

tyco

Electronics

High Speed Backplane Connectors

Catalog 1773095 Issued 4-05

AMP

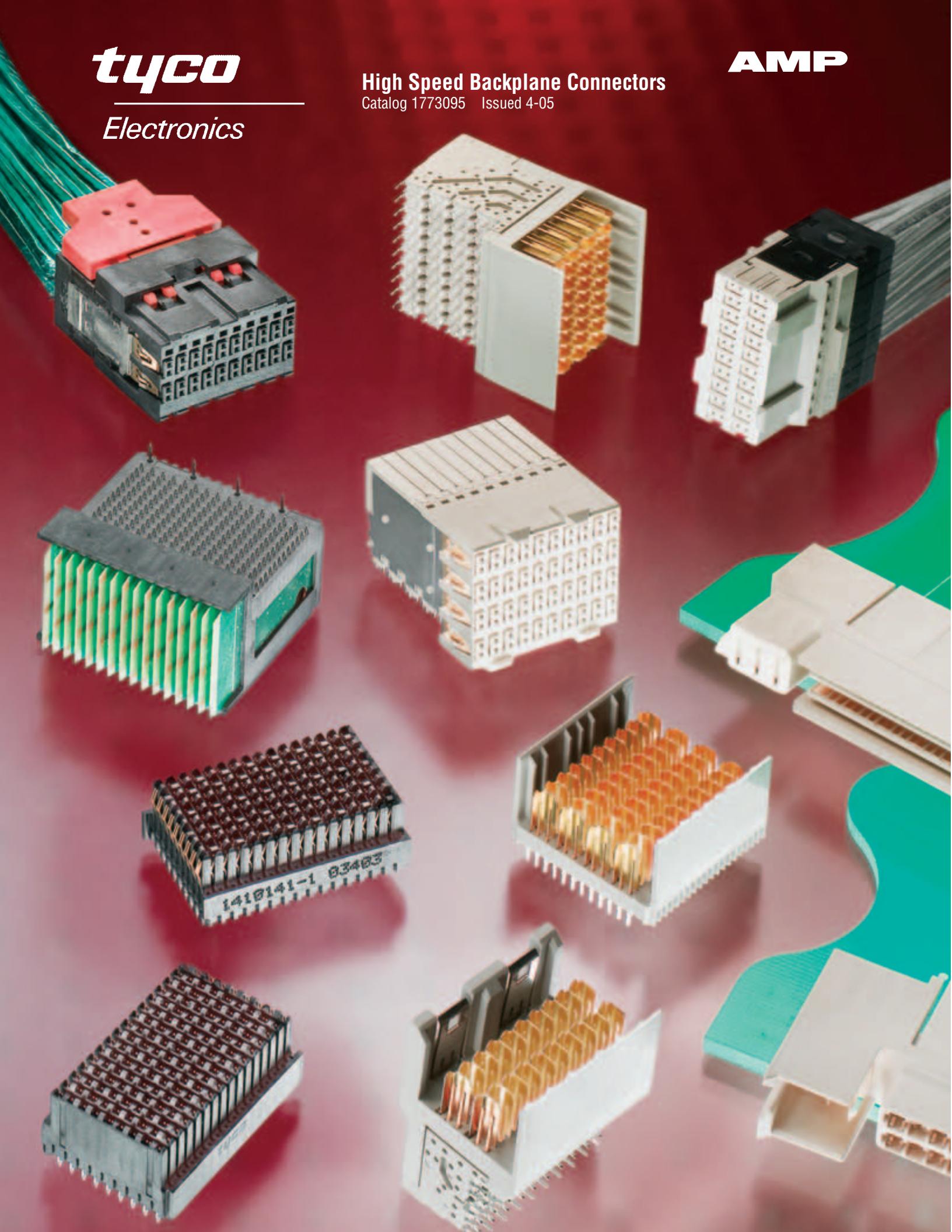


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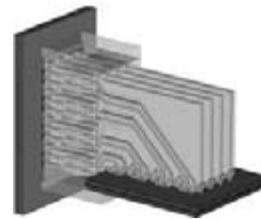
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Signal Integrity Services: Taking SI to the Next Level

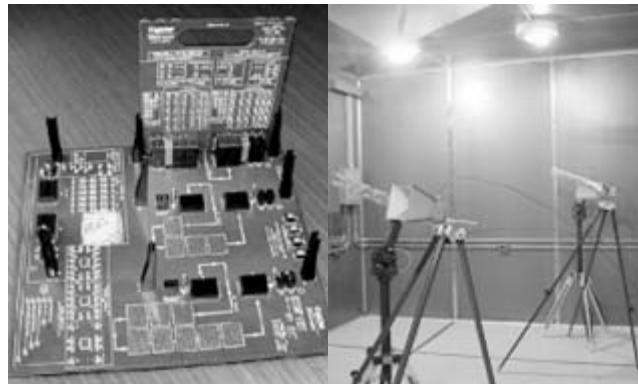
Solutions

Our goal is to apply system-level expertise to design, simulate, and verify a system to meet your performance goals. We have completed hundreds of system designs and have years of experience in system layout, design, simulation and product selection. Our modeling skills and techniques are second to none with an extensive library of Tyco Electronics product models ready to go to work on your design.



Simulation

Tyco Electronics' Signal Integrity engineers use a very sophisticated suite of tools to provide accurate connector and system models to 20 GHz and beyond. Whether we are analyzing a connector or an entire system, Tyco Electronics has the tools and expertise to get the right answer. Our tool suite includes 2D and 3D full-wave analysis, with solutions in both the time and frequency domains.



Models

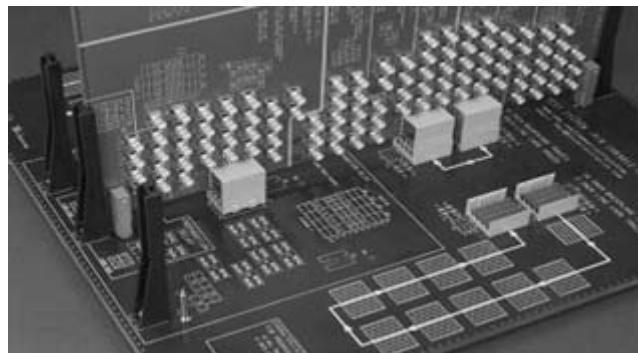
Tyco Electronics provides a variety of tools to aid customers in their design:

- SPICE single-line and multi-line models
- S-parameter models
- Customer evaluation boards using realistic system implementations
- Electrical Performance Reports (EPRs) with information on many high speed products.



Testing

With measurement capabilities beyond 10 Gb/s and 50 GHz, Tyco Electronics can characterize and provide detailed measurements of various products. Measurements of a product within a system, including measurements from silicon companies that have teamed with Tyco Electronics, can be invaluable to assure the successful implementation of a design.



For more info:

models@tycoelectronics.com

simulation@tycoelectronics.com

www.tycoelectronics.com/products/simulation/

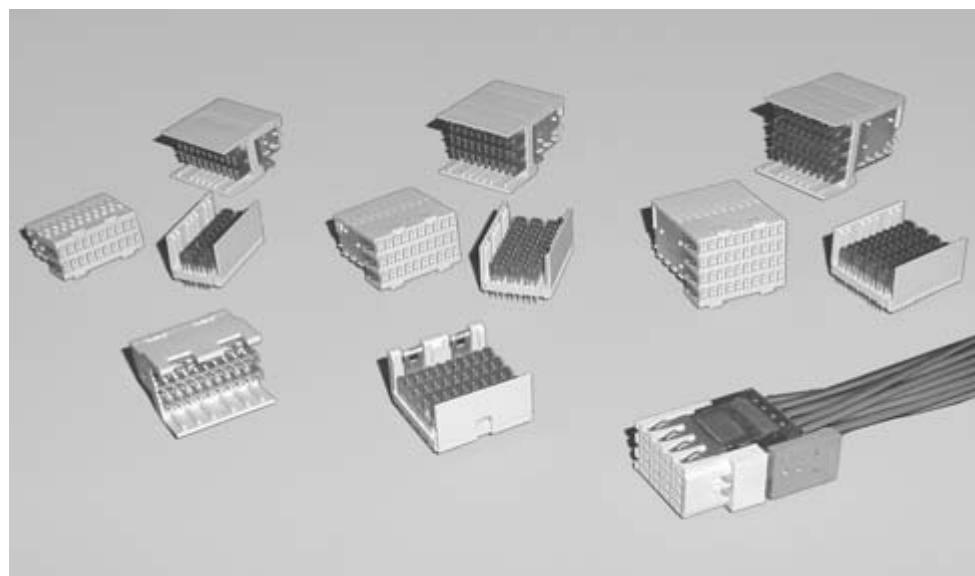
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Product Facts

- Z-PACK HM-Zd Connector is an extension of the Z-PACK 2mm HM product line
- Designed specifically for high speed differential applications
- A modular connector system with a standard module size of 25.00 [.984]
- Contact pitch is 1.50 [.059] within a pair and 3.00 [.118] pair to pair within a column; column to column pitch is 2.50 [.098]
- Card Pitch is less than 20.32 [.800] for 2 pair and 3 pair headers and 25.40 [1.000] for 4 pair headers
- Available in three versions:
 - 2 signal contact pairs per column (20 pairs per 25.00 [.984]) compatible with 5 row Z-PACK 2mm HM Connector
 - 3 signal contact pairs per column (30 pairs per 25.00 [.984])
 - 4 signal contact pairs per column (40 pairs per 25.00 [.984]) compatible with 8 row Z-PACK 2mm HM Connector
- Available in vertical and right angle press fit pin headers and right angle and vertical press fit receptacles
- Optimized footprint for improved electrical performance and ease of trace routing (unobstructed routing channels on both daughtercard and backplane)
- Pin header and receptacle have the exact same footprint to simplify PC board layout
- Designed to meet Telcordia requirements
- Recognized under the Component Program of Underwriters Laboratories Inc., File No. E28476

High Speed Backplane Connectors

Z-PACK HM-Zd Product Line Overview

The Z-PACK HM-Zd Connector System is a high speed, differential connector system, which is compatible with the Z-PACK 2mm HM Connector Line. Z-PACK HM-Zd Connector provides Z-PACK 2mm HM Connector users with a migration path for serial

switching applications from 3.125 Gb/s to 10+ Gb/s.

The Z-PACK HM-Zd Connector System features a highly reliable dual beam contact system with fully encompassing grounds dedicated to each differential pair. In addition, the Z-PACK HM-Zd Connector

footprint is optimized for both routability and system performance with the use of a 1.50 x 2.50 [.059 x .098] row to column grid. The connector design features a robust mating interface with integral prealignment and polarization built into the mating interface.

Availability

Fully validated SPICE models: E-mail requests to modeling@tycoelectronics.com

Samples: go to <http://tycoelectronics.custhelp.com>

Pro/E models and IGES models: E-mail requests to TycoCAD@tycoelectronics.com

White Papers: available on product website at <http://hmzd.tycoelectronics.com>

Electrical Performance Report: <http://hmzd.tycoelectronics.com>
EPR #20GC014

Routing Guide: <http://hmzd.tycoelectronics.com>

Routing Guide #20GC015-1

<http://hmzd.tycoelectronics.com>

Technical Documents

Product Specification
108-2055

Application Specification
114-13059

Qualification Test Report
501-568

Material and Finish

Contact Area Finish — 0.80 μ m Au min. over 1.3 μ m Ni min.

Compliant Pin Finish — 0.8 μ m SnPb min. over 1.3 μ m Ni min.

Contact Material — Copper Alloy

Housing Material — Glass filled polyester, 94V-0 rated

Ratings

Current — 0.7A per signal contact, fully energized 2A per shield, all shields energized

Operating Voltage —

500 VAC maximum, signal to signal
250 VAC maximum, signal to ground

Temperature — -65°C to 105°C

Mating Force — 0.38N maximum per contact (signal = 1 contact, ground = 1 contact)

Durability — 250 cycles

* Reference Product Spec. 108-2055 for complete list of performance data.

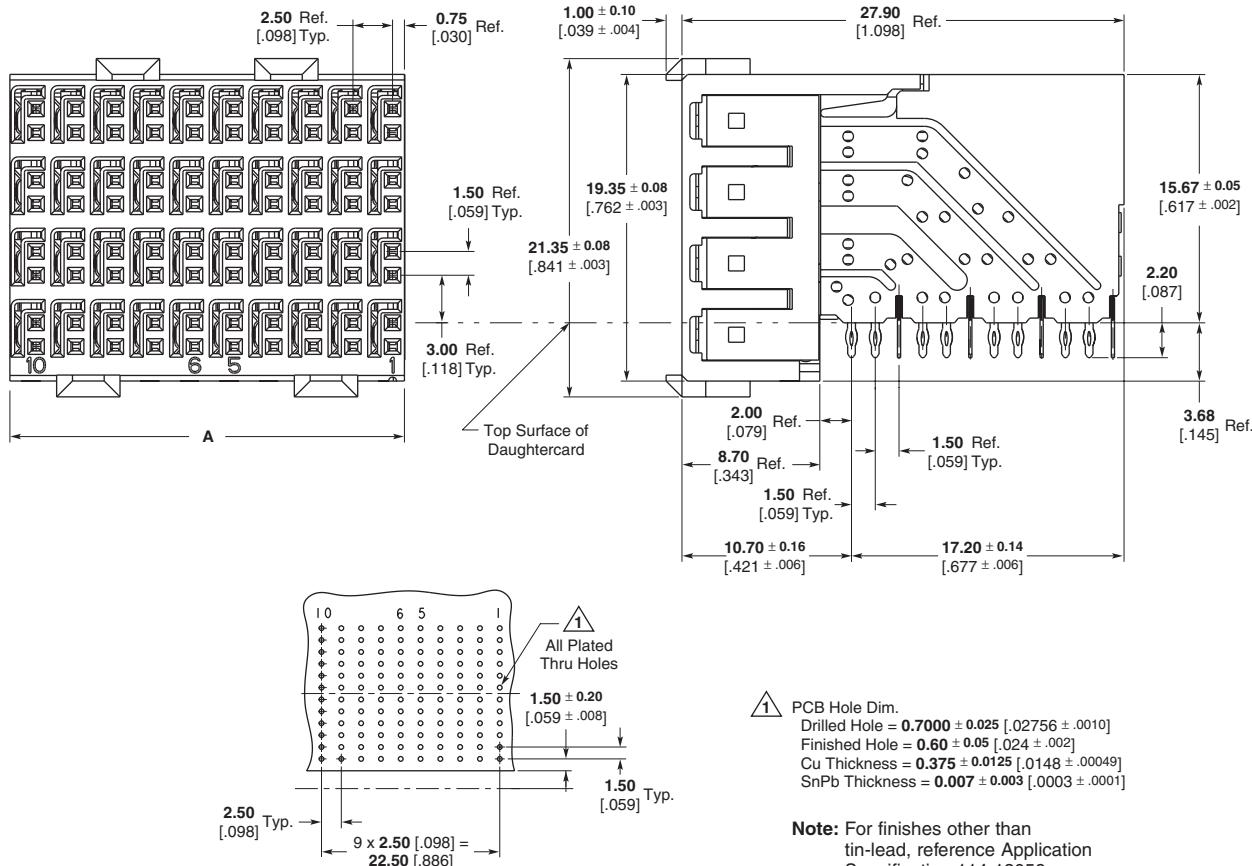


4 Pair Right Angle Receptacle Assemblies

1

Z-PACK HM-Zd Connector

Z-PACK HM-Zd Connector

Recommended PC Board Layout
Daughter Board, Component Side Shown

1 PCB Hole Dim.
Drilled Hole = **0.7000 ± 0.025** [**.02756 ± .0010**]
Finished Hole = **0.60 ± 0.05** [**.024 ± .002**]
Cu Thickness = **0.375 ± 0.0125** [**.0148 ± .00049**]
SnPb Thickness = **0.007 ± 0.003** [**.0003 ± .0001**]

Note: For finishes other than tin-lead, reference Application Specification 114-13059.

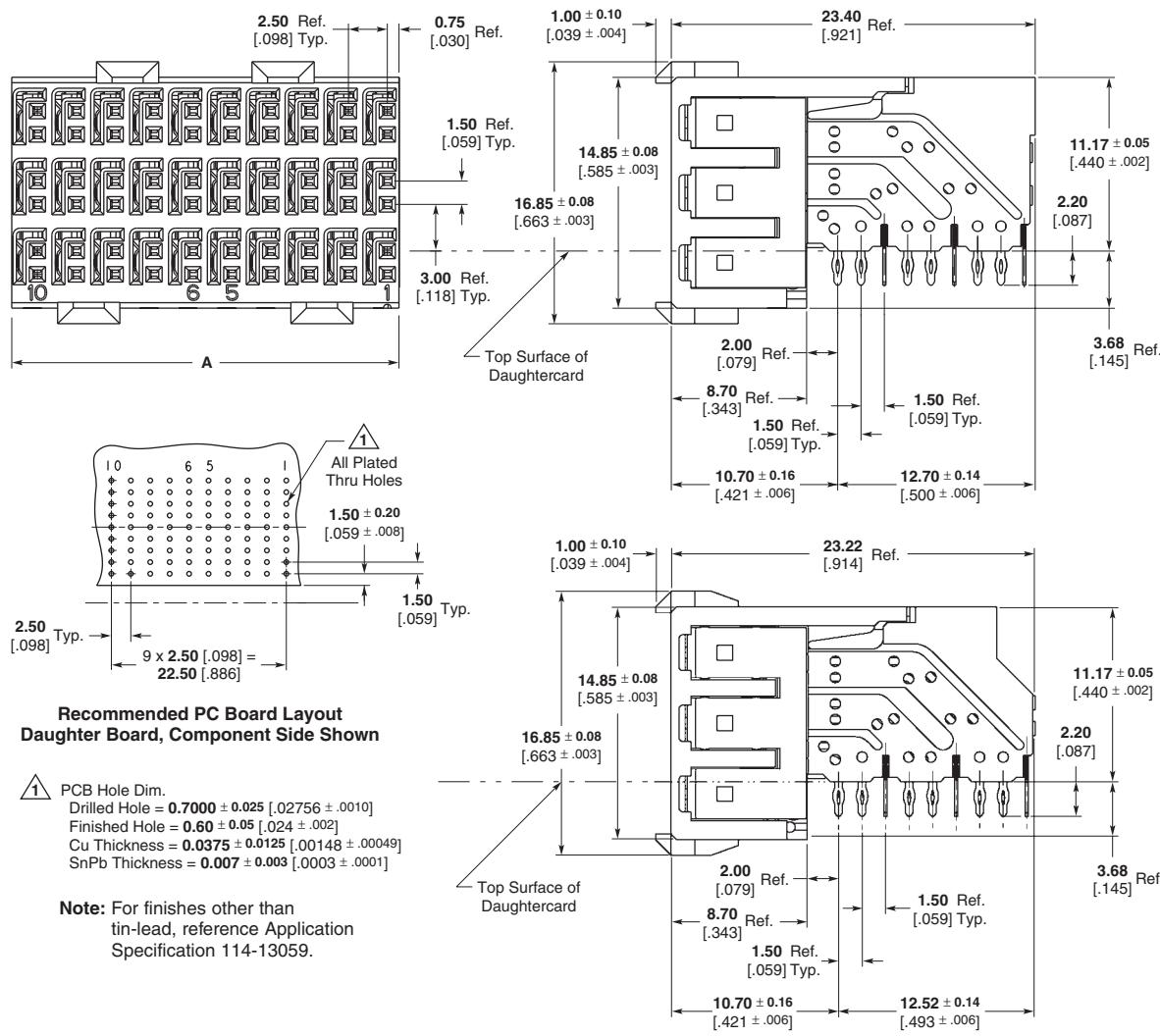
Part Number	Column Count	Module Length (Dim. A)	Signals	Grounds	Application Tooling ²		
					Insertion Receptacle	Housing Removal	Repair Chiclet Removal
1469001-11	10	25.00 .984	80	40	91347-1	1583224-1	1583248-1
1469286-1	12	30.00 1.181	96	48	91347-3	1583224-2	1583248-1
1469294-1	15	37.50 1.476	120	60	91347-2	1583224-3	1583248-1
1469061-1	20	50.00 1.969	160	80	91347-4	1583224-4	1583248-1

1 AdvancedTCA Zone 2 Daughtercard Connector.

2 See page 43 for Instruction Sheet Number.

3 Pair Right Angle Receptacle Assemblies

Z-PACK HM-Zd Connector (Continued)



Part Number	Column Count	Module Length (Dim. A)	Signals	Grounds	Application Tooling ²		
					Insertion Receptacle	Housing Removal	Chiclet Removal
1469081-1	10	25.00 .984	60	30	91376-1	1583224-1	1673952-1
1469514-11	10	25.00 .984	60	30	91376-1	1583224-1	1673952-1

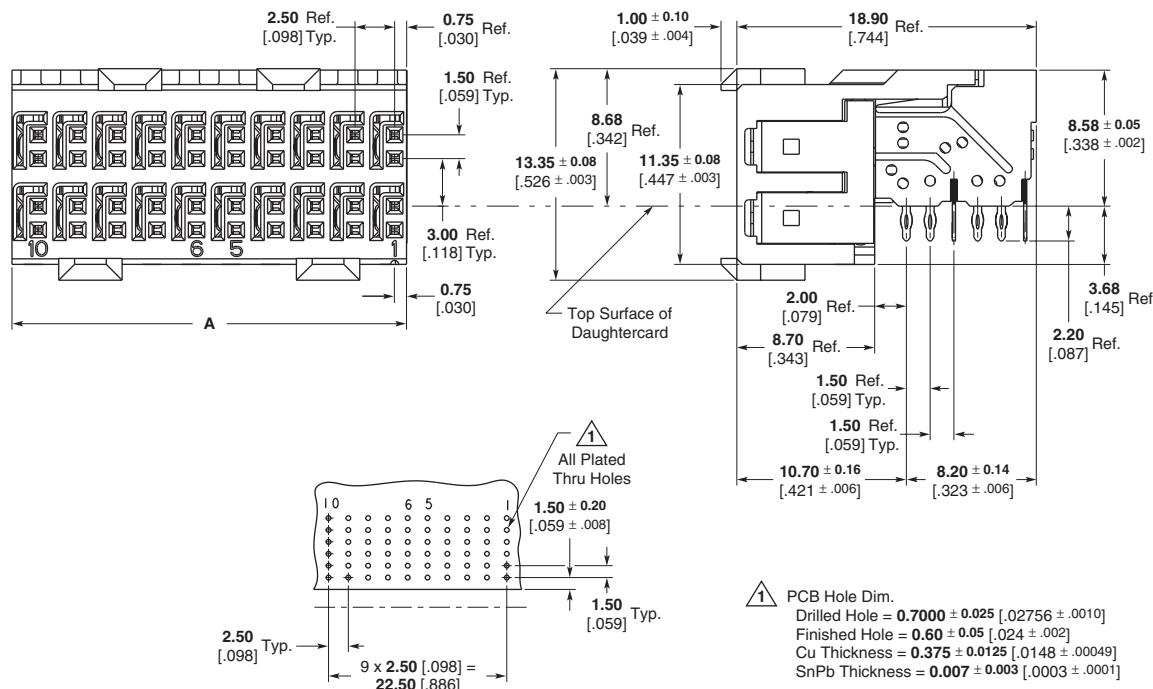
¹ For CompactPCI and AdvancedTCA PMC Applications.² See page 43 for Instruction Sheet Number.

2 Pair Right Angle Receptacle Assemblies

Z-PACK HM-Zd Connector (Continued)

1

Z-PACK HM-Zd Connector

Recommended PC Board Layout
Daughter Board, Component Side Shown

1 PCB Hole Dim.
Drilled Hole = 0.7000 ± 0.025 [0.02756 ± .0010]
Finished Hole = 0.60 ± 0.05 [0.024 ± .002]
Cu Thickness = 0.375 ± 0.0125 [0.0148 ± .00049]
SnPb Thickness = 0.007 ± 0.003 [0.0003 ± .0001]

Note: For finishes other than tin-lead, reference Application Specification 114-13059.

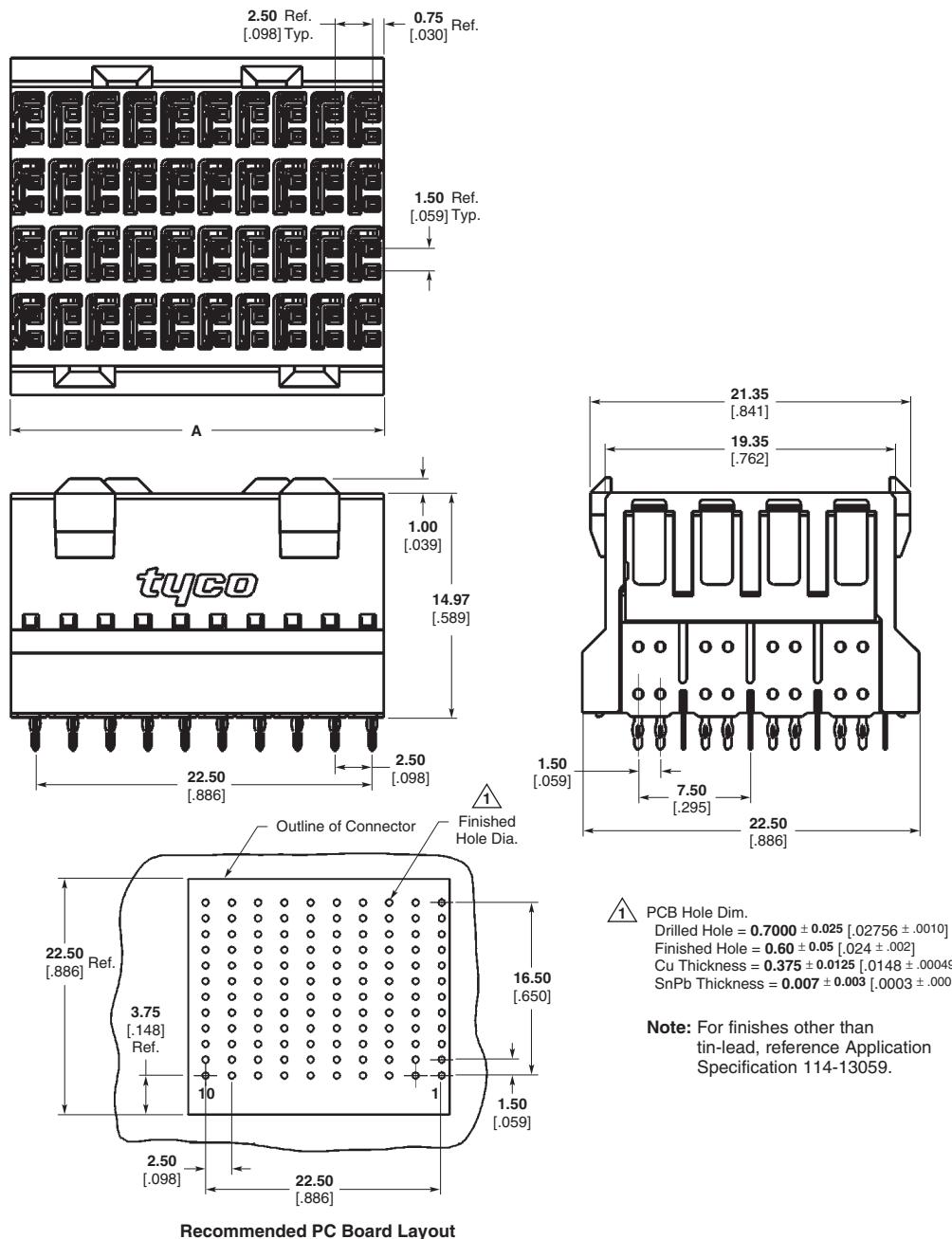
Part Number	Column Count	Module Length (Dim. A)	Signals	Grounds	Application Tooling ¹		
					Insertion Receptacle	Housing Removal	Repair Chisel Removal
1469028-1	10	25.00 .984	40	20	91350-1	1583224-1	1583249-1
1469077-1	20	50.00 1.969	80	40	91350-2	1583224-4	1583249-1

¹ See page 43 for Instruction Sheet Number.

4 Pair Vertical Receptacle Assemblies

High Speed Backplane Connectors

Z-PACK HM-Zd Connector (Continued)



Recommended PC Board Layout

Part Number	Column Count	Module Length (Dim. A)	Signals	Grounds	Application Tooling ¹	
					Insertion Receptacle	Repair Housing Removal
1469362-1*	10	25.00 .984	80	40	1804401-1	1804402-1

¹ See page 43 for Instruction Sheet Number.

