

## LIST OF FIGURES\*

### SECTION I

### SECTION II

|            |  |    |
|------------|--|----|
| Figure 2.1 | Typical 10GE Top-of-Rack Switch.....                   | 9  |
| Figure 2.2 | Campus Backbone .....                                  | 9  |
| Figure 2.3 | Typical 10GBase-T NIC.....                             | 10 |
| Figure 2.4 | IEEE 802.3ae PHY Implementations.....                  | 11 |
| Figure 2.5 | Fiber & Distances for Standard IEEE Optical Ports..... | 12 |

### SECTION III

|            |                                 |    |
|------------|---------------------------------|----|
| Figure 3.1 | Typical 10GE Line Card .....    | 13 |
| Figure 3.2 | Integrated Switch Summary ..... | 14 |

### SECTION IV

|             |   |    |
|-------------|---|----|
| Figure 4.1  | Typical 10GE Optical Module .....                   | 16 |
| Figure 4.2  | Announced Transponders .....                        | 17 |
| Figure 4.3  | 300-Pin Transponder.....                            | 18 |
| Figure 4.4  | C-Band Tunable 300-Pin Transponder Modules .....    | 18 |
| Figure 4.5  | Low-Power 300-Pin Transponder Modules .....         | 19 |
| Figure 4.6  | Xenpak Transponder .....                            | 19 |
| Figure 4.7  | Xenpak Modules for MMF Applications (LX4, LRM)..... | 20 |
| Figure 4.8  | XPAK Transponder.....                               | 20 |
| Figure 4.9  | XPAK Transponder Summary .....                      | 21 |
| Figure 4.10 | X2 Transponder.....                                 | 21 |
| Figure 4.11 | X2 Transponder Heights.....                         | 21 |
| Figure 4.12 | X2 Module Summary .....                             | 22 |
| Figure 4.13 | XFP Transceiver Module .....                        | 22 |
| Figure 4.14 | XFP Module Summary .....                            | 23 |
| Figure 4.15 | Lower-Power 10km XFP Transceiver Modules .....      | 23 |
| Figure 4.16 | SFP+ Transceiver Module (SFF-8431).....             | 24 |
| Figure 4.17 | SFP+ Module Summary .....                           | 24 |
| Figure 4.18 | Lower-Power SFP+ Transceiver Modules .....          | 25 |

### SECTION V

|            |  |    |
|------------|--|----|
| Figure 5.1 | Optical Modules Vendors by Form Factor .....           | 26 |
| Figure 5.2 | Optical Module Vendors by Wavelength & IEEE Port ..... | 27 |

### SECTION VI

|            |   |    |
|------------|---|----|
| Figure 6.1 | 300-Pin Transponder Application .....           | 31 |
| Figure 6.2 | XSBI Transceiver Summary .....                  | 32 |
| Figure 6.3 | Xenpak, X2 & XPAK Transponder Application ..... | 32 |
| Figure 6.4 | Latest Single-Port XGMII-XAUI Transceivers..... | 33 |
| Figure 6.5 | Dual-Port XGMII-XAUI Transceivers .....         | 33 |
| Figure 6.6 | Low-Power 10G Serial PHYs .....                 | 34 |

---

\* All charts and figures in this report are original to *Heavy Reading*, unless otherwise noted.

## SECTION VI (CONTINUED)

|             |                                   |    |
|-------------|-----------------------------------|----|
| Figure 6.7  | EDC 10G Serial PHYs.....          | 35 |
| Figure 6.8  | 10GBase-KR Serial PHYs.....       | 35 |
| Figure 6.9  | Leading XAUI Retimer Devices..... | 36 |
| Figure 6.10 | XFP Transceiver Application.....  | 36 |
| Figure 6.11 | Dual 10-Gbit/s CDR Summary.....   | 37 |
| Figure 6.12 | Quad 10-Gbit/s CDR Summary.....   | 37 |
| Figure 6.13 | Typical 10GBase-T PHY Device..... | 38 |
| Figure 6.14 | 10GBase-T PHY Devices.....        | 38 |
| Figure 6.15 | 10GE MAC/PHY Summary.....         | 39 |

## SECTION VII

|            |                         |    |
|------------|-------------------------|----|
| Figure 7.1 | PHY Vendor Summary..... | 40 |
|------------|-------------------------|----|

## APPENDIX A

|            |                           |    |
|------------|---------------------------|----|
| Figure A.1 | 300-Pin Transponders..... | 46 |
| Figure A.2 | Xenpak Transponders.....  | 50 |
| Figure A.3 | XPAK Transponders.....    | 51 |
| Figure A.4 | X2 Transponders.....      | 51 |
| Figure A.5 | XFP Transceivers.....     | 53 |
| Figure A.6 | SFP+ Transceivers.....    | 60 |

## APPENDIX B

|            |                                     |    |
|------------|-------------------------------------|----|
| Figure B.1 | XSBI Transceivers.....              | 62 |
| Figure B.2 | XAUI Transceivers.....              | 63 |
| Figure B.3 | XAUI-10G Serial PHYs.....           | 63 |
| Figure B.4 | XAUI Retimer & Backplane Muxes..... | 66 |
| Figure B.5 | 10-Gbit/s CDR Devices.....          | 67 |
| Figure B.6 | 10GBase-T PHYs.....                 | 68 |