

IP Subsystems: The Next IP Market Paradigm

October 2010
Study Number: SC106-10

© Copyright Semico Research, 2010. 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

Table of Contents	i
List of Tables	ii
List of Figures	iii
I. Executive Overview	1
II. Semiconductor Market Perspective - 2010	4
III. Evolution and Integration in the Semiconductor Industry	7
Evolution of the SIP Market Driven by the Discrete Semiconductor Market	9
Evolution of the IP Megablock	11
Evolution of the IP Subsystem Market	12
IV. IP Subsystems: Why the change in SoC design direction, and why now?	13
V. IP Subsystems – the Beginning	18
VI. Changes in the SoC Design methodology	21
VII. IP Subsystem Definitions	24
IP Megablock	24
IP Subsystem	24
SoC Virtualization	25
Evolved Audio IP Block in Today’s SoC	25
Features of IP Subsystems	29
Advantages of IP Subsystems	30
Disadvantages of IP Subsystems	30
Rethinking the SoC Design Methodology	31
VIII. Categories of IP Subsystems in the Market Today	34
System Resource Management IP Subsystems	36
System Resource Management Functionality	37
IP Subsystem Vendors in the Market Today	40
IX. Different Business Models for 3 rd Party SIP Vendors	41
The Broad Product Portfolio IP Vendor as IP Subsystem Supplier	42
The Limited Product Portfolio IP Vendor as IP Subsystem Supplier	42
The IP Subsystem Facilitator	42
The Collaborative IP Subsystem Vendor	43
X. IP Subsystem Market Forecast	46
Total Worldwide IP Subsystem Market Forecast	46
Total Worldwide IP Subsystem Market Revenue Forecast by IP Category	48
IP Subsystem Market Forecast by End Application Category	56
Worldwide IP Subsystem Market Revenue Forecast by Region	71
IP Subsystem Forecast for Design Starts by Device Type	79
IP Subsystem Forecast for Design Starts by Device Type and Process Geometry ..	89
XI. Future Directions in the IP Subsystem Market	98
XII. Summary	99

