

INTRODUCTION	xxi
STUDY GOALS AND OBJECTIVES.....	xxi
REASONS FOR DOING THE STUDY	xxii
CONTRIBUTIONS OF THE STUDY.....	xxii
SCOPE AND FORMAT	xxiii
METHODOLOGY AND INFORMATION SOURCES.....	xxiii
ANALYST CREDENTIALS.....	xxiv
RELATED BCC REPORTS	xxiv
BCC ONLINE SERVICES.....	xxv
DISCLAIMER	xxv
EXECUTIVE SUMMARY	xxvi
<i>SUMMARY TABLE WORLDWIDE OPTICAL MARKET SEGMENT</i>	
<i>REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	XXVII
<i>SUMMARY FIGURE WORLDWIDE OPTICAL MARKET SEGMENT</i>	
<i>REVENUES, 2004-2011 (\$ MILLIONS)</i>	XXVII
OVERVIEW	1
BUSINESSES EMBRACE NETWORKING FUNCTIONS	1
<i>TABLE 1 TYPICAL END USER DATA TRANSMISSION THROUGH</i>	
<i>2011 (KILOBITS PER SECOND)</i>	2
<i>FIGURE 1 TYPICAL END USER DATA TRANSMISSION, 2004-2011</i>	
<i>(KILOBITS PER SECOND)</i>	2
BUSINESSES EMBRACE NETWORKING ... (CONTINUED).....	3
CONSUMERS ADOPT HIGH BANDWIDTH APPLICATIONS.....	4
DIGITAL HOME MEDIA	5
LOCAL AREA NETWORKS.....	6
ETHERNET.....	6
<i>FIGURE 2 ETHERNET USAGE BY APPLICATION, 2005 (%)</i>	7
UNTETHERED NETWORKING	7
<i>TABLE 2 PER PORT WLAN PRICING TRENDS, THROUGH 2011 (\$)</i>	8
<i>FIGURE 3 PER PORT WLAN PRICING TRENDS, 2004-2011 (\$)</i>	9
WEB AT HOME	9
CHALLENGES AT HOME	10
WIRELESS LAN TAKES OFF.....	11
WLAN OPTIONS CONTINUE TO GROW.....	11
MOVE TO 100M WLAN STANDARD HITS A SNAG	12
MOVE TO 100M WLAN STANDARD ... (CONTINUED)	13
<i>FIGURE 4 SHARE OF THE MOST POPULAR WIRELESS WAN</i>	
<i>NETWORK STANDARDS, 2005 (%)</i>	14
ENTERPRISES LARGE AND SMALL EMBRACE WLANS	14
INTEROFFICE CONNECTIVITY	15
REDUCED IT COSTS.....	15
CONTINGENCY PLANNING.....	16

