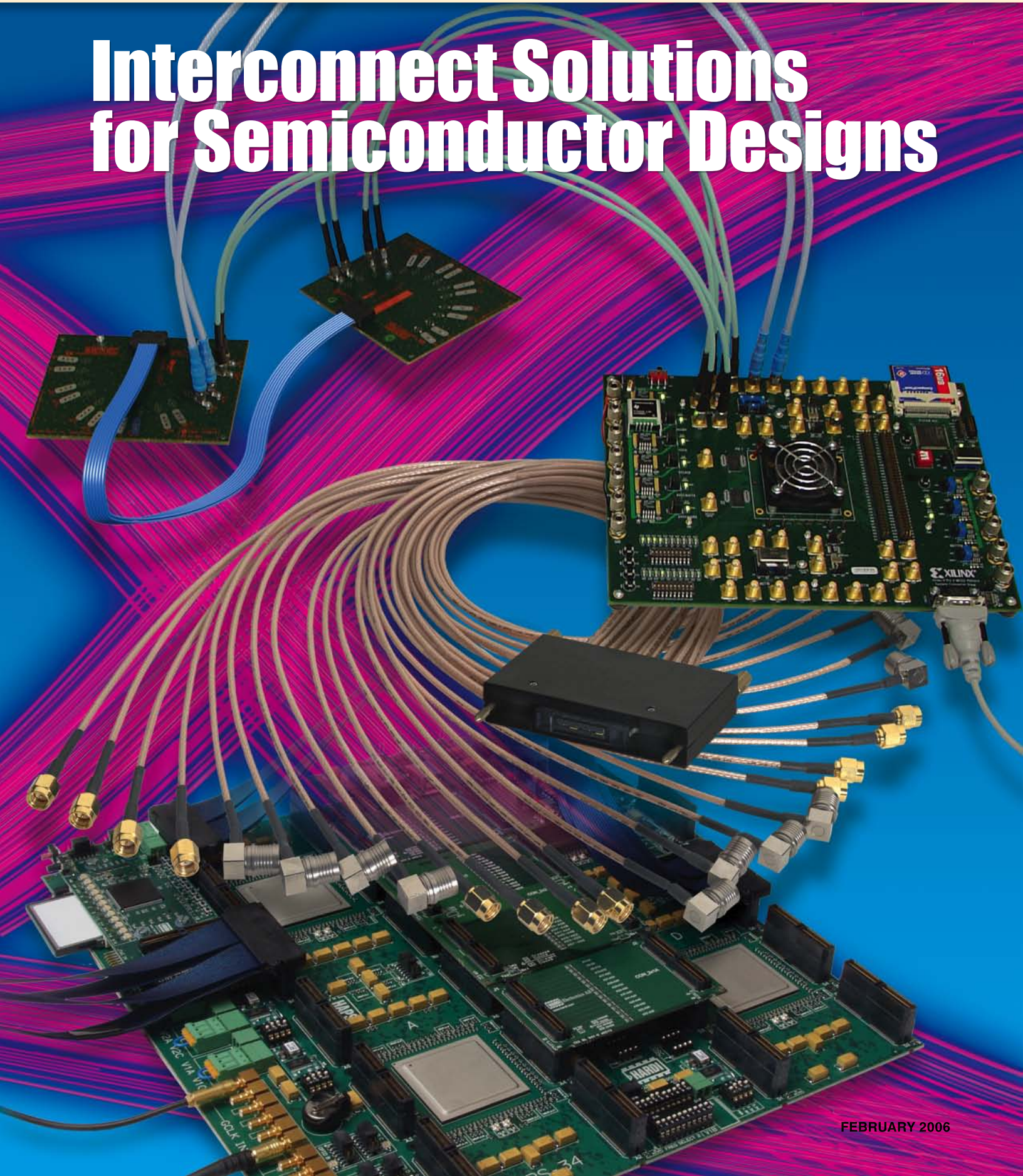
samtec

Interconnect Solutions for Semiconductor Designs



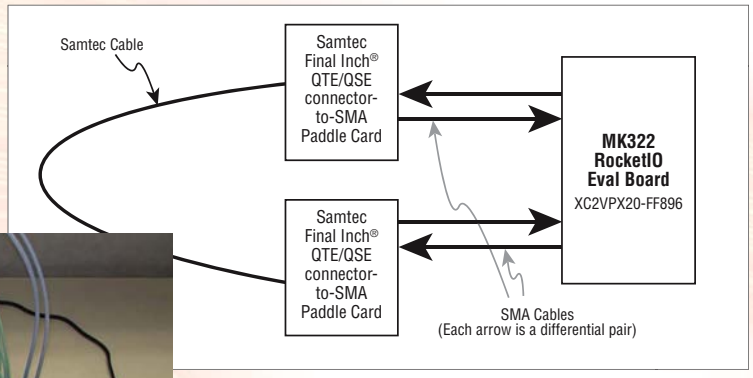
FEBRUARY 2006

High Speed Interconnect Solutions

Overview

Samtec's Signal Integrity expertise and interconnect solutions are ideal for many of the physical architectural challenges and R&D needs of today's Semiconductor industry.

Samtec's Signal Integrity expertise assists the designer who is managing thousands of signals at multi-Gigabit data rates. This expertise includes high speed interconnect systems, twinax and micro coax cable assemblies, high speed flex circuits, and signal integrity support services.