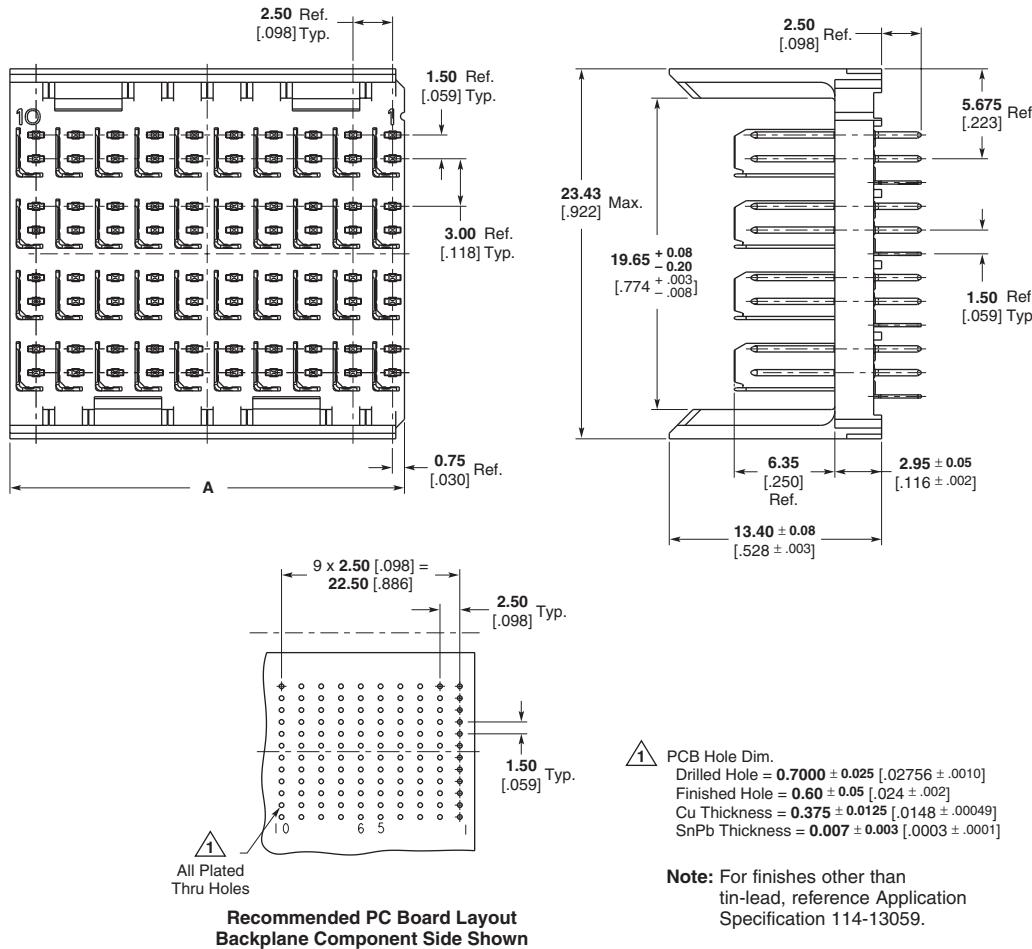
* RoHS Compliant.

4 Pair
Vertical Pin Header
Assemblies

Z-PACK HM-Zd Connector (Continued)

1

Z-PACK HM-Zd Connector

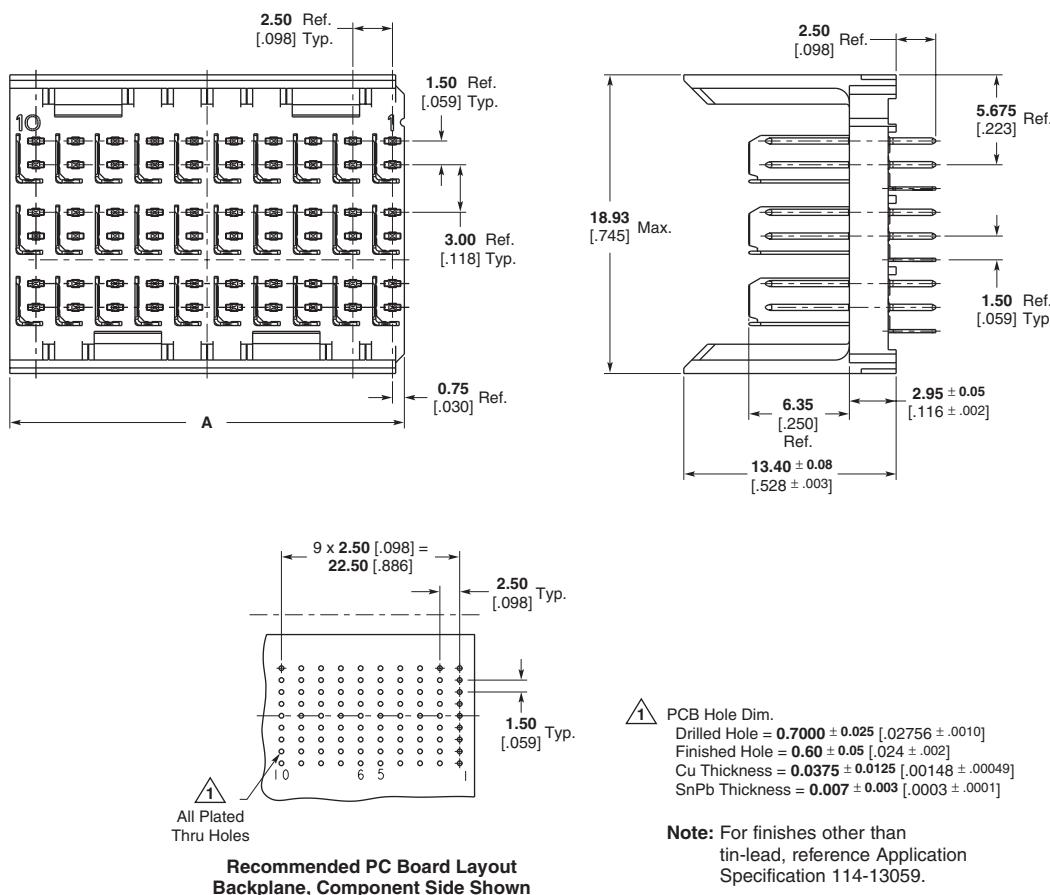


1 PCB Hole Dim.
Drilled Hole = **0.7000 ± 0.025** [**.02756 ± .0010**]
Finished Hole = **0.60 ± 0.05** [**.024 ± .002**]
Cu Thickness = **0.375 ± 0.0125** [**.0148 ± .00049**]
SnPb Thickness = **0.007 ± 0.003** [**.0003 ± .0001**]

Note: For finishes other than tin-lead, reference Application Specification 114-13059.

Part Number	Tail Length	Mating Pin Length	Column Count	Module Length (Dim. A)	Signals	Grounds	Application Tooling ³			
							Insertion	Repair		
							Pin Header	Pin Removal	Housing Removal	Pin Insertion
1469002-1 ¹	2.50 .098	5.30 .209	10	25.00 .984	80	40	91349-1	1583237-1	1583220-1	1583255-1
1469046-12	2.50 .098	5.30 .209	10	25.00 .984	80	40	91349-1	1583237-1	1583220-1	1583255-1
1469074-1	1.80 .071	5.30 .209	10	25.00 .984	80	40	91349-1	1583237-1	1583220-1	1583255-1
1469287-1	2.50 .098	5.30 .209	12	30.00 1.181	96	48	91349-3	1583237-1	1583220-1	1583255-1
1469296-1	2.50 .098	5.30 .209	15	37.50 1.476	120	60	91349-2	1583237-1	1583220-1	1583255-1
1469062-1	2.50 .098	5.30 .209	20	50.00 1.969	160	80	91349-4	1583237-1	1583220-1	1583255-1
1469099-1	1.80 .071	5.30 .209	20	50.00 1.969	160	80	91349-4	1583237-1	1583220-1	1583255-1

¹ AdvancedTCA Zone 2 Backplane Connector.² Shallow Wall for Daughtercards thicker than 3.50 [.138].³ See page 43 for Instruction Sheet Number.

**3 Pair
Vertical Pin Header
Assemblies**
Z-PACK HM-Zd Connector (Continued)


PCB Hole Dim.
 Drilled Hole = **0.7000 ± 0.025** [.02756 ± .0010]
 Finished Hole = **0.60 ± 0.05** [.024 ± .002]
 Cu Thickness = **0.0375 ± 0.0125** [.00148 ± .00049]
 SnPb Thickness = **0.007 ± 0.003** [.0003 ± .0001]

Note: For finishes other than tin-lead, reference Application Specification 114-13059.

Part Number	Tail Length	Mating Pin Length	Column Count	Module Length (Dim. A)	Signals	Grounds	Application Tooling ¹			
							Insertion Pin Header	Repair Pin Removal	Housing Removal	Pin Insertion
1469083-1	2.50 .098	5.30 .209	10	25.00 .984	60	30	91375-1	1583237-1	1725634-1	1583255-1
1469085-1	1.80 .071	5.30 .209	10	25.00 .984	60	30	91375-1	1583237-1	1725634-1	1583255-1

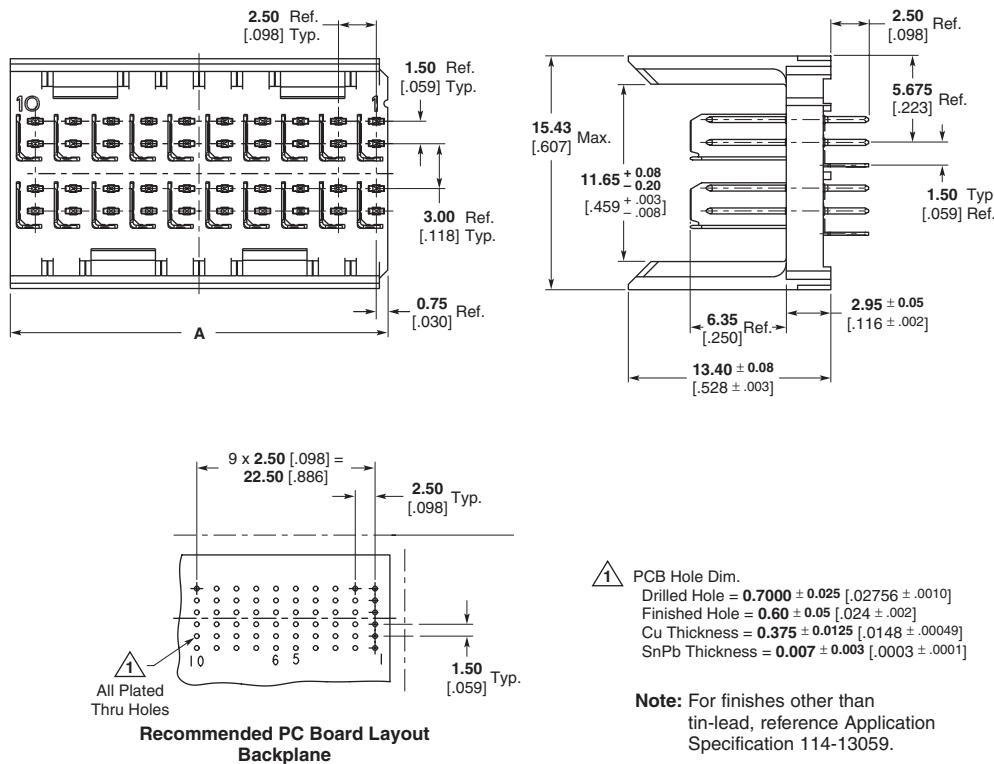
¹ See page 43 for Instruction Sheet Number.

2 Pair
Vertical Pin Header
Assemblies

Z-PACK HM-Zd Connector (Continued)

1

Z-PACK HM-Zd Connector



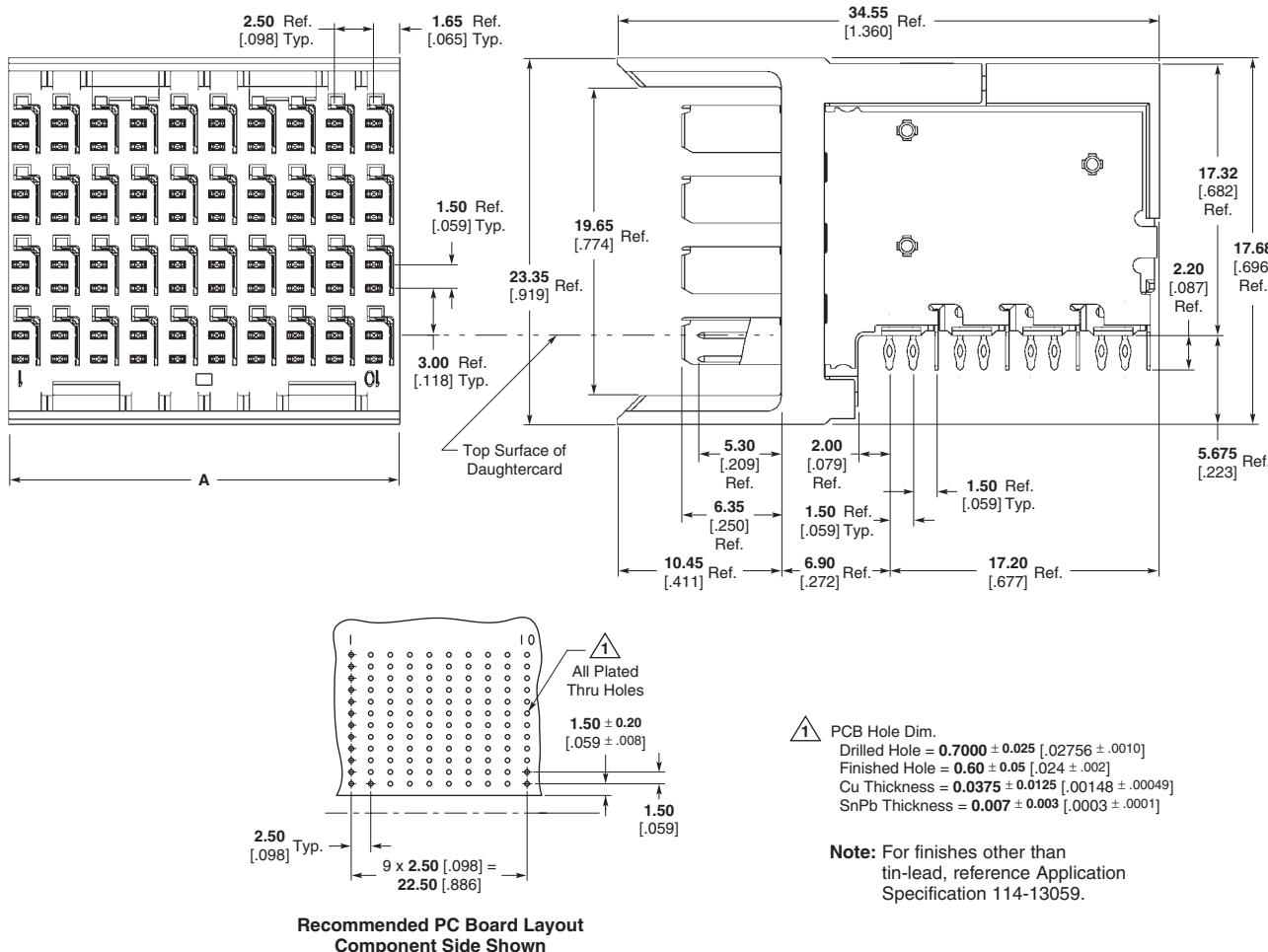
1 PCB Hole Dim.
 Drilled Hole = **0.7000 ± 0.025** [.02756 ± .0010]
 Finished Hole = **0.60 ± 0.05** [.024 ± .002]
 Cu Thickness = **0.375 ± 0.0125** [.0148 ± .00049]
 SnPb Thickness = **0.007 ± 0.003** [.0003 ± .0001]

Note: For finishes other than
tin-lead, reference Application
Specification 114-13059.

Part Number	Tail Length	Mating Pin Length	Column Count	Module Length (Dim. A)	Signals	Grounds	Application Tooling ¹			
							Insertion Pin Header	Repair Pin Removal	Housing Removal	Pin Insertion
1469025-1	2.50 .098	5.30 .209	10	25.00 .984	40	20	91348-1	1583237-1	1583234-1	1583255-1
1469076-1	1.80 .071	5.30 .209	10	25.00 .984	40	20	91348-1	1583237-1	1583234-1	1583255-1
1469078-1	2.50 .098	5.30 .209	20	50.00 1.969	80	40	91348-4	1583237-1	1583234-1	1583255-1
1469101-1	1.80 .071	5.30 .209	20	50.00 1.969	80	40	91348-4	1583237-1	1583234-1	1583255-1

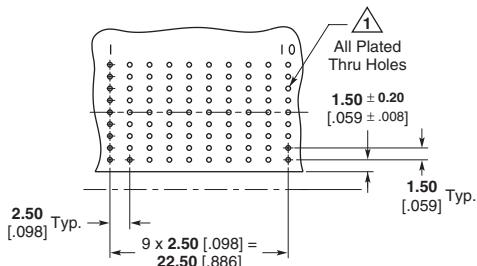
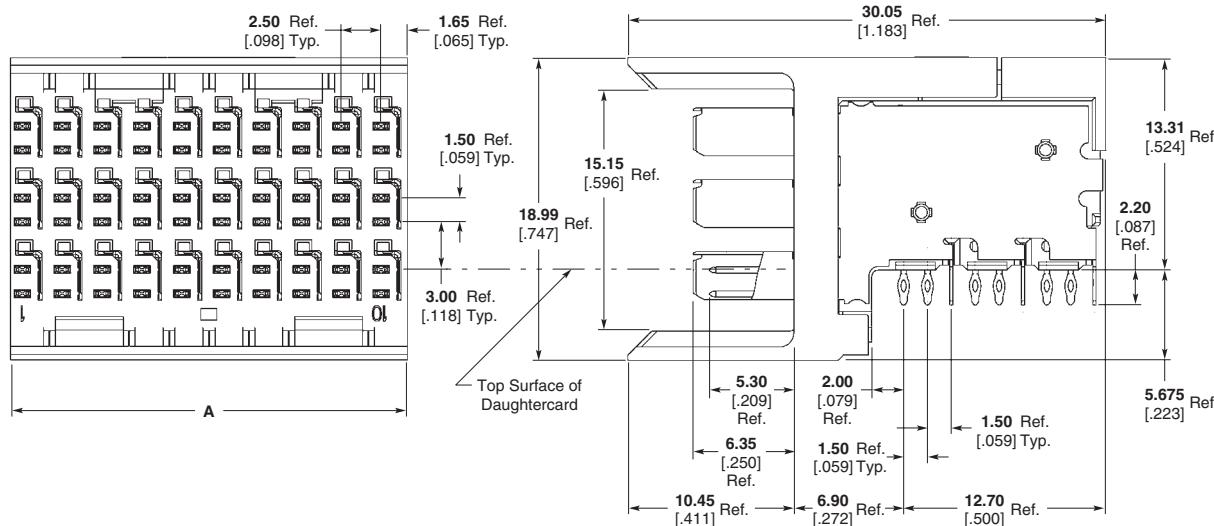
¹ See page 43 for Instruction Sheet Number.

Z-PACK HM-Zd Connector (Continued)

4 Pair
Right Angle Pin Header
AssembliesRecommended PC Board Layout
Component Side Shown

Part Number	Tail Length	Mating Pin Length	Column Count	Module Length (Dim. A)	Signals	Grounds	Application Tooling ¹		
							Insertion Pin Header	Housing Removal	Repair Chiclet Removal
1469048-1	2.20 .087	5.30 .209	10	25.00 .984	80	40	91378-1	1804174-1	1804177-1
1469375-1	2.20 .087	5.30 .209	12	30.00 1.181	96	48	91378-3	1804174-1	1804177-1

¹ See page 43 for Instruction Sheet Number.

**3 Pair
Right Angle Pin Header
Assemblies**

**Recommended PC Board Layout
Component Side Shown**

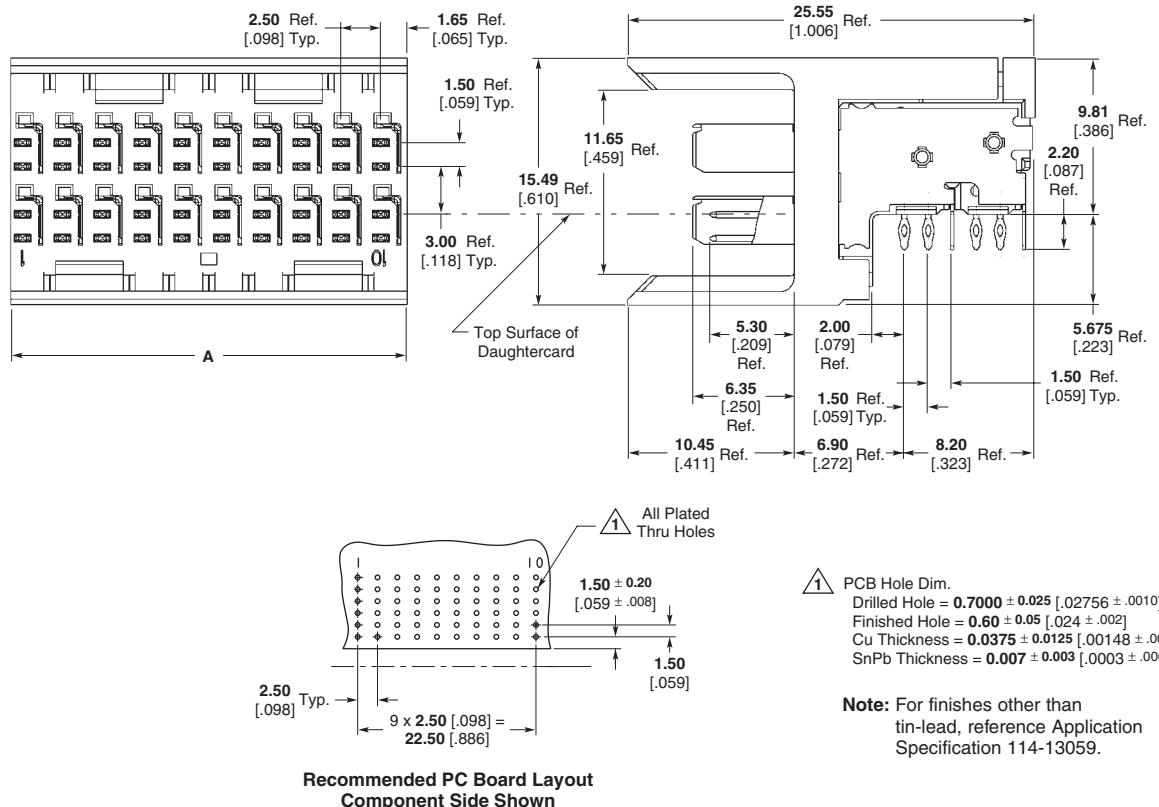
1 PCB Hole Dim.
Drilled Hole = 0.7000 ± 0.025 [.02756 ± .0010]
Finished Hole = 0.60 ± 0.05 [.024 ± .002]
Cu Thickness = 0.0375 ± 0.0125 [.00148 ± .00049]
SnPb Thickness = 0.007 ± 0.003 [.0003 ± .0001]

Note: For finishes other than tin-lead, reference Application Specification 114-13059.

Part Number	Tail Length	Mating Pin Length	Column Count	Module Length (Dim. A)	Signals	Grounds	Application Tooling ¹		
							Insertion Pin Header	Housing Removal	Repair Chiclet Removal
1469183-1	2.20 .087	5.30 .209	10	25.00 .984	60	30	1804179-1	1804173-1	1804176-1

¹ See page 43 for Instruction Sheet Number.

Z-PACK HM-Zd Connector (Continued)

2 Pair
Right Angle Pin Header
Assemblies

Part Number	Tail Length	Mating Pin Length	Column Count	Module Length (Dim. A)	Signals	Grounds	Application Tooling ¹		
							Insertion Pin Header	Repair	
								Housing Removal	Chiclet Removal
1469169-1	2.20 .087	5.30 .209	10	25.00 .984	40	20	91377-1	1804171-1	1804175-1

¹ See page 43 for Instruction Sheet Number.

Power and Guide Hardware**Universal Power Module
Vertical Receptacle (3 Pos.)**

The Tyco Electronics Universal Power Module is a three position, modular, Hard Metric board-to-board power connector designed to be compatible with Z-PACK 2mm HM Connectors. The design is in an "inverse-sex" orientation and the vertical receptacle module meets the IEC 950 safety requirements for finger probe protection.

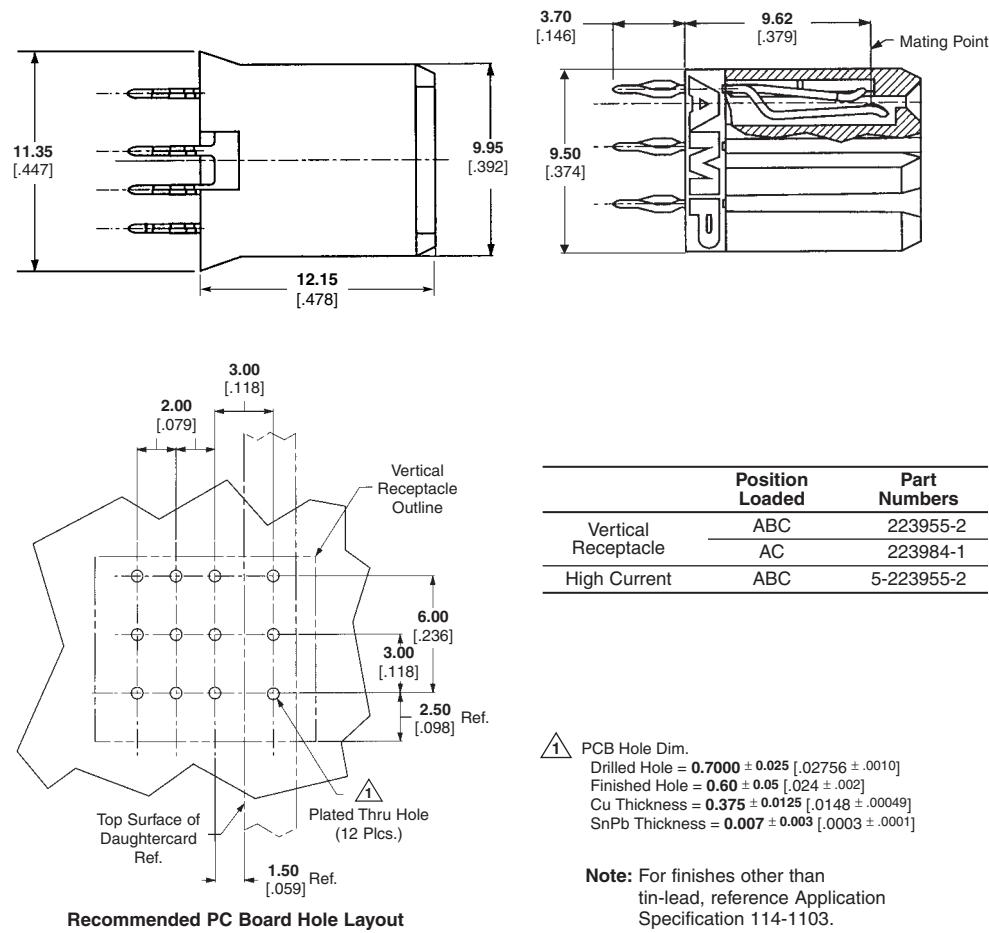
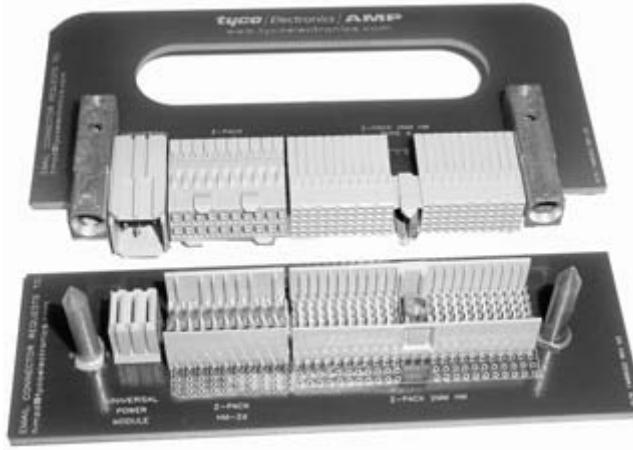
Both the headers and receptacle utilize Tyco Electronics ACTION PIN press-fit leads for ease of assembly onto printed circuit boards. Additionally, the vertical receptacle leads are polarized to allow only one orientation onto the printed circuit board, eliminating the possibility of reverse placement.

The Universal Power Module is compatible with a wide variety of other Tyco Electronics board-to-board connectors including Z-PACK HS3, Z-PACK HM-Zd, Z-PACK Strip-line 100, AMP-HDI, TBC, TBC Plus and Eurocard connectors.

The housings are thermoplastic and the contacts are offered in either a standard or high current copper alloy. Contact finish is gold over nickel on the mating surfaces. The contacts are designed to carry 10 amperes per contact in standard assemblies and 15 amperes per contact in the high current assemblies. Actual values may vary depending upon connector size, board design, etc.

The right angle header contacts are available with sequenced lengths for "make-first/break-last" applications.

Generous alignment features designed into the housings and optional guide pins and receptacles make the Tyco Electronics Universal Power Module ideal for "blind mating" applications.



