

# **ASIC Design Starts By Key End Market Application**

February 2012

Study No. SC101-12

© Copyright Semico Research, 2012. All rights reserved.

Reproduction in whole or part is prohibited without the express written permission of Semico.

The contents of this report represent the interpretation and analysis of statistics and information that is generally available to the public or released by responsible agencies or individuals, but is not guaranteed as to its accuracy or completeness.

## **Table of Contents**

<b>Table of Contents</b> .....	<b>1</b>
<b>List of Tables</b> .....	<b>4</b>
<b>List of Figures</b> .....	<b>7</b>
<b>Preface</b> .....	<b>9</b>
<b>Executive Overview</b> .....	<b>10</b>
Key End-Use Applications .....	11
<b>ASIC Design Start Forecasts</b> .....	<b>13</b>
<b>Design Starts Definition</b> .....	<b>14</b>
<b>Changes in the SoC Design methodology</b> .....	<b>15</b>
<b>Definitions of SoC</b> .....	<b>17</b>
<b>Key Assumptions for ASIC Design Starts</b> .....	<b>18</b>
<b>ASIC Design Starts Market Information</b> .....	<b>20</b>
<b>Current Economic Conditions</b> .....	<b>25</b>
<b>Computer and Peripheral</b> .....	<b>28</b>
Desktop Personal Computers.....	28
Notebook Computers .....	29
Netbook Computers .....	31
Tablet PCs.....	33
Color Laser Printers .....	35
Commercial Color Copiers .....	36
Personal Copiers .....	38
Multifunction Machines.....	40
Handheld POS Machines .....	41
Stationary POS.....	43
Color Inkjet Printers.....	45
NAS Appliance Servers .....	46
Caching Appliance Servers.....	48
Webhosting Appliance Servers.....	50
All-In-One Network Appliance Servers .....	51
Small Business Application Servers .....	53
Network Servers Under \$5K.....	55
Network Servers \$5K – \$15K.....	57
Network Servers Over \$15K.....	58
Workstations Under \$5K .....	59
Workstations \$5 – \$15K .....	61
Workstations Over \$15K .....	63
Fax Machines .....	64
<b>Communications</b> .....	<b>66</b>
Central Office Switches .....	66
PBX Switches .....	67
High-End Routers .....	69
Mid Range Routers .....	70

Low-End Routers .....	72
High-End Hubs .....	74
Mid-Range Hubs.....	75
Low-End Hubs.....	77
High-End Network Switches .....	78
Mid-Range Network Switches.....	80
Low-End Network Switches.....	82
ATM Switches .....	83
Basic Cell Phones .....	85
Mid Range Cell Phones .....	87
High End Cell Phones.....	89
Cellular Base Stations.....	91
Cable Modems .....	93
DSL Modems.....	95
WiMAX Base Stations.....	97
WiMax CPE.....	99
Internet of Things.....	101
<b>Consumer.....</b>	<b>104</b>
Handheld Game Consoles.....	104
HDTVs.....	105
Set Top Boxes.....	107
VoIP PBX .....	108
Digital Still Cameras.....	110
Digital Video Cameras.....	112
MP3 Players .....	113
DVD Recorders.....	115
DVD Players .....	117
Video Game Consoles .....	119
E-readers .....	121
Digital Photo Frames .....	122
Portable Multimedia Players.....	124
Satellite Radio.....	126
GPS .....	128
<b>Industrial .....</b>	<b>131</b>
Robotic Control Systems .....	131
High-End ATE.....	132
Mid-Range ATE .....	134
Low-End ATE.....	136
Machine Tools .....	137
Smart Grid.....	139
<b>Automotive.....</b>	<b>141</b>
Automotive Add-on Systems: Entertainment .....	141
Automotive GPS Systems.....	143
Commercial Vehicles.....	145
Vans / Minivans .....	147
High-End Passenger Cars .....	148

Mid-Range Passenger Cars .....	150
Low-End Passenger Cars .....	151
<b>Summary.....</b>	<b>153</b>