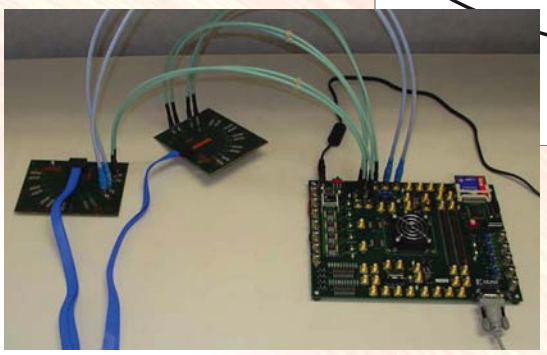


Photo courtesy of Xilinx.

Delivering signals outside the chip through Samtec's "clean" and "quiet" interconnect solutions provides the signal fidelity your system requires. We understand and share designers' goals to minimize leakage, power loss, insertion loss, and voltage drop, while satisfying loss budgets within the system. Whatever you are driving, Samtec's solutions are reliable and optimize the efficiency and performance of your design.

From product expertise to Signal Integrity support (simulation, test, and design services), Samtec has the products, tools, and flexibility to fit your unique business needs.

The Samtec Edge

- Improve operating efficiencies at multi-Gigabit speeds
- Decrease design costs using tested Samtec standard interfaces and "drop in your design" Final Inch® Solutions
- Shorten your design cycles and get to market faster
- Lengthen your product lifecycles by designing transmission lines for future expandability

Samtec will assist you with Reference Design and Application Note pre-release technical reviews and interconnect solution confirmation services. In addition, Samtec can provide a direct link to your Technical Papers and Articles on the Samtec website, making it easy for your customers to find the right interconnect solution for their system.

Whatever your design, system, or information needs, Samtec will work with you to achieve your specific goals.

24 pair, High Speed Twinax Cable Assembly

To support our partners, we also offer:

- Samtec Signal Integrity Group technical collaboration and co-hosting of Webinars targeted at specific industries
- Web access to technical data, SPICE models, and evaluation boards of transmission line products
- Co-marketing with Samtec - ranked #1 in the connector industry by The Bishop Report for 10 consecutive years in: Customer Service, Product Quality, On-time Delivery, Turnaround for New Product Design, and for Technical Support and Expertise
- Assistance with demonstrations at tradeshows and exhibitions

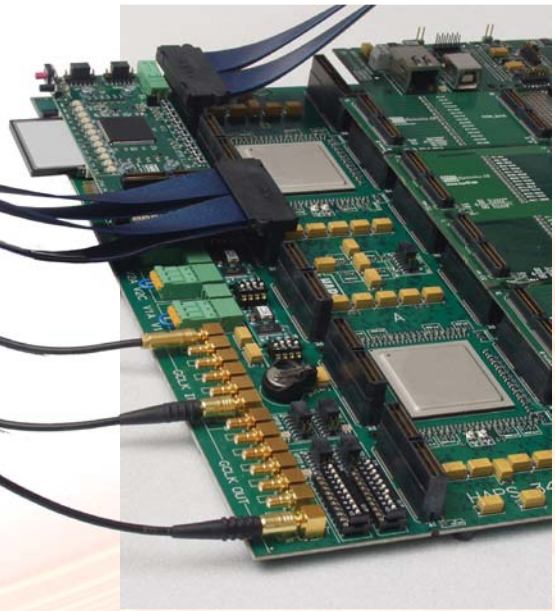


Photo courtesy of HARDI Electronics.

Photo courtesy of Spectrum Digital Inc.

Contact the Signal Integrity Group at: sig@samtec.com for more information.

For product information go to: www.samtec.com

High Speed Interconnect Solutions

Signal Integrity Capabilities

Samtec offers interconnect solutions that pre-optimize Signal Integrity and maintain signal fidelity for various signal types, protocols, and multi-Gigabit data rates, providing connectivity to silicon interfaces.

Samtec high speed board-to-board and high data rate cable-to-board systems can differentiate your design, streamline your design process, and provide solutions for common semiconductor application needs.

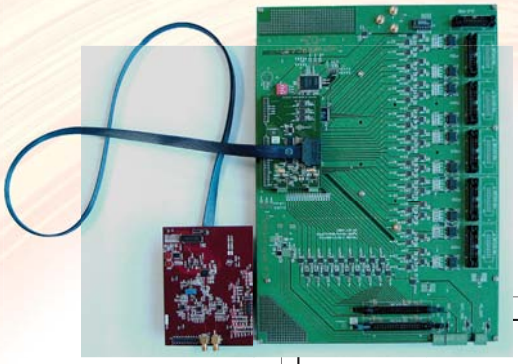
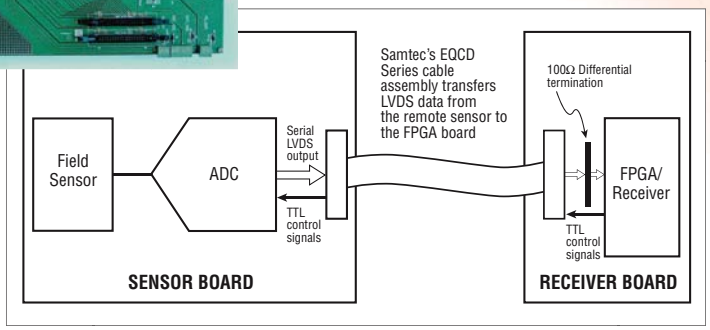
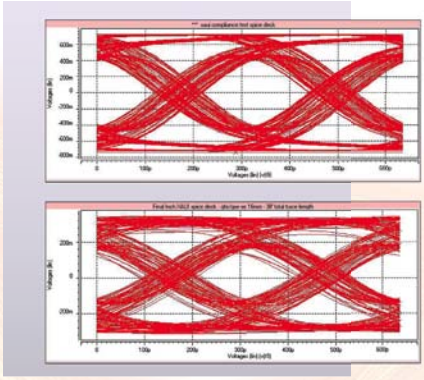