Power and Guide Hardware (Continued)

Expanded Universal Power Module Vertical Receptacles

Material and Finish

Housing — Polyester, gray

Contact — Copper alloy, plated 0.00127 [.000050] min. gold in mating area, 0.00050 [.000020] min. tin-lead on ACTION PIN area, with entire contact underplated 0.00127 [.000050] min. nickel

Note: Contact lubrication with Bellcore approved lubricant

Related Product Data

Guiding Hardware (Optional) —
pages 21-23

Application Tooling

Header

Seating Tool, 224441-1
Board Support Fixture, 224442-1

Receptacle

Seating Tool, 224421-1
Board Support Fixture, 217602-1

Technical Documents

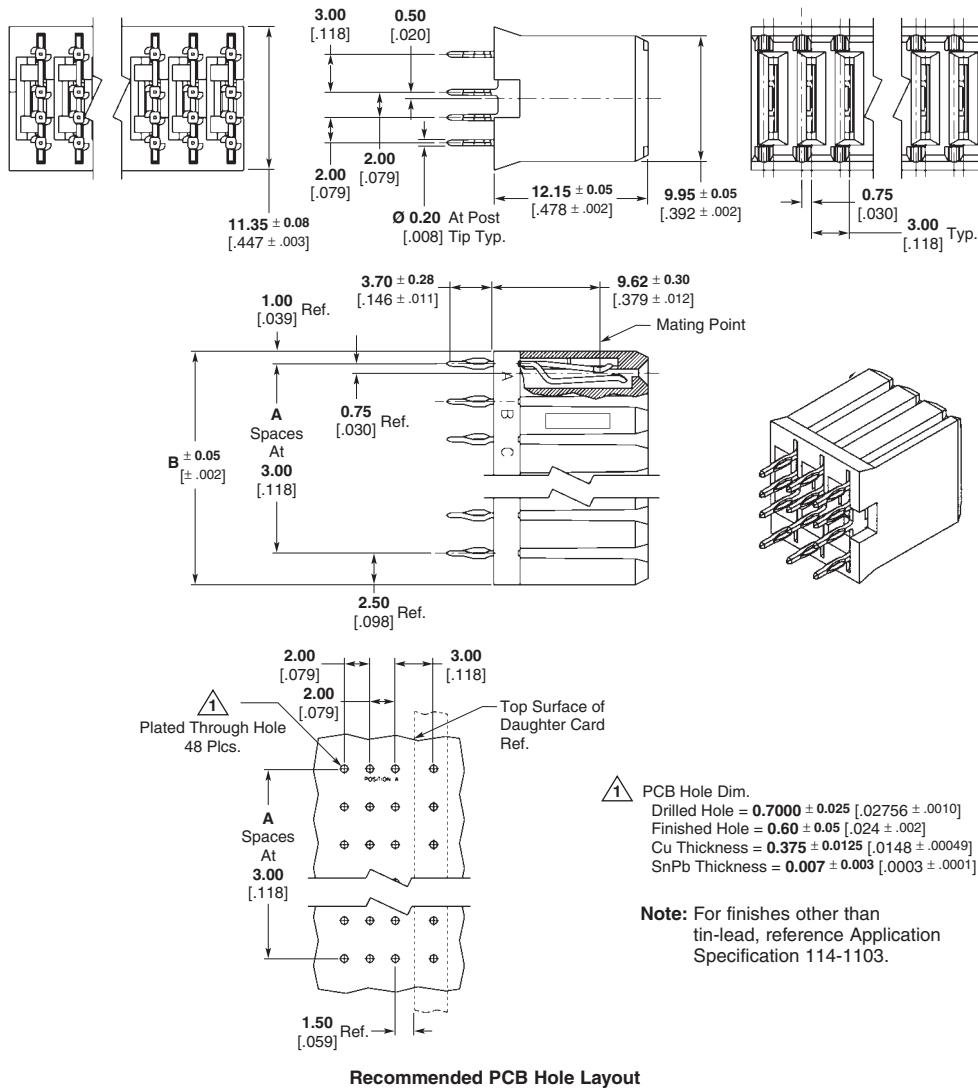
Product Specification
108-1651

Application Specification
114-1103

Tyco Electronics Instruction Sheet
408-4169 (Receptacle)
Seating Tool 224421-1)

High Speed Backplane Connectors

Z-PACK HM-Zd Connector (Continued)



Position	A	B Ref.	Standard *10A Part Number	High Current *15A Part Number
4	3	12.50 .492	223995-1	120953-1
5	4	15.50 .610	223995-2	120953-2
6	5	18.50 .728	223995-3	120953-3
7	6	21.50 .846	223995-4	120953-4
8	7	24.50 .965	223995-5	120953-5

*Reference Product Specification 108-1651.

Note: For additional Power Module options reference Catalog 1773096, "Power Connectors and Interconnection Systems," or contact your Tyco Electronics Sales Representative.

Power and Guide Hardware (Continued)

Universal Power Module Right Angle Headers (3 Pos.)

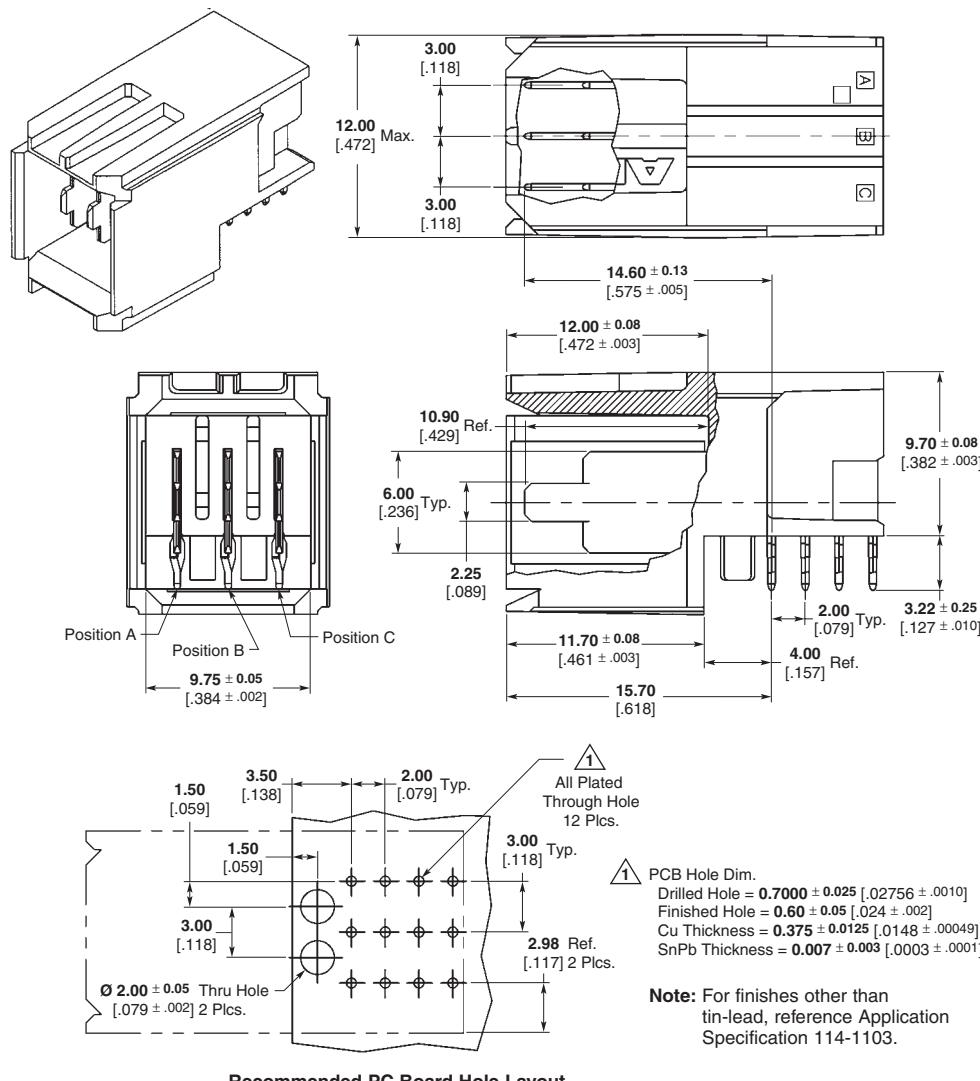
Material and Finish

Housing — polyester, natural color

Contacts — Copper alloy, plated 0.00127 [.000050] min. gold in mating area, 0.00050 [.000020] min. tin-lead on ACTION PIN post area, with entire contact underplated 0.00127 [.000050] min. nickel

High Speed Backplane Connectors

Z-PACK HM-Zd Connector (Continued)



Recommended PC Board Hole Layout

Blade Length Dimensions			Standard *10A Right Angle Header Part Numbers	High Current *15A Right Angle Header Part Numbers
Position A	Position B	Position C		
10.90 [.429]	10.90 [.429]	10.90 [.429]	223961-1	5-223961-1
10.90 [.429]	9.30 [.366]	10.90 [.429]	223962-1	—
10.90 [.429]	9.30 [.366]	9.30 [.366]	223968-1	—
10.90 [.429]	7.68 [.302]	10.90 [.429]	223972-1	—
10.90 [.429]	7.68 [.302]	9.30 [.366]	223971-1	—
10.90 [.429]	7.68 [.302]	7.68 [.302]	223970-1	—
9.30 [.429]	10.90 [.429]	9.30 [.366]	223963-1	—
9.30 [.366]	10.90 [.429]	7.68 [.302]	223964-1	—
9.30 [.366]	9.30 [.366]	9.30 [.366]	223967-1	—
9.30 [.366]	—	9.30 [.366]	223975-1	—
9.30 [.366]	9.30 [.366]	7.68 [.302]	223981-1	—
9.30 [.366]	7.68 [.302]	9.30 [.366]	223965-1	—
7.68 [.302]	9.30 [.366]	7.68 [.302]	223983-1	—
7.68 [.302]	7.68 [.302]	9.30 [.366]	223980-1	—
7.68 [.302]	7.68 [.302]	7.68 [.302]	223974-1	5-223974-1

Note: For additional Power Module options reference Catalog 1773096, "Power Connectors and Interconnection Systems," or contact your Tyco Electronics Sales Representative.

*Reference Product Specification 108-1651.

Power and Guide Hardware (Continued)

Expanded Universal Power Module Right Angle Headers

Material and Finish

Housing — Polyester, gray

Contacts — Phosphor bronze, plated 0.00127 [.000050] min. gold in mating area, 0.00054 [.000021] min. tin-lead on ACTION PIN area, with entire contact underplated 0.00127 [.000050] min. nickel

Note: Contact lubrication with Bellcore approved lubricant

Related Product Data

Guiding Hardware (Optional) —
pages 21-23

Application Tooling

Header

Seating Tool, 224441-1
Board Support Fixture, 224442-1

Receptacle

Seating Tool, 224421-1
Board Support Fixture, 217602-1

Technical Documents

Product Specification

108-1651

Application Specification

114-1103

Tyco Electronics Instruction Sheet

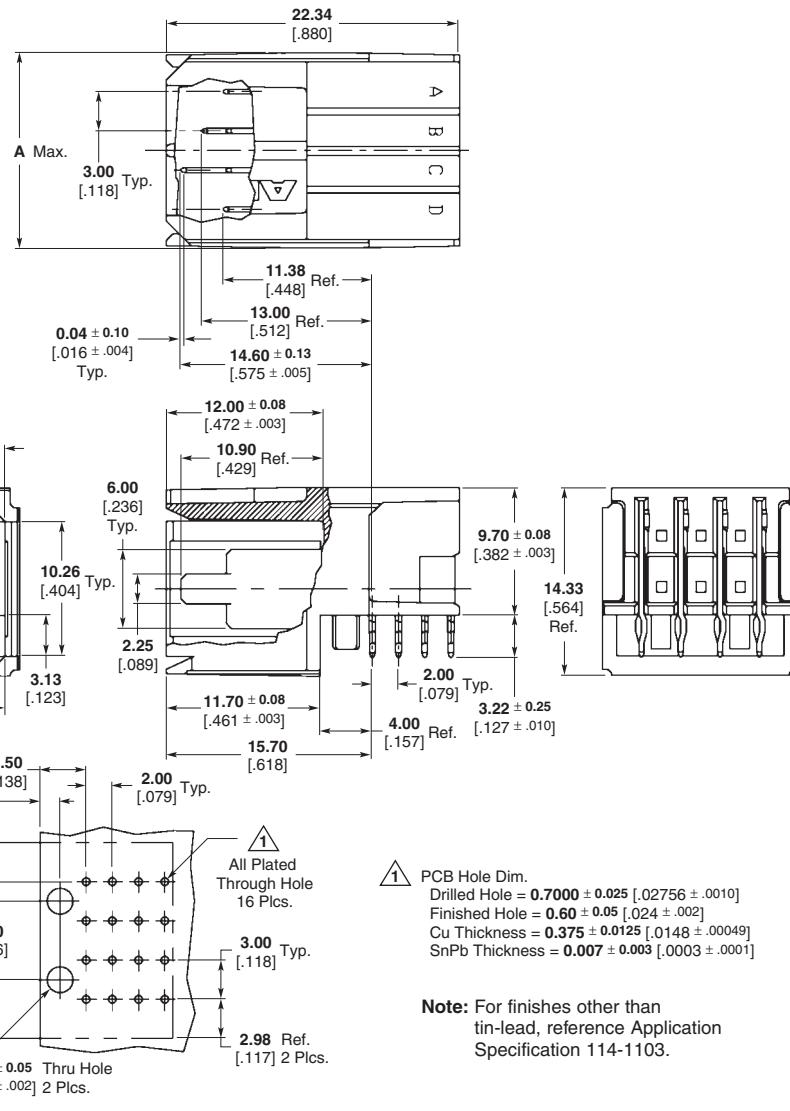
408-4169 (Receptacle)

Seating Tool 224421-1)

High Speed Backplane Connectors

AMP

Z-PACK HM-Zd Connector (Continued)



Recommended PC Board Hole Layout

Note: For additional Power Module options reference Catalog 1773096, "Power Connectors and Interconnection Systems," or contact your Tyco Electronics Sales Representative.

Positions	Dimensions		Standard *10A Base Part Number ¹	High Current *15A Base Part Number ¹
	A	B		
4	15.00 .591	12.75 .502	646954	120954 2
5	18.00 .709	15.75 .620	646955	120955 2
6	21.00 .827	18.75 .738	646956	120956 2
7	24.00 .945	21.75 .856	646957	120957 2
8	27.00 1.063	24.75 .974	646958	120958 2

¹ Dash number indicates sequence pattern. See customer drawing for specific dash numbers.

² RoHS Compliant.

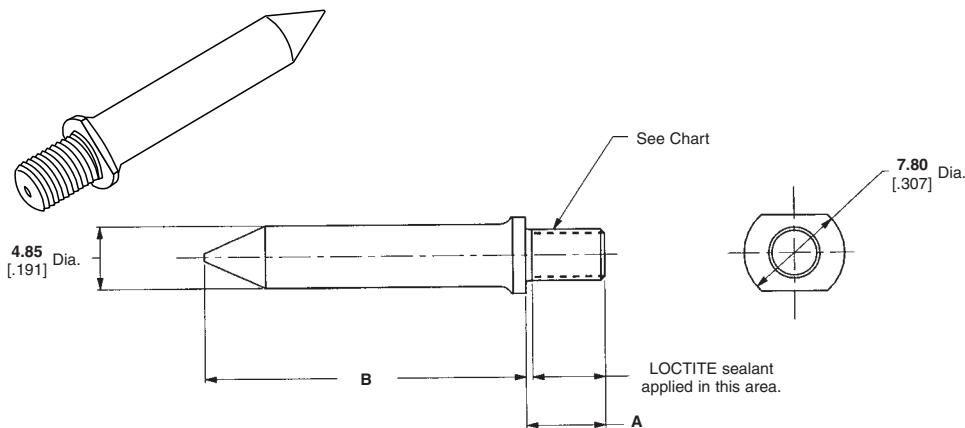
*Reference Product Specification 108-1651.

Power and Guide Hardware (Continued)

Guide Pin (Unkeyed)

Material and Finish

Guide Pin — Passivated stainless steel
Part Number 223956-1



Dimension		Thread	Part Numbers
A	B		
7.50 [.295]	24.73 [.974]	M4 x 7-6g	223982-1 1, 2
9.20 [.362]	25.16 [.991]	M4 x 7-6g	223969-7 2
12.70 [.500]	25.16 [.991]	8-32 UNC-2A	223969-4 2
12.70 [.500]	25.16 [.991]	M4 x 7-6g	223969-1 2
6.20 [.244]	25.16 [.991]	M4 x 7-6g	223956-1 2
12.70 [.500]	31.25 [1.230]	8-32 UNC-2A	1-223969-0 2
3.80 ³ [.150]	27.16 [1.069]	M4 x 7-6h	120646-1 2
2.00 ³ [.079]	27.16 [1.069]	M3 x 0.5	223988-1 2

1 6.35 Hex Base.

2 RoHS Compliant.

3 Internal Thread.

Female Guide Module (Unkeyed)

Material and Finish

Guide Module — Zinc alloy, chromate conversion coated

Related Product Data

Application Tooling — Seating Tool, 224440-1.
Board Support Fixture, 217603-1.

Technical Documents

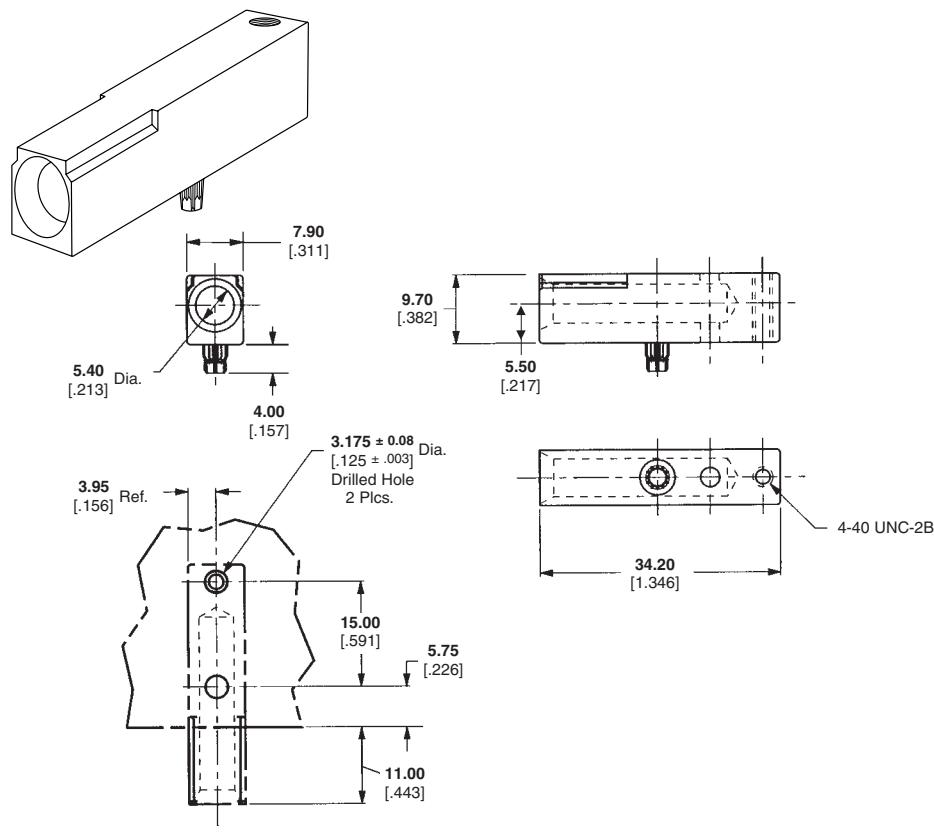
Product Specification
108-1651

Application Specification

114-1103

Part Number 223957-1
(as shown)

Part Number 223979-1
(dual alignment posts)



Recommended PC Board Hole Layout

Power and Guide Hardware (Continued)

Guide Pin (Keyed)

Material and Finish

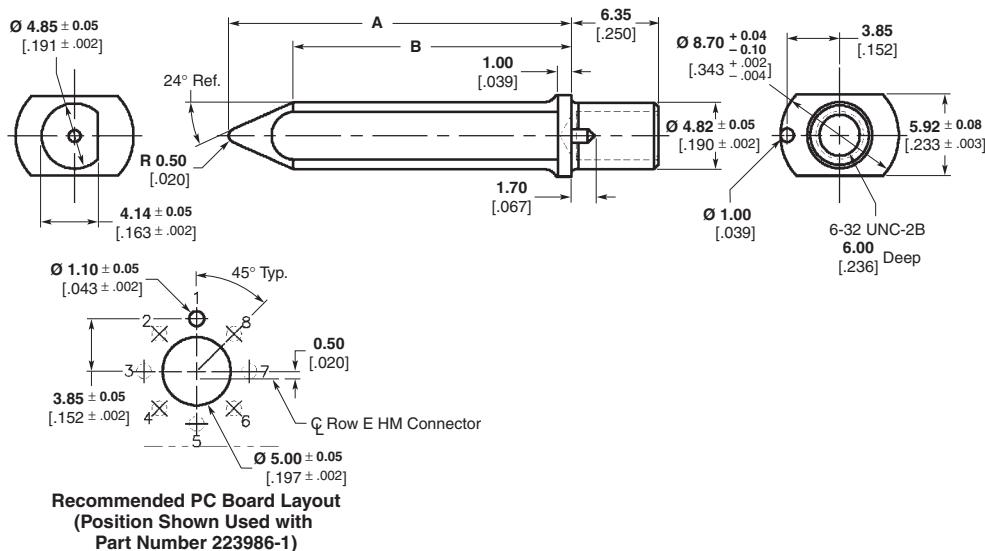
Guide Pin — Zinc alloy, chromate conversion coated

Part Number 223985

Dimension		Part Number
A	B	
25.16	20.39	223985-1
.991	.803	
29.00	24.23	223985-3
1.142	.954	

High Speed Backplane Connectors

Z-PACK HM-Zd Connector (Continued)



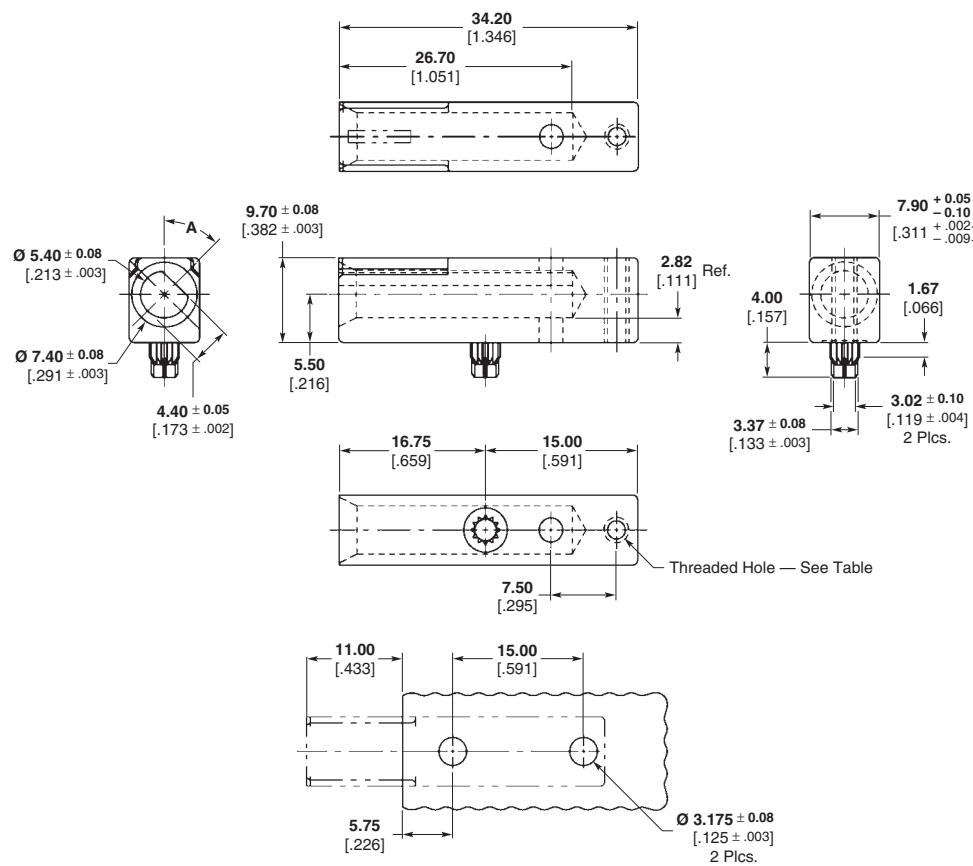
Female Guide Module (Keyed)

Material and Finish

Guide Module — Zinc alloy, chromate conversion coated

Part Number 223986

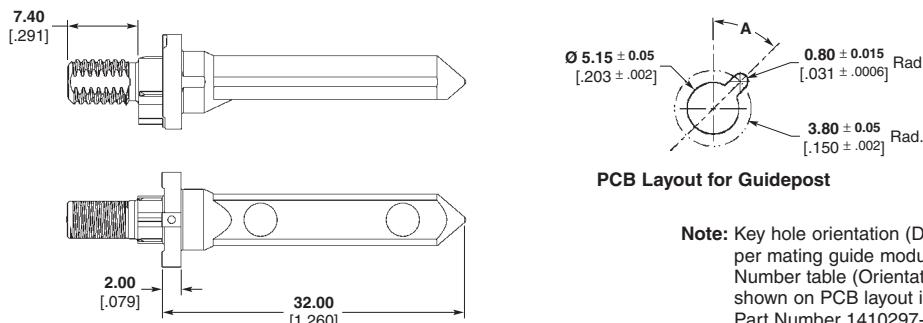
Dim. A	Thread	Part Number
0°	4-40	223986-1
45°	4-40	223986-2
90°	4-40	223986-3
135°	4-40	223986-4
180°	4-40	223986-5
225°	4-40	223986-6
270°	4-40	223986-7
315°	4-40	223986-8
0°	M2.6	120913-1
45°	M2.6	120913-2
90°	M2.6	120913-3
135°	M2.6	120913-4
180°	M2.6	120913-5
225°	M2.6	120913-6
270°	M2.6	120913-7
315°	M2.6	120913-8



Power and Guide Hardware (Continued)

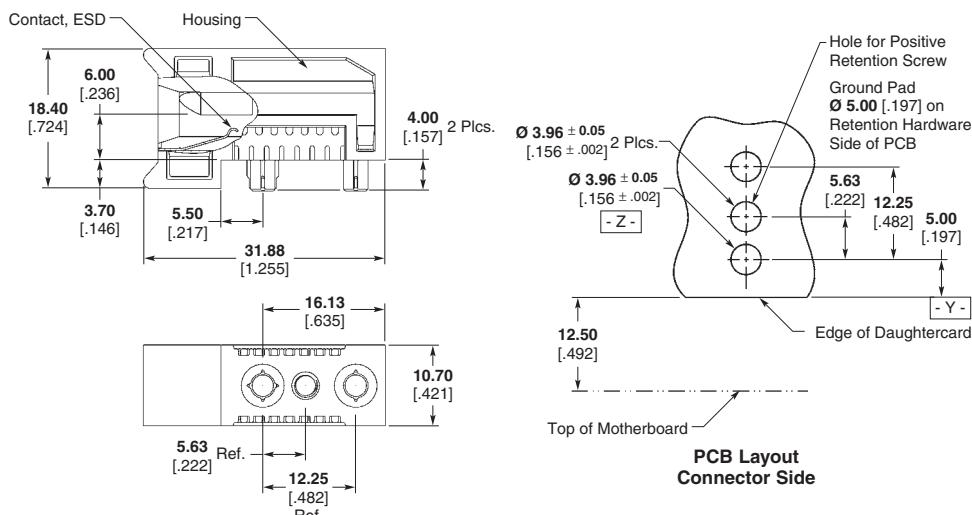
High Speed Backplane Connectors

Z-PACK HM-Zd Connector (Continued)

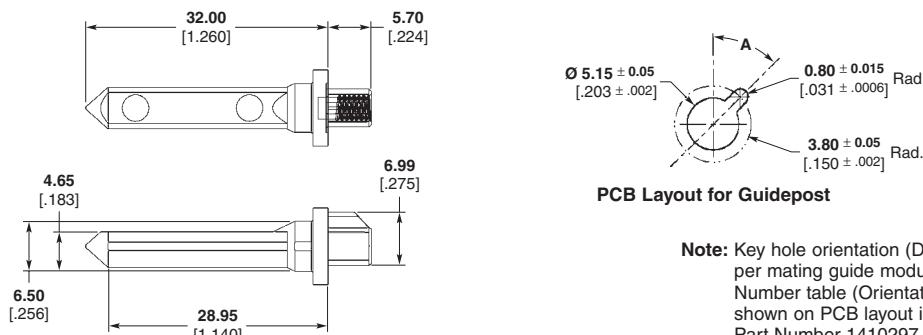


1410773 Series

Note: Key hole orientation (Dim. A) per mating guide module Part Number table (Orientation shown on PCB layout is for Part Number 1410297-2).



1410297 Series



1410548 Series

Note: Key hole orientation (Dim. A) per mating guide module Part Number table (Orientation shown on PCB layout is for Part Number 1410297-2).

MULTIGIG RT Guide Modules

Description	Part Number
Keyed/ESD Guide Module Assembly, 20.30 [.799] Daughtercard*	1410297-X
Keyed Guide Pin, Backplane Connector, Threaded Post**	1410773-X
Keyed Guide Pin, Die Cast, Rolling Thunder, Backplane Connector**	1410548-X

* See customer drawing for specific keying options.

