices, 307 OnNow technology, 20 PC 97 design, 13 PC Cards, 159 PCI, 114 printers, 318 scanners and digital cameras, 327 SCSI adapters and peripherals, 143 serial, parallel, and wireless devices, 176 storage devices, 265-66 USB buses, 92 video components, 237 WDM, 20 Workstation PC 97 systems, 69 refresh, vertical, 216 refreshing current scan line, 206 refresh rates control panel settings, 218 entertainment monitors, 235 locked VGA refresh rates, 230 non-interlaced refresh rates, 201 seizure disorders and, 353 RegisterBaseAddress, 150 registering device IDs, 10 registering vendor IDs, 33, 333 registers audio I/O registers, 249 BANDWIDTH_AVAILABLE register, 103 BARs (Base Address Registers), 112 CardBus controller initialization, 150 CHANNELS_AVAILABLE register, 103 Class Code Register (09h), 112 Command register, 150

registers (continued) configuration registers, 111, 153 DMA page registers, 119 Interrupt Line Register, 113, 150 ISA auto-configuration registers, 33 PC Card 16-bit Interface Legacy Mode BAR, 108, 151 PCI configuration register space, 111 resource data registers, 122 runtime registers, 112 SPEED_MAP register, 103 TOPOLOGY_MAP register, 103 unimplemented registers, 121 Registry, 381, 384 regulated terminators, 139 relocatable registers, 201 remote control devices cordless RF devices, 175 input component requirements, 183 pointing device requirements, 81-82, 188 range requirements, 174 switching inputs, 174 Remote wakeup, 100 removable media devices accessibility guidelines, 355 ATAPI and IDE support, 126, 127, 131 Basic PC 97 and mobile systems, 44-45 ejecting media, 355 floptical drives, 133 Media Status Notification Specification, 134 media sturdiness, 356 misinsertion of media, 356 SCSI devices, 143 removing device drivers, 36 ReqAttn bit, 157 required hardware features, xix RESERVED fields (CardBus), 156 resolution 2-D graphics low-resolution modes, 206 Basic PC 97 systems, 42 desktop display monitors, 233 dot pitch limits, 236 Entertainment PC 97 systems, 83 NTSC or PAL output, 200 Workstation PC 97 systems, 66, 67 resource allocation, 30. See also resource configuration; resource conflicts resource arbitrators, 384 resource configuration device installation experience, 34-35 IDE devices, 130 ISA implementation, 33, 39 multifunction devices, 37 non-volatile storage, 30 role in extensibility issues, 9

resource configuration (continued) SCSI requirements, 141 settings in registry, 35 static and configurable resources, 119, 384 resource configuration managers defined, 380 device nodes, 380 resource arbitrators, 384 resource conflicts. See also resource allocation; resource configuration 12-bit I/O decoding, 33 16-bit I/O decoding, 33, 120, 248 defined. 384 docking station requirements, 48 IR (infrared) devices, 174 ISA cards, 119 multiple adapters and monitors, 204 resource data registers, 122 resource data type functions, 384 Resource Management (RM) cells, 302 resources. See also resource allocation; resource configuration; resource conflicts automatic resource assignment, 141 defined, 384 DMA channels, 169, 248, 261, 287, 303 I/O addresses (see I/O addresses) IRQ signals (see interrupt signals) static resources, 119, 384 resources, informational. See references response codes, 187, 190 restarting systems device installation, 34 reconfiguring without restarting, 9 Revision IDs (CardBus), 155 rewritable ATAPI devices. See optical storage devices RF (radio frequency) devices certification, 176 low-power devices, 175 noise and interference, 175 PC 97 requirements, 172, 175-76 pointing devices, 188 protocol information contact address, 175 RF remote control devices, 81-82, 174, 175, 183, 188 typical uses, 175-76 updates, support, and standards, 188 RF field interference in hearing aids, 356 RGB mode rasterization, 208-9 ribbon cables, 129, 132 right- and left-handed users, 359 ringing cadences for modems, 283 **RISC**-based systems ARC routines and devices, 12 CPU requirements, 23

RISC-based systems (continued) defined, xx PC 97 design issues, 11-13 PowerPCs, xx running Windows NT, 11-13 Workstation PC 97 systems, 59 RM (Resource Management) cells, 302 Rockwell ADPCM, 278 Rockwell AT#V, 277 ROM mapping multiple adapters or monitors, 205 option ROMs (see option ROMs) scanning during boot process, 123 rotational speeds (storage devices), 67 rudder pedals. See joysticks and steering devices run-time functions, 32