Photo courtesy of Texas Instruments (India) Pvt. Ltd.

Semiconductor Application Solutions

- Reference Design and Application Note support relative to the interconnect architecture
- Chip specific customer development kits
- Chip specific analysis of the transmission path at various data rates
- Interface to chip platforms for system configuration
- Transmission line characterization and simulation
- New IC concept and early development emulation
- Design verification at chip finishing stage
- Data rate performance verification/BERT
- Maximizing signal fidelity during ADC/DAC
- Quiet transmission lines in deep memory probes
- Connectivity in validation boards
- Connectivity to emulation platforms
- Minimizing capacitance, power consumption and power losses in the interconnect system
- Debugging/probing





Design, Development and Testing

Design and testing support for many industry standards is available via Samtec Interconnect Reference Designs and Application Notes.

Final Inch® reference designs will help you streamline your high speed design process and save valuable time and resources. These designs provide a "drop in" high speed board-to-board solution with recommended via placement and trace routings in the Breakout Region (BOR).

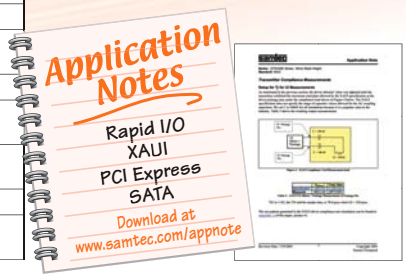
Proven Final Inch® reference design and Industry Standard measurement methods are then analyzed in Samtec Application Notes which are available on-line for a variety of systems and conditions.

You can further differentiate your customer evaluation boards and chip development kits with multiple interconnect solution options for board-to-board or cable-to-board.

Contact Samtec for more information on our rapid development tools and services, Application Specific design support, and product needs.

Industry Standards & Specifications

Industry Standard	Bandwidth	Part Numbers	Compliant to Standard's Bandwidth	Certified by Standard
CX4	3.125 Gbps	EQCD, EQDP, EEDP, 6QDPS	Y	N
EPIC Express	1 bank = 2 Gbps, 3 bank = 6 Gbps	QSE- and QTE-040-01-L-D-A-X	Y	Y
Fibre Channel	133 Mbps to 4.25 Gbps	EQDP, EEDP, 6QDPS, QMS/QFS, QMSS/QFSS, RU8, DPAM/DPAF, SEAM/SEAF	Y	N
HyperTransport	800 MHz	QSH/QTH	Y	Y
Infiniband	500 Mbps to 6 Gbps per link	QTE/QSE-DP, QTH/QSH-DP, RU8, DPAM/DPAF, SEAM/SEAF	Y	N
PCI Express	Initial bit rates reach 2.5 Gbps per lane direction	PCIE	Y	Y
PISMO 1	4.3 Gbps	QSH- and QTH-060-01-F-D-A-XX	Y	Y
PISMO 2	18.8 Gbps	SEAM-40-05.0-SM-8-2-A-K & SEAF-40-02.0-SM-8-2-A-K	Y	Y
Rapid I/O	1.56 GHz	ASP-105884-01 & ASP-105885-01	Y	Y
Rocket I/O	3.125 Gbps	EQCD-040-06.00-TTL-TBR-2-B & QSE-040-01-L-D-A-K	Y	Y
SATA 1, 2, 3	Serial ATA begin at 150 Mbps, SATA 2 - 300 Mbps	QTE/QSE-DP, QTH/QSH-DP, RU8, DPAM/DPAF, SEAM/SEAF	Y	N
Vita 42	100 MHz	ASP-105884-01 & ASP-105885-01	Y	Y
XAUI	3.125 Gbps	QTE/QSE-DP, QTH/QSH-DP, RU8, DPAM/DPAF, SEAM/SEAF	Y	N