** Internal and external threaded versions available, see customer drawings for available options.

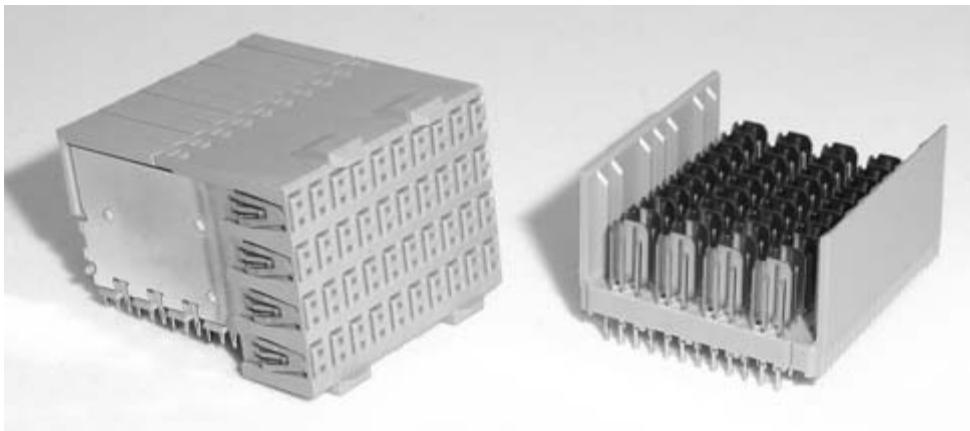
"NEW" AdvancedTCA Connectors**AdvancedTCA Zone 2****Front Board Connector**

4 Pair Right Angle Receptacle
Part Number 1469001-1

See page 7 for more details

Backplane Connector

4 Pair Vertical Header
Part Number 1469002-1
See page 11 for more details

High Speed Backplane Connectors**Z-PACK HM-Zd Connector (Continued)**

Front Board Connector

Backplane Connector

AdvancedTCA Guide/Keying Modules

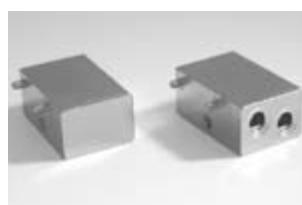
The AdvancedTCA Guide Modules can be used in a wide variety of applications. For *motherboard-to-daughtercard applications* the vertical pin and right angle socket are used. This popular configuration is further supported by our wide offering of available keying positions. Each of the two keyed guide pins and guide sockets per module can be produced in a variety of different key positions. For *co-planar applications*, the right angle guide pins are used along with the right angle guide sockets. Both vertical and right angle guide pins are available in short or long sizes, to accommodate being used with different Tyco Electronics connectors.



rK1



A2 (RTM)



K1/K2



rK1



A1



A2

ATCA Name	ATCA Location	Description	Part Number
rA1	Backplane	Rear Alignment Post 3.00 – 4.00 [.118 – .157] PCB Thickness	1469269-2*
rA1	Backplane	Rear Alignment Post 4.10 – 6.00 [.161 – .236] PCB Thickness	1469269-4*
rA1	Backplane	Rear Alignment Post 6.10 – 8.00 [.240 – .315] PCB Thickness	1469269-6*
A2 (RTM)	Rear Transition Module	Right Angle Male, Keyed	1-1469372-1*
K1/K2	Front Board	Right Angle Female, Keyed	1-1469373-1*
K1/K2	Front Board	Right Angle Female, Unkeyed Dummy	9-1469373-9*
rK1	Rear Transition	Right Angle Female	1469374-1*
A1	Backplane	Vertical Male, Keyed, Short	1-1469387-1*
A2	Mid-Plane	Vertical Male, Keyed, Long	1-1469388-1*

* RoHS Compliant.

AdvancedTCA Power Connectors (Zone 1)

Backplane Connector Straight, Compliant Press Fit, Part Number 1766501-1*

Material and Finish

Insulators — Thermoplastic, glass reinforced, black, UL94V-0

Signal Pins — Copper alloy

Power Contacts — High conductivity copper alloy, plated 0.0076 [.000030] min. gold in mating area per Tyco Electronics Specification 112-162-5, over 0.00130 [.000050] min. nickel per Tyco Electronics Specification 112-25-2

Solder tails — 0.0030 - 0.0043 [.000120 - .000170] tin plated per lead free Tyco Electronics Specification 112-65-1, matt finish

Notes:

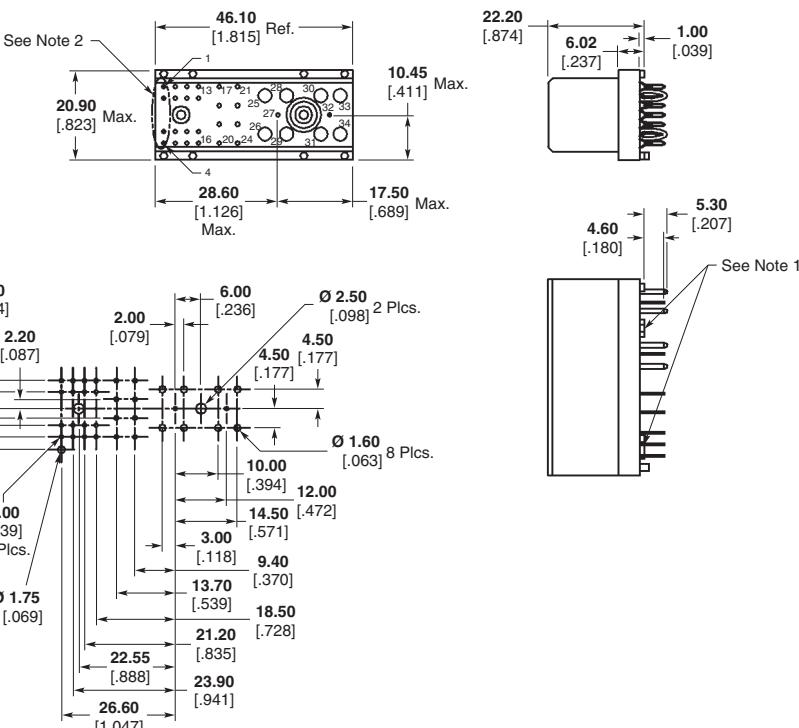
- Mounting Holes ($\varnothing 0.20$ [.079] x 5.00 [.197] DP) for use with self tapping screw (customer supplied).
- Positions 1-4 not populated and reserved for future use.

High Speed Backplane Connectors

Z-PACK HM-Zd Connector (Continued)

1

Z-PACK HM-Zd Connector



Printed Circuit Layout

Front Board Connector Right Angle, Compliant Press Fit Part Number 1766500-1*

Material and Finish

Insulators — Thermoplastic, glass reinforced, black, UL94V-0

Signal Pins — Copper alloy

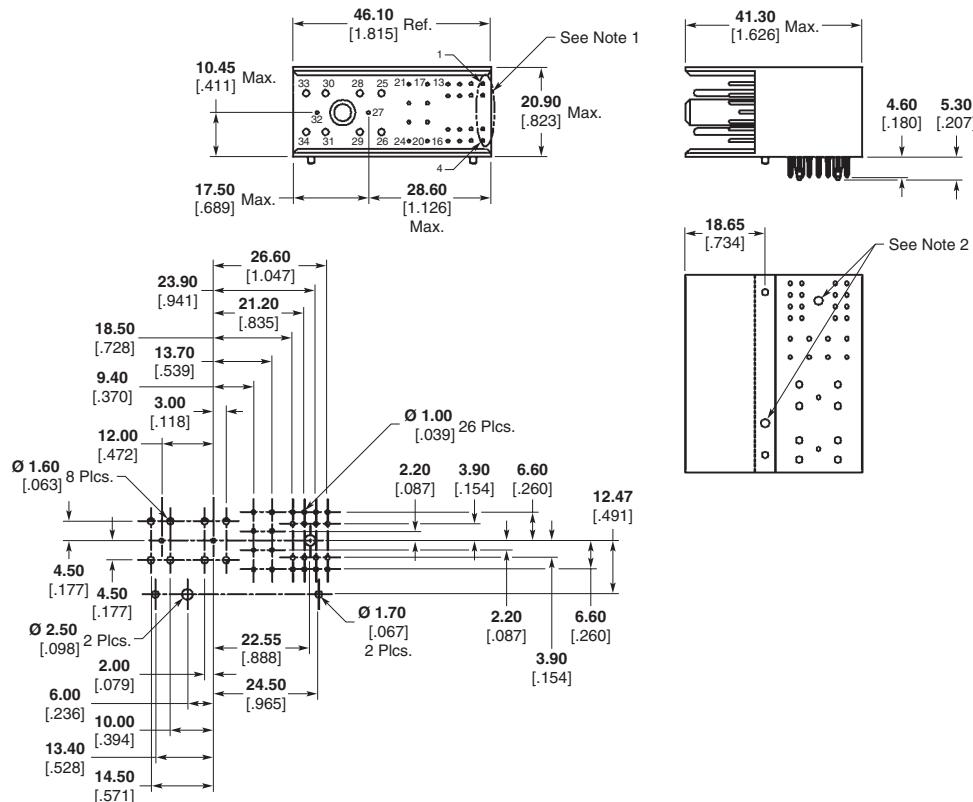
Power Contacts — High conductivity copper alloy, plated 0.00076 [.000030] min. gold in mating area per Tyco Electronics Specification 112-162-5, over 0.00130 [.000050] min. nickel per Tyco Electronics Specification 112-25-2

Solder Tails — 0.0030 - 0.0043 [.000120 - .000170] tin plated per lead free Tyco Electronics Specification 112-65-1, matt finish

Notes:

- Mounting Holes ($\varnothing 2.00$ [.079] x 5.00 [.197] DP) for use with self tapping screw (customer supplied).
- Positions 1-4 not populated and reserved for future use.

* RoHS Compliant

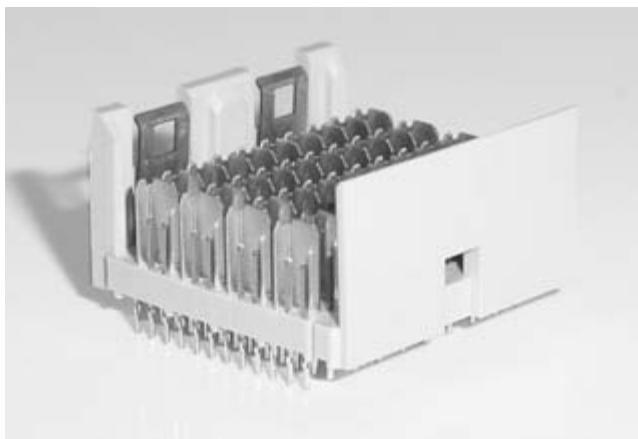


Printed Circuit Layout

Vertical Pin Headers for Cable Assemblies

High Speed Backplane Connectors

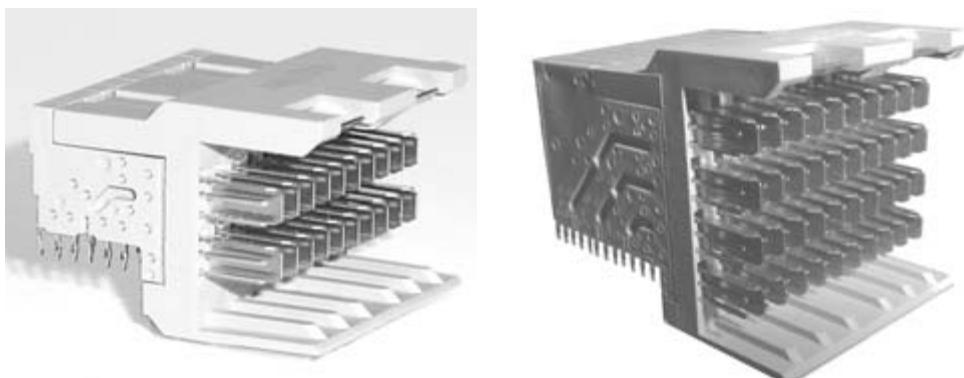
Z-PACK HM-Zd Connector (Continued)



Pair Count	Part Number	Tail Length	Mating Pin Length	Column Count	Module Length	Signals	Grounds	Application Tooling ²			
								Insertion Pin Header	Repair	Pin Removal	
									Housing Removal	Pin Insertion	
4	1469105-11	2.50 .098	5.30 .209	10	25.00 .984	80	40	91373-1	1583237-1	1725635-1	1583255-1
4	1469124-11	1.80 .071	5.30 .209	10	25.00 .984	80	40	91373-1	1583237-1	1725635-1	1583255-1
2	1469106-11	2.50 .098	5.30 .209	10	25.00 .984	40	20	91372-1	1583237-1	1804170-1	1583255-1
2	1469125-11	1.80 .071	5.30 .209	10	25.00 .984	40	20	91372-1	1583237-1	1804170-1	1583255-1

¹ With latch for cable assemblies.² See page 43 for Instruction Sheet Number.
For PCB Layout, see pages 11-13.

Right Angle Pin Headers for Cable Assemblies



Pair Count	Part Number	Tail Length	Mating Pin Length	Column Count	Module Length	Signals	Grounds	Application Tooling ²		
								Insertion Pin Header	Repair	Housing Removal
									Chiclet Removal	
4	1469668-1	2.20 .087	5.30 .209	10	25.00 .984	80	40	1804244-1	1804239-1	1804177-1
2	1469354-11	2.20 .087	5.30 .209	10	25.00 .984	40	20	1804178-1	1804172-1	1804175-1

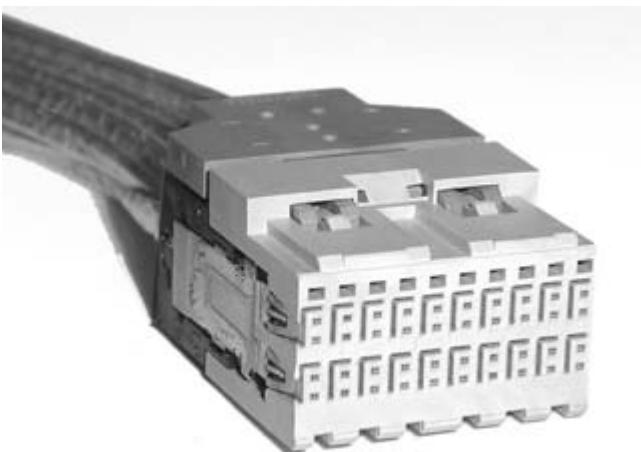
¹ With latch for cable assemblies.² See page 43 for Instruction Sheet Number.
For PCB Layout, see pages 14-16.

**4 Pair 5 Column and
4 Pair 10 Column
Push-to-Release Cable
Assemblies**

Note: Design shown for reference only. Contact Tyco Electronics for other variations and configurations.

High Speed Backplane Connectors**Z-PACK HM-Zd Connector (Continued)****2 Pair 5 Column and
2 Pair 10 Column
Push-to-Release Cable
Assemblies**

Note: Design shown for reference only. Contact Tyco Electronics for other variations and configurations.

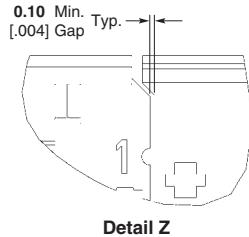
**4 Pair
Cable Assemblies for
Backplane Testing**

Note: Design shown for reference only. Contact Tyco Electronics for other variations and configurations.



Recommended Printed Circuit Board Layouts

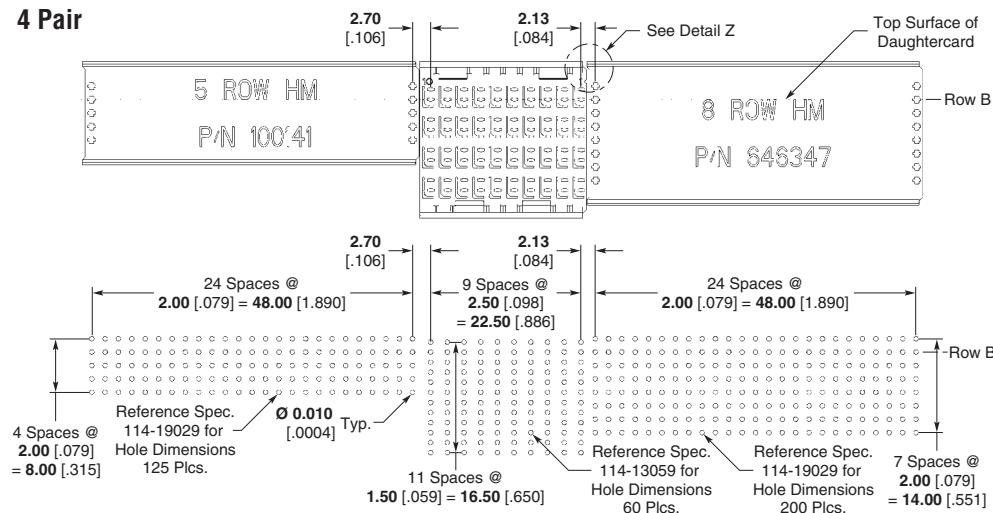
Z-PACK HM-Zd Backplane and Z-PACK 2mm HM Connectors



High Speed Backplane Connectors

Z-PACK HM-Zd Connector (Continued)

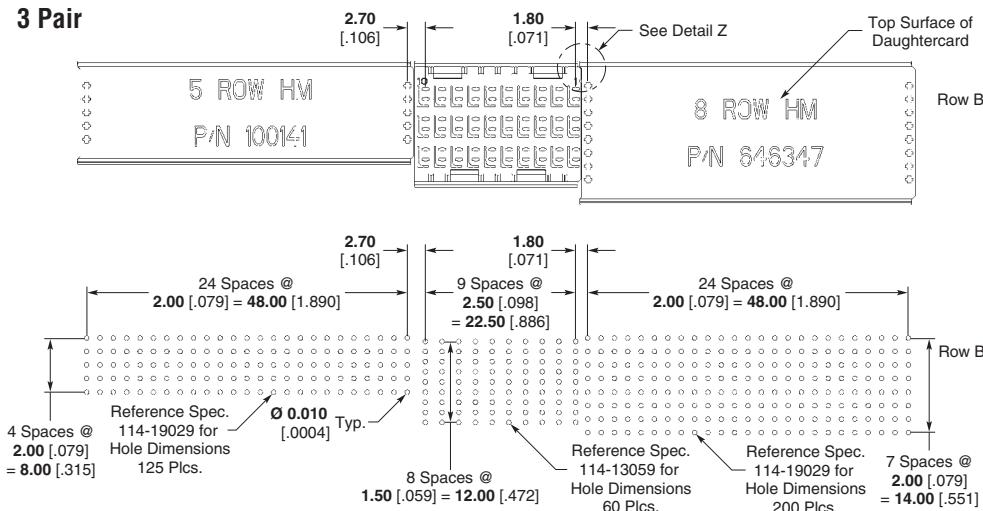
4 Pair



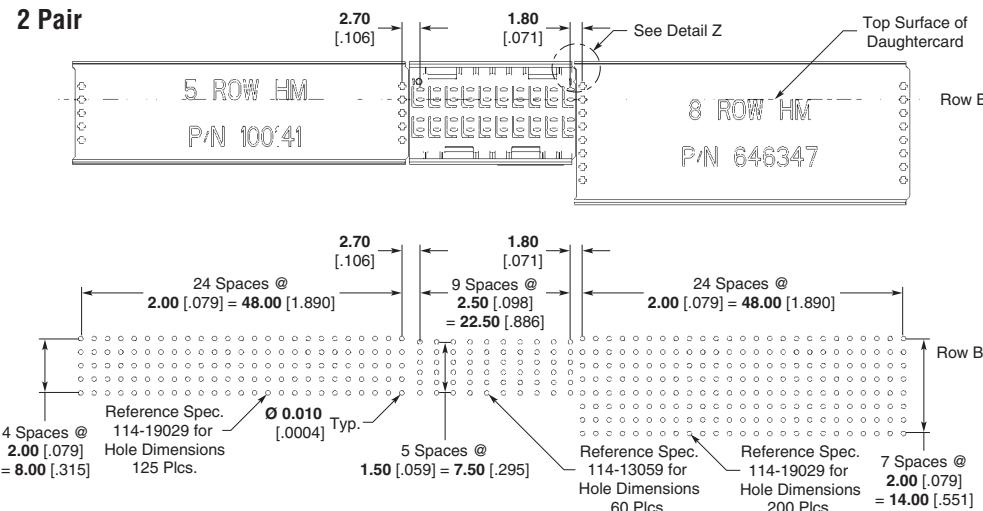
Note:

1. Dimensions shown represent minimum stacking dimensions allowable. Customer specific applications will dictate actual module spacing.

3 Pair



2 Pair



Recommended Printed Circuit Board Layouts (Continued)

Z-PACK HM-Zd Daughtercard and Z-PACK 2mm HM Connectors

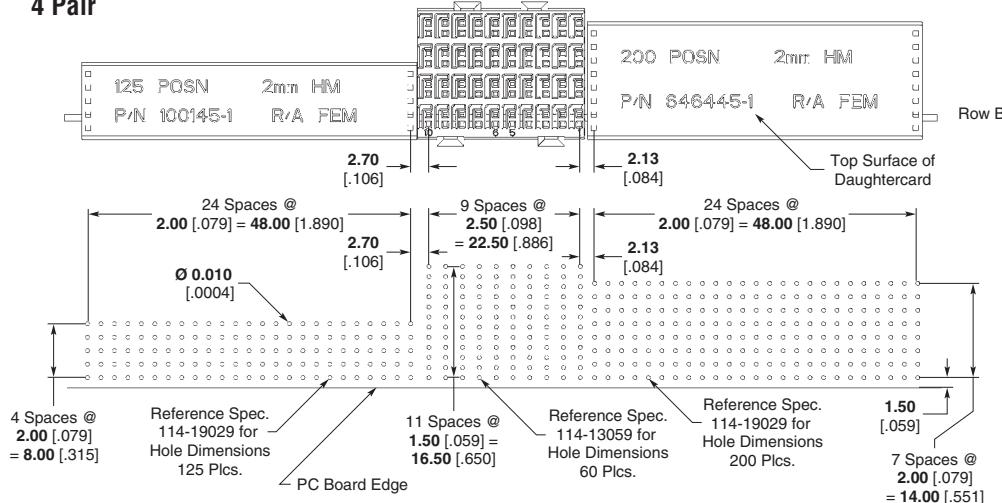
Note:

1. Dimensions shown represent minimum stacking dimensions allowable. Customer specific applications will dictate actual module spacing.

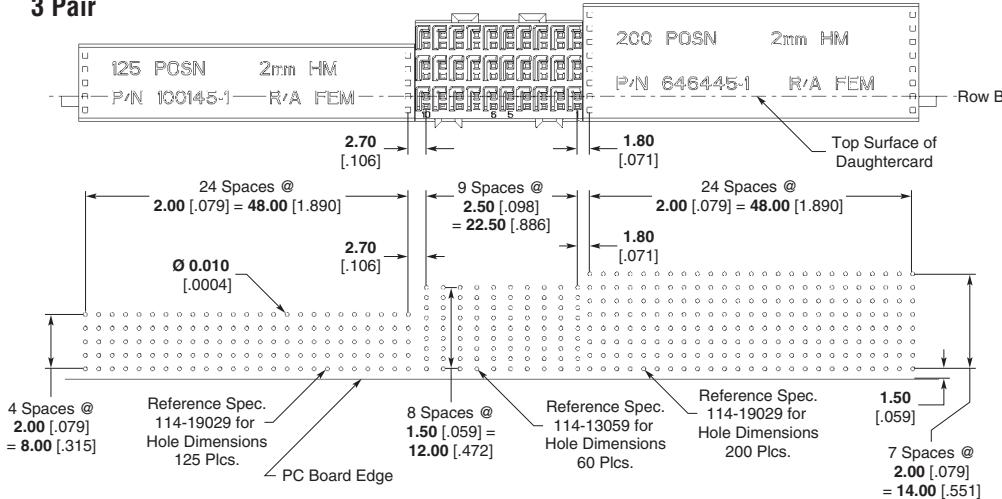
High Speed Backplane Connectors

Z-PACK HM-Zd Connector (Continued)

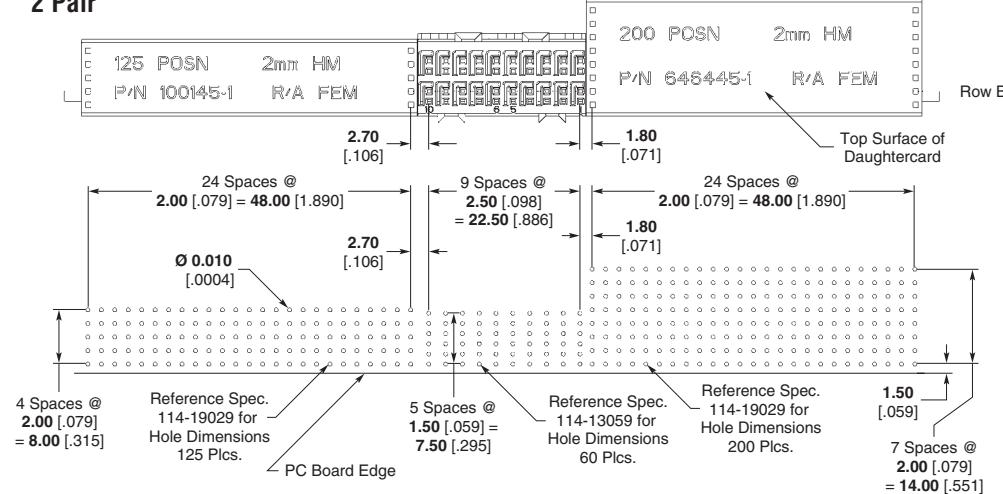
4 Pair



3 Pair



2 Pair



Recommended Printed Circuit Board Layouts

(Continued)

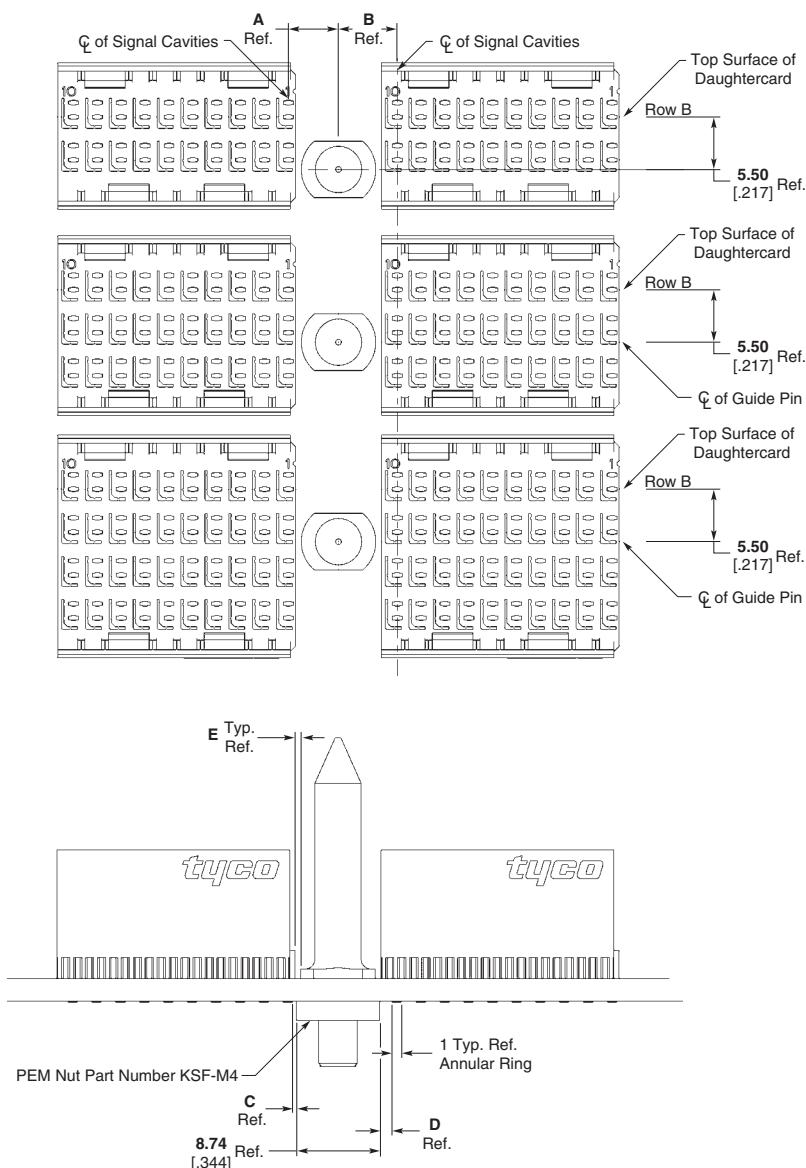
Z-PACK HM-Zd Backplane Connector with Unkeyed Guide Pins

Note:

1. Dimensions shown represent minimum stacking dimensions allowable. Customer specific applications will dictate actual module spacing.

