

PC 2001 System Design Guide

**A Technical Reference
for Designing PCs and
Peripherals for the
Microsoft® Windows®
Family of Operating
Systems**

Intel Corporation and Microsoft Corporation

The information contained in this document represents the current view of Intel Corporation and Microsoft Corporation on the issues discussed as of the date of publication. Because Intel and Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Intel and Microsoft, and Intel and Microsoft cannot guarantee the accuracy of any information presented. This document is for informational purposes only. **INTEL AND MICROSOFT MAKE NO WARRANTIES, EXPRESS OR IMPLIED, IN THIS DOCUMENT.**

Intel Corporation and Microsoft Corporation may have patents or pending patent applications, trademarks, copyrights, or other intellectual property rights covering subject matter in this document. The furnishing of this document does not give you any license to these patents, trademarks, copyrights, or other intellectual property rights.

Intel and Microsoft do not make any representation or warranty regarding specifications in this document or any product or item developed based on these specifications. Intel and Microsoft disclaim all express and implied warranties, including but not limited to the implied warranties of merchantability, fitness for a particular purpose, and freedom from infringement. Without limiting the generality of the foregoing, Intel and Microsoft do not make any warranty of any kind that any item developed based on these specifications, or any portion of a specification, will not infringe any copyright, patent, trade secret, or other intellectual property right of any person or entity in any country. It is your responsibility to seek licenses for such intellectual property rights where appropriate. Intel and Microsoft shall not be liable for any damages arising out of or in connection with the use of these specifications, including liability for lost profit, business interruption, or any other damages whatsoever.

ClearType, Direct3D, DirectDraw, DirectInput, DirectMusic, DirectShow, DirectSound, DirectX, Microsoft, Microsoft Press, MS-DOS, Win32, Win64, Windows, and Windows NT are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Intel is a registered trademark of Intel Corporation.

Other product and company names herein may be the trademarks of their respective owners.

© 1999-2000 Intel Corporation and Microsoft Corporation. All rights reserved.

Contents

About the Design Guide	vii
Chapter 1 Executive Summary	1
Platform Requirements Summary	2
Device Class Subsystem Requirements Summary	5
Part 1 Initiatives	
 Chapter 2 Easy PC Initiative	13
Easy PC Initiative Goals in 2000–2001	13
Legacy Removal and Easy PC Goals	15
Recommendations for Easy PC Configuration.....	16
Part 2 Platform Requirements	
 Chapter 3 PC System	29
PC 2001 General System Requirements.....	29
PC 2001 BIOS Requirements.....	34
PC 2001 Physical Design Requirements	40
PC 2001 System Expansion Bus Requirements	41
PC 2001 General Device Requirements.....	44
Legacy Removal Requirements.....	49
Manageability Component Instrumentation Requirements	53
PC System References	54
Checklist for PC System	56
 Chapter 4 Workstation	59
Workstation System Design Requirements	59
Workstation References	62
Checklist for Workstation	62
 Chapter 5 Mobile	63
Mobile PC System Design Requirements	63
Port Replicator and Docking Station Requirements.....	67
Mobile References	71
Checklist for Mobile	71

Part 3 Device Class Subsystem Design Requirements

Chapter 6 Buses and Interfaces	77
USB	77
IEEE 1394.....	80
SCSI.....	84
ATA and ATAPI.....	87
PCI.....	89
Bluetooth	92
Buses and Interfaces References.....	93
Checklist for Buses and Interfaces.....	95
Chapter 7 Input Devices	99
General Input Device Requirements	99
Wireless Component Requirements.....	103
Smart Card Requirements	105
Input Devices References	107
Checklist for Input Devices	109
Chapter 8 Graphics Adapters	111
Baseline Graphics Features.....	111
Multiple-Adapter and Multiple-Monitor Support	115
Hardware Acceleration for 2-D Graphics	116
Hardware Acceleration for 3-D Graphics	117
Television Output Requirements	120
Plug and Play Requirements for Graphics Adapters.....	121
BIOS and Option ROM Requirements for Graphics Adapters	122
Requirements for AGP and PCI Graphics Adapters	123
Power Management for Graphics Adapters	123
Device Drivers and Installation for Graphics Adapters and Video Devices	124
Graphics Subsystem Support for Video.....	125
Mobile PC Graphics Design	127
Graphics Adapters References.....	130
Checklist for Graphics Adapters	131
Chapter 9 Video	133
Baseline Video Features	133
MPEG-2 Video Playback Requirements.....	136
DVD-Video Playback Requirements	137
VBI Data Delivery Requirements	139
Digital TV Receiver Module Requirements.....	140
Mobile PC Video Design.....	141
Video References.....	142
Checklist for Video	143

Chapter 10 Monitors	145
Basic Monitor Requirements.....	145
Monitors References	150
Checklist for Monitors	151
Chapter 11 Audio	153
Basic Audio Requirements.....	153
Audio Performance Requirements	157
Requirements for Voice Input.....	158
Requirements for PCI, USB, and IEEE 1394 Audio.....	160
Power Management for Audio	161
Requirements for Mobile PC Audio	162
Audio References.....	163
Checklist for Audio.....	164
Chapter 12 Storage	165
Storage Basic Requirements.....	165
CD and DVD Devices.....	168
DVD Devices	169
CD Devices	170
Rewritable Optical ATAPI Devices	170
PC 2001 Design for Storage Components.....	171
Device Drivers and Installation for Storage	171
Storage References.....	172
Checklist for Storage.....	174
Chapter 13 Modems	175
Voiceband Modems	175
Driver-based Modems	180
ISDN Modems	180
Mobile Modems	181
Telephony.....	183
Modems References	184
Checklist for Modems	185
Chapter 14 Network Communications	187
Network Adapter Requirements.....	187
Connectionless Requirements	189
ISDN Requirements	191
Cable Modem Requirements.....	192
ATM Adapter Requirements.....	193
ADSL Requirements	196
Wireless Networking.....	197
IrDA Requirements for Network Communications.....	198
Home Networking Media.....	199
Plug and Play and Bus Design for Network Communications.....	199
Power Management for Network Communications	200

Device Drivers and Installation for Network Communications	202
Network Communications References.....	202
Checklist for Network Communications.....	204
Chapter 15 Printers	207
Basic Printer Requirements.....	207
Device Drivers and Installation for Printers.....	208
Printers References	211
Checklist for Printers	212
Chapter 16 Digital Still Image Peripherals	213
Digital Still Image Devices Basic Requirements	213
Plug and Play for Digital Still Image Devices.....	215
Device Drivers and Installation for Digital Still Image Devices.....	215
Digital Still Image Peripherals References	217
Checklist for Digital Still Image Peripherals	218

Appendices

Appendix A Resource Mapping	221
ISA Interrupts	221
Legacy ISA DMA Assignments.....	222
Legacy ISA I/O Address Assignments.....	222
Required Interrupts for PC 2001 Legacy-Free Systems	224
Appendix B Remote Lockout	227
Inquire Lockout Capabilities (00H)	228
Get Remote Lockouts (01H).....	229
Set Remote Lockouts (02H).....	230
Appendix C PC 2001 Master Checklist	231
Appendix D Master Reference List	253
Glossary	267

Addenda

Legacy Plug and Play Guidelines

Design Guidelines for PC Card and CardBus