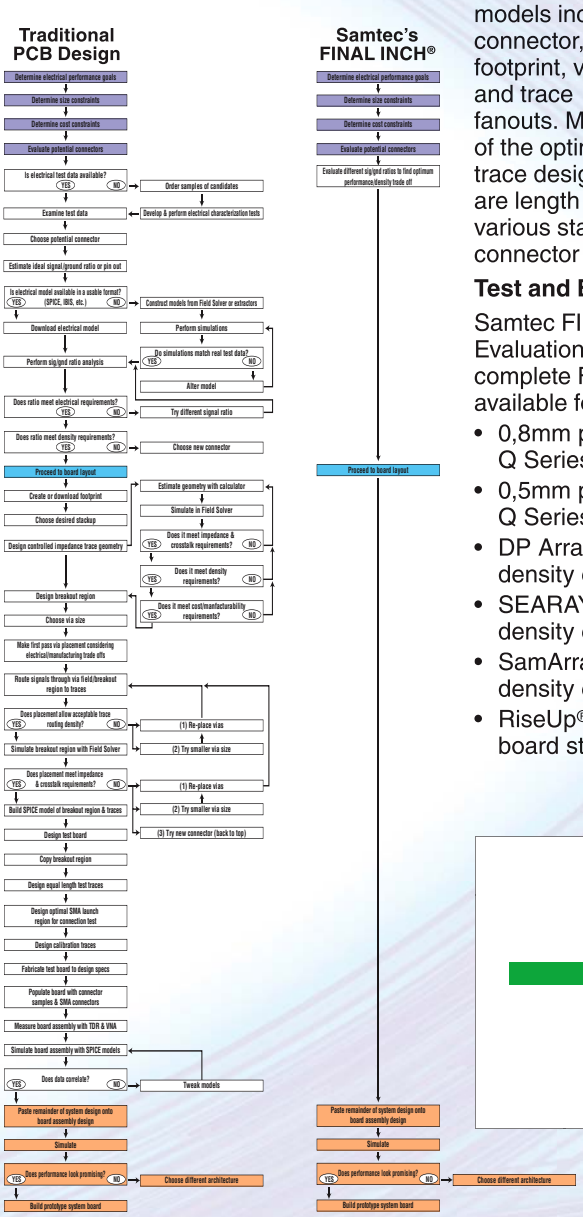
Signal Integrity Services

Final Inch® Design Tools
(Pre-Optimized BOR Design)

Reference designs that save design, development and validation time and resources.

Time and Cost Savings

To make high speed connectors easier to specify and use, Samtec has extended the concept of manufacturer PCB layouts and connector SPICE models. Samtec supplies "reference designs" for one of the most difficult design issues on the board: the Breakout Region (BOR) around the high speed connector, or what Samtec calls "FINAL INCH®."



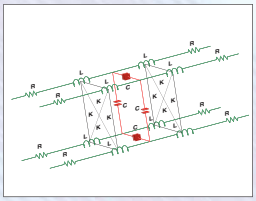
See www.samtec.com/FI for downloadable/printable flow chart.

Physical Models

Downloadable Gerber and DXF files are available for cut and paste application into standard board layout software packages. The entire design is treated as a series of components that can be dropped into software for routing "to and from."

Electrical Models

SPICE models of the breakout region and traces are provided so that the electrical effects of the entire FINAL INCH® design can be easily simulated. Samtec HPSICE models include connector, footprint, vias and trace fanouts. Models of the optimized trace designs are length scalable, and are available for various stack heights within a connector family.



Test and Evaluation Boards

Samtec FINAL INCH® Test and Evaluation kits allow laboratory testing of complete FINAL INCH® designs and are available for:

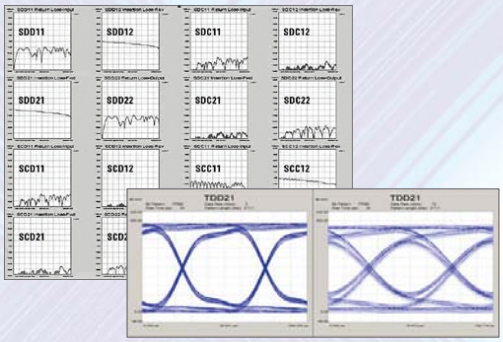
- 0,8mm pitch (QTE/QSE) Q Series® high speed connectors
- 0,5mm pitch (QTH/QSH) Q Series® high speed connectors
- DP Array™ (DPAF/DPAM) high density connectors
- SEARAY™ (SEAF/SEAM) high density connectors
- SamArray® (YFT/YFW/YFS) high density connectors
- RiseUp® (RU8) high speed elevated board stacking system