High Speed Backplane Connectors

Z-PACK HM-Zd Connector (Continued)



Dimension					Part Number
A	B	C	D	E	
5.25 .207	6.15 .242	0.40 .016	1.30 .051	0.60 .024	223956*
5.52 .217	6.42 .253	0.65 .026	1.55 .061	0.42 .017	223985

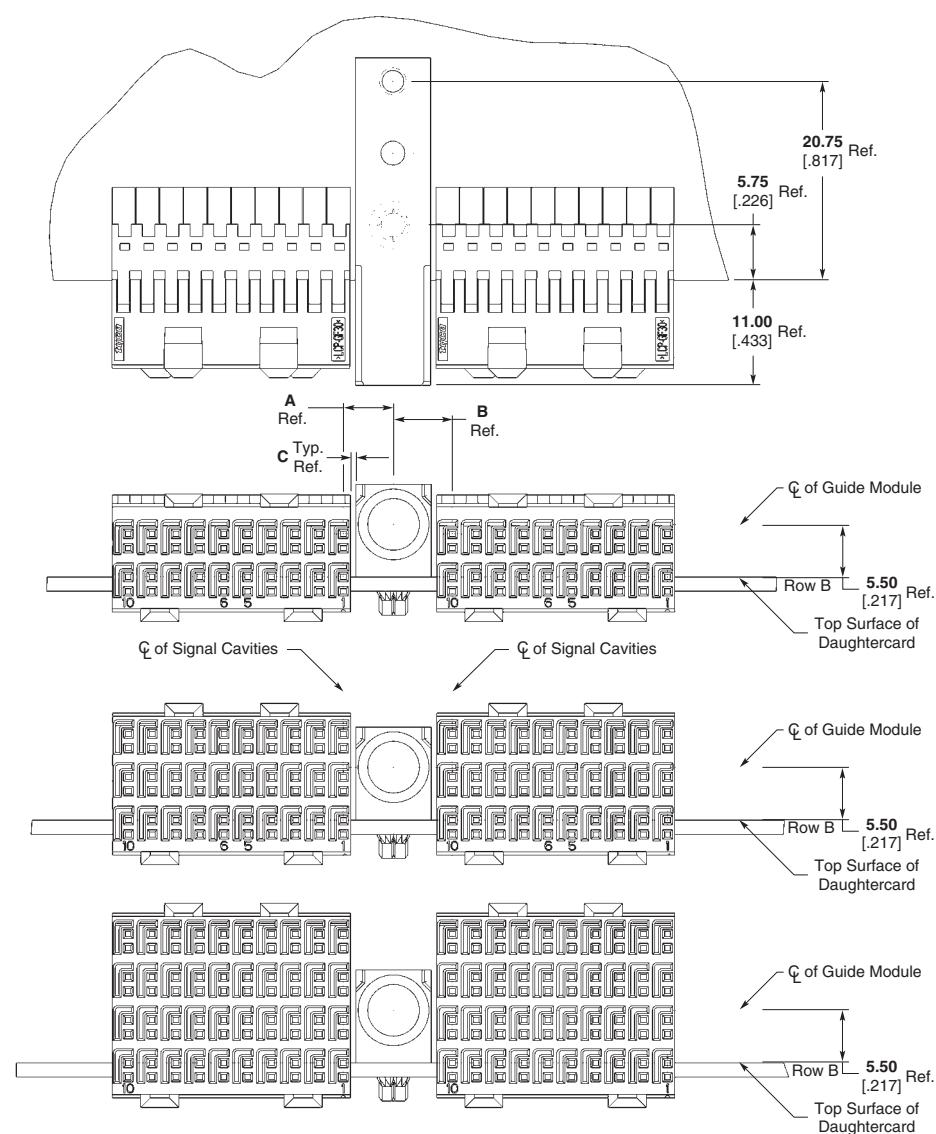
* RoHS Compliant.

Recommended Printed Circuit Board Layouts (Continued)

Z-PACK HM-Zd Daughtercard Connector With Unkeyed Female Guide Modules

Note:

1. Dimensions shown represent minimum stacking dimensions allowable. Customer specific applications will dictate actual module spacing.



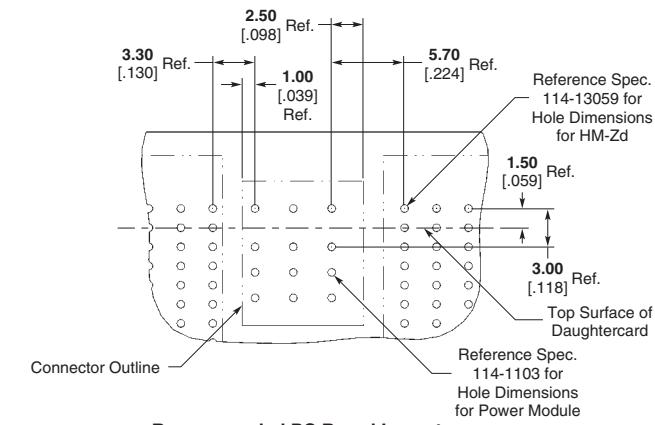
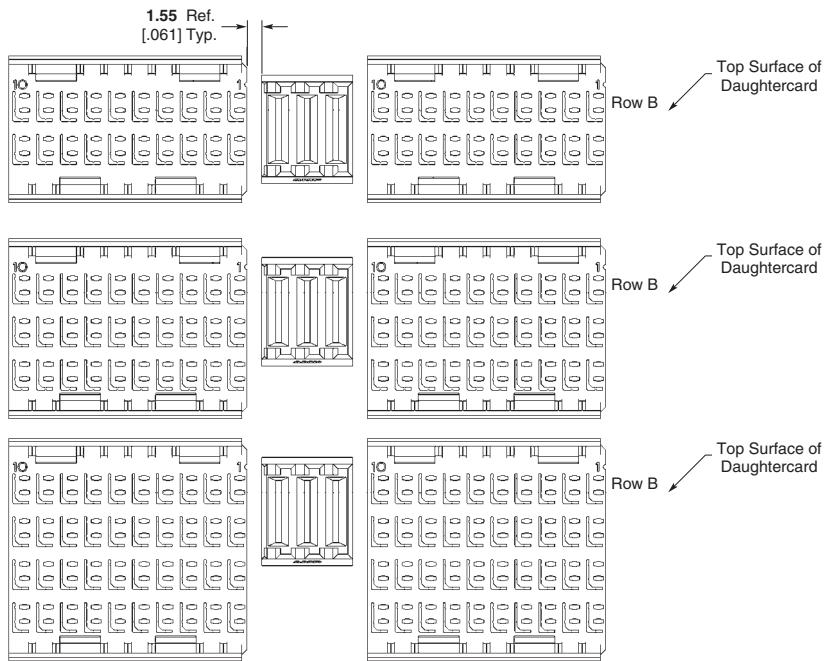
Dimension			Part Number
A	B	C	
5.25 .207	6.15 .242	0.56 .022	223957
5.52 .217	6.42 .253	0.83 .033	223986

Recommended Printed Circuit Board Layouts

(Continued)

Z-PACK HM-Zd Backplane Connector and Universal Power Modules**Note:**

1. Dimensions shown represent minimum stacking dimensions allowable. Customer specific applications will dictate actual module spacing.

High Speed Backplane Connectors**Z-PACK HM-Zd Connector (Continued)**

**Recommended PC Board Layout
Component Side**

Recommended Printed Circuit Board Layouts (Continued)

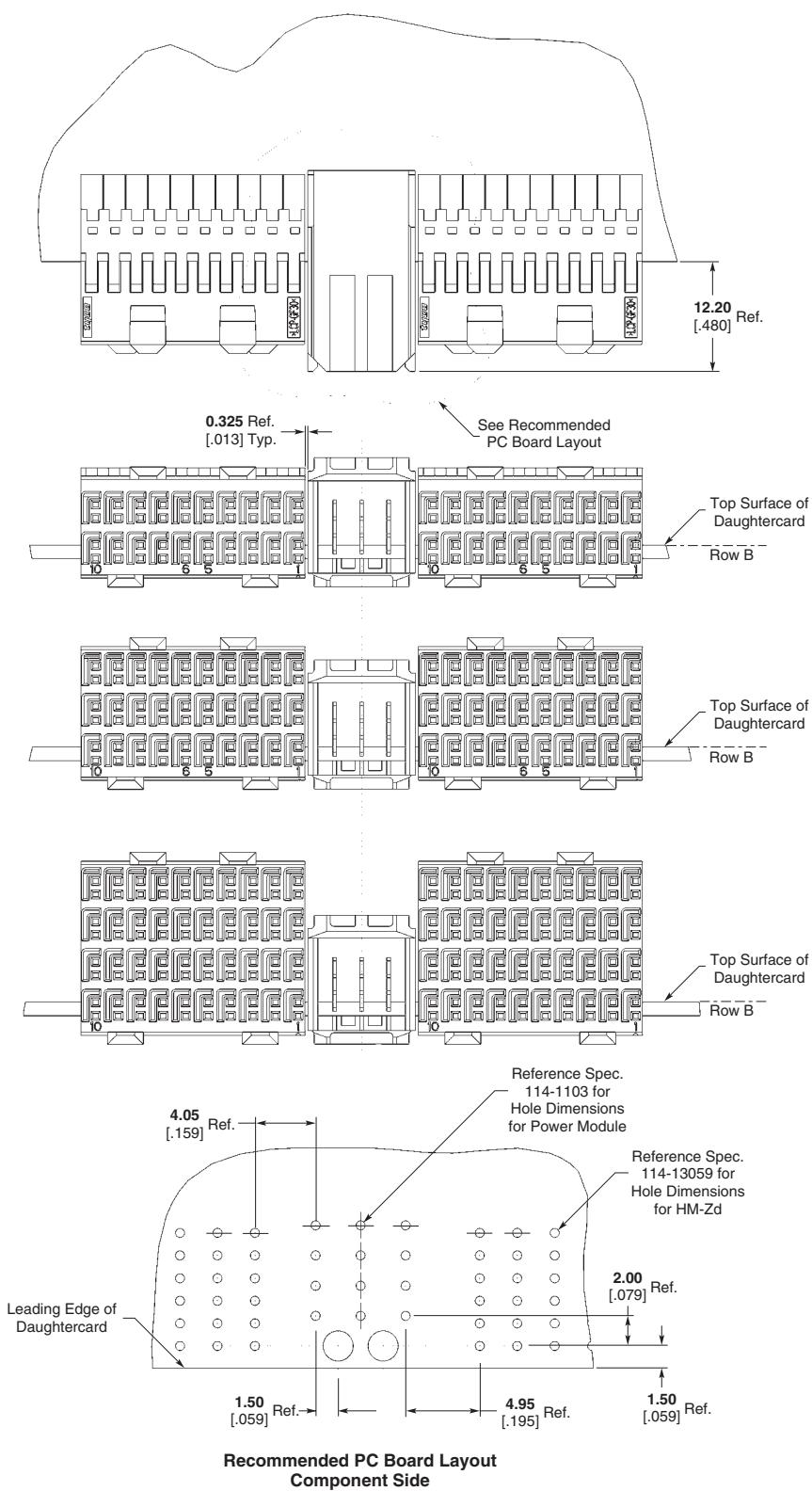
Z-PACK HM-Zd Daughtercard Connector and Universal Power Modules

Note:

1. Dimensions shown represent minimum stacking dimensions allowable. Customer specific applications will dictate actual module spacing.

High Speed Backplane Connectors

Z-PACK HM-Zd Connector (Continued)



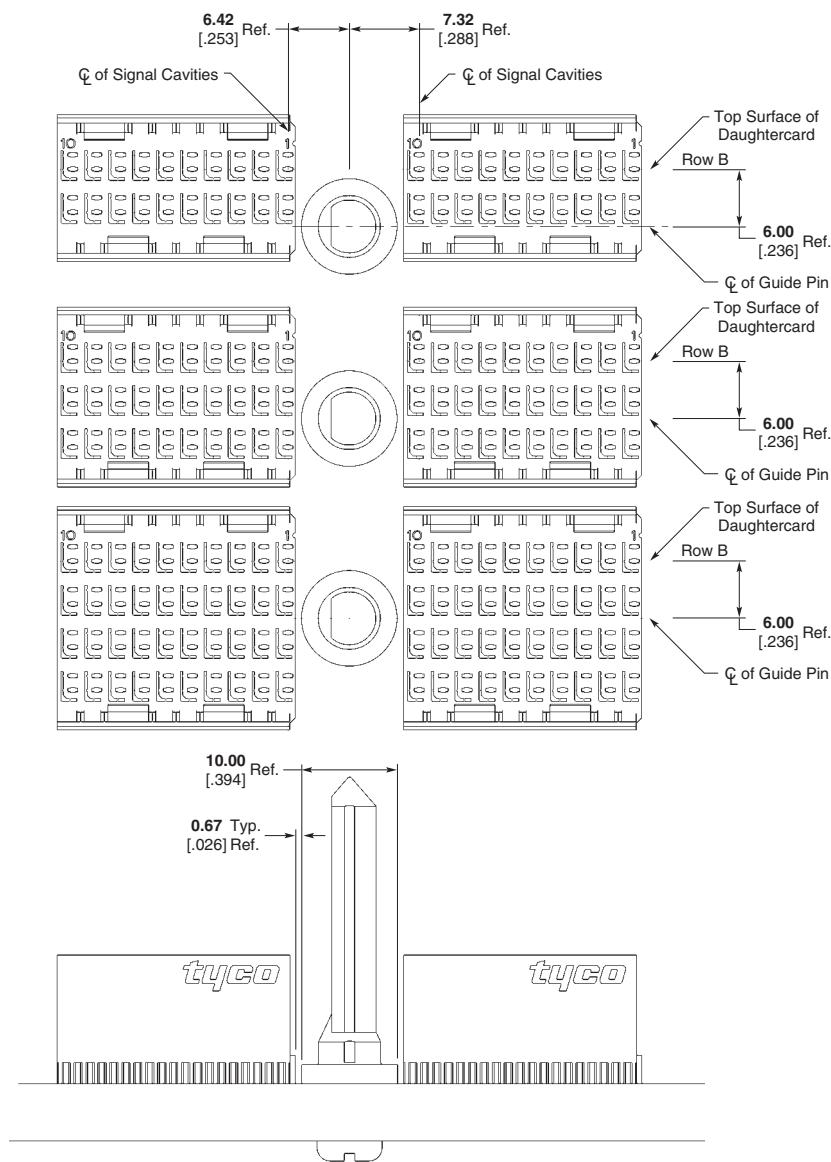
Recommended PC Board Layout
Component Side

Recommended Printed Circuit Board Layouts

(Continued)

Z-PACK HM-Zd Backplane Connector and MULTIGIG RT Connector Guide Modules**Note:**

1. Dimensions shown represent minimum stacking dimensions allowable. Customer specific applications will dictate actual module spacing.

High Speed Backplane Connectors**Z-PACK HM-Zd Connector (Continued)**

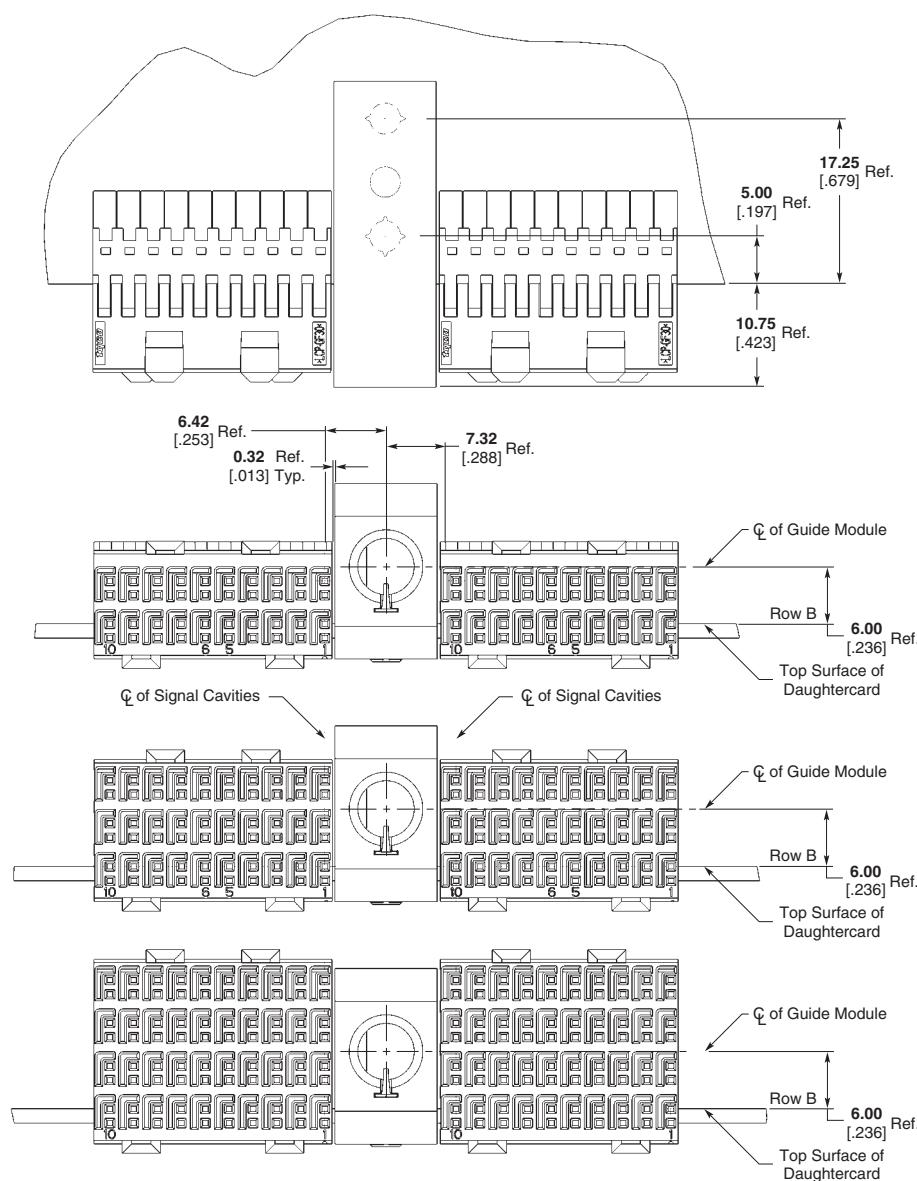
Recommended Printed Circuit Board Layouts (Continued)

Z-PACK HM-Zd Daughtercard Connector and MULTIGIG RT Connector Guide Modules

Note:

1. Dimensions shown represent minimum stacking dimensions allowable. Customer specific applications will dictate actual module spacing.

Z-PACK HM-Zd Connector (Continued)

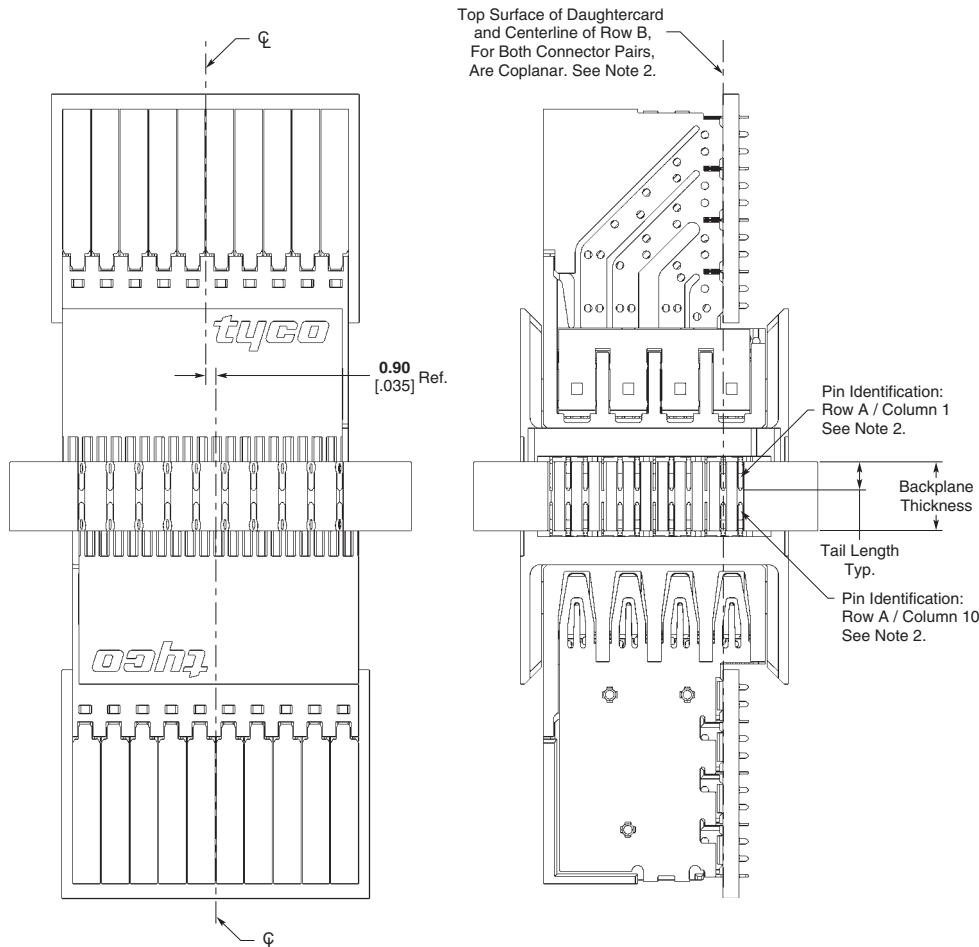


Recommended Printed Circuit Board Layouts

(Continued)

Z-PACK HM-Zd Connector Recommended Mid-Plane Layout Option #1**Notes:**

1. Minimum recommended backplane thicknesses calculated using maximum and minimum tolerances. No statistical methods were used.
2. Refer to the customer print for complete column and row designations.

Z-PACK HM-Zd Connector (Continued)

Tail Length	Min. Recommended Backplane Thickness
1.80 .071	4.00 .157
2.50 .098	5.40 .213

Recommended Printed Circuit Board Layouts

(Continued)

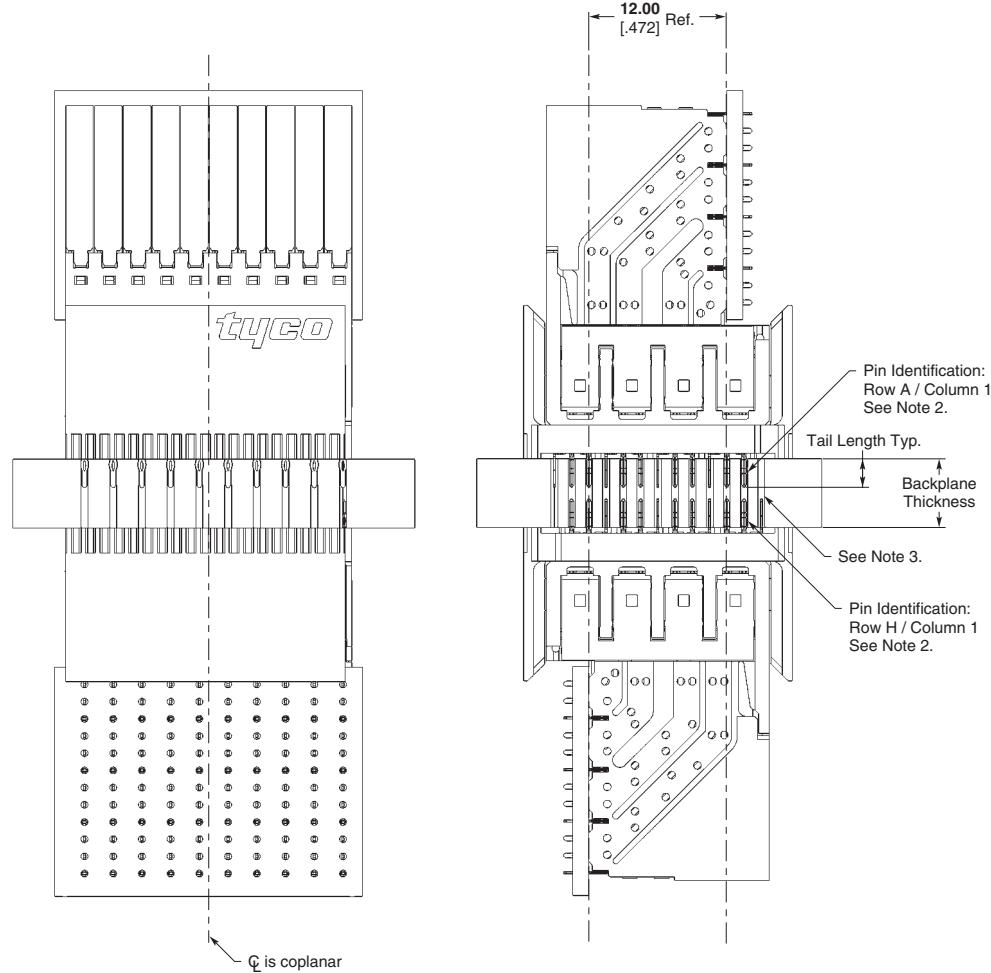
Z-PACK HM-Zd Connector
Recommended Mid-Plane Layout Option #2

Notes:

1. Minimum recommended backplane thicknesses calculated using maximum and minimum tolerances. No statistical methods were used.
2. Refer to the customer print for complete column and row designations.
3. An additional row of holes must be drilled to accommodate this midplane application.

High Speed Backplane Connectors

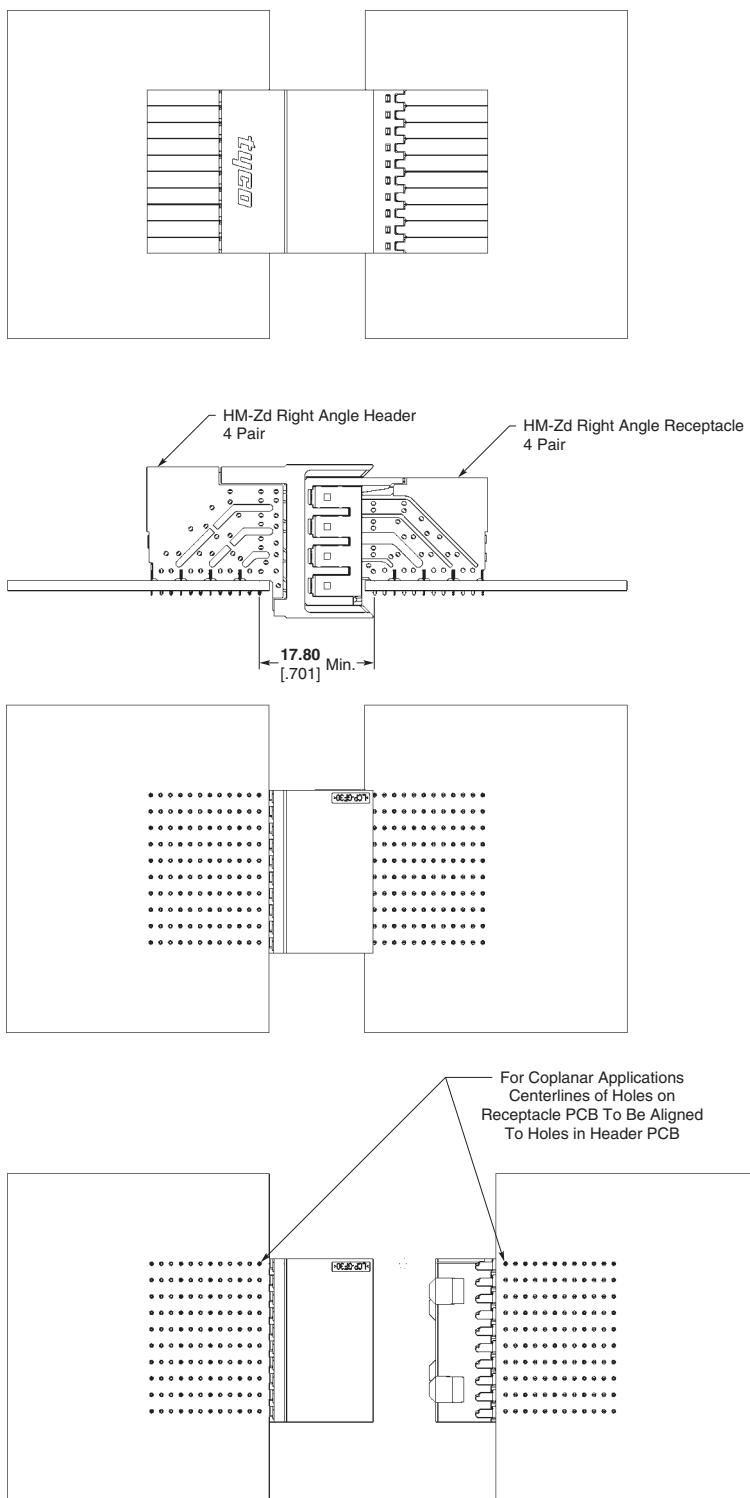
Z-PACK HM-Zd Connector (Continued)



Tail Length	Min. Recommended Backplane Thickness
1.80 .071	4.00 .157
2.50 .098	5.40 .213

Recommended Printed Circuit Board Layouts

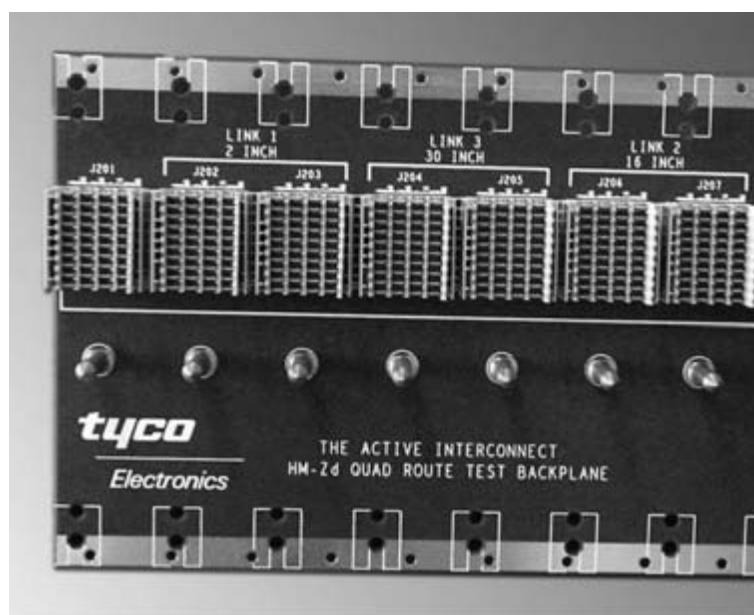
(Continued)

Z-PACK HM-Zd Connector Coplanar**High Speed Backplane Connectors****Z-PACK HM-Zd Connector (Continued)**

Z-PACK HM-Zd Connector Footprint and PC Board Trace Routing

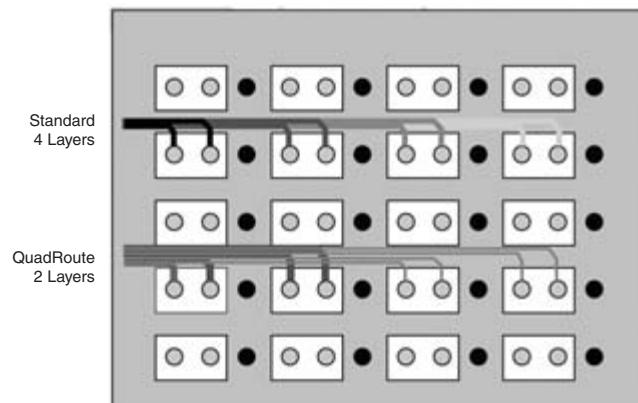
- Accounts for system design requirements
- Footprint is optimized for low noise and ease of routing
- Footprint permits wide traces for long runs and without having to separate differential pairs
- Footprint supports quad routing techniques (see below)

High Speed Backplane Connectors



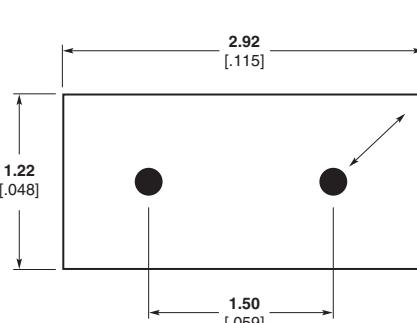
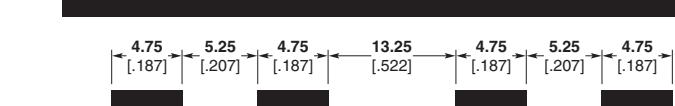
Benefits of Quad Routing

- Better Platform Characteristics
 - Performance variation due to layer connection is reduced
 - Crosstalk is reduced
 - Return loss is reduced
- Enables a lower cost solution
 - Cost of better materials is offset by reduced processing
 - Increased manufacturability—less layers and decreased aspect ratios
 - Decreased number of layers reduces the need for counterboring of PC boards



Notes Regarding Quad Routing:

1. Within pin field, center signal pairs between signal columns
2. Trace separation is increased over "standard" recommendations to further limit trace to trace crosstalk
3. Recommend Quad Routing pairs together that are propagating in the same direction



Notes Regarding Antipad Design:

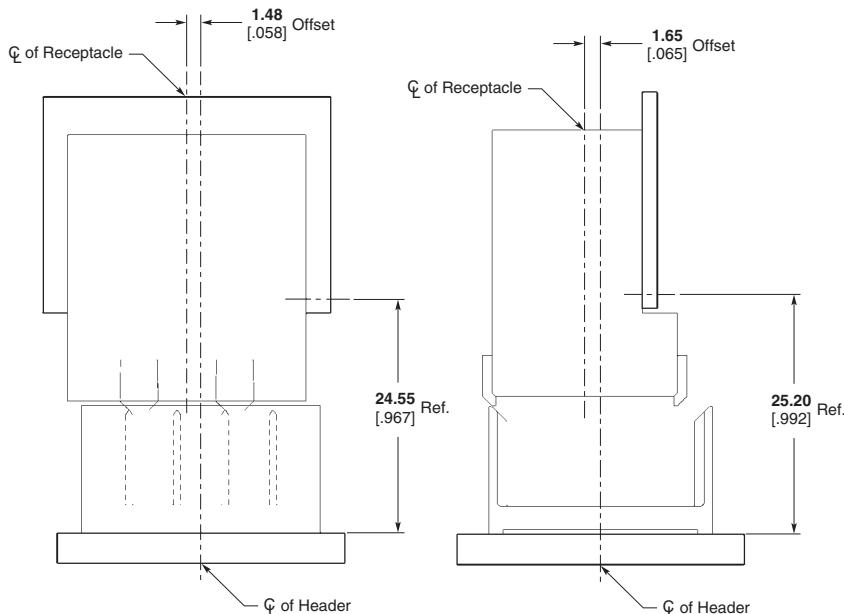
1. An oval shaped antipad may be used to increase PC board manufacturability and to improve trace break-out
2. Antipad length shown is 2.92 [.114]. An antipad length up to 3.48 [.137] may be used.

