Avago Technologies provides proven high-speed optical interconnects for your Altera FPGA design.

Avago is the industry leader in high-density, high-speed optical interconnects for applications such as Enterprise Networking, Metro-Access connectivity, including FTTH and Wireless Base Station links, and the fast growing converged Data Center which can include Ethernet, Fibre Channel or InfiniBand architectures.

Based on proven laser and IC technology, Avago provides a comprehensive portfolio of fiber optic transceiver, transmitter and receiver module and single-mode optical component solutions with unmatched quality and performance.

Avago fiber optic modules come in a wide range of form factors including SFP/SFP+, QSFP+, CFP2, and CXP that support 1G, 10G, 40G, and 100G applications.

High-Speed Optical Solutions for Networking

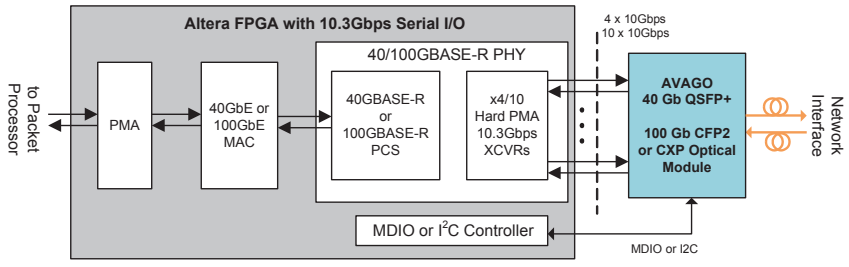
	100G	40G	10G	1G
ALTERA®	Stratix® V (GX, GS, GT) Stratix® IV GT Arria® V (GT, GZ)	Stratix® V (GX, GS, GT) Stratix® IV GT Arria® V (GT, GZ)	Stratix® V (GX, GS, GT) Stratix® IV GT Arria® V (GT, GZ)	Stratix® V (GX, GS, GT) Stratix IV (GX, GT) Stratix II GX Arria® V, II Cyclone® V (GX, GT)
Avago Pluggable Optical Transceivers	**100G CFP2 / CXP**	**40G QSFP+**	**10G SFP+**	**1G SFP**
				
Ethernet	**AFBR-8420Z** 100G-SR10, CFP2 100m over OM3 MMF **AFBR-83ExZ** 100G-SR10, CXP 100m over OM3 MMF	**AFBR-79EQxZ** 40G-SR4 100m over OM3 MMF **AFBR-79EExZ** 40G-SR4 (extended) 300m over OM3 MMF	**AFBR-708SMZ** 10G-USR 100 m. OM3 MMF **AFBR-709SMZ** 10G-SR 300/400 m. OM3/ OM4 MMF **AFCT-701SDZ/ AFCT-709SMZ*** 10G-LR 10 km over SMF	**AFBR-5715PZ** 1000BASE-SX 500 m. over MMF **AFCT-5715PZ** 1000BASE-LX 10km over SMF **ABCU-5740RZ** 10/100/1000BASE-T 100m. over Cat5
			* Available early 2014	
Avago Active Optical Cables (AOCs)	**CXP AOC**	**QSFP+ AOC**	**SFP+ AOC**	
				
	AFBR-83ExyyyZ	**AFBR-7QERxxZ**	**AFBR-7CERxxZ**	**AFBR-7IERxxZ (Octopus)**

QSFP+ and CXP/CFP2 for 40 & 100Gbps Solutions

40/100Gbps Modules and Active Optical Cables (AOC)				
40G QSFP+ AOC	**AFBR-7QERxxZ**	40G AOC , 0.5 to 20m links		**40G QSFP+ AOC** • Compliant to QSFP+ MSA (SFF-8436) • XLPPI electrical interface (IEEE 802.3ba)
40G QSFP+ Transceiver	**AFBR-79EQxZ**	40G-SR4, 100m OM3 MMF		**40G QSFP+** • Compliant to QSFP+ MSA (SFF-8436) • XLPPI electrical interface (IEEE 802.3ba) • Programmable electrical output amplitude/de-emphasis for signal integrity • Internal digital diagnostics via I^2C
	AFBR-79EExZ	40G-SR4, 300m OM3 MMF		
100G CXP AOC	**AFBR-83EyyyyZ**	100G AOC, 0.5 to 10m links		**100G CXP-AOC** • Compliant with the CXP MSA (SFF-8642) • CPPI electrical interface (IEEE 802.3ba) • Programmable Electrical amplitude/de-emphasis and input equalization • Full digital diagnostics via I^2C
100G Transceiver	**AFBR-8420Z**	100G-SR10, CFP2 for 100m OM3 MMF		**100G CFP2** • Compliant with 100GBASE-SR10 per the IEEE 802.3ba for parallel ribbon fiber • Internal CDRs for both re-timed (CAUI) and non-retimed (CPPI) operation • Full digital diagnostics and loopback modes available via MDIO
	AFBR-83ExZ	100G-SR10, CXP for 100m OM3 MMF		**100G CXP** • Compliant with the CXP MSA (SFF-8642) • CPPI electrical interface (IEEE 802.3ba) • Programmable Electrical amplitude/de-emphasis and input equalization • Full digital diagnostics via I^2C

Evaluation Kits and Design Tools		
CFP2	**CXP**	**QSFP+**
Module Compliance Evaluation Kit	Module Compliance Evaluation Kit	Module Compliance Evaluation Kit
P/N: AFBR-8420EVB	P/N: AFBR-83EVB	P/N: AFBR-79QEKZ
		

Altera Stratix FPGA's offer a proven 40/100G MAC and PCS/PMA sub-layer which, combined with Avago 40/100G fiber optics components, completes a robust solution for high-speed networking applications.