HOT SPOTS CATCH FIRE	16
HOT SPOTS CATCH FIRE (CONTINUED).....	17
MUNICIPAL WI-FI HOT SPOT NETWORKS TAKE HOLD.....	18
<i>TABLE 3 NUMBER OF U.S. CITIES DEPLOYING MUNICIPAL WI-FI NETWORKS, THROUGH 2011</i>	<i>19</i>
<i>FIGURE 5 NUMBER OF U.S. CITIES DEPLOYING MUNICIPAL WI-FI NETWORKS, 2004-2011</i>	<i>20</i>
WI-FI HOT SPOT USAGE SPREADS	20
<i>TABLE 4 WORLDWIDE DEPLOYMENTS OF WI-FI HOT SPOTS, THROUGH 2011</i>	<i>20</i>
<i>FIGURE 6 WORLDWIDE DEPLOYMENTS OF WI-FI HOT SPOTS, 2004-2011</i>	<i>21</i>
THE END-USER INFLUX.....	21
THE GLOBAL REACH OF TELECOMMUNICATIONS SERVICES	21
<i>TABLE 5 NUMBER OF INTERNET USERS WORLDWIDE, 1995 TO JUNE 2006 (NUMBERS IN MILLIONS).....</i>	<i>22</i>
<i>TABLE 5 (CONTINUED).....</i>	<i>23</i>
THE INTERNET'S IMPACT ON NETWORK TRAFFIC.....	23
<i>TABLE 6 U.S. INTERNET BACKBONE TRAFFIC PATTERNS, 1990-2005 (TB/MONTH)</i>	<i>23</i>
<i>TABLE 6 (CONTINUED).....</i>	<i>24</i>
INTERNET USE IS LIMITED TO SPECIFIC AREAS.....	24
<i>TABLE 7 INTERNET USAGE STATISTICS BY WORLD REGION, 2005.....</i>	<i>24</i>
WIRELESS NETWORKS START TO BOOM.....	24
Wireless Networks Start to Boom (Continued)	25
Wireless Networks Start to Boom (Continued)	26
Wireless Networks Start to Boom (Continued)	27
<i>FIGURE 7 WIRELESS USAGE PATTERNS, 2005 (%).....</i>	<i>28</i>
<i>TABLE 8 CELLULAR NETWORK SUBSCRIBER GROWTH, THROUGH 2011 (MILLIONS).....</i>	<i>28</i>
<i>FIGURE 8 CELLULAR NETWORK SUBSCRIBER GROWTH, 2004-2011 (\$ MILLIONS).....</i>	<i>29</i>
<i>TABLE 9 TOP TEN WIRELESS CARRIERS BY NUMBER OF SUBSCRIBERS, 2005 (MILLIONS).....</i>	<i>29</i>
THE IMPACT ON TELECOM NETWORKS.....	30
HOW CARRIERS CAN MEET RISING TRAFFIC DEMANDS WITH NEXT-GENERATION NETWORK INFRASTRUCTURES	30
HOW CARRIERS CAN MEET ...(CONTINUED)	31
HOW CARRIERS CAN MEET ...(CONTINUED)	32
HOW CARRIERS CAN MEET ...(CONTINUED)	33
HOW CARRIERS CAN MEET ...(CONTINUED)	34
HOW CARRIERS CAN MEET ...(CONTINUED)	35
HOW CARRIERS CAN MEET ...(CONTINUED)	36
HOW CARRIERS CAN MEET ...(CONTINUED)	37

THE MOVE TO OPTICAL NETWORKS.....	38
REQUIREMENTS FOR OPTICAL EQUIPMENT	39
REQUIREMENTS FOR ... (CONTINUED).....	40
REQUIREMENTS FOR ... (CONTINUED).....	41
WDM IN THE WAN	42
OPTICAL CROSS-CONNECTS.....	43
PROTECTION SWITCHING.....	44
OPTICAL ADD/DROP MULTIPLEXING	44
OPTICAL SIGNAL MONITORING	44
NETWORK PROVISIONING.....	45
OPTICAL SWITCH FABRICS.....	45
Optomechanical Switches	46
Microelectromechanical System Devices	46
Microelectromechanical System ... (Continued).....	47
Electrooptic Switches	48
Thermooptic Switches	48
Liquid-Crystal Switches.....	49
Bubble Switches.....	50
Acoustooptic Switches	50
Semiconductor Optical Amplifier Switches	50
Semiconductor Optical (Continued)	51
Semiconductor Optical Amplifier ... (Continued).....	51
Semiconductor Optical (Continued)	52
OPTICAL PACKET SWITCHING.....	53
ISSUES CONCERNING OPTICAL PACKET SWITCHING.....	53
Issues Concerning Optical Packet Switching (Continued)	54
CONTENTION RESOLUTION.....	55
Buffering	55
Buffering (Continued).....	56
Deflection Routing	57
Wavelength Conversion.....	58
PACKET SWITCH ARCHITECTURES.....	59
General.....	59
Shared Wavelength Converters	60
Limited-Range Wavelength Converters	61
KEOPS (KEys to Optical Packet Switching).....	61
The Data-Vortex Packet Switch.....	62
The Data-Vortex Packet Switch (Continued)	63
GENERALIZED MULTIPROTOCOL LABEL SWITCHING	64
<i>TABLE 10 MPLS USAGE BY PERCENTAGE OF TELECOM TRAFFIC,</i> <i>THROUGH 2011 (%).....</i>	<i>65</i>
<i>FIGURE 9 MPLS USAGE BY PERCENTAGE OF TELECOM TRAFFIC,</i> <i>2004-2011 (%).....</i>	<i>65</i>
HOW MULTIPROTOCOL LABEL SWITCHING WORKS.....	66