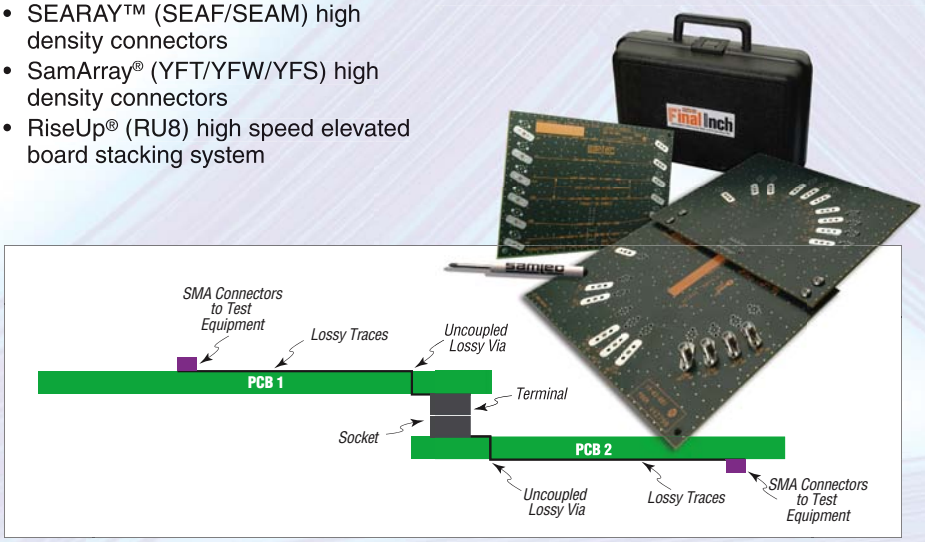
Empirical Signal Integrity Data

FINAL INCH® is not complete without validation of the electrical system performance through signal integrity modeling, simulations and measurements. Samtec supplies simulation and test reports to support FINAL INCH® designs, including "On-Request" test data. In addition, Samtec can provide assistance through the Signal Integrity Services Group to customers who wish to use the design in some way other than our standard configurations.

On-Request Test Data

Samtec offers On-Request laboratory test data for FINAL INCH® circuits. Eye patterns, as well as a vast array of characterization data, are available for complete PCB/connector paths in a variety of conditions.





Signal Integrity Services

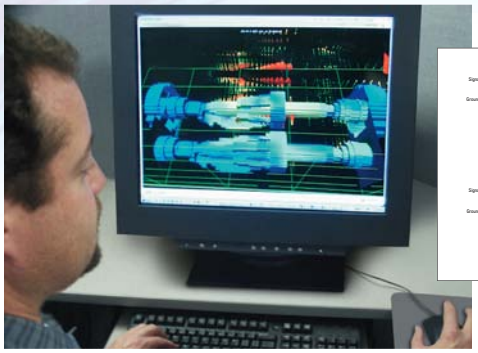
Contact the Signal Integrity Group at: sig@samtec.com for more information.

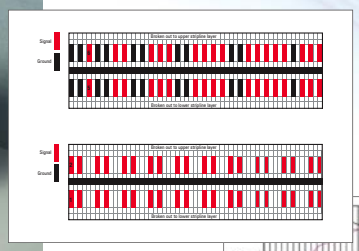
For product information go to: www.samtec.com

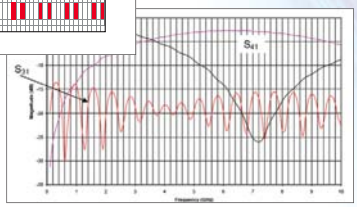
Signal Integrity Group

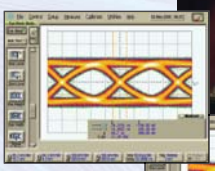
Samtec is the service leader in the connector industry, offering worldwide testing, simulation and "real time" EE support from our Signal Integrity Group:

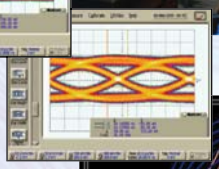
- In-house EE staff offering person-to-person SI engineering support
- Standards compliance analysis for your interconnect needs, including PCIE, XAUI, Rapid IO, SPI-4, MGT (Rocket I/O or other), etc.
- Design, modeling and testing of subsystems
- Interpretation of test data, performance results and capabilities
- PCB layout, trace and routing assistance
- Connector ground pin assignment assistance
- Application specific design, modeling and testing services
- Modeling and simulation services
- Testing services
- North American and Korean facilities

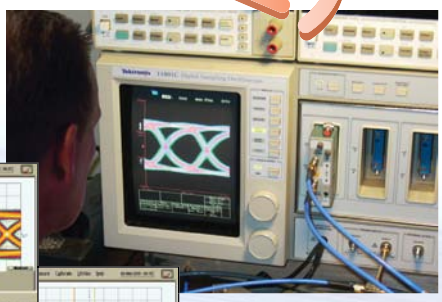


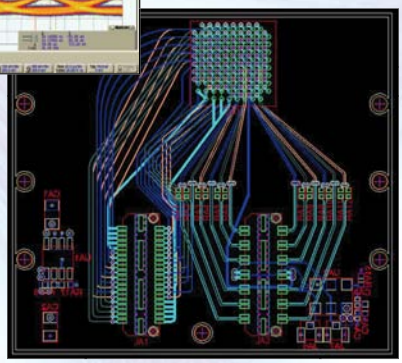








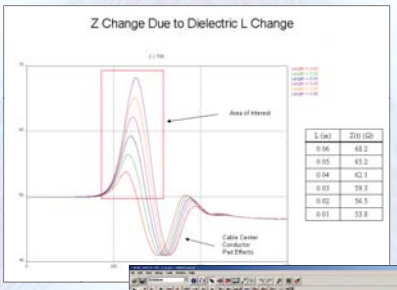


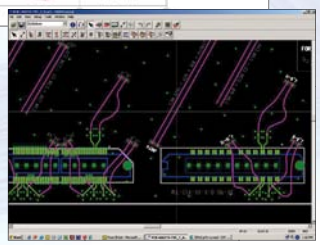


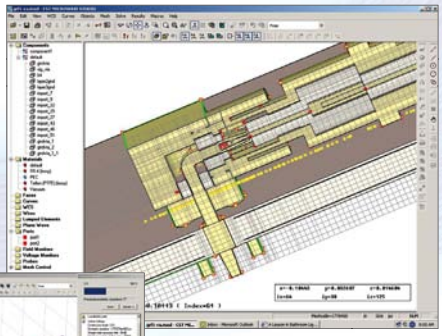
Signal Integrity Center

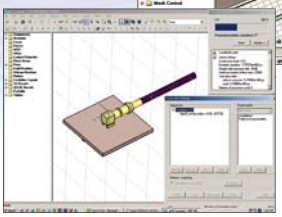
Samtec's online Signal Integrity Center is a comprehensive, user-friendly web site for high speed connector models, reports, drawings and specifications, including:

