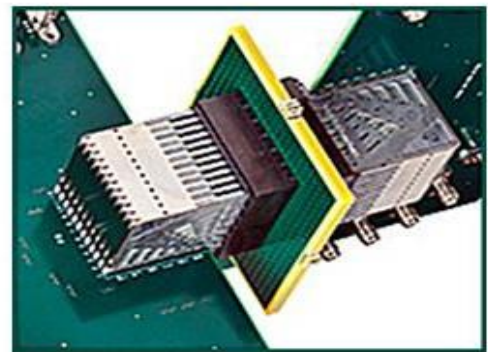
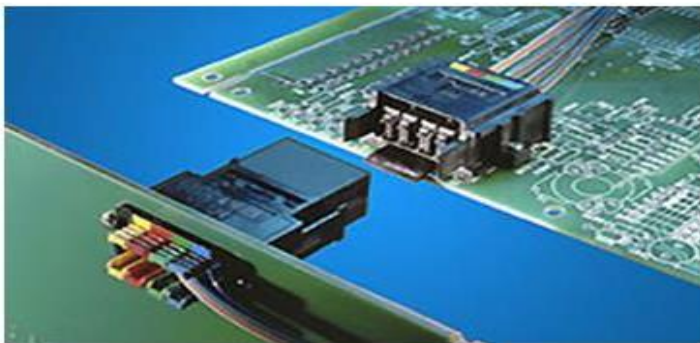


Evolving High-Speed Backplane Connectors

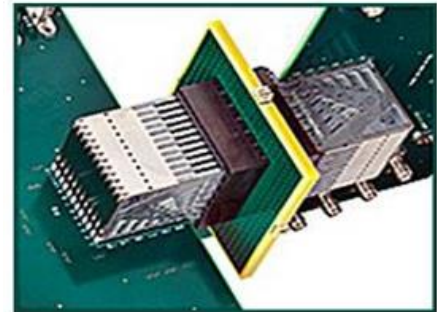
Research Report P-881-17
November 2017



Evolving High-Speed Backplane Connectors

Report No.: P-881-17
November 2017

Bishop and Associates, Inc. has just released a new eleven-chapter, 250-page research report providing an analysis of the expanding role and market for high-speed traditional, midplane, orthogonal, cable, ruggedized, and fiber optic backplane connectors designed to perform in the 6 to 50+ Gb/s arena. The report reviews the basic technology underlying high-speed backplane connectors and outlines current and anticipated applications that demand them. Detailed analysis compares performance of high-speed backplane connectors from leading suppliers, as well as the challenges designers face in predicting connector performance in very specific applications.



Emphasis is placed on identifying significant advances in interconnect technology, system design and designer expectations that have occurred over the past four years.

A variety of factors associated with high-speed channels have a major influence on their behavior. Sections are devoted to reviewing related system elements including driver and receiver technology, printed circuit board materials and design, as well as channel modeling, design support, second sourcing imperatives, and performance measurement systems.

A statistical analysis by region of the world provides a breakdown by high-speed backplane type for the years 2016 through 2022F.

	2016	2017F	Percent Change	2018F	Percent Change	2019F	Percent Change
Traditional							
Orthogonal							
Ruggedized							
Cable							
Fiber Optic							
Midplane							
Total High-Speed Backplane							

	2020F	Percent Change	2021F	Percent Change	2022F	Percent Change	2017 - 2022 5-Year CAGR
Traditional							
Orthogonal							
Ruggedized							
Cable							
Fiber Optic							
Midplane							
Total High-Speed Backplane							