S

S4 "soft off" state, 24 sampling density (DVD playback), 230 sampling rates Advanced audio standards, 245 baseline audio, 243, 244 SAR (Segmentation and Re-Assembly) chips, 302 satellite broadcast systems, 83 scaling and interpolation (graphics adapters), 203 SCAM (SCSI Configured Automatically), 384 scan codes pointing devices, 187 PS/2-style keyboards, 190 scan lines (graphics adapters), 206 scanners checklist, 328-29 device drivers and installation, 326-27 ICC color matching, 322 IEEE 1394 requirements, 324 overview, 322 parallel port requirements, 324-25 Plug and Play requirements, 325 port labels and icons, 322 power management, 326 references, 327 SCSI requirements, 323 serial port requirements, 324 USB requirements, 323 Win32 Imaging Class, 101 scanning ROMs during boot process, 123 scan rates display monitors, 234 graphics adapters, 201

SCART sockets, 213 SCART standard, 213 scatter/gather capabilities in VDS, 139 screen displays (monitors). See display monitors screen displays (system startup), 27 screen door transparency, 210 screen size (virtual desktop), 219 SCSI-2 specifications bus parity signals, 142 multisession CD-ROM support, 262 SCSI-2 alternative-2 terminators, 139 Small Computer Interface (SCSI-2), 143 SCSI-3 Multimedia Command Set (MMC), 102 SCSI-3 parallel interface (SPI) cable requirements, 142 defined, 384 DIFFSENS, 139 IEEE 1394 support, 102 SCSI-3 SPI terminators, 139 Small Computer Interface (SCSI-3) Parallel Interface (SPI), 143, 266 SCSI-3 Serial Bus Protocol, 102 SCSI adapters and peripherals automatic termination, 139, 143 bus mastering, 138 bus parity signal, 142 cable requirements, 142 checklist, 144-45 defined, 384 device IDs, 140, 335, 346 differential devices, 139 high-density connectors, 143 icons, 139, 331 IDE and SCSI Interface Specifications, 266 internal termination, 139, 142 Media Status Notification Specification for SCSI and ATAPI Devices, 143 overview, 138 Plug and Play requirements, 140-41 Plug and Play SCSI Specification v. 1.0, 140.143 power management, 141-42 references, 143 resource configuration, 141 scanners and digital cameras, 323 Small Computer Interface (SCSI-2), 266 spin-down recovery, 142 storage device requirements, 68 terminator power (TERMPWR), 140 virtual DMA services (VDS), 139 SCSI Configured Automatically (SCAM), 384 SD DVCR data, 101 SDRC, 66 sealed case PCs, 8-9, 77

Segmentation and Re-Assembly (SAR) chips, 302 seizure disorders, 351, 353 self-powered device requirements, 99-100 send buffers (network adapters), 296 send identifier codes, 187, 190 sensing ATM adapters, 301 cable sense, 296, 297, 300, 301 dynamic detection, 381 hardware recognizer (Ntdetect), 12 ISDN devices, 297 network adapters, 296, 305, 306 option ROMs, 123 TV hardware connections, 214 Windows NT detection DLL, 305 Serial IDs (system devices), 122 serializing channel I/O, 128 SerialKeys software, 357, 358 Serial Number fields, 39, 121, 248 serial ports and devices automatic device configuration, 167-68 Basic PC 97 and mobile systems, 40, 47 checklist, 177-79 conflict resolution, 165 connection requirements, 164 device drivers and installation, 166 device IDs, 10, 338 dynamic disable capabilities, 167-68 Entertainment PC 97 systems, 82 icons, 332 legacy port requirements, 167-68 PC 97 design requirements, 167-68 Plug and Play requirements, 165 power management, 166 references, 176 resource allocation, 167-68 scanners and digital cameras, 324 serial ports as ISA devices, 118 Standard Serial Interface Circuit Emulation, 168 Workstation PC 97 systems, 64 servers operation and maintenance support, 302 VPI and VCI ranges, 301 serviceability in PC design, 16 SET FEATURES command, 126 SFF (Small Form Factor) documents obtaining documents, 134, 266 SFF 8020i, 128, 129, 131, 132, 133, 134 SFF 8020i v. 2.6, 263 SFF 8020i v. 3.0, 264 SFF 8038i, 129, 134