How Multiprotocol Label Switching Works (Continued)	66
GENERALIZED MULTIPROTOCOL LABEL SWITCHING	67
Generalized Multiprotocol Label ... (Continued)	68
Generalized Multiprotocol Label ... (Continued)	69
Generalized Multiprotocol Label ... (Continued)	70
AUTOMATICALLY SWITCHED OPTICAL NETWORK	71
Automatically Switched Optical Network (Continued)	72
OPTICAL BURST SWITCHING	73
NETWORK AND NODE ARCHITECTURE.....	73
BURST GENERATION	74
CHANNEL SCHEDULING	74
QOS SUPPORT	75
CONTENTION RESOLUTION.....	76
TERABIT BURST SWITCHING	77
THE NEXT STEP IN OPTICAL NETWORKING	78
OPTICAL DATA CONNECTIONS BROKEN DOWN	78
ITU HISTORY.....	79
ITU DEVELOPS OPTICAL NETWORK STANDARDS	80
THE MOVEMENT TO SONET	81
SONET Speeds	82
<i>TABLE 11 SONET/SDH DATA RATES AND LINE SPEEDS.....</i>	<i>82</i>
<i>FIGURE 10 MOST POPULAR TELECOM DATA LINE SPEEDS BY</i>	
<i>MARKET SHARE, 2005 (%).....</i>	<i>83</i>
Asynchronous Transfer Mode	83
ATM Concepts.....	84
ATM Concepts (Continued)	85
WHY VIRTUAL CIRCUITS?	86
TYPES OF VIRTUAL CIRCUITS AND PATHS.....	87
<i>FIGURE 11 STRUCTURE OF AN ATM CELL.....</i>	<i>88</i>
SUCCESSSES AND FAILURES OF ATM TECHNOLOGY	89
DENSE WAVELENGTH DIVISION MULTIPLEXING	90
THE RISE OF HYBRID CWDM/DWDM NETWORKING	91
THE RISE OF HYBRID CWDM/DWDM ... (CONTINUED).....	92
THE RISE OF HYBRID CWDM/DWDM ... (CONTINUED).....	93
THE RISE OF HYBRID CWDM/DWDM ... (CONTINUED).....	94
THE EMERGENCE OF 10 GIGABIT ETHERNET.....	95
THE EMERGENCE OF 10 GIGABIT ... (CONTINUED).....	96
NETWORKING COMPONENTS.....	97
CHANGING CHIP DESIGN	98
THE EMERGENCE OF NPUS	98
NEW ARCHITECTURE MAXIMIZES PERFORMANCE,	
MINIMIZES DEPLOYMENT TIME.....	98
SELECTING NETWORKING PROCESSING SILICON.....	99
NPU VERSUS ASICS.....	100

PARTITIONING.....	101
Partitioning (Continued)	102
REMEMBER MEMORY	103
ONE PLUS ONE DOES NOT EQUAL TWO	104
APPLICATIONS FOR NPUS	105
NPU IN A CORE ROUTER	105
NPU IN A MULTI-SERVICE EDGE SWITCH	106
NPU IN AN ETHERNET AGGREGATION SYSTEM	106
NPU REVENUE RAMPS UP	107
<i>TABLE 12 WORLDWIDE OPTICAL NETWORK PROCESSING</i>	
<i>REVENUES, THROUGH 2011 (\$ MILLION)</i>	107
<i>TABLE 13 WORLDWIDE OPTICAL NETWORK PROCESSING</i>	
<i>REVENUES BY TYPE, THROUGH 2011 (\$ MILLION)</i>	108
NPU INTEREST SHIFTS TO 10G TRANSMISSION RATE	108
<i>TABLE 14 WORLDWIDE NPU PRICING TRENDS BY UNIT,</i>	
<i>THROUGH 2011 (\$)</i>	108
<i>FIGURE 12 WORLDWIDE NPU PRICING TRENDS BY UNIT, 2004-</i>	
<i>2011 (\$)</i>	109
<i>FIGURE 13 TOP FIVE NETWORK PROCESSING UNIT VENDORS BY</i>	
<i>MARKET SHARE, 2005</i>	109
<i>FIGURE 13 (CONTINUED)</i>	110
OC-1 NPUs.....	110
<i>TABLE 15 WORLDWIDE OPTICAL OC-1 NETWORK PROCESSING</i>	
<i>UNIT REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	110
<i>FIGURE 14 WORLDWIDE OPTICAL OC-1 NETWORK PROCESSING</i>	
<i>UNIT REVENUES, 2004-2011 (\$ MILLIONS)</i>	110
<i>FIGURE 15 MARKET SHARES OF TOP FIVE WORLDWIDE OC-1</i>	
<i>OPTICAL NETWORK PROCESSING UNIT VENDORS, 2005 (%)</i>	111
AGERE.....	111
AMCC.....	111
HIFN	112
INTEL.....	112
PMC	112
OC-3 NPUs.....	112
<i>TABLE 16 WORLDWIDE OPTICAL OC-3 NETWORK PROCESSING</i>	
<i>UNIT REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	112
<i>FIGURE 16 WORLDWIDE OPTICAL OC-3 NETWORK PROCESSING</i>	
<i>UNIT REVENUES, 2004-2011 (\$ MILLIONS)</i>	113
<i>FIGURE 17 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL</i>	
<i>OC-3 NETWORK PROCESSING UNIT VENDORS, 2005 (%)</i>	113
AGERE.....	114
HIFN	114
INTEL.....	114
MINDSTREAM	114