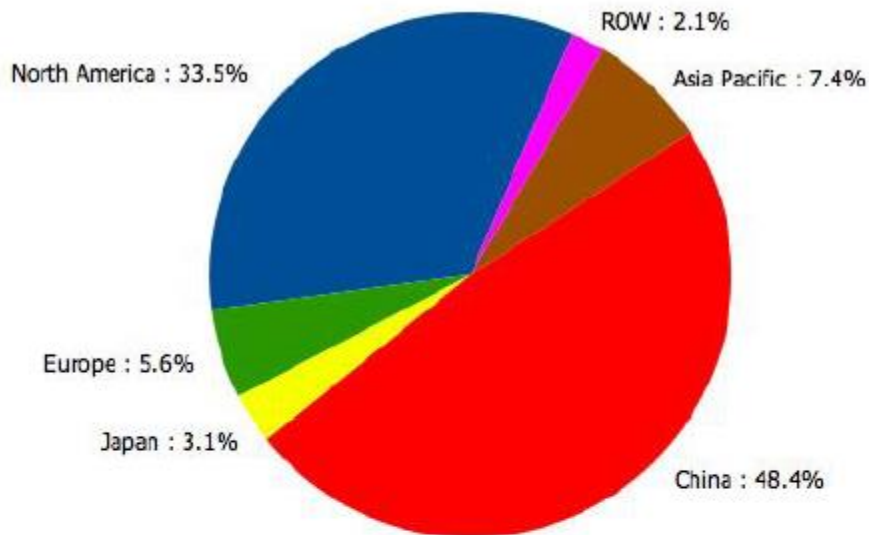
\$ Millions

Note: Orthogonal Includes Orthogonal Direct

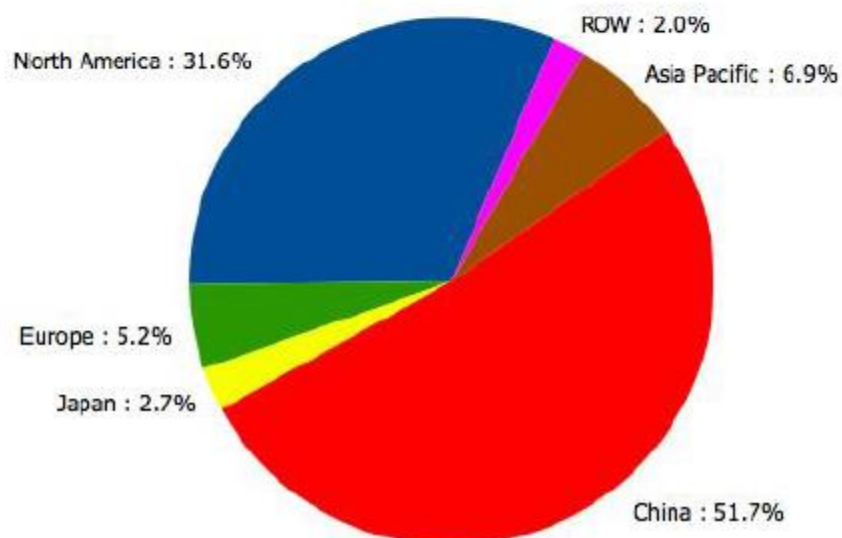
Evolving High-Speed Backplane Connectors

Since our 2013 report on high-speed backplanes was published, application opportunities such as the dawn of the Internet-of-Things, and Industry 4.0 continue to stimulate demand for access to increased network capacity and speed. Improved pluggable I/O interfaces have enabled transfer of multi-terabit levels of throughput from a 1U chassis, thereby eliminating that data bottleneck. Broad adoption of PAM4 signaling is allowing system designers to remain in their comfort zone by allowing the use of existing connectors while essentially doubling system data rates. The last four years have seen the ranks of the top four high-speed backplane connectors shift as industry consolidation and cross-licensing of second sources altered the mix of key players.

**2017F Total World High-Speed Backplane Connector Sales
By Region**



**2022F Total World High-Speed Backplane Connector Sales
By Region**



Evolving High-Speed Backplane Connectors

The following table of contents shows the detail provided in this new report.

Table of Contents

Chapter 1 Report Scope and Methodology

Survey Objectives
Issues Addressed in this Report
Methodology and Approach

Chapter 2 Executive Summary

Executive Summary
High-Speed Backplane Connector Families

Chapter 3 Introduction

Preface
Introduction to System Packaging

Chapter 4 High-Speed Backplane Connector Basics

System Design Options
Traditional Backplane Architecture
Midplane Architecture
Orthogonal Midplane Architecture
High-Speed Transmission Line Issues
Defining Features of High-Speed Interfaces
Connector Selection Criteria
The Second Sourcing Imperative
Performance Measuring Systems
Test and Measurement Equipment
Comparison of Electrical Performance
Design Support Provided by Connector Manufacturers

Chapter 5 High-Speed Backplane System Elements

Driver and Receiver Technology
The Role of Active Signal Conditioning
Printed Circuit Board Materials
Printed Circuit Board Design and Fabrication