- Application Notes: reference designs that verify performance to industry standards
- FINAL INCH® reference designs that save design, development and validation time and resources
- "On-Request" FINAL INCH® Test Data
- Test Reports & Models for Simulation
  - PADS, Gerber and DXF files
  - Spice, IBIS Models
  - High Speed Characterization Reports
- Product information
  - 3D Models
  - Prints
  - Product Searches
  - Material Specifications
  - Processing Guidelines
  - Samples
- Interactive Cable Builder
- Bandwidth Performance Selector
- White Papers and Articles concerning Samtec products and advances





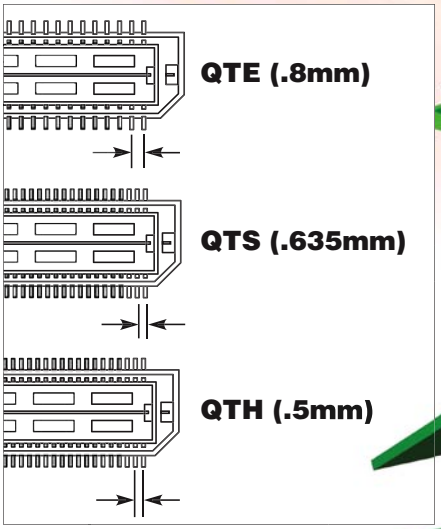


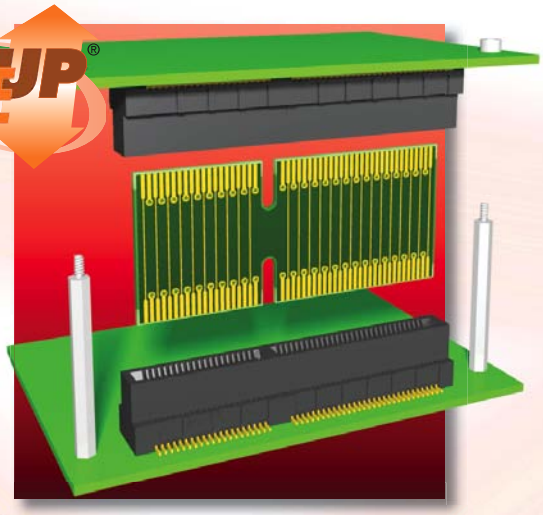


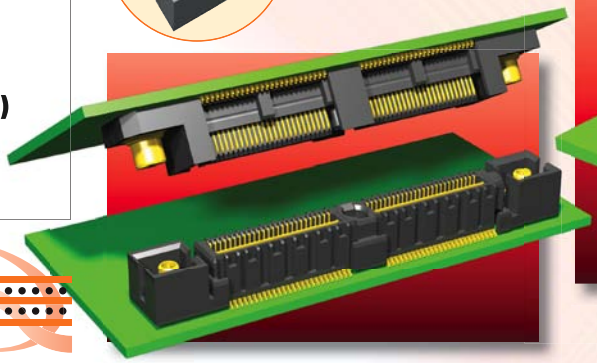
High Speed Interconnect Solutions

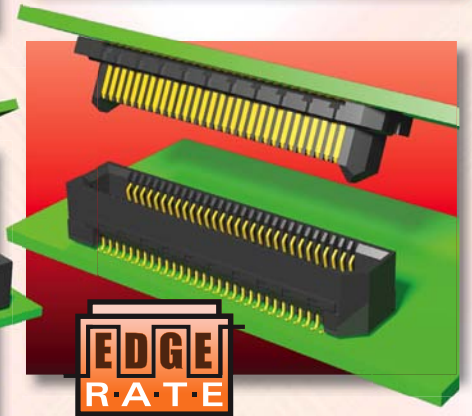
High Speed Interfaces

- Shielded and Rugged Systems
- Rugged Edge Rate™ System
- Mixed Technology Footprint
- Horizontal & Perpendicular Interfaces
- Edge Mount & Right Angle
- High Speed Elevated Board-to-Board
- Elevated Riser Card Systems
- High Speed Card Interfaces