PMC	115
OC-12 NPUs	115
TABLE 17 WORLDWIDE OPTICAL OC-12 NETWORK PROCESSING	
UNIT REVENUES, THROUGH 2011 (\$ MILLIONS).....	115
FIGURE 18 WORLDWIDE OPTICAL OC-12 NETWORK PROCESSING	
UNIT REVENUES, 2004-2011 (\$ MILLIONS).....	115
FIGURE 19 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL	
OC-12 NETWORK PROCESSING UNIT VENDORS, 2005 (%).....	116
AMCC.....	116
BAY MICROSYSTEMS.....	117
EZCHIP.....	117
INFINEON	117
PMC	117
OC-48 NPUs	117
TABLE 18 WORLDWIDE OPTICAL OC-48 NETWORK PROCESSING	
UNIT REVENUES, THROUGH 2011 (\$ MILLIONS).....	117
FIGURE 20 WORLDWIDE OC-48 OPTICAL NETWORK PROCESSING	
UNIT REVENUES, 2004-2011 (\$ MILLIONS).....	118
FIGURE 21 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL	
OC-48 NETWORK PROCESSING UNIT VENDORS, 2005 (%).....	118
FIGURE 21 (CONTINUED)	119
AMCC.....	119
BAY MICROSYSTEMS.....	119
INTEL.....	119
PMC	119
XCELERATED	120
OC-192 NPUS	120
TABLE 19 WORLDWIDE OPTICAL OC-192 NETWORK PROCESSING	
UNIT REVENUES, THROUGH 2011 (\$ MILLIONS).....	120
FIGURE 22 WORLDWIDE OPTICAL OC-192 NETWORK PROCESSING	
UNIT REVENUES, 2004-2011 (\$ MILLIONS).....	120
FIGURE 23 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL	
OC-192 NETWORK PROCESSING UNIT VENDORS, 2005 (%).....	121
AMCC.....	121
BAY CHESAPEAKE	122
EZCHIP.....	122
PMC-SIERRA	122
XCELERATED	122
SYSTEM-ON-CHIP DESIGN STARTS TO TAKE HOLD	123
SYSTEM-ON-CHIP DESIGN STARTS TO TAKE HOLD	123
SOC IT TO ME	124
PROGRAMMABLE LOGIC DEVICES	125
ADDITIONAL SOLUTIONS.....	126
SOFTWARE FUNCTIONS	127

