

RISC-V Market: Momentum Building

February 2021

CC319-21

©Copyright Semico Research Corp. 2021. All rights reserved.

Reproduction in whole or part is prohibited without permission of Semico Research

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

Table of Contents	iii
Table of Figures	v
Table of Tables	7
Executive Overview	9
Introduction	10
Methodology	11
Key End-Use Applications.....	12
Survey Results	13
RISC-V End Market Analysis	21
Computer and Peripheral.....	21
<i>Desktop Computers</i>	21
<i>Notebook Computers</i>	23
<i>Tablet PCs</i>	24
<i>Servers Under \$5K</i>	26
<i>Servers \$5K - \$15K</i>	28
<i>Servers Over \$15K</i>	30
<i>Solid State Drives (SSD)</i>	32
<i>Total Computer</i>	34
Communications	36
<i>Low-End Smartphones</i>	36
<i>Mid-Range Smartphones</i>	38
<i>High-End Smartphones</i>	40
<i>Cable Modems</i>	42
<i>DSL Modems</i>	44
<i>4G / 5G Picocell Base Stations</i>	46
<i>4G / 5G Femtocell CPE</i>	48
<i>5G Infrastructure</i>	50
<i>Total Communications</i>	52
Consumer	54
<i>Handheld Game Consoles</i>	54
<i>HDTV</i>	56
<i>Wearable Medical Devices</i>	58
<i>Smart Watches</i>	60
<i>Fitness</i>	62
<i>Augmented Reality / Virtual Reality (AR/VR)</i>	64
<i>Satellite Radio</i>	66
<i>GPS</i>	68
<i>Smart Speakers</i>	70

IoT.....	72
Total Consumer	74
Industrial	75
<i>Smart Grid</i>	75
<i>Industrial Internet of Things (IIoT)</i>	77
<i>Low-End Automatic Test Equipment (ATE)</i>	79
<i>Mid-Range Automatic Test Equipment (ATE)</i>	81
<i>Total Industrial</i>	82
Automotive	84
<i>Automotive GPS Systems</i>	84
<i>Commercial Vehicles</i>	86
<i>High-End Passenger Cars</i>	88
<i>Mid-Range Passenger Cars</i>	90
<i>Low-End Passenger Cars</i>	92
<i>Advanced Driver Assistance Systems (ADAS)</i>	94
<i>Total Automotive</i>	96
Conclusion	99
Appendix: Terminology	102
<i>SoC</i>	102
<i>FPGA</i>	103
<i>Internet of Things</i>	103
<i>Artificial Intelligence</i>	104

Table of Figures

Figure 1. Survey Respondents by Location.....	11
Figure 2. RISC-V Products Introduced in the Past Year	13
Figure 3. RISC-V Products Currently in Design	14
Figure 4. End Markets Targeted with RISC-V Designs	15
Figure 5. Number of CPU Cores in a Silicon Solution	15
Figure 6. Other CPU Cores Used in Conjunction with RISC-V in an Application.....	16
Figure 7. Number of Additional ISA's Expected to be Created Beyond the RISC-V ISA.....	16
Figure 8. Amount of Embedded Memory Needed per Design.....	17
Figure 9. Respondent's Solutions Classified by Complexity	17
Figure 10. Process Geometry to be Used	18
Figure 11. Challenges that Exist in Designing and Developing a RISC-V Solution	19
Figure 12. Desktop TAM	21
Figure 13. Desktop RISC-V SAM.....	22
Figure 14. Notebook TAM	23
Figure 15. Notebook RISC-V SAM	24
Figure 16. Tablet PC TAM	25
Figure 17. Tablet PC RISC-V SAM.....	26
Figure 18. Servers Under \$5K TAM	27
Figure 19. Servers Under \$5K RISC-V SAM	28
Figure 20. Servers \$5K - \$15K TAM	29
Figure 21. Servers \$5K - \$15K RISC-V SAM.....	30
Figure 22. Servers Over \$15K TAM.....	31
Figure 23. Servers Over \$15K RISC-V SAM	32
Figure 24. SSD TAM	33
Figure 25. SSD RISC-V SAM.....	34
Figure 26. Total Computer TAM.....	35
Figure 27. Total Computer RISC-V SAM.....	36
Figure 28. Low-End Smartphone TAM.....	37
Figure 29. Low-End Smartphone RISC-V SAM	38
Figure 30. Mid-Range Smartphone TAM.....	39
Figure 31. Mid-Range Smartphone RISC-V SAM	40
Figure 32. High-End Smartphone TAM.....	41
Figure 33. High-End Smartphone RISC-V SAM	42
Figure 34. Cable Modem TAM.....	43
Figure 35. Cable Modem RISC-V SAM	44
Figure 36. DSL Modem TAM.....	45
Figure 37. DSL Modem RISC-V SAM	46
Figure 38. 4G / 5G Picocell Base Station TAM.....	47
Figure 39. 4G / 5G Picocell Base Station RISC-V SAM.....	48
Figure 40: 4G / 5G Femtocell CPE TAM	49
Figure 41. 4G / 5G Femtocell CPE RISC-V SAM.....	50
Figure 42. 5G Infrastructure TAM.....	51
Figure 43. 5G Infrastructure RISC-V SAM	52
Figure 44. Total Communications TAM.....	53
Figure 45. Total Communications RISC-V SAM.....	54