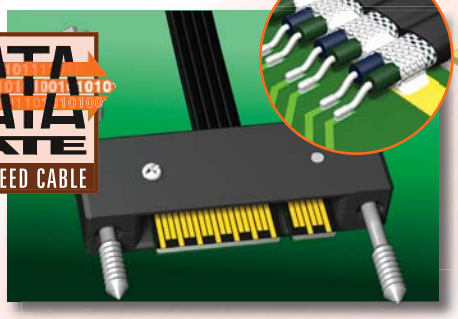


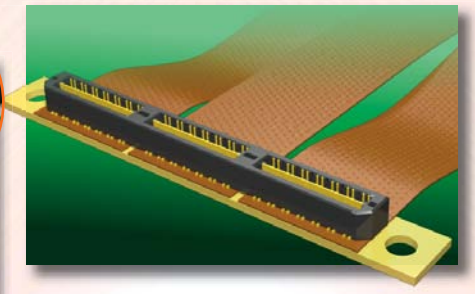


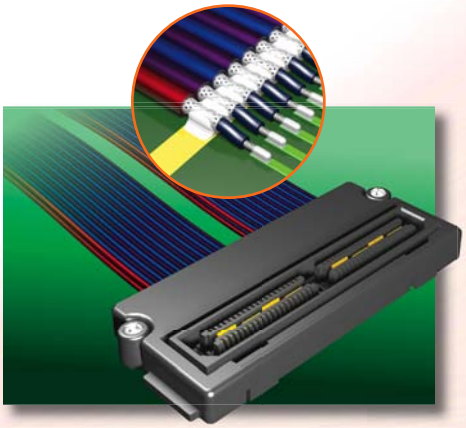


Data Rate™ Cable & High Speed Flex

- Twinax Data Rate™ Cable
- Micro Coax Data Rate™ Cable
- High Speed Flex
- Data Links







Data Rate™ Cable Assemblies

Series	Pitch/System	Mates
EEDP	.8mm/100Ω	HSEC8
6QDPS	.635mm/100Ω	QMSS, QFSS (DP)
6QDP	.635mm/100Ω	QMS, QFS (DP)
EQDP	.8mm/100Ω	QTE, QSE (DP)
HQDP	.5mm/100Ω	QTH, QSH (DP)
MICD	.635mm/50Ω	MIT, MIS
SQCD	.635mm/50Ω	QTS, QSS
HQCD	.5mm/50Ω	QTH, QSH
EQCD	.8mm/50Ω	QTE, QSE
HBCD	.5mm/50Ω	BTH, BSH
EQSD	.8mm/75Ω	QTE, QSE

High Speed Flex Assemblies

Series	Type	Mates
SADL	High Density	SEAM, SEAF
HFHM	.5mm Q Series®	QTH, QSH (DP)
HFHM2	.5mm Q Series®	QTH, QSH (SE or DP)
HFEM	.8mm Q Series®	QTE, QSE (SE or DP)
HFEM2	.8mm Q Series®	QTE, QSE (SE or DP)
ZFHF	ZIF/Q Series®	QSE (DP), ZF5
HSF8	Edge Card	HSEC8
TFMDL	.050" Tiger Eye™	SFM, TFM
FSIF	1mm Compression	FSI-03-SD

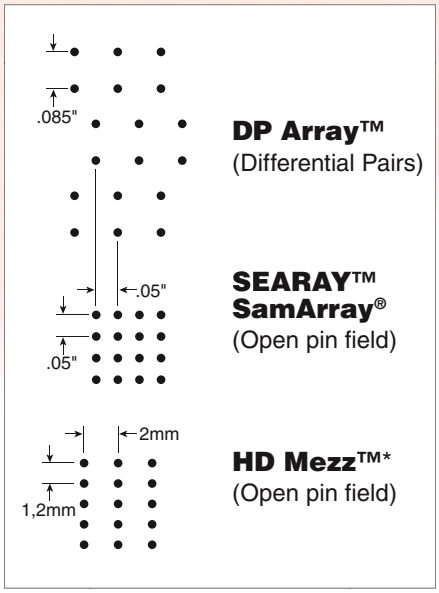
Contact the Signal Integrity Group at: sig@samtec.com for more information.

For product information go to: www.samtec.com

High Speed Interconnect Solutions

High Density Arrays

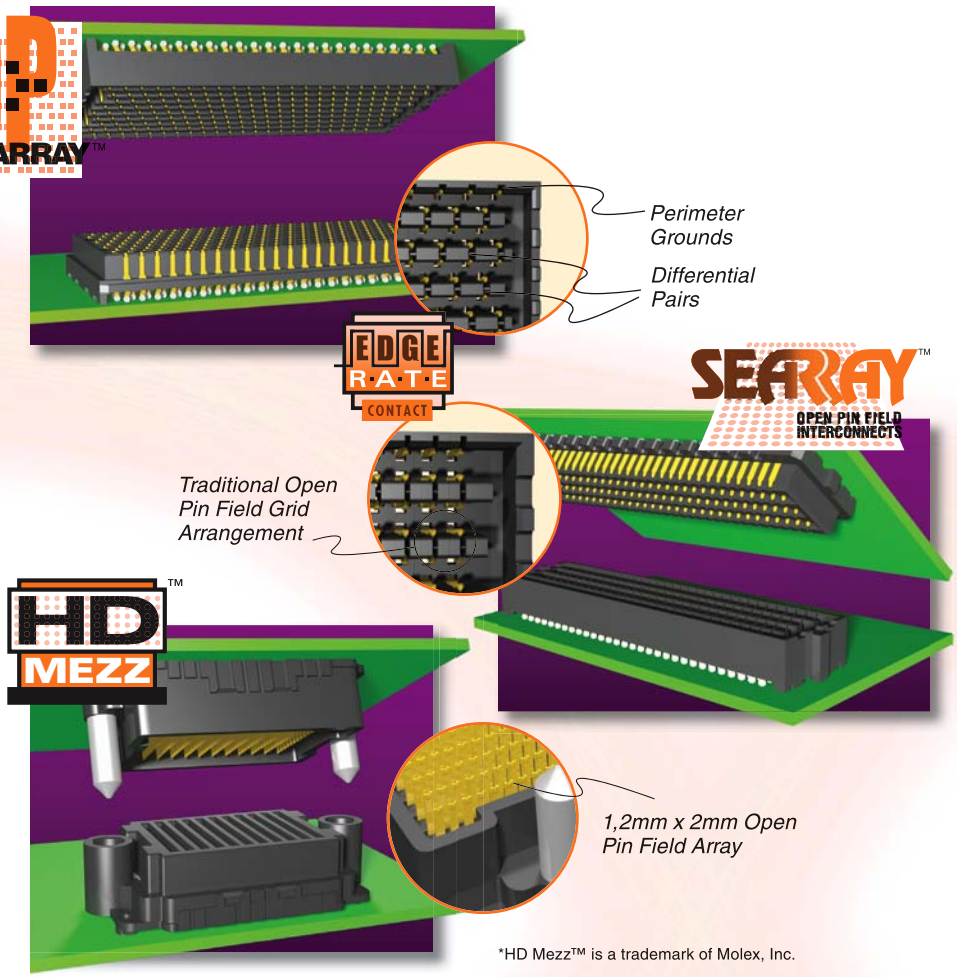
- Open Pin Field
- Differential Pair Signaling
- Edge Mount & Right Angle High Density Arrays
- Elevated High Density Arrays