<i>TABLE 20 WORLDWIDE OPTICAL SYSTEM-ON-CHIP REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	127
<i>TABLE 21 WORLDWIDE OPTICAL SYSTEM-ON-CHIP REVENUES BY TYPE OF UNIT, THROUGH 2011 (\$ MILLIONS)</i>	127
<i>TABLE 22 WORLDWIDE SOC PRICING TRENDS BY UNIT, THROUGH 2011 (\$)</i>	128
<i>FIGURE 24 WORLDWIDE SOC PRICING TRENDS BY UNIT, 2004-2011 (\$)</i>	128
<i>FIGURE 25 TOP FIVE SOC SUPPLIERS BY MARKET SHARE 2005 (%)</i>	129
OC-1 SOCs.....	129
<i>TABLE 23 WORLDWIDE OPTICAL OC-1 SYSTEM-ON-CHIP REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	129
<i>FIGURE 26 WORLDWIDE OPTICAL OC-1 SYSTEM-ON-CHIP REVENUES, 2004-2011 (\$ MILLIONS)</i>	130
<i>FIGURE 27 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL OC-1 SYSTEM-ON-CHIP VENDORS, 2005 (%)</i>	130
AGERE.....	131
BROADCOM.....	131
FREESCALE	131
MARVELL	131
TEXAS INSTRUMENTS	131
OC-3 SOCs.....	132
<i>TABLE 24 WORLDWIDE OPTICAL OC-3 SYSTEM-ON-CHIP REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	132
<i>FIGURE 28 WORLDWIDE OPTICAL OC-3 SYSTEM-ON-CHIP REVENUES, 2004- 2011 (\$ MILLIONS)</i>	132
<i>FIGURE 29 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL OC-3 SYSTEM-ON-CHIP VENDORS, 2005 (%)</i>	132
<i>FIGURE 29 (CONTINUED)</i>	133
AGERE.....	133
BROADCOM.....	133
FREESCALE	133
MARVELL	134
TEXAS INSTRUMENTS	134
OC-12 SOCs.....	134
<i>TABLE 25 WORLDWIDE OPTICAL OC-12 SYSTEM-ON-CHIP REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	134
<i>FIGURE 30 WORLDWIDE OPTICAL OC-12 SYSTEM-ON-CHIP REVENUES, 2004-2011 (\$ MILLIONS)</i>	134
<i>FIGURE 31 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL OC-12 SYSTEM-ON-CHIP VENDORS, 2005 (%)</i>	135
BROADCOM.....	135
CENTILLION.....	135
FREESCALE	136

MARVELL	136
TEXAS INSTRUMENTS	136
OC-48 SOCs.....	136
<i>TABLE 26 WORLDWIDE OPTICAL OC-48 SYSTEM-ON-CHIP REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	136
<i>FIGURE 32 WORLDWIDE OPTICAL OC-48 SYSTEM-ON-CHIP REVENUES, 2004-2011 (\$ MILLIONS)</i>	137
<i>FIGURE 33 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL OC-48 SYSTEM-ON-CHIP VENDORS, 2005 (%)</i>	137
<i>FIGURE 33 (CONTINUED)</i>	138
BROADCOM.....	138
FREESCALE	138
MYSTICOM.....	138
PMC	138
TEXAS INSTRUMENTS	139
OC-192 SOCs.....	139
<i>TABLE 27 WORLDWIDE OPTICAL C-192 SYSTEM-ON-CHIP REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	139
<i>FIGURE 34 WORLDWIDE OPTICAL C-192 SYSTEM-ON-CHIP REVENUES, 2004-2011 (\$ MILLIONS)</i>	139
<i>FIGURE 35 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL OC-192 SYSTEM-ON-CHIP VENDORS, 2005 (%)</i>	140
BROADCOM.....	140
CENTILLION.....	140
FREESCALE	141
PMC-SIERRA	141
TEXAS INSTRUMENTS	141
TRANSCEIVERS.....	142
<i>TABLE 28 WORLDWIDE OPTICAL TRANSCEIVER REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	142
<i>TABLE 29 WORLDWIDE OPTICAL TRANSCEIVER REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	142
<i>TABLE 30 WORLDWIDE TRANSCEIVER PRICING TRENDS BY UNIT, THROUGH 2011 (\$)</i>	143
<i>FIGURE 36 WORLDWIDE TRANSCEIVER PRICING TRENDS BY UNIT, 2004-2011 (\$)</i>	143
<i>FIGURE 37 TOP FIVE OPTICAL TRANSCEIVER VENDORS BY REVENUE, 2005 (%)</i>	144
OC-1 TRANSCEIVERS.....	144
<i>TABLE 31 WORLDWIDE OC-1 OPTICAL TRANSCEIVER REVENUE, THROUGH 2011 (\$ MILLIONS)</i>	144
<i>FIGURE 38 WORLDWIDE OC-1 OPTICAL TRANSCEIVER REVENUE, 2004-2011 (\$ MILLIONS)</i>	145