Figure 46. Handheld Game Console TAM	55
Figure 47. Handheld Game Console RISC-V SAM	56
Figure 48. HDTV TAM	57
Figure 49. HDTV RISC-V SAM	58
Figure 50. Wearable Medical Device TAM	59
Figure 51. Wearable Medical Device RISC-V SAM	60
Figure 58. Smart Watch TAM	61
Figure 59. Smart Watch RISC-V SAM	62
Figure 60. Fitness TAM	63
Figure 61. Fitness RISC-V SAM	64
Figure 52. AR/VR TAM	65
Figure 53. AR/VR RISC-V SAM	66
Figure 54. Satellite Radio TAM	67
Figure 55. Satellite Radio RISC-V SAM	68
Figure 56. GPS TAM	69
Figure 57. GPS RISC-V SAM	70
Figure 62. Smart Speaker TAM	71
Figure 63. Smart Speaker RISC-V SAM	72
Figure 64. IoT TAM	73
Figure 65. IoT RISC-V SAM	73
Figure 66. Total Consumer TAM	74
Figure 67. Total Consumer RISC-V SAM	75
Figure 68. Smart Grid TAM	76
Figure 69. Smart Grid RISC-V SAM	77
Figure 70. Industrial IoT TAM	78
Figure 71. Industrial IoT RISC-V SAM	78
Figure 72. Low-End ATE TAM	79
Figure 73. Low-End ATE RISC-V SAM	80
Figure 74. Mid-Range ATE TAM	81
Figure 75. Mid-Range ATE RISC-V SAM	82
Figure 76. Total Industrial TAM	83
Figure 77. Total Industrial RISC-V SAM	84
Figure 78. Automotive GPS TAM	85
Figure 79. Automotive GPS RISC-V SAM	86
Figure 80. Commercial Vehicle TAM	87
Figure 81. Commercial Vehicle RISC-V SAM	88
Figure 82. High-End Passenger Car TAM	89
Figure 83. High-End Passenger Car RISC-V SAM	90
Figure 84. Mid-Range Passenger Car TAM	91
Figure 85. Mid-Range Passenger Car RISC-V SAM	92
Figure 86. Low-End Passenger Car TAM	93
Figure 87. Low-End Passenger Car RISC-V SAM	94
Figure 88. Advanced Driver Assistance System TAM	95
Figure 89. Advanced Driver Assistance System RISC-V SAM	96
Figure 90. Total Automotive TAM	97
Figure 91. Total Automotive RISC-V SAM	98
Figure 92. Number of RISC-V Cores Per SoC in Development	100
Figure 93. Total RISC-V SAM	100