List of Tables

Table 1: General List of System Functions and SIP Block Level Solutions.....	13
Table 2: List of Imaging Video Accelerator Features for TI OMAP Processors.....	19
Table 3: List of Device Manufacturers Creating IP Subsystems	20
Table 4: Requirements for Commercialization of IP Subsystems	32
Table 5: Requirements for Commercialization of IP Subsystems	33
Table 6: SWOT Analysis from the IP Subsystem Vendors Point of View	44
Table 7: SWOT Analysis from the SoC Designers Point of View	45
Table 8: Worldwide IP Subsystem Revenue Forecast by IP Category	48
Table 9: Worldwide Memory IP Subsystem Revenue Forecast by Application.....	49
Table 10: Total Worldwide Video IP Subsystem Revenue Forecast by Application	50
Table 11: Total Worldwide Communications IP Subsystem Revenue Forecast by Application.....	51
Table 12: Total Worldwide Multi Media IP Subsystem Revenue Forecast by Application	52
Table 13: Total Worldwide System Resource Mgmt. IP Subsystem Revenue Forecast by Application.....	53
Table 14: Total Worldwide Security IP Subsystem Revenue Forecast by Application.....	54
Table 15: Total Worldwide Computing IP Subsystem Revenue Forecast by Application	55
Table 16: Worldwide IP Subsystem Market Forecast by Application.....	57
Table 17: Worldwide IP Subsystem Unit Shipments Forecast by Application	58
Table 18: Total Worldwide IP Subsystem Revenue Forecast by Consumer Applications	59
Table 19: Worldwide IP Subsystem Unit Shipment Forecast for Consumer Applications by Device Type	60
Table 20: Worldwide IP Subsystem Market Forecast for Computer Applications.....	61
Table 21: Worldwide IP Subsystem Market Forecast for Computer Applications by Device Type	62
Table 22: Worldwide IP Subsystem Revenue Forecast for Communications Applications	63
Table 23: Worldwide IP Subsystem Unit shipment Forecast for Communications Applications by Device Type.....	64
Table 24: Worldwide IP Subsystem Revenue Forecast for Automotive Applications	65
Table 25: Worldwide IP Subsystem Unit Shipment Forecast for Automotive Applications by Device Type	66
Table 26: Worldwide IP Subsystem Revenue Forecast for Industrial Applications	67
Table 27: Worldwide IP Subsystem Unit shipment Forecast for Industrial Applications by Device Type..	68
Table 28: Worldwide IP Subsystem Revenue Forecast for Military Applications	69
Table 29: Worldwide IP Subsystem Unit Shipment Forecast for Military Applications by Device Type ...	70
Table 30: Worldwide IP Subsystem Revenue Forecast by Region.....	72
Table 31: Americas IP Subsystem Revenue Forecast by Product Type	74
Table 32: Europe IP Subsystem Revenue Forecast by Product Type.....	75
Table 33: Japan IP Subsystem Revenue Forecast by Product Type	76
Table 34: Asia Pacific IP Subsystem Revenue Forecast by Product Type	77
Table 35: China IP Subsystem Revenue Forecast by Product Type.....	78
Table 36: Worldwide IP Subsystem Design Start Forecast by Product Type.....	81
Table 37: Worldwide Design Start Forecast for Advanced Performance Multicore SoC by Application....	82
Table 38: Worldwide Design Start Forecast for Value Multicore SoC by Application.....	83
Table 39: Worldwide Design Start Forecast for Basic SoC by Application	84
Table 40: Worldwide Design Start Forecast for Programmable SoC by Application	85
Table 41: Worldwide Design Start Forecast for Platform SoC by Application	86
Table 42: Worldwide Design Start Forecast for Slice SoC by Application.....	87
Table 43: Worldwide Design Start Forecast for SoPC SoC by Application.....	88
Table 44: Total Worldwide Design Start Forecast for SoC by Process Geometry	90
Table 45: Worldwide Design Start Forecast for Advanced Performance Multicore SoC by Process Geometry	91
Table 46: Worldwide Design Start Forecast for Value Multicore SoC by Process Geometry	92
Table 47: Worldwide Design Start Forecast for Basic SoC by Process Geometry.....	93

Table 48: Worldwide Design Start Forecast for Programmable SoC by Process Geometry.....	94
Table 49: Worldwide Design Start Forecast for Platform SoC by Process Geometry	95
Table 50: Worldwide Design Start Forecast for Slice SoC by Process Geometry	96
Table 51: Worldwide Design Start Forecast for SoPC SoC by Process Geometry	97