shading flat shading, 208 Gouraud shading, 208 shaded triangle performance, 66 S (slave) hard disk setting, 262 sharing IRQs (see IRQ sharing) writable PCI Configuration Space bits, 108 Short Messaging Services (SMS), 273, 286 shrouded connectors, 34 sight impairments, 351 signaling interrupts. See interrupt signals signal-to-noise ratios, 244 silence. See noise requirements Simply Interactive Personal Computer initiative. See SIPC initiative simultaneous voice/data integration, 83 SIPC initiative, 7-9, 75. See also living room PCs SIR (serial infrared) specification, 176 size of controls and buttons, 358 slave devices CSEL support, 132 hard disk configuration, 262 IDE/ATAPI devices, 129 Sleeping state, 24, 25 SlowKeys feature, 358 Small Computer Interface (SCSI-2), 143 Small Computer Interface (SCSI-2), 266 Small Computer Interface (SCSI-3) Parallel Interface (SPI), 139, 142, 143, 266 small computer system interface. See SCSI adapters and peripherals Small Form Factor documents. See SFF (Small Form Factor) documents SMART cards, 83 SMART commands, 132 SMART IOCTL API specification, 132, 134 Smartvsd.vxd, 132 SMS (Short Messaging Services), 273, 286 S/N ratios, 244 socket controllers for PC Cards, 149-51 Socket Services driver (Socketsv.vxd), 150 SoftImage, 66 Soft Power_On and Self Power_Shutdown functions, 100 software and utilities. See also device drivers; operating systems accessibility guidelines, 349, 352 accessibility utilities, 352 copy protection, 265 device applications testing, 228 Dtpl.exe, 159 Gdi.exe, 218 graphics adapter driver compatibility, 218

Mmsystem.dll, 218 software and utilities (continued) OnNow requirements, 17 Pci.exe utility, 111 Pci.vxd, 151 port monitor software, 316 power state changes, 16 scanner and digital camera driver requirements, 327 SerialKeys software, 357, 358 SlowKeys feature, 358 StickyKeys utility, 357, 358 storage components, 259 User.exe, 218 software development kits (SDKs), xxi Sonet frames, 302 Sony/Philips CD-ROM hardware logo program, 265 Sony ReadTOC method, 262 sound and hearing impairments, 351 Sound Blaster pin-out compatibility, 193 Sound Blaster register, 249 sound devices. See audio components source alpha blending, 209 south bridge multifunction devices, 127 speakerphones, 83, 277-78 speakers, 354, 367 special needs. See accessibility guidelines Specification for Cable Power Distribution, 99 specifications, obtaining. See references Specifications for Consumer-Use Digital VCRs Using 6.3mm Magnetic Tape (Blue Book), 101 speech impairments, 351 speech recognition software, 354 speed data modems, 274 IR device input speed, 173 ports for ISDN devices, 298 speed traps in bus bandwidth, 98 SPEED MAP register, 103 SPI. See SCSI-3 Parallel Interface (SPI) spin up and spin down hard drive spin-up times, 262 SCSI peripheral spin down, 142 spin down defined, 384 splash screens, 27 spoofing IDs, 103 stability of keyboards, 359 Standard Definition (SD) DVCR data, 101 standards, obtaining. See references Standard Serial Interface Circuit Emulation, 168 Standard Signaling Method for a Bi-directional Parallel Peripheral Interface for Personal Computers, 313

static resources. See also DMA (direct memory access); interrupt signals; I/O addresses defined. 384 for standard system devices, 119 Status and Enable (STS/EN) bits, 24 status indicators accessibility guidelines, 353 Message Waiting indicators, 26, 46 Working and Sleeping states, 26 steering devices. See joysticks and steering devices stereo in and stereo out port icons, 332 stereo input and output, 243-44, 245 StickyKeys feature, 357, 358 still cameras. See digital cameras stippled alpha blending, 210 STOP/START UNIT command, 142 storage components. See also CD-ROM devices; DVD devices and playback; floppy disk drives and controllers; hard disk drives and controllers; optical storage devices; removable media devices accessibility guidelines, 368-70 basic features, 256-57 Basic PC 97 and mobile systems, 44-45 bus mastering, 45, 68, 86 CD-ROM peripherals, 262-63 checklist, 267-69 conflict resolution, 257-58 device drivers and installation, 259-60 DVD devices, 264-65 Entertainment PC 97 systems, 85-86 floppy disk drives and controllers, 260-61 hard disk drives, 261-62 high-performance components, 67 host controllers, 44, 68 installation, 257 I/O addresses, 258 Media Status Notification Specification, 256 optical storage devices, 263 overview, 256-57 partitioned media, 260 Plug and Play requirements, 257-58 power management issues, 258 references, 265-66 Workstation PC 97 systems, 67-68 Storage Device Class, 131, 258 stream synchronization (audio), 246 #STSCHG mechanism, 157 subpicture compositing, 231 SubSystem and SubSystem Vendor IDs CardBus cards, 156 IDE devices, 130 PCI devices, 111 SVD (simultaneous voice/data) integration, 83