DP Array™
(Differential Pairs)

SEARAY™ SamArray®
(Open pin field)

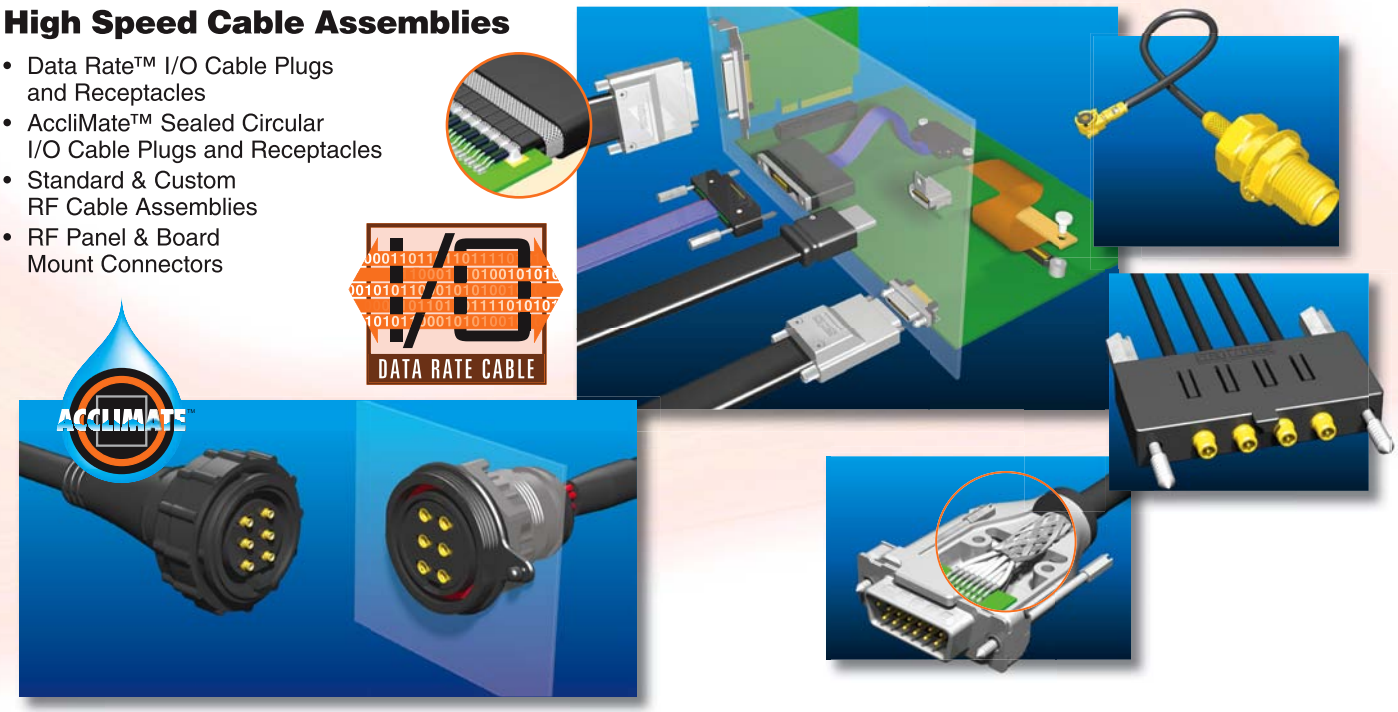
HD Mezz™*
(Open pin field)



*HD Mezz™ is a trademark of Molex, Inc.

High Speed Cable Assemblies

- Data Rate™ I/O Cable Plugs and Receptacles
- AccliMate™ Sealed Circular I/O Cable Plugs and Receptacles
- Standard & Custom RF Cable Assemblies
- RF Panel & Board Mount Connectors



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