Table of Tables

Table 1. Desktop TAM	22
Table 2. Desktop RISC-V SAM	22
Table 3. Notebook TAM	23
Table 4. Notebook RISC-V SAM.....	24
Table 5. Tablet PC TAM	25
Table 6. Tablet PC RISC-V SAM.....	26
Table 7. Servers Under \$5K TAM	27
Table 8. Servers Under \$5K RISC-V SAM	28
Table 9. Servers \$5K - \$15K TAM	29
Table 10. Servers \$5K - \$15K RISC-V SAM.....	30
Table 11. Servers Over \$15K TAM.....	31
Table 12. Servers Over \$15K RISC-V SAM	32
Table 13. SSD TAM	33
Table 14. SSD RISC-V SAM.....	34
Table 15. Total Computer TAM.....	35
Table 16. Total Computer RISC-V SAM	36
Table 17. Low-End Smartphone TAM	37
Table 18. Low-End Smartphone RISC-V SAM.....	38
Table 19. Mid-Range Smartphone TAM.....	39
Table 20. Mid-Range Smartphone RISC-V SAM	40
Table 21. High-End Smartphone TAM.....	41
Table 22. High-End Smartphone RISC-V SAM	42
Table 23. Cable Modem TAM.....	43
Table 24. Cable Modem RISC-V SAM	44
Table 25. DSL Modem TAM.....	45
Table 26. DSL Modem RISC-V SAM	46
Table 27. 4G / 5G Picocell Base Station TAM.....	47
Table 28. 4G / 5G Picocell Base Station RISC-V SAM	48
Table 29. 4G / 5G Femtocell CPE TAM	49
Table 30. 4G / 5G Femtocell CPE RISC-V SAM	50
Table 31. 5G Infrastructure TAM	51
Table 32. 5G Infrastructure RISC-V SAM	52
Table 33. Total Communications TAM.....	53
Table 34. Total Communications RISC-V SAM	54
Table 36. Handheld Game Consoles RISC-V SAM	56
Table 37. HDTV TAM	57
Table 38. HDTV RISC-V SAM.....	58
Table 39. Wearable Medical Device TAM	59
Table 40. Wearable Medical Device RISC-V SAM.....	60
Table 47. Smart Watch TAM	61
Table 48. Smart Watch RISC-V SAM.....	62
Table 49. Fitness TAM	63
Table 50. Fitness RISC-V SAM.....	64
Table 41. AR/VR TAM.....	65

Table 42. AR/VR RISC-V SAM	66
Table 43. Satellite Radio TAM	67
Table 44. Satellite Radio RISC-V SAM.....	68
Table 45. GPS TAM.....	69
Table 46. GPS RISC-V SAM	70
Table 51. Smart Speaker TAM.....	71
Table 52. Smart Speaker RISC-V SAM	72
Table 53. IoT TAM	73
Table 54. IoT RISC-V SAM.....	74
Table 55. Total Consumer TAM.....	74
Table 56. Total Consumer RISC-V SAM	75
Table 57. Smart Grid TAM.....	76
Table 58. Smart Grid RISC-V SAM	77
Table 59. Industrial IoT TAM	78
Table 60. Industrial IoT RISC-V SAM.....	79
Table 61. Low-End ATE TAM	80
Table 62. Low-End ATE RISC-V SAM.....	80
Table 63. Mid-Range ATE TAM	81
Table 64. Mid-Range ATE RISC-V SAM	82
Table 65. Total Industrial TAM.....	83
Table 66. Total Industrial RISC-V SAM	84
Table 67. Automotive GPS TAM.....	85
Table 68. Automotive GPS RISC-V SAM	86
Table 69. Commercial Vehicle TAM	87
Table 70. Commercial Vehicle RISC-V SAM.....	88
Table 71. High-End Passenger Car TAM.....	89
Table 72. High-End Passenger Car RISC-V SAM	90
Table 73. Mid-Range Passenger Car TAM.....	91
Table 74. Mid-Range Passenger Car RISC-V SAM	92
Table 75. Low-End Passenger Car TAM.....	93
Table 76. Low-End Passenger Car RISC-V SAM	94
Table 77. Advanced Driver Assistance System TAM.....	95
Table 78. Advanced Driver Assistance System RISC-V SAM.....	96
Table 79. Total Automotive TAM	97
Table 80. Total Automotive RISC-V SAM.....	98
Table 81. Total RISC-V SAM (CAGR 2020-2025).....	101