For further details request Report # 20GC015-1 or visit
http://catalog.tycoelectronics.com/TE/GeneralInfo/footprint_optimization.pdf

Connector Housing
Gathering Capabilities

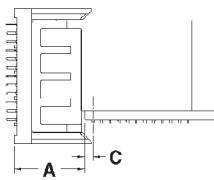
Z-PACK HM-Zd Connector (Continued)

Note: Dimensions are at nominal conditions. The offsets are to be applied to either side of the header center line.

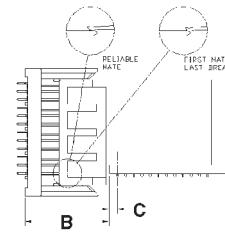


**Z-PACK HM-Zd Connector
Mating Sequence Chart**

High Speed Backplane Connectors

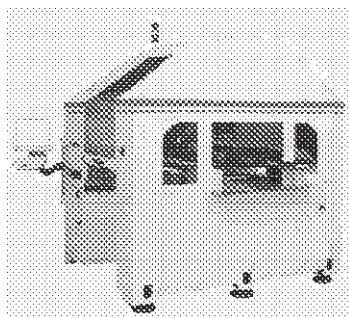
Z-PACK HM-Zd Connector (Continued)


Fully Mated

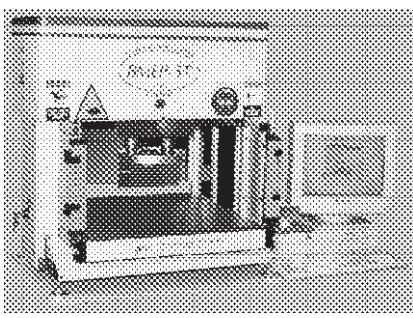


Reliable Mate

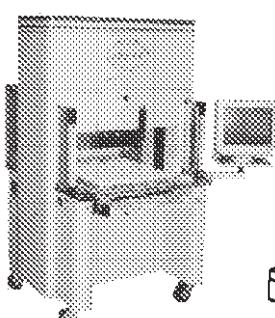
Product Family	Dim. C	Dim. A Fully Mated	Contact	Dim B.		Fully Mated Wipe Length
				Reliable Mate	First Mate Last Break	
HM-Zd	1.50 .059	12.50 .492	Ground Shield	16.78 [.661]	17.55 [.691]	4.28 [.169]
			Signal Level 2	15.41 [.607]	15.85 [.624]	2.91 [.115]
			Signal Level 1	13.91 [.548]	14.35 [.565]	1.41 [.056]
HM-Zd Guide Hardware	3.00 .118	12.50 .492	24.0 mm Pin	27.50 [1.083]	33.40 [1.315]	N/A
			22.2 mm Pin	25.70 [1.012]	31.60 [1.244]	N/A
			Key Blocking Point	N/A	22.03 [.867]	N/A
HM-2mm	1.50 .059	12.50 .492	Signal Level 3	18.27 [.719]	18.84 [.742]	5.77 [.227]
			Signal Level 2	16.77 [.660]	17.34 [.683]	4.27 [.168]
			Signal Level 1	15.27 [.601]	15.84 [.624]	2.77 [.109]
MULTIGIG RT T1	2.50 .098	12.50 .492	Ground	18.00 [.709]	—	5.50 [.217]
			Signal Level 3	18.00 [.709]	—	5.50 [.217]
			Signal Level 2	16.50 [.650]	—	4.00 [.157]
			Signal Level 1	15.00 [.591]	—	2.50 [.098]
MULTIGIG RT T2	2.25 .089	12.50 .492	Ground	18.00 [.709]	—	5.50 [.217]
			Signal Level 3	18.00 [.709]	—	5.50 [.217]
			Signal Level 2	16.50 [.650]	—	4.00 [.157]
			Signal Level 1	15.00 [.591]	—	2.50 [.098]
MULTIGIG RT T3	2.25 .089	12.50 .492	Ground	16.50 [.650]	—	4.00 [.157]
			Signal Level 1	15.00 [.591]	—	2.50 [.098]
MULTIGIG RT Power Module	5.50 .217	12.50 .492	Power Level 3	23.75 [.935]	—	11.25 [.443]
			Power Level 2	22.25 [.876]	—	9.75 [.384]
			Power Level 1	20.75 [.817]	—	8.25 [.325]
MULTIGIG RT Guide Hardware	N/A	12.50 .492	Guide Pin Key	33.25 [1.309]	N/A	20.75 [.817]
			Guide ESD Contact	30.75 [1.211]	—	18.25 [.719]
HS-3	1.50 .059	12.50 .492	Ground	17.08 [.672]	17.60 [.693]	4.78 [.188]
			Signal Level 2	16.05 [.632]	16.47 [.648]	3.75 [.148]
			Signal Level 1	14.55 [.573]	14.97 [.589]	2.25 [.089]
UPM	3.50 .138	12.50 .492	Power Level 3	20.25 [.797]	20.95 [.825]	8.10 [.319]
			Power Level 2	18.65 [.734]	19.35 [.762]	6.50 [.256]
			Power Level 1	17.03 [.670]	17.73 [.698]	4.88 [.192]
UPM Guide Hardware	5.75 .226	12.50 .492	Guide Pin Key	31.39 [1.236]	36.16 [1.424]	N/A
			Keyed Guide Pin	31.39 [1.236]	36.16 [1.424]	N/A
			Keyed Guide Pin	35.23 [1.387]	40.00 [1.575]	N/A
MULTI-BEAM XL Right Angle Header to Vertical Receptacle	5.08 .200	14.73 .580	PreMate Power — Level 1	—	16.84 [.663]	5.61 [.221] Min.
			PostMate Power — Level 2	—	17.81 [.701]	4.34 [.171] Min.
			PreMate Signal — Level 2	—	18.26 [.719]	3.81 [.150] Min.
			PostMate Signal — Level 3	—	19.53 [.769]	2.54 [.100] Min.
MULTI-BEAM XL Right Angle Receptacle to Vertical Header	3.81 .150	13.21 .520	PreMate Power — Level 1	—	15.32 [.603]	5.61 [.221] Min.
			PostMate Power — Level 2	—	16.28 [.641]	4.34 [.171] Min.
			PreMate Signal — Level 2	—	16.74 [.659]	3.81 [.150] Min.
			PostMate Signal — Level 3	—	18.01 [.709]	2.54 [.100] Min.

Z-PACK HM-Zd Connector Application Tooling and Equipment

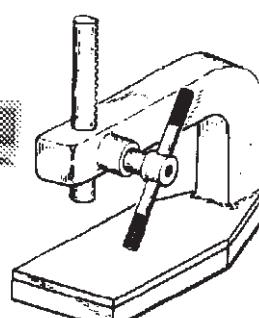
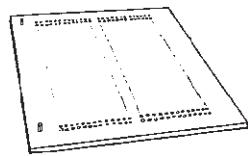
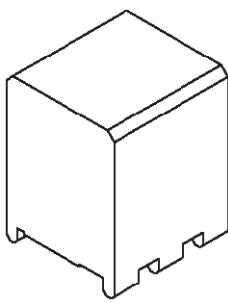
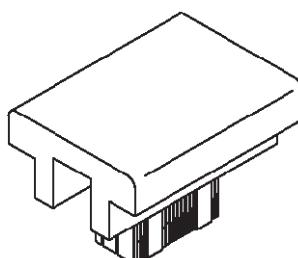
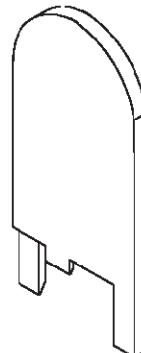
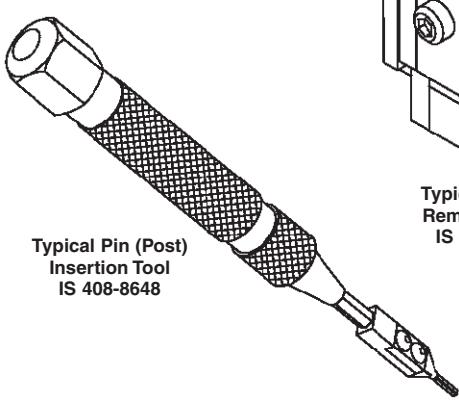
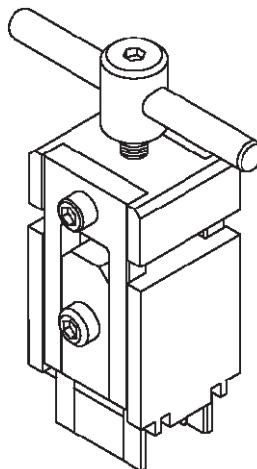
1585280-1 Model AP3



1585696-1 Model BMEP 5T



1585699-1 Model MEP 6T

Typical Manual Arbor Frame Assembly
(Commercially Available)Typical PC Board Support
(Customer Supplied)Typical Receptacle Seating Tool
IS 408-8500Typical Pin Header Seating Tool
IS 408-8501Typical Chiclet Removal Tool
IS 408-8647Typical Receptacle Housing Removal Tool
IS 408-8644Typical Pin (Post)
Extraction Tool
IS 408-8646Typical Pin (Post)
Insertion Tool
IS 408-8648Typical Header Removal Tools
IS 408-8645

Note: Typical power units from Tyco Electronics Automation Group include, but are not limited to those shown on this page.

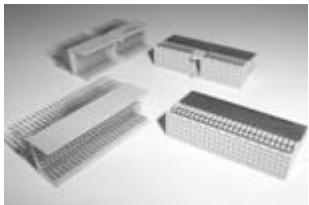
Z-PACK HM-Zd Connector Application Tooling and Equipment (Continued)

High Speed Backplane Connectors

Z-PACK HM-Zd Connector (Continued)

Type	Description	Instruction Sheet	Part Number
Board to Board Insertion Tooling	Seating Tool, Receptacle, 4 Pair, 10 Column	408-8500	91347-1
	Seating Tool, Receptacle, 4 Pair, 15 Column	408-8500	91347-2
	Seating Tool, Receptacle, 4 Pair, 12 Column	408-8500	91347-3
	Seating Tool, Receptacle, 4 Pair, 20 Column	408-8500	91347-4
	Seating Tool, Receptacle, 3 Pair	408-8500	91376-1
	Seating Tool, Receptacle, 2 Pair, 10 Column	408-8500	91350-1
	Seating Tool, Receptacle, 2 Pair, 20 Column	408-8500	91350-2
	Seating Tool, Header, 4 Pair, 10 Column	408-8501	91349-1
	Seating Tool, Header, 4 Pair, 15 Column	408-8501	91349-2
	Seating Tool, Header, 4 Pair, 12 Column	408-8501	91349-3
	Seating Tool, Header, 4 Pair, 20 Column	408-8501	91349-4
	Seating Tool, Header, 3 Pair	408-8501	91375-1
	Seating Tool, Header, 2 Pair, 10 Column	408-8501	91348-1
	Seating Tool, Header, 2 Pair, 20 Column	408-8501	91348-4
	Seating Tool, Right Angle Header, 4 Pair, 10 Column	408-8810	91378-1
	Seating Tool, Right Angle Header, 4 Pair, 12 Column	408-8810	91378-3
	Seating Tool, Right Angle Header, 3 Pair	Note 1	1804179-1
	Seating Tool, Right Angle Header, 2 Pair	Note 1	91377-1
Board to Board Repair Tooling	Receptacle Housing Removal Tool, 4, 3, 2 Pair, 10 Column	408-8644	1583224-1
	Receptacle Housing Removal Tool, 4, 3, 2 Pair, 12 Column	408-8644	1583224-2
	Receptacle Housing Removal Tool, 4, 3, 2 Pair, 15 Column	408-8644	1583224-3
	Receptacle Housing Removal Tool, 4, 3, 2 Pair, 20 Column	408-8644	1583224-4
	Housing Removal Tool, Vertical Header, 4 Pair	408-8645	1583220-1
	Housing Removal Tool, Vertical Pin Header, 3 Pair	408-8645	1725634-1
	Housing Removal Tool, Vertical Header, 2 Pair	408-8645	1583234-1
	Extraction Tool, Individual Pin, Header, 4, 3, 2 Pair	408-8646	1583237-1
	Chiclet Removal Tool, Receptacle, 4 Pair	408-8647	1583248-1
	Chiclet Removal Tool, Receptacle, 3 Pair	408-8867	1673952-1
	Chiclet Removal Tool, Receptacle, 2 Pair	408-8647	1583249-1
	Insertion Tool, Individual Pin, Header, 4, 3, 2 Pair	408-8648	1583255-1
	Housing Removal Tool, Right Angle Header, 4 Pair	Note 1	1804174-1
	Housing Removal Tool, Right Angle Header, 3 Pair	Note 1	1804173-1
	Housing Removal Tool, Right Angle Header, 2 Pair	Note 1	1804171-1
	Chiclet Removal Tool, Right Angle Header, 4 Pair	Note 1	1804177-1
	Chiclet Removal Tool, Right Angle Header, 3 Pair	Note 1	1804176-1
	Chiclet Removal Tool, Right Angle Header, 2 Pair	Note 1	1804175-1
Cable to Board Insertion Tooling	Seating Tool, Vertical Cable Header, 4 Pair	408-8785	91373-1
	Seating Tool, Vertical Cable Header, 2 Pair	408-8785	91372-1
	Seating Tool, Right Angle Cable Header, 4 Pair	Note 1	1804244-1
	Seating Tool, Right Angle Cable Header, 2 Pair	408-8785	1804178-1
Cable to Board Repair Tooling	Housing Removal Tool, Vertical Header, 4 Pair	408-8645	1725635-1
	Housing Removal Tool, Vertical Header, 2 Pair	Note 1	1804170-1
	Housing Removal Tool, Right Angle Header, 4 Pair	Note 1	1804239-1
	Housing Removal Tool, Right Angle Header, 2 Pair	Note 1	1804172-1
	Chiclet Removal Tool, Right Angle Header, 4 Pair	Note 1	1804177-1
	Chiclet Removal Tool, Right Angle Header, 2 Pair	Note 1	1804175-1

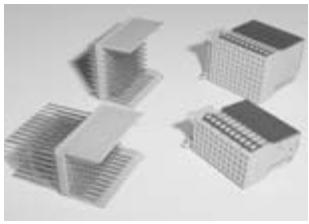
Note: 1. Contact Tyco Electronics for Instruction Sheet.

Compatible 2mm HM Products**Z-PACK 2mm HM Type A & B Connector Modules**

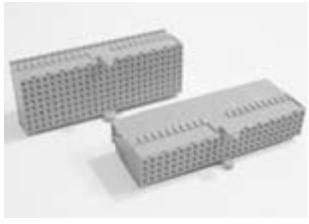
- Offered with five rows of signal contacts and two rows of ground contacts
- Type A offers center guiding and keying facility and 110 signal contacts
- Type B has 125 signal contacts
- Upper ground return shields are pre-fitted to receptacles and used with the 5+2 row male connectors
- Up to three levels of sequenced pins available on vertical pin headers
- Both types are end stackable without change in contact pitch

**Z-PACK 2mm HM Type D & E Connector Modules**

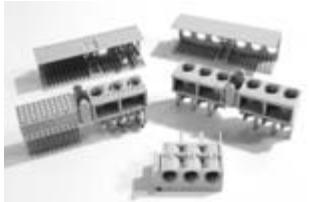
- Offered with 8 rows of signal contacts and two rows of ground contacts
- Type D offers center guiding and keying facility and 176 signal contacts
- Type E has 200 signal contacts
- Upper ground return shields are pre-fitted to receptacles and used with 8+2 row male connectors
- Up to three levels of sequenced pins available on vertical pin headers
- Both types are end stackable without change in contact pitch

**Z-PACK 2mm HM Type F & C Connector Modules**

- Half size modules which are intended for use at the end of a column
- Type C has 55 signal pins and guidance features
- Type F has 88 signal pins and guidance features
- Upper ground return shields are pre fitted to receptacles and used with 5+2 and 8+2 row connectors
- Three levels of sequenced pins available on vertical pin headers
- Both types are end stackable without change in contact pitch

**Type AB/ DE Modules**

- Offers maximum signal density and alignment features of standard Type A & D modules
- Type AB offers 125 signal contacts and guiding and keying features
- Type DE offers 200 signal contacts and guiding and keying features
- Offers all the advantages of sequenced pins, pre-shielded receptacles and end stackable

**Type L M & N Connectors**

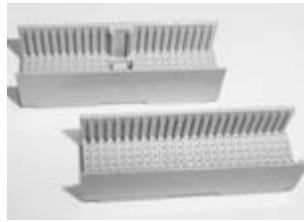
- DIN contacts can be fitted to types L, M and N style housings either in power or coax options
- 5 row and 5+2 row connector options
- Type L accommodates up to 6 DIN contacts
- Type M connectors are loaded with 55 signal contacts in row A to E and 3 cavities for DIN style contacts
- Type N accommodates up to 3 DIN contacts

**Receptacles with Upper and Lower Ground Return Shields**

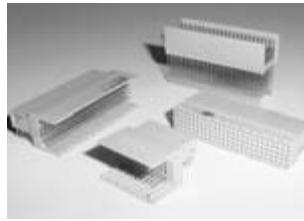
- Mates with 5+2 and 8+2 row male product to improve signal integrity
- Three levels of performance
 - a) reduced cross talk
 - b) ground return shields
 - c) reduced cross talk and ground return shields

**Z-PACK 2mm HM Connector Coding Keys**

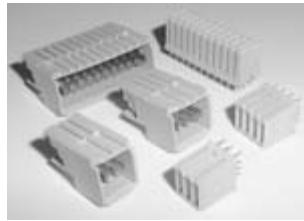
- Used in Type A, D, L and M male and female connectors
- Polarized features and used in the multi-purpose center of the male and female housings
- Keys are inserted in the mating faces of the housings
- Available in up to 70 different options

**Shrouds**

- Offered in type A, B, A/B, C, D, E, D/E, and F
- Product is offered in various standoff heights to accommodate a wide variety of pcb thicknesses

**Right Angle Male Offering**

- 5 row connector offering Type A, B & C style product mate with respective right angle product for card extender applications
- Type A has 110 signal contacts and center guidance and keying facility
- Type B offered in 25, 22 & 19 column offerings
- Type C has 55 signal contacts and guidance features
- Available in standard and reduced cross talk varieties

**Universal Power Module**

- Offered in 3 to 12 position sizes
- Inverse sex configuration offers a vertical receptacle for backplane applications
- Polarized vertical press fit leads
- Up to 15 amperes per contact with a durability rating of 250 mating cycles

**Vertical Receptacles**

- 5 & 8 row product offering
- Used with either vertical or right angle males in application
- Type A & D offers center keying and guidance
- Type B & E offers 25 columns of signal contacts
- Type C & F is a half size module with guidance features

Table of Contents**Z-PACK HS3 Connector**

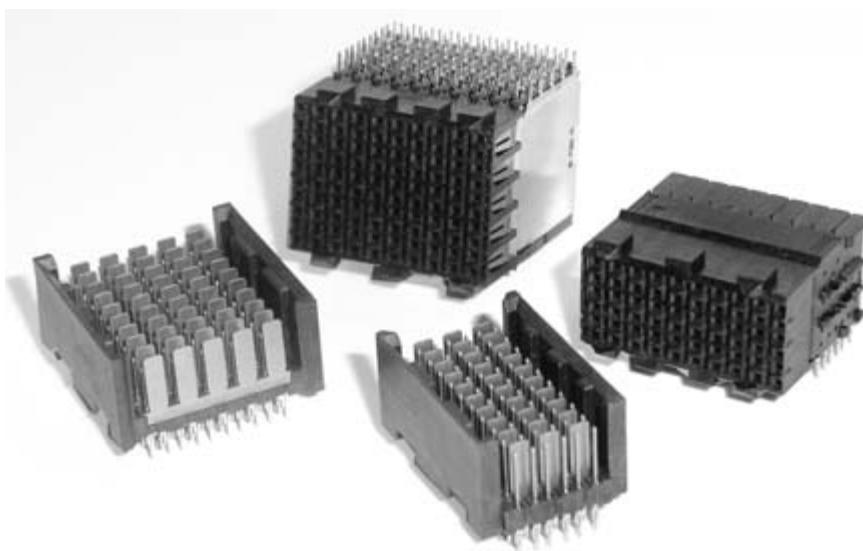
Product Line Overview	46-48
Part Number Selection Chart	49, 50
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Coding Keys (10 Row Only)	76
Power and Guide Hardware	76-81
Mating Sequence Chart	82
Application Tooling and Equipment	83

Product Line Overview**Product Facts**

- High speed, high density two piece board-to-board backplane connector
- Dual beam provides redundant contact for improved reliability
- For data rates of 6.2+ Gb/s
- 10 row, 100 high speed lines per 25.00 [.984]
- 6 row, 60 high speed lines per 25.00 [.984]
- Controlled impedance:
50 ohm Single Ended
100 ohm Differential
- Feedthrough versions for midplane applications
- 250 mating cycles
- End stackable on 2.50 [.098] centerline, signal pin to signal pin
- Advanced ESD/Power (10 Amps) using optional guide pins and power contacts

Applications

- High Speed Telecommunications Equipment
- Mid-range and high-end services
- Recognized under the Component Program of Underwriters Laboratories Inc., File No. E28476

**High Speed Backplane Connectors****Z-PACK HS3 Connector**

The emergence of high speed serial backplanes has forced interconnections to be able to transfer data at gigabit speeds.

The Z-PACK HS3 connector system has been specifically designed to support this generation of high speed serial data transfer. Tyco Electronics has incorporated a controlled impedance microstrip path through the connector to minimize signal degradation and

crosstalk. Compliant pins are used on both daughter-card and backplane.

This connector family is press fit and is compatible with other Z-PACK HM family connectors on the same board edge. Z-PACK HS3 connectors support data rates of 6.2+ Gb/s per differential pair. The 6 row version is optimized for 20.32mm or 0.8 inch card centerline applications, while the 10 row version is

optimized for high density for 25.4mm or 1.0 inch card centerline applications.

The Tyco Electronics Universal Power Module (UPM) is designed to be compatible with the Z-PACK HS3 connector.

Static Discharge Guide/Power Pins, Guide Pin/Power Receptacles, Universal Guide Pin and Receptacles, and Coding Keys (10 row only) are also available.

Availability

Fully validated SPICE models: E-mail requests to modeling@tycoelectronics.com

Samples: go to <http://tycoelectronics.custhelp.com>

Pro/E models and IGES models: E-mail requests to TycoCAD@tycoelectronics.com

White Papers: available on product website at <http://hs3.tycoelectronics.com>

Electrical Performance Report: <http://hs3.tycoelectronics.com>

6 row EPR #1308505; 10 row EPR #1308506

Routing Guide: <http://hs3.tycoelectronics.com>

Routing Guide #20GC004-1

<http://hs3.tycoelectronics.com>

Technical Documents**Product Specification**

108-1957

Application Specification

114-13020

Qualification Test Report

501-501

Material and Finish

Contact Area Finish — 0.80 μ m Au min. over 1.3 μ m Ni min.

Compliant Pin Finish — 0.8 μ m SnPb min. over 1.3 μ m Ni min.

Contact — Copper Alloy

Housing — Glass filled polyester, 94V-0 rated

Ratings

Current — 1.15A per fully energized

Operating Voltage — 250 VAC max.

Temperature — -65°C to 105°C

Mating Force — 0.75N max. per contact (signal = 1 contact, ground = 1 contact)

Durability — 250 cycles

* Reference Product Spec. 108-1957 for complete list of performance data.

Performance Specifications**Electrical Characteristics****Characteristic Impedance** — $100 \pm 10\%$ Ohms**Nominal Resistance** — $21 \text{ m}\Omega$ **Crosstalk** — See table at right**Insertion Loss** — See chart below**High Speed Backplane Connectors****Z-PACK HS3 Connector** (Continued)**Asynchronous Diff. NEXT (%)**

Edge rate 20-80%	HS3 10-Row Measured Noise Totals			
	50 ps	100 ps	150 ps	250 ps
BC Pair Total NEXT	2.3%	1.9%	1.7%	1.3%
DE Pair Total NEXT	4.0%	3.3%	3.0%	2.4%
FG Pair Total NEXT	4.0%	3.4%	3.1%	2.7%
HJ Pair Total NEXT	2.3%	1.9%	1.7%	1.5%

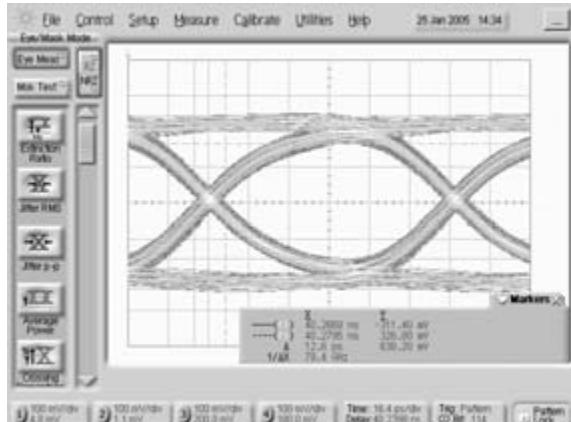
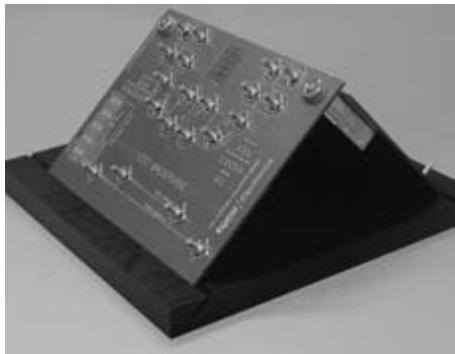
Synchronous Diff. NEXT (%)

Edge rate 20-80%	HS3 10-Row Measured Noise Totals			
	50 ps	100 ps	150 ps	250 ps
BC Pair Total FEXT	0.5%	0.3%	0.3%	0.2%
DE Pair Total FEXT	1.5%	0.8%	0.5%	0.5%
FG Pair Total FEXT	1.4%	0.8%	0.7%	0.5%
HJ Pair Total FEXT	1.0%	0.6%	0.4%	0.3%

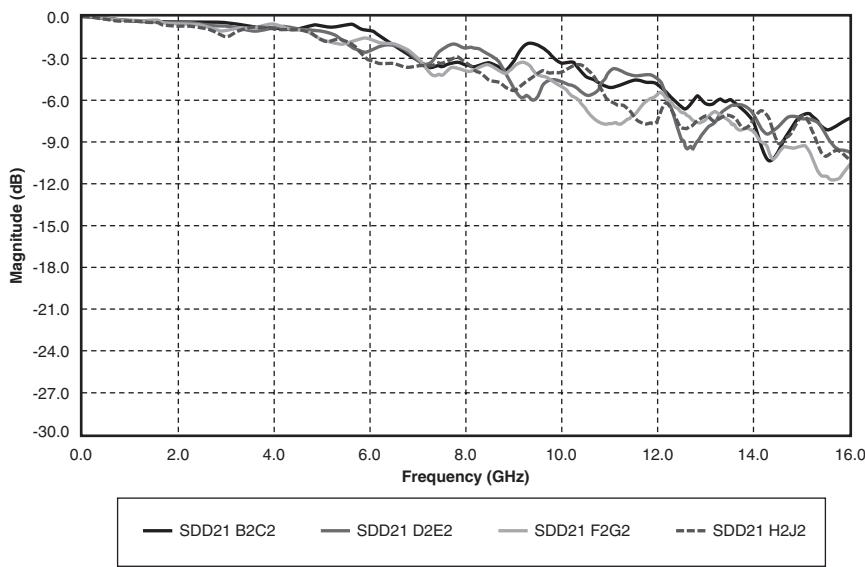
Edge rates specified are at the connector.