SVGA monitors, sensing, 202 S-Video connectors, 84, 213, 219 S-Video standard, 213 switched WAN cards, 295 switches, power, 26 synchronized audio and video, 224, 230 synchronous access mode (V.80), 275 synchronous HDLC framing, 297 synthesized speech, 352 system ACPI sleep states, 24 system board devices. See system devices system boards ACPI design, 17-18 defined, 384 integrated devices, 382 motherboard device IDs, 340 system control interrupts, 24 system devices. See also BIOS; bridges; buses; DMA (Direct memory access); names of specific system devices ACPI description tables, 24 defined, xx, 22 device IDs, 335, 336-41 fixed resources, 30, 185 fixed Serial IDs, 122 general PC 97 requirements, 29-37 interrupt controllers, 30, 118, 119, 336 ISA-compatible addresses, 37 legacy I/O assignments, 375-78 real-time clocks, 24, 30, 119, 340 timers, 30, 119, 336 system memory, 24, 59, 76 system miniports. See miniports and miniport drivers

T

TAM (telephone answering machines) Message Waiting indicators, 26 modem support, 272 TAPI (telephony API), 6, 295, 384 TCP/IP, 299, 306 TDD (Telephone Device for the Deaf), 276 TDMA (Time Division Multiplexed Access), 285, 286 tear-free double-buffering, 206 telephone answering, 277 telephone answering machines (TAM) Message Waiting indicators, 26 modem support, 272 Telephone Device for the Deaf (TDD), 276 telephone lines audio paths, 278 port icons, 332

telephone lines (continued) POTS lines, 272 wave-in and wave-out devices, 278 telephones cordless RF devices, 175 local telset support, 280 port icons, 332 speakerphones, 83, 277-78 telephone wave device compression methods, 285 telephony API (TAPI), 6, 295, 384 television. See TV output telsets. See telephones termination internal SCSI termination, 140, 142 regulated terminators, 139 SCSI automatic termination circuits, 139, 143 terminator power (TERMPWR), 140 TV output, 213 TERMPWR (terminator power), 140 testing Audio Compatibility Tests (ACT), 243 "Designed for Microsoft Windows" requirements, 3 device drivers, 36 Microsoft testing tools, specifications, and information, xxii, 114 mobile units and docking stations, 48 WHQL (Windows Hardware Quality Labs), 3 Windows Logo Key Testing Software, 190 text documentation text files, 360 labels, 360 text telephones, 276 texturing bilinear filtered textures, 209 palettized textures, 210 point-sampled, perspective-correct texturing, 208 trilinear MIP-mapped textures, 209 thermal models, ACPI support for, 25 Thicknet+Twisted cable port icons, 332 TIA communications standards obtaining, 289 TIA-553, 285 TIA-578-A, 275 TIA-602, 274, 280, 297 TIA-678, 285 TIA-695, 83, 277, 280, 284 TIA IS-95, 285 TIA IS-99, 286 TIA IS-101, 277, 279 TIA IS-135, 286