## **List of Tables**

Table 1. Total Worldwide ASIC Design Starts .....	21
Table 2. Total Worldwide ASIC Unit Shipments (Millions).....	22
Table 3. Total Worldwide Identified ASIC Design Starts.....	23
Table 4. Total Worldwide Identified ASIC Unit Shipments (Millions) .....	24
Table 5. Desktop ASIC Design Starts .....	29
Table 6. Desktop ASIC Unit Shipments (Millions).....	29
Table 7. Notebook ASIC Design Starts.....	31
Table 8. Notebook ASIC Unit Shipments (Millions) .....	31
Table 9. Netbook ASIC Design Starts.....	32
Table 10. Netbook ASIC Unit Shipments (Millions) .....	33
Table 11. Tablet PC ASIC Design Starts.....	34
Table 12. Tablet PC ASIC Unit Shipments (Millions).....	34
Table 13. Color Laser Printer ASIC Design Starts .....	36
Table 14. Color Laser Printer ASIC Unit Shipments (Millions) .....	36
Table 15. Commercial Color Copier ASIC Design Starts .....	37
Table 16. Commercial Color Copier ASIC Unit Shipments (Millions) .....	38
Table 17. Personal Copier ASIC Design Starts .....	39
Table 18. Personal Copier ASIC Unit Shipments (Millions) .....	40
Table 19. Multifunction Machine ASIC Design Starts.....	41
Table 20. Multifunction Machine ASIC Unit Shipments (Millions).....	41
Table 21. Handheld POS ASIC Design Starts.....	42
Table 22. Handheld POS ASIC Unit Shipments (Millions) .....	43
Table 23. Stationary POS ASIC Design Starts.....	44
Table 24. Stationary POS ASIC Unit Shipments (Millions) .....	45
Table 25. Color Inkjet Printer ASIC Design Starts .....	46
Table 26. Color Inkjet Printer ASIC Unit Shipments (Millions).....	46
Table 27. NAS Appliance Server ASIC Design Starts .....	48
Table 28. NAS Appliance Server ASIC Unit Shipments (Millions) .....	48
Table 29. Caching Appliance Server ASIC Design Starts.....	49
Table 30. Caching Appliance Server ASIC Unit Shipments (Millions).....	50
Table 31. Webhosting Appliance Server ASIC Design Starts.....	51
Table 32. Webhosting Appliance Server ASIC Unit Shipments (Millions) .....	51
Table 33. All-In-One Network Appliance Server ASIC Design Starts .....	52
Table 34. All-In-One Network Appliance Server ASIC Unit Shipments (Millions).....	53
Table 35. Small Business Application Server ASIC Design Starts .....	54
Table 36. Small Business Application Server ASIC Unit Shipments (Millions) .....	55
Table 37. Network Server Under \$5K ASIC Design Starts.....	56
Table 38. Network Server Under \$5K ASIC Unit Shipments (Millions).....	56
Table 39. Network Servers \$5K – \$15K ASIC Design Starts .....	57
Table 40. Network Servers \$5K – \$15K ASIC Unit Shipments (Millions).....	58
Table 41. Network Servers Over \$15K ASIC Design Starts .....	59
Table 42. Network Servers Over \$15K ASIC Unit Shipments (Millions) .....	59
Table 43. Workstations Under \$5K ASIC Design Starts.....	60
Table 44. Workstations Under \$5K ASIC Unit Shipments (Millions) .....	61
Table 45. Workstations \$5K – \$15K ASIC Design Starts.....	62
Table 46. Workstations \$5K – \$15K ASIC Unit Shipments (Millions) .....	62
Table 47. Workstations Over \$15K ASIC Design Starts.....	63
Table 48. Workstations Over \$15K ASIC Unit Shipments (Millions) .....	64
Table 49. Fax Machine ASIC Design Starts.....	65
Table 50. Fax Machine ASIC Unit Shipments (Millions) .....	65
Table 51. Central Office Switch ASIC Design Starts.....	67
Table 52. Central Office Switch ASIC Unit Shipments (Millions) .....	67
Table 53. PBX Switch ASIC Design Starts.....	68