Noise includes 1.60 [.063] footprints on both sides of the connector.

Totals include contributions from 8 adjacent aggressor pairs.



**PRBS 2⁷-1 data pattern
10 Gb/s data rate
BC Pair
64% Eye Opening
12.6ps Jitter**



Calibrated to include only the connector and the 1.60 [.063] footprints on both sides of the connector.

Z-PACK HS3 Connector: Printed Circuit Design Rules for Backplane Routing

Using Standard Commercial Design Rules

This table lists routing specifications which meet design rules practiced by most printed circuit board vendors. This table should be used to route the Z-PACK HS3 connector for most applications and especially under one or more of these considerations:

1. Edge rates require the widest conductors possible.
2. Backplanes having layer counts above 16.
3. Backplanes which exceed 508mm (20") in length or width.
4. Cost is a major factor.

Using Advanced Design Rules

This table lists routing specifications which can be built by a limited number of leading edge printed circuit vendors using advanced design rules. This table can be used as a reference for Z-PACK HS3 connector in backplane applications where very high density is a major factor. The PCB vendor should be consulted regarding applicability of these rules to a specific design. Consideration should be given to the following:

1. Signal layer count reduction is possible with these design rules.
2. Backplanes which exceed 508mm (20") in length or width generally cannot be built with these rules.
3. Cost factors can potentially be higher.

Z-PACK HS3 Connector Routing Pattern

For more details request
Report #20GC004-1
or visit
[http://www.tycoelectronics.com/
products/simulation/files/
papers/20GC004_1.pdf](http://www.tycoelectronics.com/products/simulation/files/papers/20GC004_1.pdf)

Finished Hole Dia.	Drilled Hole Dia.	Pad Dia.	Annular Ring	Pad-Pad Spacing 63 mils (1.58mm) C/C	Conductor Routing Options	
					5 mil spacing	6 mil spacing
24 mils 0.6mm	28 mils 0.7mm	44 mils 1.1mm	2 mils 0.05mm	19 mils 0.475mm	9 mils 0.225mm	7 mils 0.175mm
24 mils 0.6mm	28 mils 0.7mm	42 mils 1.05mm	1 mil 0.025mm	21 mils 0.525mm	11 mils 0.275mm	9 mils 0.225mm
24 mils 0.6mm	28 mils 0.7mm	40 mils 1.0mm	tangency	23 mils 0.575mm	13 mils 0.325mm	11 mils 0.275mm

Commercial Design Rules:

Minimum pad diameter for tangency: Drill Diameter (D)+12 mils (0.3mm)

Hole location tolerance: +/- 3 mils (0.075mm)

Pad/Pad artwork tolerance: +/- 2 mils (0.05mm)

Feature tolerance (1 oz foil): +/- 0.075 mils (0.0175mm)

Finished Hole Dia.	Drilled Hole Dia.	Pad Dia.	Annular Ring	Pad-Pad Spacing 63 mil (1.58mm) C/C	Conductor Routing Options	
					5 mil spacing	6 mil spacing
24 mils 0.6mm	28 mils 0.7mm	38 mils 0.95mm	tangency	25 mils 0.625mm	15 mils 0.35mm	13 mils 0.3mm
Two Conductor Routing						
24 mils 0.6mm	28 mils 0.7mm	42 mils 1.05mm	2 mils 0.05mm	21 mils 0.525mm	4.5 mil lines/4 mil spacing 0.11mm lines/0.09mm spacing	
24 mils 0.6mm	28 mils 0.7mm	40 mils 1.0mm	1 mil 0.025mm	23 mils 0.575mm	5.5 mil lines/4 mil spacing 0.125mm lines/0.1mm spacing	

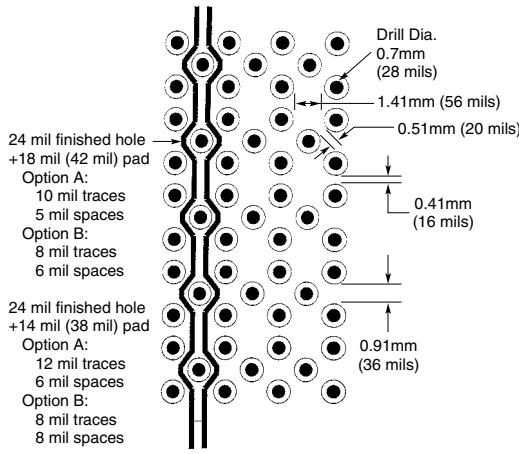
Advanced Design Rules:

Minimum pad diameter for tangency: Drill Diameter (D)+10 mils (0.25mm)

Hole location tolerance: +/- 2 mils (0.05mm)

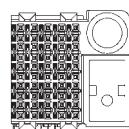
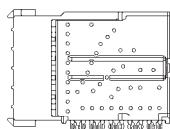
Pad/Pad artwork tolerance: +/- 2 mils (0.05mm)

Feature tolerance (1 oz foil): +/- 0.075 mils (0.0175mm)

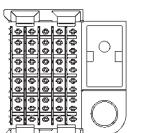
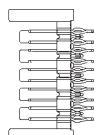


Part Number Selection Chart

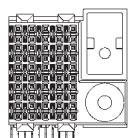
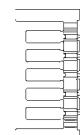
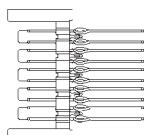
10 Row Z-PACK HS3 Connector



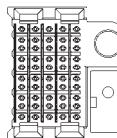
Part Number 120874
50 Position
Right Receptacle
Univ Pwr Guide Pin



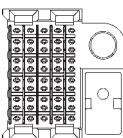
Part Number 120670
50 Position
Right Header
Univ Pwr Guide Pin



Part Number 120792
50 Position
Right Receptacle
ESD/HDI Guide Pin



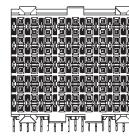
Part Number 120661
50 Position
Right Header
ESD/HDI Guide Pin



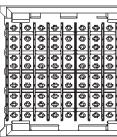
Part Number 120665
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Right Feed-Through
ESD/HDI Guide Pin



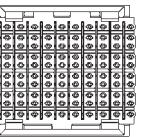
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ESD/HDI Guide Pin



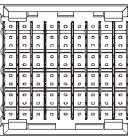
Part Number 120790
100 Position
Center Receptacle



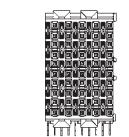
Part Number 120658
100 Position
Center Header



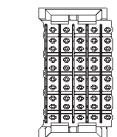
Part Number 120664
100 Position
Center Feed-Through



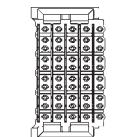
Part Number 120663
100 Position
Center Shroud



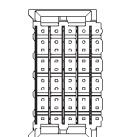
Part Number 120791
50 Position
Center Receptacle



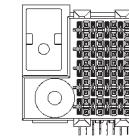
Part Number 120747
50 Position
Center Header



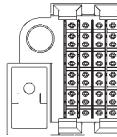
Part Number 120748
50 Position
Center Feed-Through



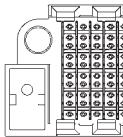
Part Number 120750
50 Position
Center Shroud



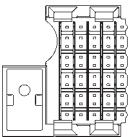
Part Number 120793
50 Position
Left Receptacle
ESD/HDI Guide Pin



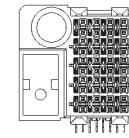
Part Number 120662
50 Position
Left Header
ESD/HDI Guide Pin



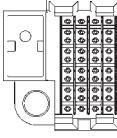
Part Number 120666
50 Position
Left Feed-Through
ESD/HDI Guide Pin



Part Number 120668
50 Position
Left Shroud
ESD/HDI Guide Pin



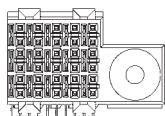
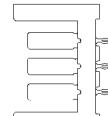
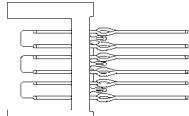
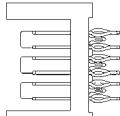
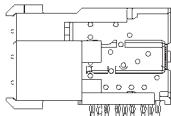
Part Number 120875
50 Position
Left Receptacle
Univ Pwr Guide Pin



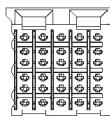
Part Number 120672
50 Position
Left Header
Univ Pwr Guide Pin

Part Number Selection Chart
6 Row Z-PACK HS3 Connector

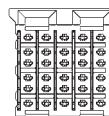
Z-PACK HS3 Connector (Continued)



Part Number 120788
30 Position
Right Receptacle



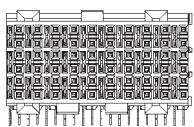
Part Number 120677
30 Position
Right Header



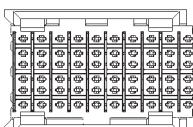
Part Number 120680
30 Position
Right Header
Feed-Through



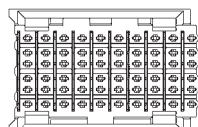
Part Number 120683
30 Position
Right Shroud



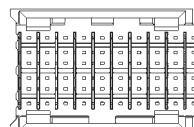
Part Number 120786
60 Position
Center Receptacle



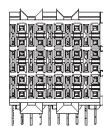
Part Number 120674
60 Position
Center Header



Part Number 120679
60 Position
Center Header
Feed-Through



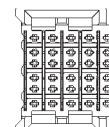
Part Number 120682
60 Position
Center Shroud



Part Number 120787
30 Position
Center Receptacle



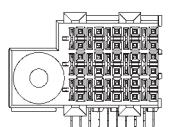
Part Number 120732
30 Position
Center Header



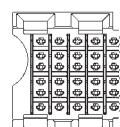
Part Number 120742
30 Position
Center Header
Feed-Through



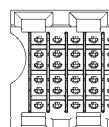
Part Number 120743
30 Position
Center Shroud



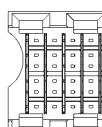
Part Number 120789
30 Position
Left Receptacle



Part Number 120678
30 Position
Left Header



Part Number 120681
30 Position
Left Header
Feed-Through

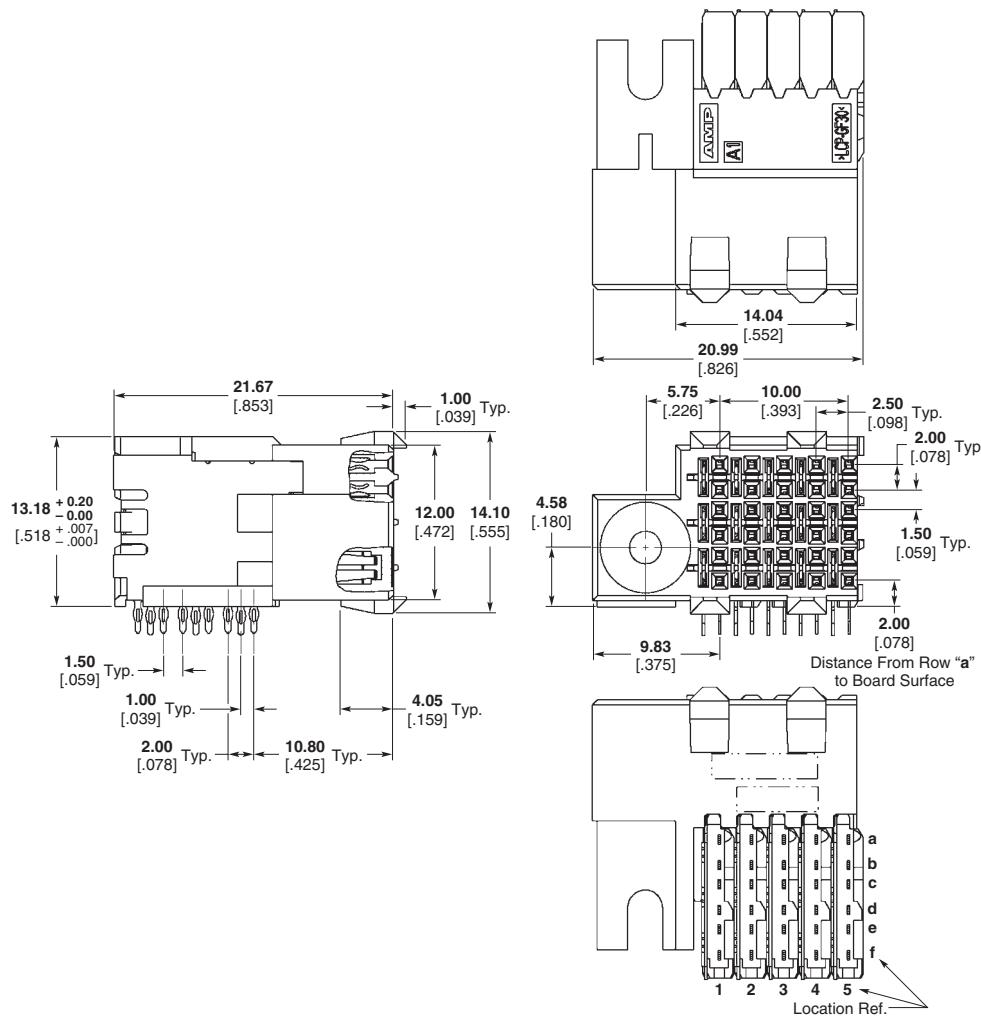


Part Number 120684
30 Position
Left Shroud

**Right Angle Receptacle
6 Row, Left Module
(accepts ESD Guide Pin)**

High Speed Backplane Connectors

Z-PACK HS3 Connector (Continued)



Pin Header Assemblies

Number of Positions	Part Number	Application Tooling					
		Insertion IS Sheet	Hsg Removal IS Sheet	IS Sheet	Chiclet Removal IS Sheet	IS Sheet	
30	120789-1	1338742-1	408-8394	1338744-1	408-8393	1338745-1	408-8410

P.C.B. Hole Dimensions

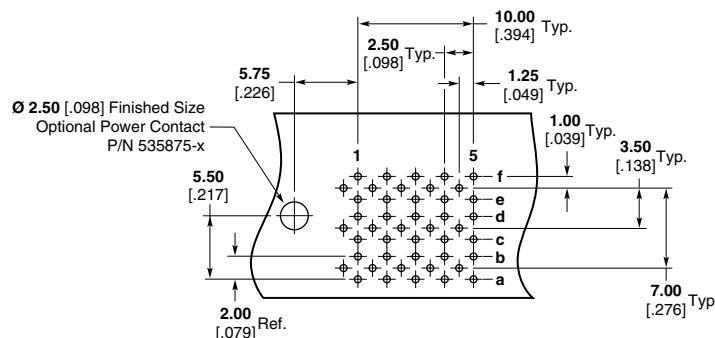
Drilled Hole — $0.7 \pm 0.025\text{mm}$

Fin. Hole — 0.55 to 0.65mm

Cu-thickness — 0.025 to 0.050mm

SnPb-thickness — 0.004 to 0.010mm

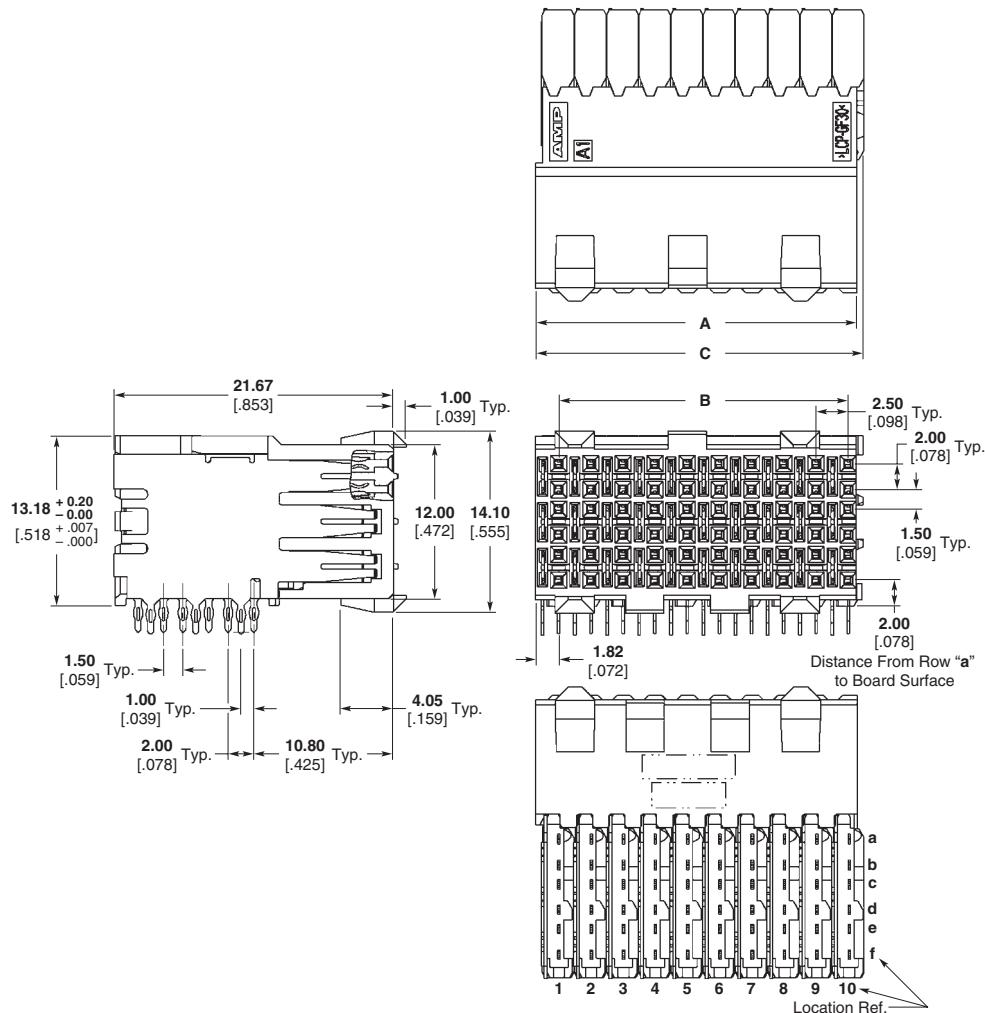
Note: For finishes other than tin-lead, reference Application Specification 114-13020.



**Recommended PC Board Layout
(Component Side Shown)**

Right Angle Receptacle
(Continued)
6 Row, Center Module

Z-PACK HS3 Connector (Continued)



Pin Header Assemblies

Number of Positions	Dimensions			Part Number	Insertion	IS Sheet	Application Tooling			IS Sheet
	A	B	C				Hsg Removal	IS Sheet	Chiclet Removal	
60	24.88 .980	22.50 .886	25.40 1.00	120786-1	1338742-2	408-8394	1338744-1	408-8393	1338745-1	408-8410
30	12.38 .487	10.00 .394	12.90 .508	120787-1	1338742-1	408-8394	1338744-1	408-8393	1338745-1	408-8410

P.C.B. Hole Dimensions

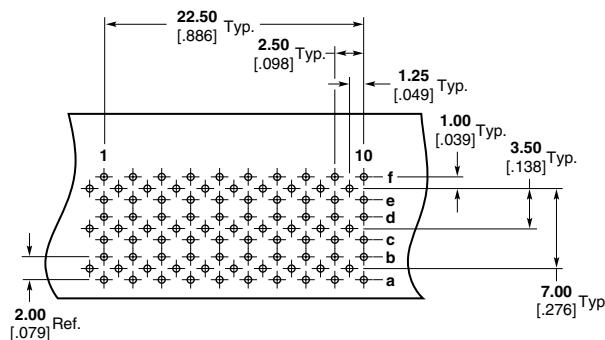
Drilled Hole — 0.7±0.025mm

Fin. Hole — 0.55 to 0.65mm

Cu-thickness — 0.025 to 0.050mm

SnPb-thickness — 0.004 to 0.010mm

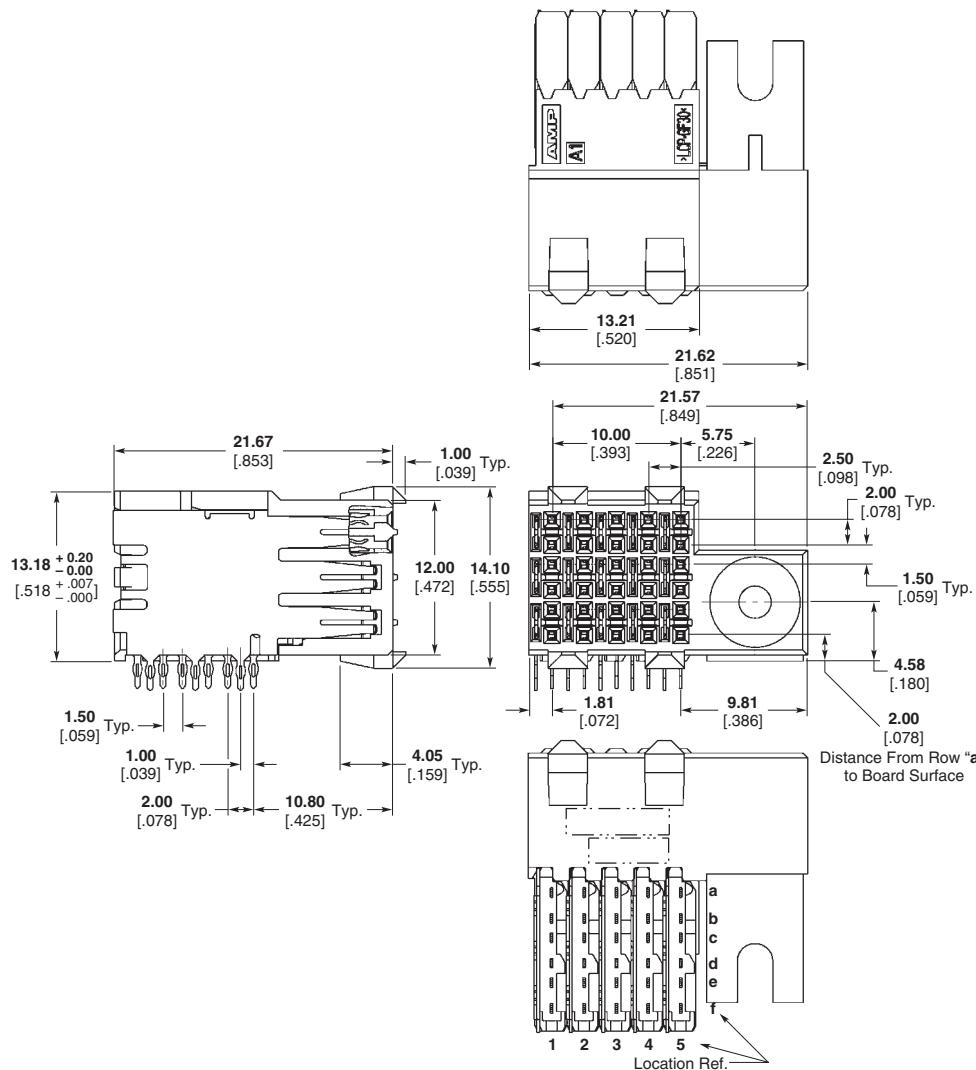
Note: For finishes other than tin-lead, reference Application Specification 114-13020.



Recommended PC Board Layout
(Component Side Shown)

Right Angle Receptacle

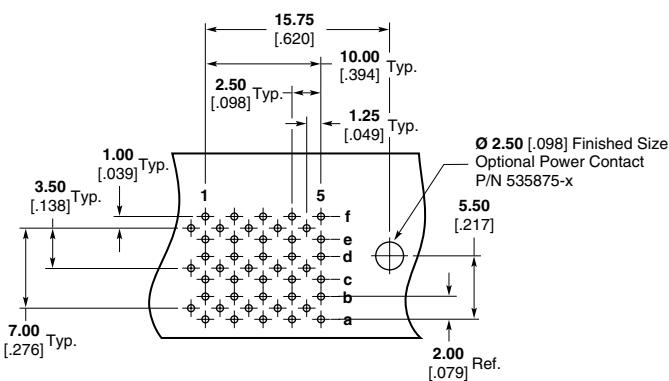
(Continued)

**6 Row, Right Module
(accepts ESD Guide Pin)****Pin Header Assemblies**

Number of Positions	Part Number	Application Tooling					
		Insertion IS Sheet	Hsg Removal IS Sheet	IS Sheet	Chiclet Removal IS Sheet	IS Sheet	
30	120788-1	1338742-1	408-8394	1338744-1	408-8393	1338745-1	408-8410

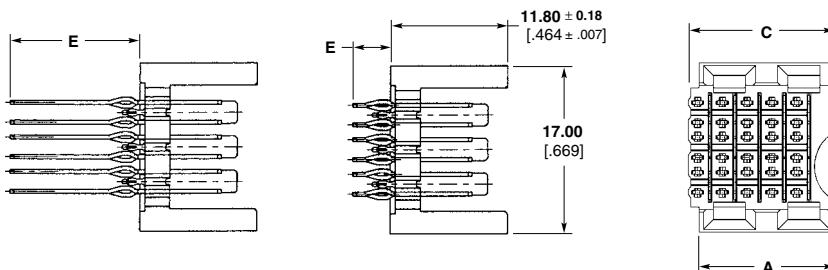
P.C.B. Hole Dimensions**Drilled Hole** — $0.7 \pm 0.025\text{mm}$ **Fin. Hole** — 0.55 to 0.65mm **Cu-thickness** — 0.025 to 0.050mm **SnPb-thickness** — 0.004 to 0.010mm

Note: For finishes other than tin-lead, reference Application Specification 114-13020.

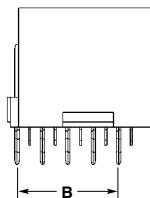


Recommended PC Board Layout
(Component Side Shown)

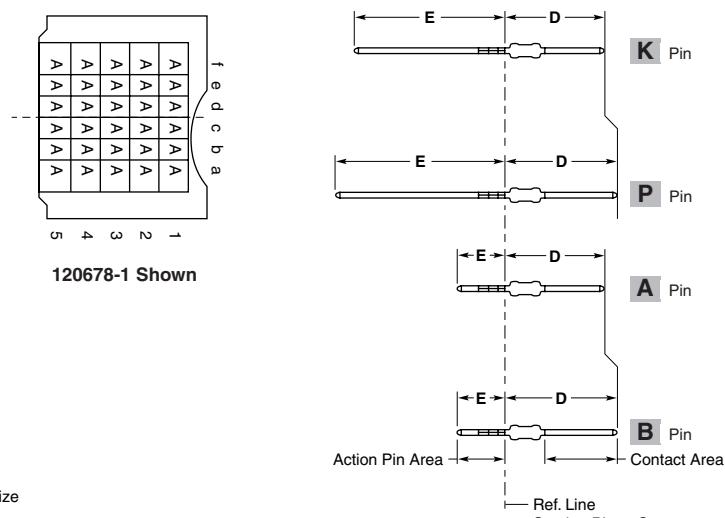
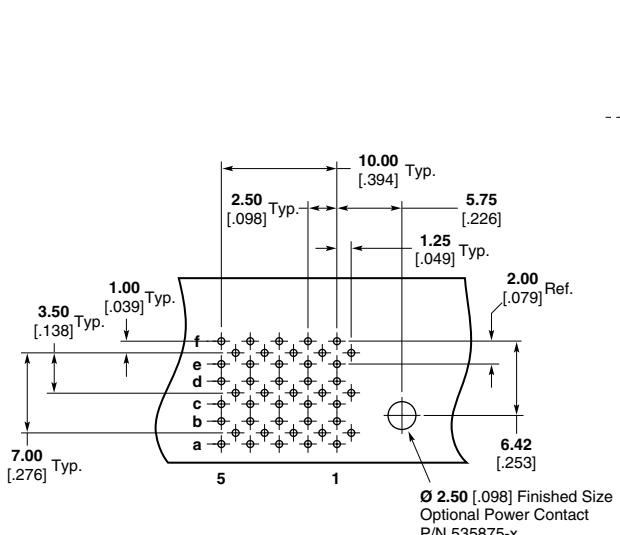
**Vertical Pin Header Assemblies
6 Row, Left Module
(accepts ESD Guide Pin)**

**P.C.B. Hole Dimensions****Drilled Hole** — $0.7 \pm 0.025\text{mm}$ **Fin. Hole** — 0.55 to 0.65mm**Cu-thickness** — 0.025 to 0.050mm**SnPb-thickness** — 0.004 to 0.010mm

Note: For finishes other than tin-lead, reference Application Specification 114-13020.