<i>FIGURE 39 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL OC-1 TRANSCEIVER VENDORS, 2005 (%)</i>	145
AGERE.....	146
BROADCOM.....	146
CENTILLIUM	146
INFINEON	146
MARVELL	146
OC-3 TRANSCEIVERS.....	146
<i>TABLE 32 WORLDWIDE OPTICAL OC-3 TRANSCEIVER REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	146
<i>FIGURE 40 WORLDWIDE OPTICAL OC-3 TRANSCEIVER REVENUES, 2004-2011 (\$ MILLIONS)</i>	147
<i>FIGURE 41 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL OC-3 TRANSCEIVER VENDORS, 2005 (%)</i>	147
AGERE.....	148
BROADCOM.....	148
CENTILLIUM	148
INFINEON	148
TEXAS INSTRUMENTS	148
OC-12 TRANSCEIVERS.....	149
<i>TABLE 33 WORLDWIDE OPTICAL OC-12 TRANSCEIVER REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	149
<i>FIGURE 42 WORLDWIDE OPTICAL OC-12 TRANSCEIVER REVENUES, 2004-2011 (\$ MILLIONS)</i>	149
<i>FIGURE 43 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL OC-12 TRANSCEIVER VENDORS, 2005 (%)</i>	150
AGERE.....	150
BROADCOM.....	150
CENTILLIUM	151
INFINEON	151
TEXAS INSTRUMENTS	151
OC-48 TRANSCEIVERS.....	151
<i>TABLE 34 WORLDWIDE OPTICAL OC-48 TRANSCEIVER REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	151
<i>FIGURE 44 WORLDWIDE OPTICAL OC-48 TRANSCEIVER REVENUES, 2004-2011 (\$ MILLIONS)</i>	152
<i>FIGURE 45 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL OC-48 TRANSCEIVER VENDORS, 2005 (%)</i>	152
AGERE.....	153
CENTILLIUM	153
INFINEON	153
MARVELL	153
TEXAS INSTRUMENTS	153
OC-192 TRANSCEIVERS.....	154

<i>TABLE 35 WORLDWIDE OPTICAL OC-192 TRANSCEIVER REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	154
<i>FIGURE 46 WORLDWIDE OPTICAL OC-192 TRANSCEIVER REVENUES, 2004-2011 (\$ MILLIONS)</i>	154
<i>FIGURE 47 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL OC-192 TRANSCEIVER VENDORS, 2005 (%)</i>	155
BROADCOM.....	155
CENTILLION.....	155
MARVEL.....	156
INFINEON	156
TEXAS INSTRUMENTS	156
BACKPLANE.....	157
ATCA	158
MIGRATING TO ADVANCED TELECOM COMPUTING ARCHITECTURE.....	159
THE NEED FOR SPEED.....	160
The Need for Speed (Continued)	161
COMPLIANCE	162
MORE STANDARDS WORK TO COME	163
More Standards Work To Come (Continued)	164
<i>TABLE 36 WORLDWIDE OPTICAL BACKPLANE REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	165
<i>TABLE 37 WORLDWIDE OPTICAL BACKPLANE REVENUES BY UNIT, THROUGH 2011 (\$ MILLIONS)</i>	165
<i>TABLE 38 WORLDWIDE BACKPLANE PRICING TRENDS BY UNIT, THROUGH 2011 (\$)</i>	165
<i>FIGURE 48 WORLDWIDE BACKPLANE PRICING TRENDS BY UNIT, 2004-2011 (\$)</i>	166
<i>FIGURE 49 TOP FIVE OPTICAL BACKPLANE VENDORS BY REVENUE, 2005 (%)</i>	166
<i>FIGURE 49 (CONTINUED)</i>	167
OC-1 BACKPLANE	167
<i>TABLE 39 WORLDWIDE OC-1 BACKPLANE REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	167
<i>FIGURE 50 WORLDWIDE BACKPLANE REVENUES, 2004-2011 (\$ MILLIONS)</i>	168
<i>FIGURE 51 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL OC-1 BACKPLANE VENDORS, 2005 (%)</i>	169
AGERE.....	169
AMCC.....	169
INFINEON	170
TEXAS INSTRUMENTS	170
VITESSE.....	170
OC-3 BACKPLANE	170