Table 54. PBX Switch ASIC Unit Shipments (Millions) .....	69
Table 55. High-End Router ASIC Design Starts .....	70
Table 56. High-End Router ASIC Unit Shipments (Millions of Units).....	70
Table 57. Mid-Range Router ASIC Design Starts.....	71
Table 58. Mid-Range Router ASIC Unit Shipments (Millions) .....	72
Table 59. Low-End Router ASIC Design Starts.....	73
Table 60. Low-End Router ASIC Unit Shipments (Millions) .....	74
Table 61. High-End Hub ASIC Design Starts .....	75
Table 62. High-End Hub ASIC Unit Shipments (Millions) .....	75
Table 63. Mid-Range Hub ASIC Design Starts.....	76
Table 64. Mid-Range Hub ASIC Unit Shipments (Millions) .....	77
Table 65. Low-End Hub ASIC Design Starts.....	78
Table 66. Low-End Hub ASIC Unit Shipments (Millions) .....	78
Table 67. High-End Switch ASIC Design Starts .....	80
Table 68. High-End Switch ASIC Unit Shipments (Millions) .....	80
Table 69. Mid-Range Switch ASIC Design Starts .....	81
Table 70. Mid-Range Switch ASIC Unit Shipments (Millions).....	82
Table 71. Low-End Switch ASIC Design Starts.....	83
Table 72. Low-End Switch ASIC Unit Shipments (Millions).....	83
Table 73. ATM Switch ASIC Design Starts.....	84
Table 74. ATM Switch ASICs by Type (Millions) .....	85
Table 75. Basic Cell Phone ASIC Design Starts .....	86
Table 76. Basic Cell Phone ASIC Unit Shipments (Millions).....	87
Table 77. Mid Range Cell Phone Design Starts .....	88
Table 78. Mid Range Cell Phone ASICs by Type (Millions).....	89
Table 79. High End Cell Phone ASIC Design Starts.....	90
Table 80. High End Cell Phone ASIC Unit Shipments (Millions) .....	91
Table 81. Cellular Base Station ASIC Design Starts.....	93
Table 82. Cellular Base Station ASIC Unit Shipments (Millions) .....	93
Table 83. Cable Modem ASIC Design Starts .....	95
Table 84. Cable Modem ASIC Unit Shipments (Millions) .....	95
Table 85. DSL Modem Market ASIC Design Starts .....	96
Table 86. DSL Modem ASIC Unit Shipments (Millions) .....	97
Table 87. WiMAX Base Station ASIC Design Starts .....	98
Table 88. WiMAX Base Station ASIC Unit Shipments (Millions).....	99
Table 89. WiMAX CPE ASIC Design Starts .....	100
Table 90. WiMAX CPE ASIC Unit Shipments (Millions).....	101
Table 91. Internet of Things ASIC Design Starts .....	102
Table 92. Internet of Things ASIC Unit Shipments (Millions) .....	103
Table 93. Handheld Game Console ASIC Design Starts.....	105
Table 94. Handheld Game Console ASIC Unit Shipments (Millions) .....	105
Table 95. HDTV ASIC Design Starts.....	106
Table 96. HDTV ASIC Unit Shipments (Millions).....	107
Table 97. Set Top Box ASIC Design Starts .....	108
Table 98. Set Top Box ASIC Unit Shipments (Millions).....	108
Table 99. VoIP PBX ASIC Design Starts .....	109
Table 100. VoIP PBX ASIC Unit Shipments (Millions).....	110
Table 101. Digital Still Camera ASIC Design Starts.....	111
Table 102. Digital Still Camera ASIC Unit Shipments (Millions) .....	112
Table 103. Digital Video Camera ASIC Design Starts.....	113
Table 104. Digital Video Camera ASIC Unit Shipments (Millions).....	113
Table 105. MP3 Player ASIC Design Starts.....	115
Table 106. MP3 Player ASIC Unit Shipments (Millions) .....	115
Table 107. DVD Recorder ASIC Design Starts .....	116
Table 108. DVD Recorder ASIC Unit Shipments (Millions).....	117