Chapter 6 Market Drivers for High-Speed Backplane Connectors

The Need for Speed
Advancing Semiconductor Technology
Industry Standards
Supercomputers
Internet of Things
Industry 4.0
Cloud Computing
Artificial Intelligence
Augmented / Virtual Reality
Emerging 5G Networks

Chapter 7 Overview of Current High-Speed Backplane Connectors

Amphenol TCS
VHDM H Series
VHDM RAM
e-HSD
GbX
GbX E / U Series
Ventura
Crossbow
XCede HD / LC / Orthogonal
Paladin / VIPER
SMASH

Chapter 7 Overview of Current High-Speed Backplane Connectors (continued)

ERNI Components
ERmet Zd
ERmet Zd Plus / Zd Pro

FCI Electronics
AirMax VS
AirMax VSe / VS2
ZipLine
ExaMAX

Molex
GbX I-Trac
Impact
Impact zX2 / Impel / Impel Plus
Impulse Orthogonal Direct

TE Connectivity
HS3
Z-PACK HM-Zd
Z-PACK HM-Zd Plus
Z-PACK HMeZd+ / TinMan
Z-Pack Slim UHD
STRADA Whisper
MultiGig RT-2R

3M Electronic Solutions Division
Ultra Hard Metric Connector

Samtec
AirMax / XCede/ ExaMAX / Paladin

Chapter 8 Additional Backplane Solutions

Ruggedized Backplane Connectors
Cable Backplane Systems
Optical Backplane Connectors

Chapter 9 Impact of Continuing Backplane Evolution

Impact of Continuing Backplane Evolution
Non Return to Zero (NRZ) and Pulse Amplitude Modulation (PAM4) Signaling
Cable Backplanes
Flyover Technology
Open System Architecture Standards
Low-Cost High-Performance Connectors

Chapter 10 Market Analysis and Forecasts

Measurement Criteria

Total World

High-Speed Backplane Connector Sales and Forecast by Type 2016 through 2022F
High-Speed Backplane Connector Usage by Type 2017F and 2022F
High-Speed Backplane Connector CAGR and Sales \$ by type
High-Speed Backplane Connector Sales by Region 2016 through 2022F

Evolving High-Speed Backplane Connectors

Chapter 10 Market Analysis and Forecasts (continued)

High-Speed Backplane Connector Sales by Region
2017F and 2022F
High-Speed Backplane Connector Sales by Region
2016-2022F

North America

High-Speed Backplane Connector Sales and Forecast
by Type 2016 through 2022F
High-Speed Backplane Connector Usage by Type 2017F
and 2022F
High-Speed Backplane Connector CAGR and Sales \$ by
type 2017F-2022F

Europe

High-Speed Backplane Connector Sales and Forecast
by Type 2016 through 2022F
High-Speed Backplane Connector Usage by Type 2017F
and 2022F
High-Speed Backplane Connector CAGR and Sales \$ by
type

Japan

High-Speed Backplane Connector Sales and Forecast
by Type 2016 through 2022F
High-Speed Backplane Connector Usage by Type 2017F
and 2022F
High-Speed Backplane Connector CAGR and Sales \$ by
type

Chapter 10 Market Analysis and Forecasts (continued)

China

High-Speed Backplane Connector Sales and Forecast
by Type 2016 through 2022F
High-Speed Backplane Connector Usage by Type 2017F
and 2022F
High-Speed Backplane Connector CAGR and Sales \$ by
type

Asia Pacific

High-Speed Backplane Connector Sales and Forecast
by Type 2016 through 2022F
High-Speed Backplane Connector Usage by Type 2017F
and 2022F
High-Speed Backplane Connector CAGR and Sales \$ by
type

ROW

High-Speed Backplane Connector Sales and Forecast
by Type 2016 through 2022F
High-Speed Backplane Connector Usage by Type 2017F
and 2022F
High-Speed Backplane Connector CAGR and Sales \$ by
type

Chapter 11 Major Findings and Conclusions

General Observations
Backplane Connectors
Midplane and Orthogonal Midplane Connectors
Ruggedized and Cable Backplane Connectors
Fiber Optic Backplanes

To Order *Evolving High-Speed Backplane Connectors*



Research Report P-881-17, *Evolving High-Speed Backplane Connectors* is available for \$4,500. Additional print copies of this report are available for \$450. If you would like additional information about this report, or would like to place an order, please complete the following information and e-mail, fax or mail it to Bishop & Associates, Inc. To place your order on our website: <http://store.bishopinc.com/>.