TIA communications standards (continued) TIA IS-136, 285 time code reading, 232 Time Division Multiplexed Access (TDMA), 285, 286 timers device IDs, 336 fixed resources, 30 reserving static resources, 119 tools and information, obtaining. See references TOPOLOGY_MAP register, 103 TPLLV1_INFO, 152 TP transceivers, sensing, 296 Trace Research and Development Center, 349, 373 trackballs, 79. See also pointing device ports and peripherals Traffic Management Specification, 302 transceiver types, sensing, 296 Transistor-Transistor Logic level (TTL), 193 transmit clocks, 302 transparency effects, 209-10 transparent blters, 206 triangles shaded triangle performance, 66 triangle setup, 211 trilinear MIP-mapped textures, 209 TTL (Transistor-Transistor Logic level), 193 tuners for cable TV, 84 tuples. See also CIS (card information structure) CardBus cards, 156 defined, 384 PC Card 16, 152-54 turning on PCs. See powering systems on and off TV output, 211-14. See also NTSC systems; PAL systems; TV systems; video components; video playback and output Basic PC 97 and mobile systems, 43 composite video and S-Video connectors, 213 Entertainment PC 97 systems, 84 flicker filters, 212 NTSC and PAL output, 212 Plug and Play requirements, 214-16 positioning controls, 213 software connection detection, 214 termination, 213 underscan scaling, 212 VGA support, 213 Workstation PC 97 systems, 66 world standards, 211 TV systems cable TV tuners, 84 digital broadcast satellite subsystems, 83

TV systems (continued) electronic program guide software, 84 high-resolution TV, 74 HSCDS (High Speed Cable Data Services), 299–301 TV channel remote controls, 81 VBI (vertical blanking interval), 84 World TV and S-Video interface standards, 219 typefaces documentation, 361 labels, 360 Type F DMA, 248 typing issues in accessibility, 352

U

UARTs (universal asynchronous receivertransmitters), 167, 385 UDF (Universal Disk Format), 265 UHCI controller implementation standard, 91, 92 underscan scaling, 212 undocking mobile units, 49 unicast packet filtering, 174 Unidriver, 318 Unimodem driver defined. 385 IMA ADPCM support, 278 modem driver support, 272, 288 Unimodem/V, 83 voice support, 277 unimplemented registers, 121 Unique IDs, 248. See also Global Unique IDs (GUID) universal asynchronous receiver-transmitters (UARTs), 167, 385 Universal Disk Format (UDF), 265 Universal HCI controller implementation standard, 91, 92 Universal HCI Design Guide for USB, 92 Universal Modem Driver. See Unimodem driver Universal Printer Driver, 318 universal serial bus. See USB (universal serial buses) Universal Serial Bus PC Legacy Compatibility Specification, 28, 189 University of Wisconsin Trace Research and Development Center, 349, 373 Updates to PC 97 Hardware Design Guide, xviii usability. See ease of use

USB (universal serial buses), 89-93. See also USB (universal serial buses) specifications audio components, 249 basic design requirements, 90-91 Basic PC 97 and mobile systems, 38, 47 BIOS USB keyboard support, 28 checklist, 93 controller requirements, 91 defined, 6, 385 device identifiers, 10 Entertainment PC 97 systems, 79 game pad requirements, 191 modem requirements, 287 overview, 90 peripheral design features, 92 port icons, 90-91, 332 power management, 91-92 printers, 312 references, 92 role in extensibility issues, 9 scanners and digital camera requirements, 323 Workstation PC 97 systems, 62 USB Human Input Device driver, 186 USB-IF Information, 92 USBOn, USBSuspend, or USBOff power states, 91 USB (universal serial buses) specifications Universal Serial Bus PC Legacy Compatibility Specification, 28 USB Audio Class, 102 USB core specification, 10 USB Device Class Definition for Communication Devices, 168 USB Device Class Specifications, 92 USB Human Input Device class specification, 182 USB Specification, 90, 92 User.exe, 218 UserName PNP field, 324 users. See also accessibility guidelines; ease of use color-blind users, 361 left- and right-handed users, 359 perceptions of PCs, 7 perceptions of power states, 16 user-servicable parts, 7, 9, 77 user-servicable parts, 7, 9, 77 utilities. See software and utilities

V

V.25, V.8, and V.8bis features. See ITU communications standards ValidateDesk function export, 219 VBE/DDC, 219 VBI (vertical blanking interval), 84 VCI (Virtual Channel Identifier) range, 301 VDDs (virtual device drivers), 11 VDM (Virtual Device Manager), 11 VDS (virtual DMA services), 139 vendor codes obtaining PNP vendor code, 333 PC 97 design requirements, 32 Vendor IDs CardBus cards, 155 ISA devices, 39 obtaining IDs, 121 vendors (IHVs), 382 Vendor Specific Drivers (VSD), 132 vertical blanking interval (VBI), 84 VESA (Video Electronics Standard Association), 385 VESA and Industry Standards and Guidelines for Computer Display Monitor Timing, 219 VESA BIOS Extension Standard / Core Functions 2.0, 219 VESA/VL-buses, 339 VGA BIOS, 215, 217 VGA controllers, 118 VGA destination color keying, 207 VGA graphics standard, 215 VGA mode, 43, 66, 84, 200 VGA monitors. See also display monitors; entertainment monitors; graphics adapters large-screen VGA monitors, 85 multiple monitor support, 204 refresh rates, 230 sensing, 202 TV-output equipped systems, 213 VGA pixels, 207 VGA registers, 201 VGA resources, disabling, 205 video clocks, 232 video components. See also display monitors; DVD devices and playback; graphics adapters; TV output; video input and capture; video playback and output checklist, 238-39 conflict resolution and device configuration, 226 DDC2B standard, 225 desktop display monitors, 233-34 device drivers and installation, 227-28 display adapter device IDs, 338-39