Table 109. DVD Player ASIC Design Starts.....	118
Table 110. DVD Player ASIC Unit Shipments (Millions) .....	119
Table 111. Video Game Console ASIC Design Starts .....	120
Table 112. Video Game Console ASIC Unit Shipments (Millions).....	121
Table 113. E-reader ASIC Design Starts .....	122
Table 114. E-reader ASIC Unit Shipments (Millions) .....	122
Table 115. Digital Photo Frame ASIC Design Starts .....	123
Table 116. Digital Photo Frame ASIC Unit Shipments (Millions) .....	124
Table 117. Portable Multimedia Player ASIC Design Starts.....	125
Table 118. Portable Multimedia Player ASIC Unit Shipments (Millions) .....	126
Table 119. Satellite Radio ASIC Design Starts .....	127
Table 120. Satellite Radio ASIC Unit Shipments (Millions) .....	128
Table 121. GPS ASIC Design Starts .....	129
Table 122. GPS ASIC Unit Shipments (Millions).....	130
Table 123. Robotic Control System ASIC Design Starts .....	132
Table 124. Robotic Control System ASIC Unit Shipments (Millions).....	132
Table 125. High-End ATE ASIC Design Starts .....	133
Table 126. High-End ATE ASIC Unit Shipments (Millions).....	134
Table 127. Mid-Range ATE ASIC Design Starts.....	135
Table 128. Mid-Range ATE ASIC Unit Shipments (Millions) .....	135
Table 129. Low-End ATE ASIC Design Starts .....	136
Table 130. Low-End ATE ASIC Unit Shipments (Millions) .....	137
Table 131. Machine Tool ASIC Design Starts .....	138
Table 132. Machine Tool ASIC Unit Shipments (Millions).....	138
Table 133. Smart Grid ASIC Design Starts.....	140
Table 134. Smart Grid ASIC Unit Shipments (Millions) .....	140
Table 135. Automotive Entertainment System ASIC Design Starts .....	142
Table 136. Automotive Entertainment System ASIC Unit Shipments (Millions).....	142
Table 137. Automotive GPS ASIC Design Starts .....	144
Table 138. Automotive GPS ASIC Unit Shipments (Millions).....	145
Table 139. Commercial Vehicle ASIC Design Starts.....	146
Table 140. Commercial Vehicle ASIC Unit Shipments (Millions).....	146
Table 141. Van / Minivan ASIC Design Starts .....	147
Table 142. Van / Minivan ASIC Unit Shipments (Millions).....	148
Table 143. High-End Passenger Car ASIC Design Starts .....	149
Table 144. High-End Passenger Car ASIC Unit Shipments (Millions).....	149
Table 145. Mid-Range Passenger Car ASIC Design Starts .....	150
Table 146. Mid-Range Passenger Car ASIC Unit Shipments (Millions) .....	151
Table 147. Low-End Passenger Car ASIC Design Starts .....	152
Table 148. Low-End Passenger Car ASIC Unit Shipments (Millions) .....	152