Fax No. 630-443-2704

Name:		
Title:		
Company:		
Address:		
City:	State:	Zip:
Phone:	Fax:	
E-Mail Address:		
Signature:		

Evolving High-Speed Backplane Connectors

- Print Copy @ \$4,500
- Print Copy + 1 Additional Print Copy @ \$4,950
- Print Copy + CD (Multi-User Corporate License) @ \$5,850

Invoice Me Check Enclosed Visa Master Card American Express

Additional \$85.00 for International Airmail
Illinois Customers Add 8.0% Sales Tax

Credit Card No.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Expiration Date

--	--

Mo.

--	--

Yr.



1209 Fox Glen Drive

St. Charles, IL 60174

Phone: 630/443-2702 Fax: 630/443-2704

E-mail: bishop@bishopinc.com

Website: www.connectorindustry.com - Online Store: <http://store.bishopinc.com/>

For Questions in **Europe:**

Mr. Arthur Visser

Bishop & Associates, Inc.

Phone: (32) 2.660.3696 Fax: (32) 2.675.8374

[Email Arthur Visser](mailto:Arthur.Visser@bishopinc.com)

What's New ?

Bishop & Associates has recently completed several new research reports about the worldwide connector industry. A table of contents for each report can be found at <http://store.bishopinc.com>.

- ❑ **Report P-881-17** **Evolving High-Speed Backplane Connectors (November 2017) NEW**
- ❑ **Report P-940-17** **World Market for Connectors Used in Mobile Network Infrastructure Equipment – 2017 to 2022 (October 2017) NEW**
- ❑ **Report M-121-17** **2017 Top 100 Connector Manufacturers (August 2017) NEW**
- ❑ **Report C-122-17** **2017 Connector Industry Yearbook (July 2017) NEW**
- ❑ **Report C-303-17** **2017 European Customer Survey of the Electronic Connector Industry (July 2017) NEW**
- ❑ **Report F-2017-01** **Connector Industry Forecast (June 2017)**
- ❑ **Report P-910-17** **The High-Speed Data Communications and Connectivity Market – 2017 and Beyond (June 2017)**
- ❑ **Report P-799-17** **2017 World Cable Assembly Market (April 2017)**
- ❑ **Report M-700-17** **World Connector Market Handbook (March 2017)**
- ❑ **Report M-617-17** **Digital Transformation – Industrial IoT and the Connector Market – Industrial IoT as the Driver of Connectivity – Smart Factory – Smart Grid – Smart City (February 2017)**
- ❑ **Report T-800-17** **2017 North American Cable Assembly Manufacturers (February 2017)**
- ❑ **Report M-1501-17** **Medical Electronics Market for Connectors (January 2017)**
- ❑ **Report P-780-16** **World RF Coax Connector Market (November 2016)**
- ❑ **Report P-620-16** **The World Market for Terminal Blocks (October 2016)**

THE BISHOP REPORT - CONNECTOR INDUSTRY YEARBOOK

An annual subscription to [THE BISHOP REPORT](#) (12 issues) is available for \$1,150. As part of your Bishop Report subscription, you have admission to BishopReport.com, a website that provides quick access to prior issues of The Bishop Report, News Briefs, connector industry news, the connector industry forecast, and various industry statistics. An annual corporate subscription is available for \$2,950, which includes an unlimited number of subscribers and one PDF version of the Yearbook.

The [CONNECTOR INDUSTRY YEARBOOK](#) is available for \$1,500. However, Bishop & Associates offers a special combined price of \$1,750 for [THE BISHOP REPORT and the CONNECTOR INDUSTRY YEARBOOK](#) (an annual savings of \$900).

[Click here](#) to view an expanded report description, and a complete table of contents, for all Bishop & Associates' research reports.



1209 Fox Glen Drive • St. Charles, IL 60174

Phone: 630.443.2702 • bishop@bishopinc.com • ConnectorIndustry.com

Online Ordering: <http://store.bishopinc.com>