video components (continued) DVD-Video support, 44, 68, 85 entertainment monitors, 234-36 icons, 226 overview, 224 Plug and Play requirements, 226-27 power management, 227 references, 237 video miniport drivers, 13 ZV-compatible cards, 158 video conferencing, 281 video decode performance, 228 video description services, 374 video discs, 231. See also DVD devices and playback video display memory, 67, 84, 198 Video Electronics Standards Association. See VESA (Video Electronics Standard Association) video frame rates, 230 video input and capture. See also video components; video playback and output audio and video clocks, 232 consumer electronics devices, 101 device IDs, 335, 346-47 DirectDraw Live Video Extensions (LVE), 158 Entertainment PC 97 systems, 85 requirements, 232 system requirements, 225 time code reading, 232 wave audio capture, 232 WDM minidrivers, 232 video plane compositing, 207 video playback and output. See also DVD devices and playback; graphics adapters; video components; video input and capture Basic PC 97 and mobile systems, 43 consumer electronics devices, 101 DirectDraw Live Video Extensions (LVE), 158 DVD playback requirements, 225, 229-31 Entertainment PC 97 systems, 84 Microsoft ActiveMovie, 199 mobile systems, 47 MPEG-1 playback, 44, 67, 84, 225 MPEG-1 playback requirements, 228-29 MPEG device enumeration, 227 NTSC or PAL output, 200 Workstation PC 97 systems, 66 ZV-compatible cards, 158 video telephony and videophones PSTN Videophones, 279 synchronous access for data modems, 275

425

video telephony and videophones (continued) V.8bis call mode signaling, 278 videophone multiplexors, 281 Video Telephony (H.324 suite) recommendations, 273 Virtual Channel Identifier (VCI) range, 301 virtual desktop graphics driver support, 219 virtual device drivers (VDDs), 11 Virtual Device Manager (VDM), 11 virtual DMA services (VDS), 139 virtual key code level compatibility, 190 Virtual Path Identifier (VPI) range, 301 virtual programmable interrupt controller device (VpicD), 121 virtual-reality headgear. See joysticks and steering devices visual display accessibility guidelines, 351 visual impairments, 351 Visual Message Waiting Indicator Generic Requirements, 280 VMs (virtual machines), xxi voice and voice/data modems. See also modems Entertainment PC 97 systems, 82-83 features list, 272-73 real-time wave encoder/decoders, 278 references, 282, 289 speakerphone capabilities, 277-78 telset capabilities, 280 voice/data integration, 281 VoiceView, 282 Voiceband Data Transmission Interface Generic Requirements, 280 voice/data integration, 281, 282 Voice Mode compound responses, 284 Voice Mode in-band responses, 284 VoiceSpan technology, 281 VoiceView technology, 273, 282 VoiceView Tone Detection by Voice Modems, 282 volume controls accessibility guidelines, 354 remote controls, 81 VpicD (virtual programmable interrupt controller device), 121 VPI (Virtual Path Identifier) range, 301 VSDs (Vendor Specific Drivers), 132 VxDs (device drivers) card services, 379 defined, 385 device driver requirements, 36 message support, 36