40/100G Ethernet Switch or Router Line card

SFP/SFP+ Transceivers and Active Optical Cables (AOCs)

1 - 10Gbps Modules and Active Optical Cables (AOC)				
10G SFP+ AOC	**AFBR-7CERxxZ**	10G AOC, 0.5 - 20m link distance		**10G SFP+ AOCs** • Fully compliant to IEEE 802.3ae and the SFP+ MSA (SFF-8431/8472) • Data rate and protocol agnostic (1 thru 10G) • Performance and reliability exceeds that of other cabling solutions (passive/active-DAC and 10GBASE-T)
10G SFP+	**AFBR-708SMZ**	10G-USR for 100m over OM3 MMF		**10G SFP+** • Fully compliant to IEEE 802.3ae and the SFP+ MSA (SFF-8431/8472) • Proven high volume designs support reaches up to 10km with industry leading reliability • Full digital diagnostics via I^2C
	AFBR-709SMZ	10G-SR for 300/400m over OM3/OM4 MMF		
	AFCT-701SDZ/ AFCT-709SMZ*	10G-LR for 10 km over Single Mode Fiber		
1G SFP	**AFBR-5715PZ**	1GBASE-SX for 500m over MMF		**SFP** • Compliant to IEEE802.3 and the SFP MSA (SFF-8074i) for SFPs with Digital Diagnostics • Avago proprietary OSA design ensures excellent signal integrity and low EMI **Also available:** • Fibre Channel (16/8/4G) SFP's • Base Station CPRI/OBSAI SFP's (up to 9.8G) • SONET OC-3/12/48 SR-1 and Fast Ethernet
	AFCT-5715PZ	1GBASE-LX for 10km over SMF		
	ABCU-5740RZ	10/100/1000BASE-T for 100m over Cat5		

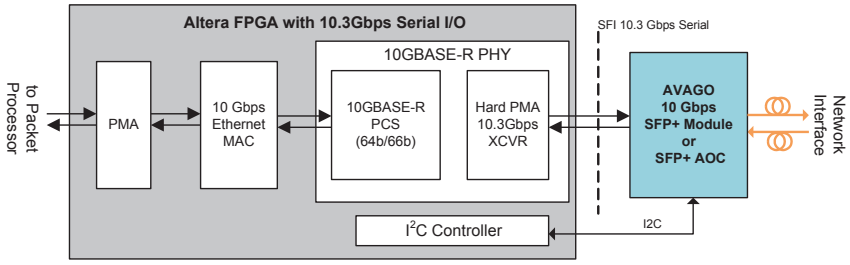
*Available early 2014

Evaluation Kits and Design Tools		
SFP (1-4Gbps)	**SFP+ / SFP+ AOC**	
Module Compliance Evaluation Kit	Module Compliance Evaluation Kit	Host Extender Board
P/N: HFBR-0544	P/N: AFCT-5716Z	P/N: AFCT-5716EXBZ
		

Avago high-speed fiber optics have been evaluated in conjunction with Altera high-speed FPGAs.

Design References and Applications Notes are available.

For more information please visit: **www.avagotech.com/fiber**



10G Ethernet Switch/NIC or Router Line Card

Your Imagination. Our Innovation



Avago Technologies is a leading designer, developer and global supplier of a broad range of analog, mixed signal and optoelectronics components and subsystems with a focus in III-V compound semiconductor design and processing. Backed by an extensive portfolio of intellectual property including approximately 4,200 patents and pending applications, Avago products serve three primary target markets: wireless communications, wired infrastructure, and industrial and other. Avago has a global employee presence and heritage of technical innovation dating back 50 years to its Hewlett-Packard roots.

Avago products serve three diverse end markets

Wireless Communications serving the smartphone/handset and Base Station infrastructure markets with over 250 patents and leading-edge products that include:

- Power Amplifiers
- Front End Modules
- Film Bulk Acoustic Resonator (FBAR) Filters
- GPS/GLONASS LNAs
- Optical Finger Navigation
- LED Backlighting, Screen Illumination
- Ambient Light and Proximity Sensors

Wired Infrastructure for switches/routers, data centers, supercomputers and storage/servers with over 200 patents in parallel optics alone and products that include:

- 168Gb Parallel Optic Arrays
- 28Gb SerDes ASICs in 28nm
- Storage Fibre Channel Transceivers
- QSFP+/SFP+ Ethernet Transceivers

Industrial and Other for alternative energy power generation, electronic sign and signals, automated manufacturing, automotive lighting, GPS/GLONASS navigation, motor inverter system, battery charging and management, infotainment systems and vehicle safety systems with products that include:

- Inverters
- Isolation and Digital Optocouplers
- Motion Control Optical & Magnetic Encoders
- Polymer Optical Fiber
- Indicator and Display LEDs



For product information and a complete list of distributors, please go to our web site:

www.avagotech.com
www.avagotech.com/fiber
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For technical support please email a Technical Response Center in your region:

United States: support@avagotech.com

Europe: info@promotionteam.de

Asia Pacific: pacrim.components@avagotech.com

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