## **List of Figures**

Figure 1. Revised Complexity Definitions for SoCs .....	16
Figure 2. Total ASIC Design Starts .....	20
Figure 3. Total ASIC Units by Device Type .....	21
Figure 4. Total Worldwide Identified ASIC Design Starts by Application.....	22
Figure 5. Total Worldwide Identified ASIC Unit Volumes by Application Category .....	23
Figure 6. Original SoC Designs without Derivative Designs .....	26
Figure 7. Desktop ASIC Design Starts .....	28
Figure 8. Notebook ASIC Design Starts.....	30
Figure 9. Netbook Design Starts.....	32
Figure 10. Tablet PC ASIC Design Starts .....	33
Figure 11. Color Laser Printer ASIC Design Starts.....	35
Figure 12. Commercial Color Copier ASIC Design Starts.....	37
Figure 13. Personal Copier ASIC Design Starts.....	39
Figure 14. Multifunction Machine ASIC Design Starts .....	40
Figure 15. Handheld POS ASIC Design Starts.....	42
Figure 16. Stationary POS Market ASIC Design Starts .....	44
Figure 17. Color Inkjet Printer ASIC Design Starts .....	45
Figure 18. NAS Appliance Server ASIC Design Starts.....	47
Figure 19. Caching Appliance Server ASIC Design Starts .....	49
Figure 20. Webhosting Appliance Server ASIC Design Starts .....	50
Figure 21. All-In-One Network Appliance Server ASIC Design Starts .....	52
Figure 22. Small Business Application Server ASIC Design Starts.....	54
Figure 23. Network Server Under \$5K ASIC Design Starts .....	55
Figure 24. Network Servers \$5K – \$15K ASIC Design Starts .....	57
Figure 25. Network Servers Over \$15K ASIC Design Starts.....	58
Figure 26. Workstations Under \$5K ASIC Design Starts .....	60
Figure 27. Workstations \$5K – \$15K ASIC Design Starts .....	61
Figure 28. Workstations Over \$15K ASIC Design Starts .....	63
Figure 29. Fax Machine ASIC Design Starts .....	64
Figure 30. Central Office Switch ASIC Design Starts .....	66
Figure 31. PBX Switch ASIC Design Starts .....	68
Figure 32. High-End Router Market ASIC Design Starts .....	69
Figure 33. Mid-Range Router Market ASIC Design Starts.....	71
Figure 34. Low-End Router Market (Units/Dollars in Millions).....	73
Figure 35. High-End Hub ASIC Design Starts.....	74
Figure 36. Mid-Range Hub ASIC Design Starts .....	76
Figure 37. Low-End Hub Design Starts .....	77
Figure 38. High-End Switch Market ASIC Design Starts .....	79
Figure 39. Mid-Range Switch Design Starts .....	81
Figure 40. Low-End Switch ASIC Design Starts .....	82
Figure 41. ATM Switch ASIC Design Starts .....	84
Figure 42. Basic Cell Phone ASIC Design Starts .....	86
Figure 43. Mid Range Cell Phone Market Design Starts.....	88
Figure 44. High End Cell Phone ASIC Design Starts .....	90
Figure 45. Cellular Base Station Market ASIC Design Starts .....	92
Figure 46. Cable Modem ASIC Design Starts.....	94
Figure 47. DSL Modem ASIC Design Starts .....	96
Figure 48. WiMAX Base Station ASIC Design Starts .....	98
Figure 49. WiMAX CPE ASIC Design Starts.....	100
Figure 50. Internet of Things ASIC Design Starts.....	102
Figure 51. Handheld Game Console ASIC Design Starts .....	104
Figure 52. HDTV ASIC Design Starts .....	106
Figure 53. Set Top Box ASIC Design Starts .....	107

Figure 54. VoIP PBX ASIC Design Starts .....	109
Figure 55. Digital Still Camera ASIC Design Starts .....	111
Figure 56. Digital Video Camera ASIC Design Starts .....	112
Figure 57. MP3 Player ASIC Design Starts .....	114
Figure 58. DVD Recorder ASIC Design Starts .....	116
Figure 59. DVD Player ASIC Design Starts .....	118
Figure 60. Video Game Console ASIC Design Starts .....	120
Figure 61. E-reader ASIC Design Starts.....	121
Figure 62. Digital Photo Frame ASIC Design Starts .....	123
Figure 63. Portable Multimedia Player ASIC Design Starts .....	125
Figure 64. Satellite Radio ASIC Design Starts.....	127
Figure 65. GPS ASIC Design Starts .....	129
Figure 66. Robotic Control System ASIC Design Starts.....	131
Figure 67. High-End ATE ASIC Design Starts.....	133
Figure 68. Mid-Range ATE ASIC Design Starts .....	134
Figure 69. Low-End ATE ASIC Design Starts.....	136
Figure 70. Machine Tool ASIC Design Starts.....	137
Figure 71. Smart Grid ASIC Design Starts .....	139
Figure 72. Automotive Entertainment System ASIC Design Starts .....	141
Figure 73. Automotive GPS ASIC Design Starts .....	144
Figure 74. Commercial Vehicle ASIC Design Starts .....	145
Figure 75. Van / Minivan ASIC Design Starts .....	147
Figure 76. High-End Passenger Car ASIC Design Starts .....	148
Figure 77. Mid-Range Passenger Car ASIC Design Starts.....	150
Figure 78. Low-End Passenger Car ASIC Design Starts.....	151