Smartvsd.vxd, 132

W

Wake [CSN] command, 122 Wakeup events OnNow initiative requirements, 16 power management requirements, 26 Real-Time Clock alarms, 24 Remote Wakeup, 100 WAN cards, 295 warning lights, 353 warning sound visual cues, 354 wave audio capture, 232 wave device compression methods, 285 wave encoders/decoders for modems, 278 wave-in and wave-out phone line devices, 278 WC (write combining memory type) support, 65 WDL (Windows Driver Library) contact address, xxii WDM (Win32 Driver Model) audio/video decoded minidrivers, 230 class drivers, 19 device minidrivers, 36 IEEE device command protocols, 100 imaging minidrivers, 225, 232 minidrivers, 19 OnNow requirements, 17 overview, 18-19 role in Plug and Play issues, 9 USB support, 90 Win32 Driver Model DDK, 101 Win32 Driver Model Kit (DDK) for IEEE 1394, 104 Windows 95 and Windows NT, 5-6 WDM white papers and information, 20 Web communication support, 74 White Book format, 263, 264 WHQL (Windows Hardware Quality Labs) Audio Compatibility Tests (ACT), 243, 251 contact information, xxii "Designed for Microsoft Windows" requirements, 3 device driver testing, 35 Hardware compatibility tests, 20 mobile unit and docking station testing, 48 testing tools and specifications, 114 Windows Logo Key Testing Software, 190 wide area networks. See WANs Win32 addresses, 12 Win32 API, 385 Win32 Audio Class, 102 Win32 DDK, 36

Win32 Device Class Interfaces, 100 Win32 Driver Model. See WDM (Win32 Driver Model) Win32 Driver Model DDK, 101 Win32 Driver Model Kit (DDK) for IEEE 1394, 104 Win32 Imaging Class, 101 Win32 SDK, 36, 104 Win32 TAPI applications, 295 Windows 95. See Microsoft Windows 95 Windows 95 DDK, xxii, 104, 134, 176 Windows 95 Modem Developers Kit (MDK), 289 Windows Driver Library, xxii Windows Hardware Compatibility List, xxii Windows Logo keys, 81, 190-91 Windows Logo Key testing software, documentation, and license agreement, 194 Windows NT. See Microsoft Windows NT Windows NT DDK, xxii, 104, 134, 176 Windows NT file system (NTFS), 383 wire frame performance, 66 wireless components Basic PC 97 and mobile systems, 41 checklist, 177-79 conflict resolution, 165 connection requirements, 81-82, 164 device drivers and installation, 166 game pads or joysticks, 81 infrared (IR) support, 172-75, 187, 190 keyboard ports and peripherals, 80, 190 PC 97 requirements, 172-76 Plug and Play requirements, 165 pointing devices, 81-82, 187 power management, 166, 173 radio frequency (RF) support, 172, 175-76, 188 references, 176 remote control devices, 81-82, 175, 183, 188 Workstation PC 97 systems, 64 wireline modem features, 273 Working power state, 26 Workstation PC 97 requirements ACPI support, 24-25, 60 audio, 64, 242, 244, 245-46 boot device BIOS support, 28, 60 bus requirements, 62 checklist, 70-71 CPUs, 59 defined, 4, 385 display monitors, 65, 66, 67, 200, 201

Workstation PC 97 requirements (continued) engineering systems, 66 general device requirements, 29-37, 61 graphics adapters 2-D and 3-D hardware acceleration, 67, 205-11 bus adapters, 199 hardware stretching, 203 high-performance components, 65 key issues, 198 industrial design requirements, 60 input components, 28, 60, 63, 182-83 I/O device requirements, 63-65 L2 cache, 59 modems, 65, 273, 277-78 network communications, 65, 294, 295 OnNow support, 25-26, 27, 60 operating system installation, 64 optimization for Windows NT Workstation, 58 overview, 58 references, 69 serial, parallel, and wireless connections, 63, 64, 164, 183 storage device requirements, 45, 68 system memory, 59 video components DVD playback, 68, 229-31, 264 hardware stretching, 229 MPEG-1 playback, 67 NTSC/PAL support, 66, 200 TV output, 212-14 video component requirements, 225-26 World TV and S-Video interface standards, 219 World Wide Web communication support, 74 write combining (WC) memory type support, 65 Writing Accessible HTML Documents, 372 WSS-compatible register, 249

X

x86-based systems boot device BIOS support, 28 defined, xx fixed resources, 119 OnNow BIOS support, 27 option ROMs, 31–32, 120 PC 97 design issues, 11–13 running Windows NT, 11–13

Y

Yellow Book format, 263, 264 "Yenta" specification: PCI to PCMCIA CardBus Bridge Register Description, 108, 114, 149, 159 YUV off-screen surfaces, 203, 229

Ζ

Z-buffer support, 210 ZV (Zoomed-Video) compatible cards, 158