List of Figures

Figure 1: SoC Unit Volumes Needed to Reach Breakeven Point.....	5
Figure 2: Functional Integration Drives New Markets.....	7
Figure 3: Discrete Semiconductor Market by Function and Type.....	9
Figure 4: Current Semiconductor IP Market Landscape	10
Figure 5: Evolved Semiconductor IP Market Landscape	12
Figure 6: Growth in the Number of SIP Blocks per Design	14
Figure 7: SIP Market Revenue Growth Over Time.....	17
Figure 8: First Deployment of an IP Subsystem – the TI OMAP2420 Processor	18
Figure 9: Fourth Generation of an IP Subsystem – the TI OMAP44x Processor	19
Figure 10. Revised Complexity Definitions for SoCs - I	22
Figure 11. Revised Complexity Definitions for SoCs - II	23
Figure 12: Contemporary Audio Block with Many ‘Moving Parts’	26
Figure 13: Contemporary Audio Block from the System Level Perspective	27
Figure 14: ‘Stylized” IP Subsystem Concept from the System Level Perspective.....	28
Figure 15: Total Worldwide SIP Subsystem Market Forecast; IDMs and IP Vendors	46
Figure 16: Worldwide IP Subsystem Revenue Forecast by IP Category	48
Figure 17: Worldwide Memory IP Subsystem Revenue Forecast by Application	49
Figure 18: Total Worldwide Video IP Subsystem Revenue Forecast by Application.....	50
Figure 19: Total Worldwide Communications IP Subsystem Revenue Forecast by Application	51
Figure 20: Total Worldwide Multi Media IP Subsystem Revenue Forecast by Application	52
Figure 21: Total Worldwide System Resource Mgmt. IP Subsystem Revenue Forecast by Application	53
Figure 22: Total Worldwide Security IP Subsystem Revenue Forecast by Application	54
Figure 23: Total Worldwide Computing IP Subsystem Revenue Forecast by Application	55
Figure 24: Worldwide IP Subsystem Market Revenue Forecast by Application Percent of Total.....	56
Figure 25: Worldwide IP Subsystem Market Forecast Revenues by Application.....	57
Figure 26: Worldwide IP Subsystem Unit Shipments Forecast by Application.....	58
Figure 27: Total Worldwide IP Subsystem Revenue Forecast by Consumer Applications	59
Figure 28: Worldwide IP Subsystem Unit Shipment Forecast for Consumer Applications by Device Type.....	60
Figure 29: Worldwide IP Subsystem Revenue Forecast for Computer Applications.....	61
Figure 30: Worldwide IP Subsystem Unit Shipment Forecast for Computer Applications by Device Type	62
Figure 31: Worldwide IP Subsystem Revenue Forecast for Communications Applications	63
Figure 32: Worldwide IP Subsystem Unit Shipment Forecast for Communications Applications by Device Type.....	64
Figure 33: Worldwide IP Subsystem Revenue Forecast for Automotive Applications	65
Figure 34: Worldwide IP Subsystem Unit Shipment Forecast for Automotive Applications by Device Type	66
Figure 35: Worldwide IP Subsystem Revenue Forecast for Industrial Applications	67
Figure 36: Worldwide IP Subsystem Unit Shipment Forecast for Industrial Applications by Device Type.....	68
Figure 37: Worldwide IP Subsystem Revenue Forecast for Military Applications	69
Figure 38: Worldwide IP Subsystem Unit Shipment Forecast for Military Applications by Device Type.....	70
Figure 39: Worldwide IP Subsystem Revenue Forecast by Region.....	71
Figure 40: Americas IP Subsystem Revenue Forecast by Product Type.....	74
Figure 41: Europe IP Subsystem Revenue Forecast by Product Type	75

Figure 42: Japan IP Subsystem Revenue Forecast by Product Type	76
Figure 43: Asia Pacific IP Subsystem Revenue Forecast by Product Type	77
Figure 44: China IP Subsystem Revenue Forecast by Product Type.....	78
Figure 45: Original SoC Design Starts with Derivative Designs Removed	80
Figure 46: Worldwide IP Subsystem Design Start Forecast by Device Type	81
Figure 47: Worldwide Design Start Forecast for Advanced Performance Multicore SoC by Application ..	82
Figure 48: Worldwide Design Start Forecast for Value Multicore SoC by Application	83
Figure 49: Worldwide Design Start Forecast for Basic SoC by Application.....	84
Figure 50: Worldwide Design Start Forecast for Programmable SoC by Application	85
Figure 51: Worldwide Design Start Forecast for Platform SoC by Application.....	86
Figure 52: Worldwide Design Start Forecast for Slice SoC by Application	87
Figure 53: Worldwide Design Start Forecast for SoPC SoC by Application	88
Figure 54: Total Worldwide Design Start Forecast for SoC by Process Geometry	90
Figure 55: Worldwide Design Start Forecast for Advanced Performance Multicore SoC by Process Geometry	91
Figure 56: Worldwide Design Start Forecast for Value Multicore SoC by Process Geometry	92
Figure 57: Worldwide Design Start Forecast for Basic SoC by Process Geometry	93
Figure 58: Worldwide Design Start Forecast for Programmable SoC by Process Geometry.....	94
Figure 59: Worldwide Design Start Forecast for Platform SoC by Process Geometry	95
Figure 60: Worldwide Design Start Forecast for Slice SoC by Process Geometry	96
Figure 61: Worldwide Design Start Forecast for SoPC SoC by Process Geometry	97