<i>TABLE 40 WORLDWIDE OPTICAL OC-3 BACKPLANE REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	170
<i>FIGURE 52 WORLDWIDE OPTICAL OC-3 BACKPLANE REVENUES, 2004-2011 (\$ MILLIONS)</i>	171
<i>FIGURE 53 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL OC-3 BACKPLANE VENDORS, 2005 (%)</i>	172
AGERE.....	172
AMCC.....	172
BROADCOM.....	173
INFINEON	173
TEXAS INSTRUMENTS	173
OC-12 BACKPLANE.....	173
<i>TABLE 41 WORLDWIDE OPTICAL OC-12 BACKPLANE REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	173
<i>FIGURE 54 WORLDWIDE OPTICAL OC-12 BACKPLANE REVENUES, 2004-2011 (\$ MILLIONS)</i>	174
<i>FIGURE 55 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL OC-12 BACKPLANE VENDORS, 2005 (%)</i>	174
<i>FIGURE 55 (CONTINUED)</i>	175
AGERE.....	175
AMCC.....	175
FREESCALE	175
INFINEON	175
TEXAS INSTRUMENTS	176
OC-48 BACKPLANE.....	176
<i>TABLE 42 WORLDWIDE OPTICAL OC-48 BACKPLANE REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	176
<i>FIGURE 56 WORLDWIDE OPTICAL OC-48 BACKPLANE REVENUES, 2004-2011 (\$ MILLIONS)</i>	176
<i>FIGURE 57 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL OC-48 BACKPLANE VENDORS, 2005 (%)</i>	177
AGERE.....	177
AMCC.....	177
FREESCALE	178
INFINEON	178
TEXAS INSTRUMENTS	178
VITESSE.....	178
OC-192 BACKPLANE.....	178
<i>TABLE 43 WORLDWIDE OPTICAL OC-192 BACKPLANE REVENUES, THROUGH 2011 (\$ MILLIONS)</i>	178
<i>FIGURE 58 WORLDWIDE OPTICAL OC-192 BACKPLANE REVENUES, 2004-2011 (\$ MILLIONS)</i>	179
<i>FIGURE 59 MARKET SHARES OF TOP FIVE WORLDWIDE OPTICAL OC-192 BACKPLANE VENDORS, 2005 (%)</i>	179

<i>FIGURE 59 (CONTINUED)</i>	180
AGERE.....	180
AMCC.....	180
FREESCALE	180
INFINEON	180
TEXAS INSTRUMENTS	181
WHAT'S NEXT?.....	182
MEMS TECHNOLOGY ADVANCES	182
MEMS TECHNOLOGY ADVANCES (CONTINUED)	183
MEMS TECHNOLOGY ADVANCES (CONTINUED)	184
MEMS TECHNOLOGY ADVANCES (CONTINUED)	185
MEMS TECHNOLOGY ADVANCES (CONTINUED)	186
MEMS TECHNOLOGY ADVANCES (CONTINUED)	187
MEMS IN A 3-D CONFIGURATION.....	188
MEMS in a 3-D Configuration (Continued).....	189
MEMS IN A 3-D CONFIGURATION.....	190
OPTICAL CHIP-TO-CHIP CONNECTIONS ADVANCE.....	191
MOVEMENT TO HIGHER SPEED NETWORKS	192
MOVEMENT TO HIGHER SPEED NETWORKS (CONTINUED).....	193
<i>FIGURE 60 TYPICAL 4-BYTE FRAME USED IN OC-768 TRANSMISSIONS</i>	194
HIGH-CAPACITY REPEATER TECHNOLOGY	194
High-Capacity Repeater Technology (Continued).....	195
NANOELECTRONICS EMERGE.....	196
NANOELECTRONICS EMERGE (CONTINUED)	197
NANOELECTRONICS EMERGE (CONTINUED)	198
MOVING AWAY FROM DISCRETE DEVICES.....	199
NANOSTRUCTURE-BASED PLATFORM ARCHITECTURE	199
NANOIMPRINT LITHOGRAPHY	200
Nanoimprint Lithography (Continued)	201
CHALLENGES IN NANOTECHNOLOGY	202
THE ADVANTAGES OF NANOIMPRINTS.....	202
The Advantages of Nanoimprints (Continued)	203
OPTICAL WIRELESS LOOMS ON HORIZON	204
PLACEMENT OF WIRELESS OPTICAL LINES	205
Placement of Wireless Optical Lines (Continued).....	206
WIRELESS OPTICAL ADVANTAGES.....	207
APPENDIX — LIST OF ABBREVIATIONS	208
APPENDIX — LIST OF ABBREVIATIONS	208
APPENDIX — LIST OF ABBREVIATIONS (CONTINUED)	209
APPENDIX — LIST OF ABBREVIATIONS	210
APPENDIX — LIST OF ABBREVIATIONS	211

APPENDIX — LIST OF ABBREVIATIONS 212