**Pin Header Assemblies**

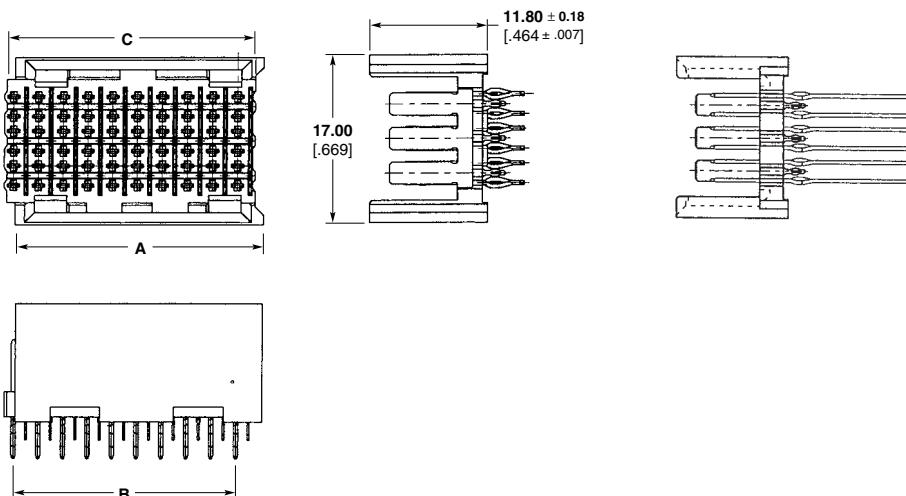
Number of Positions	Dimensions					Pin Ref.	Part Numbers	Application Tooling					
	A	B	C	D	E			Seating	IS Sheet	Signal Pin Repair Kit	IS Sheet	Ground Blade Repair Kit	
30	13.70 .539	10.00 .393	14.80 .583	8.20 .322	3.70 .145	A	120678-1	91313-1	408-4546	354687-2	408-9979	1320534-1	408-4573
	13.70 .539	10.00 .393	14.80 .583	9.70 .381	3.70 .145	B	120678-2	91313-1	408-4546	354687-2	408-9979	1320534-1	408-4573
	13.70 .539	10.00 .393	14.80 .583	8.20 .322	13.00 .511	K	120681-1	91313-1	408-4546	354687-2	408-9979	1320534-1	408-4573
	13.70 .539	10.00 .393	14.80 .583	9.70 .381	14.50 .570	P	120681-2	91313-1	408-4546	354687-2	408-9979	1320534-1	408-4573



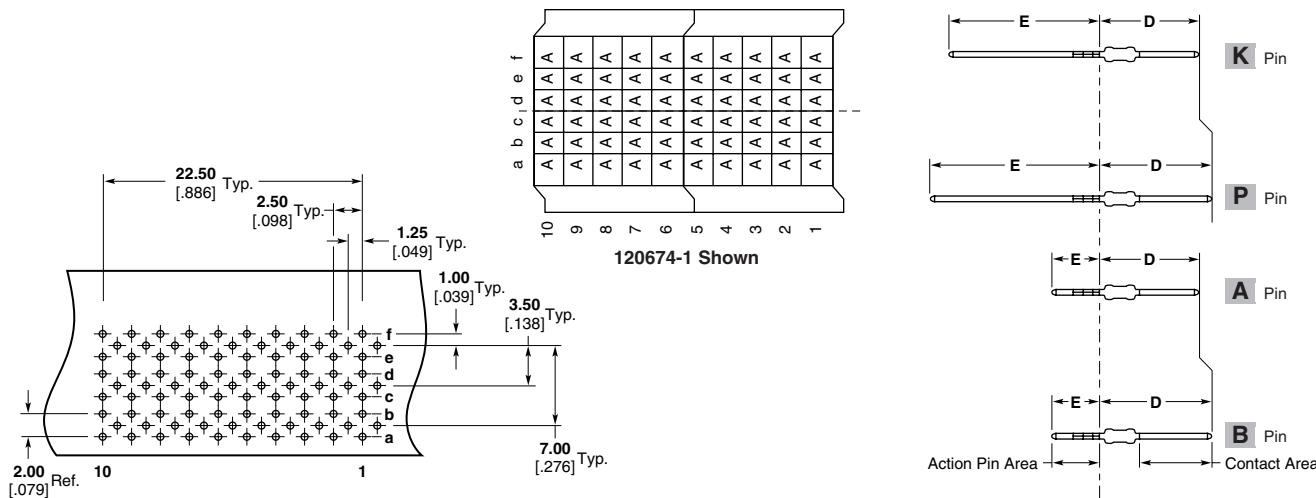
**Recommended PC Board Layout
(Component Side Shown)
For Non-Midplane Applications
For Midplane Applications Reference Page 60**

Vertical Pin Header Assemblies (Continued)
6 Row, Center Module
P.C.B. Hole Dimensions**Drilled Hole** — $0.7 \pm 0.025\text{mm}$ **Fin. Hole** — 0.55 to 0.65mm **Cu-thickness** — 0.025 to 0.050mm **SnPb-thickness** — 0.004 to 0.010mm

Note: For finishes other than tin-lead, reference Application Specification 114-13020.

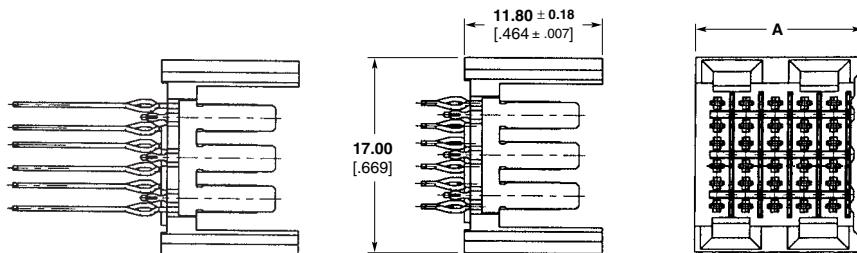
**Pin Header Assemblies**

Number of Positions	Dimensions					Pin Ref.	Part Numbers	Application Tooling					
	A	B	C	D	E			Seating	IS Sheet	Signal Pin Repair Kit	IS Sheet	Ground Blade Repair Kit	
60	24.90 .980	22.50 .885	24.90 .980	8.20 .322	3.70 .145	A	120674-1	91313-2	408-4546	354687-2	408-9979	1320534-1	408-4573
	24.90 .980	22.50 .885	24.90 .980	9.70 .381	3.70 .145	B	120674-2	91313-2	408-4546	354687-2	408-9979	1320534-1	408-4573
	24.90 .980	22.50 .885	24.90 .980	8.20 .322	13.00 .511	K	120679-1	91313-2	408-4546	354687-2	408-9979	1320534-1	408-4573
	24.90 .980	22.50 .885	24.90 .980	9.70 .381	14.50 .570	P	120679-2	91313-2	408-4546	354687-2	408-9979	1320534-1	408-4573
30	12.41 .488	10.00 .393	12.40 .488	8.20 .322	3.70 .145	A	120732-1	91313-1	408-4546	354687-2	408-9979	1320534-1	408-4573
	12.41 .488	10.00 .393	12.40 .488	9.70 .381	3.70 .145	B	120732-2	91313-1	408-4546	354687-2	408-9979	1320534-1	408-4573
	12.41 .488	10.00 .393	12.40 .488	8.20 .322	13.00 .511	K	120742-1	91313-1	408-4546	354687-2	408-9979	1320534-1	408-4573
	12.41 .488	10.00 .393	12.40 .488	9.70 .381	14.50 .570	P	120742-2	91313-1	408-4546	354687-2	408-9979	1320534-1	408-4573

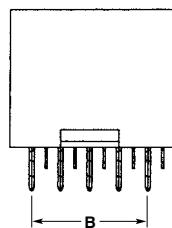


Recommended PC Board Layout (Component Side Shown)
For Non-Midplane Applications
For Midplane Applications Reference Page 60

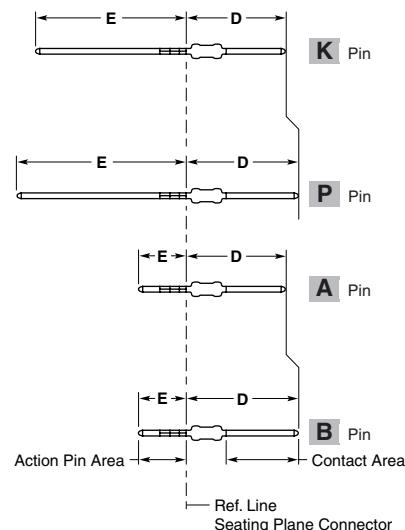
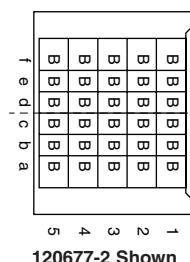
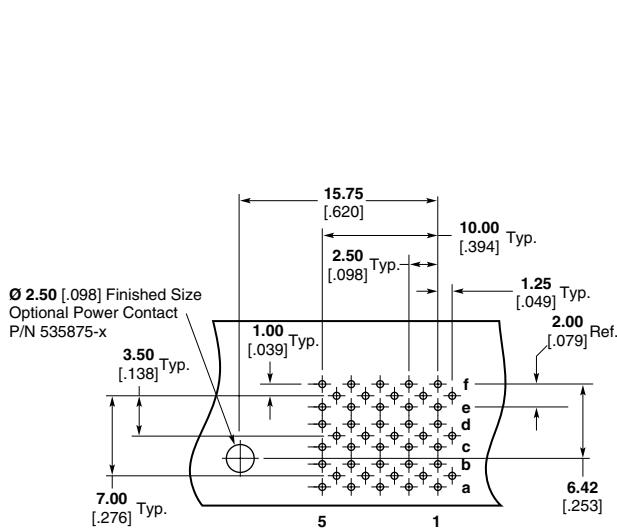
Vertical Pin Header Assemblies (Continued)
6 Row, Right Module (accepts ESD Guide Pin)

P.C.B. Hole Dimensions**Drilled Hole** — $0.7 \pm 0.025\text{mm}$ **Fin. Hole** — 0.55 to 0.65mm **Cu-thickness** — 0.025 to 0.050mm **SnPb-thickness** — 0.004 to 0.010mm 

Note: For finishes other than tin-lead, reference Application Specification 114-13020.

**Pin Header Assemblies**

Number of Positions	Dimensions				Pin Ref.	Part Numbers	Application Tooling					
	A	B	D	E			Seating	IS Sheet	Signal Pin Repair Kit	IS Sheet	Ground Blade Repair Kit	IS Sheet
30	14.45 .568	10.00 .393	8.20 .322	3.70 .145	A	120677-1	91313-1	408-4546	354687-2	408-9979	1320534-1	408-4573
	14.45 .568	10.00 .393	9.70 .381	3.70 .145	B	120677-2	91313-1	408-4546	354687-2	408-9979	1320534-1	408-4573
	14.45 .568	10.00 .393	8.20 .322	13.00 .511	K	120680-1	91313-1	408-4546	354687-2	408-9979	1320534-1	408-4573
	14.45 .568	10.00 .393	9.70 .381	14.50 .570	P	120680-2	91313-1	408-4546	354687-2	408-9979	1320534-1	408-4573



Recommended PC Board Layout (Component Side Shown)
For Non-Midplane Applications
For Midplane Applications Reference Page 60

**Vertical Pin Header
Shrouds
6 Row, Left Module**

P.C.B. Hole Dimensions

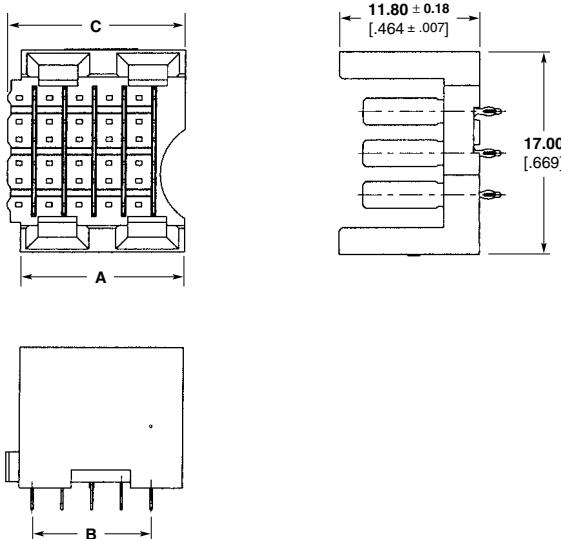
Drilled Hole — 0.7 ± 0.025 mm

Fin. Hole — 0.55 to 0.65mm

Cu-thickness — 0.025 to 0.050mm

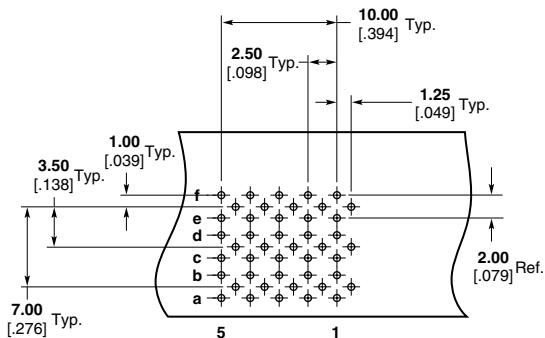
SnPb-thickness — 0.004 to 0.010mm

Note: For finishes other than tin-lead, reference Application Specification 114-13020.

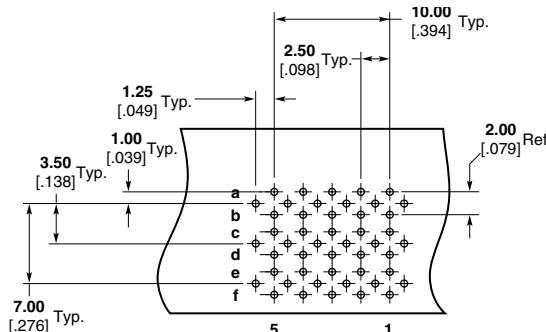


Pin Header Assemblies

Number of Positions	Dimensions			Part Number	Application Tooling		
	A	B	C		Insertion	IS Sheet	Ground Blade Repair Kit
30	13.70 .537	10.00 .393	14.80 .582	120684-1	91313-1	408-4546	1320534-1 408-4573



Non-Coplanar Daughtercards
(Pin 1a Header = Pin 1f Shroud Side)
Recommended PC Board Layout — Reference Page 60
(Shroud Side Shown)



Coplanar Daughtercards
(Pin 1a Header = Pin 5a Shroud Side)
Recommended PC Board Layout — Reference Page 60
(Shroud Side Shown)

**Vertical Pin Header
Shrouds (Continued)**
6 Row, Center Module

P.C.B. Hole Dimensions

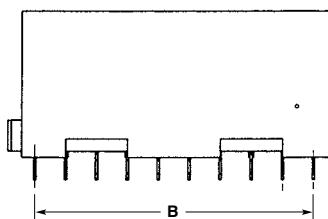
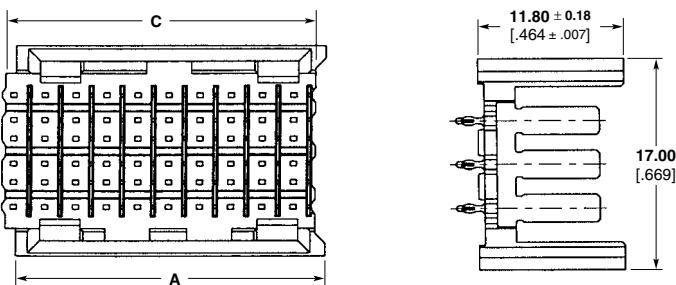
Drilled Hole — 0.7 ± 0.025 mm

Fin. Hole — 0.55 to 0.65mm

Cu-thickness — 0.025 to 0.050mm

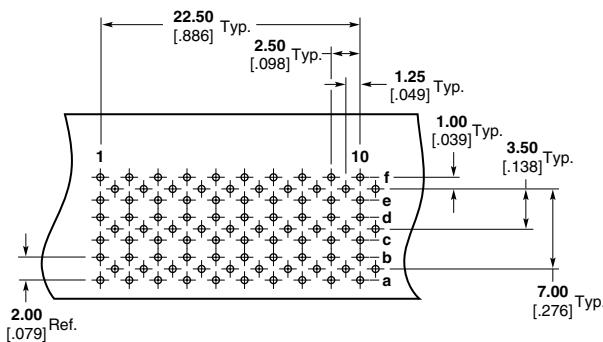
SnPb-thickness — 0.004 to 0.010mm

Note: For finishes other than tin-lead, reference Application Specification 114-13020.

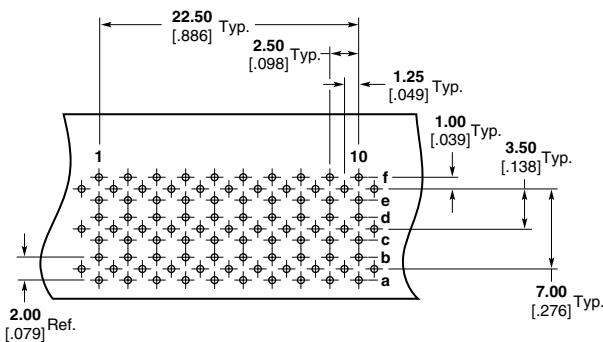


Pin Header Assemblies

Number of Positions	Dimensions			Part Number	Application Tooling		
	A	B	C		Insertion	IS Sheet	Ground Blade Repair Kit
60	24.90 .980	22.50 .885	24.90 .980	120682-1	91313-2	408-4546	1320534-1 408-4573
30	12.57 .494	10.00 .393	12.40 .488	120743-1	91313-1	408-4546	1320534-1 408-4573



Non-Coplanar Daughtercards
(Pin 1a Header = Pin 1f Shroud Side)
Recommended PC Board Layout — Reference Page 60
(Shroud Side Shown)



Coplanar Daughtercards
(Pin 1a Header = Pin 5a Shroud Side)
Recommended PC Board Layout — Reference Page 60
(Shroud Side Shown)

**Vertical Pin Header
Shrouds (Continued)
6 Row, Right Module**

P.C.B. Hole Dimensions

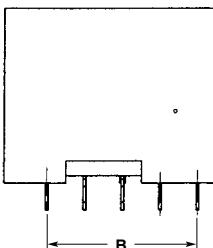
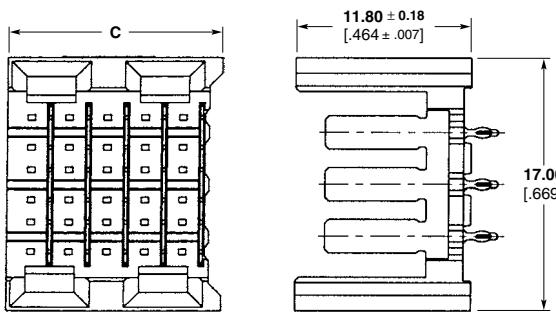
Drilled Hole — $0.7 \pm 0.025\text{mm}$

Fin. Hole — 0.55 to 0.65mm

Cu-thickness — 0.025 to 0.050mm

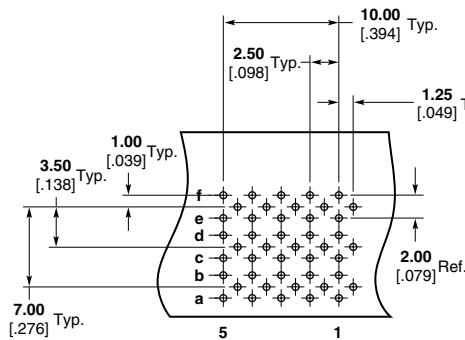
SnPb-thickness — 0.004 to 0.010mm

Note: For finishes other than tin-lead, reference Application Specification 114-13020.

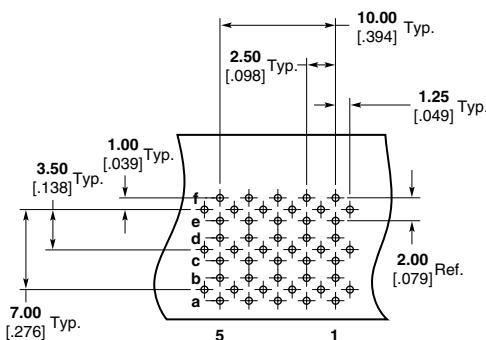


Pin Header Assemblies

Number of Positions	Dimensions			Part Number	Application Tooling			
	A	B	C		Insertion	IS Sheet	Ground Blade Repair Kit	IS Sheet
30	—	10.00 .393	14.20 .559	120683-1	91313-1	408-4546	1320534-1	408-4573



Non-Coplanar Daughtercards
(Pin 1a Header = Pin 1f Shroud Side)
Recommended PC Board Layout — Reference Page 60
(Shroud Side Shown)

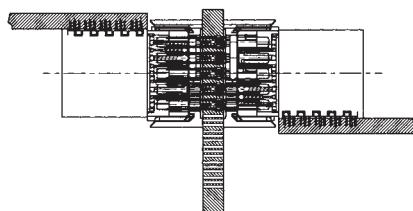


Coplanar Daughtercards
(Pin 1a Header = Pin 5a Shroud Side)
Recommended PC Board Layout — Reference Page 60
(Shroud Side Shown)

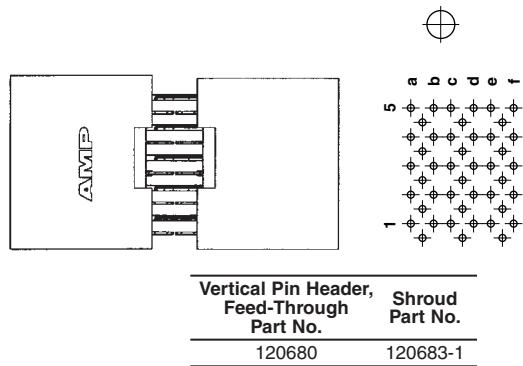
Z-PACK HS3 Connector (Continued)

Layout Guide for Midplane Applications
6 Row Connectors

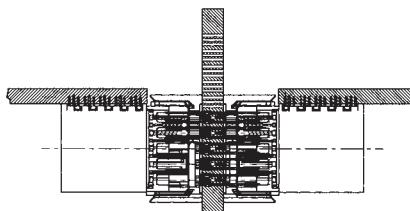
Non-Coplanar Applications



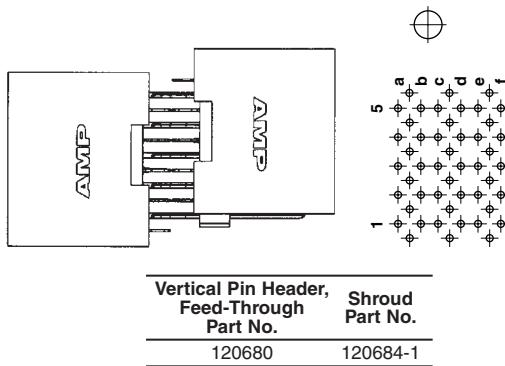
Right Module



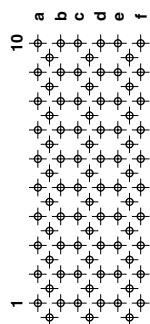
Coplanar Applications



Right Module

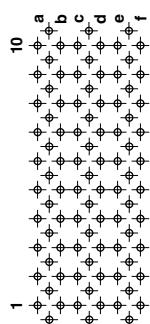


Center Module



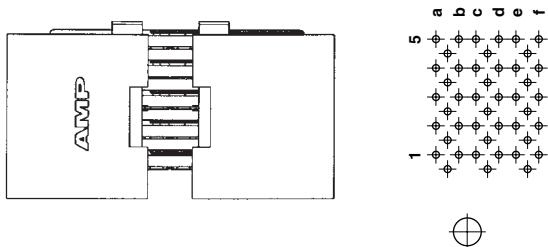
Vertical Pin Header, Feed-Through Part No.	Shroud Part No.
120679	120682-1

Center Module



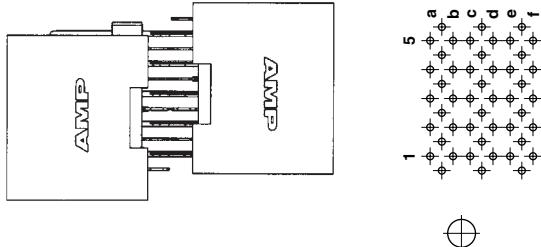
Vertical Pin Header, Feed-Through Part No.	Shroud Part No.
120679	120682-1

Left Module



Vertical Pin Header, Feed-Through Part No.	Shroud Part No.
120681	120684-1

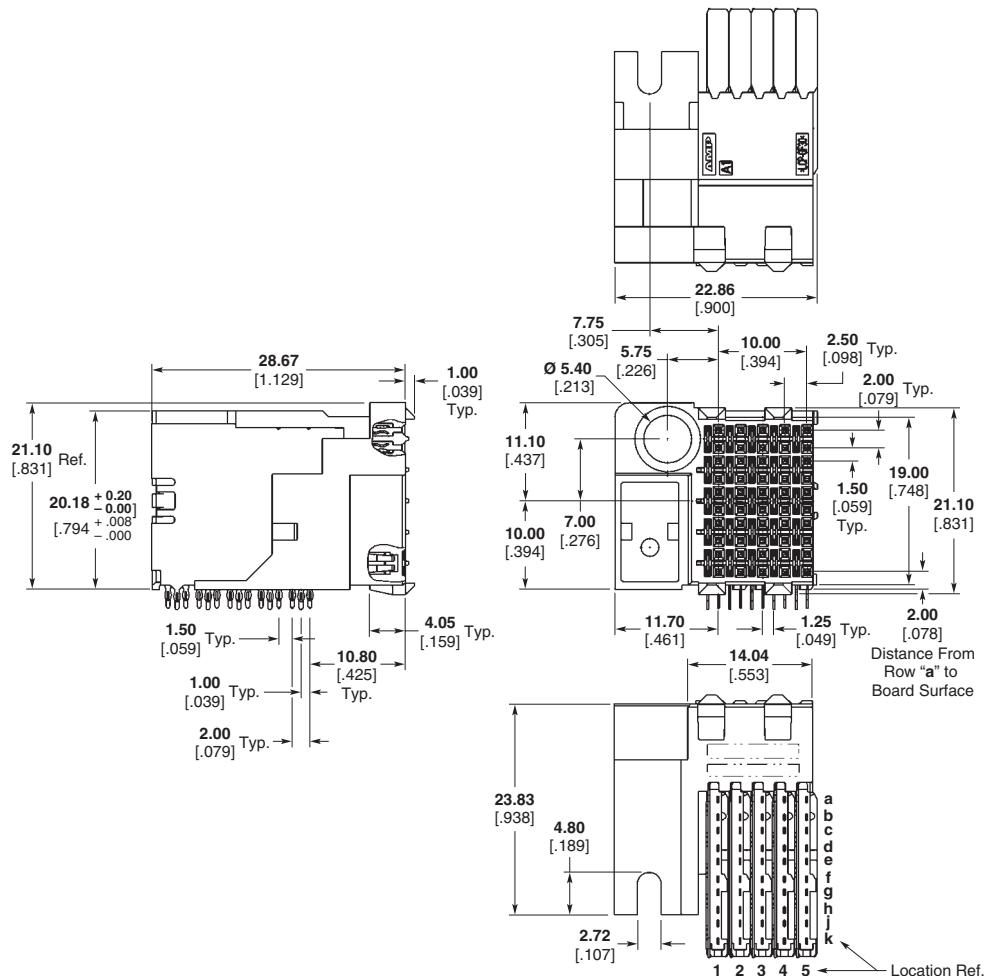
Left Module



Vertical Pin Header, Feed-Through Part No.	Shroud Part No.
120681	120683-1

Right Angle Receptacle

**10 Row, Left Module
(accepts Universal Guide Pin)**



Receptacle Assemblies

Number of Positions	Part Number	Application Tooling					
		Insertion IS Sheet	Hsg Removal IS Sheet	IS Sheet	Chiclet Removal IS Sheet	IS Sheet	
50	120875-1	1338743-1	408-8394	1338744-1	408-8393	1338746-1	408-8410

P.C.B. Hole Dimensions

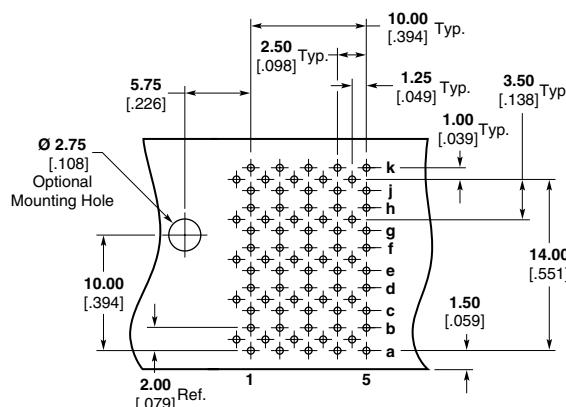
Drilled Hole — $0.7 \pm 0.025\text{mm}$

Fin. Hole — 0.55 to 0.65mm

Cu-thickness — 0.025 to 0.050mm

SnPb-thickness — 0.004 to 0.010mm

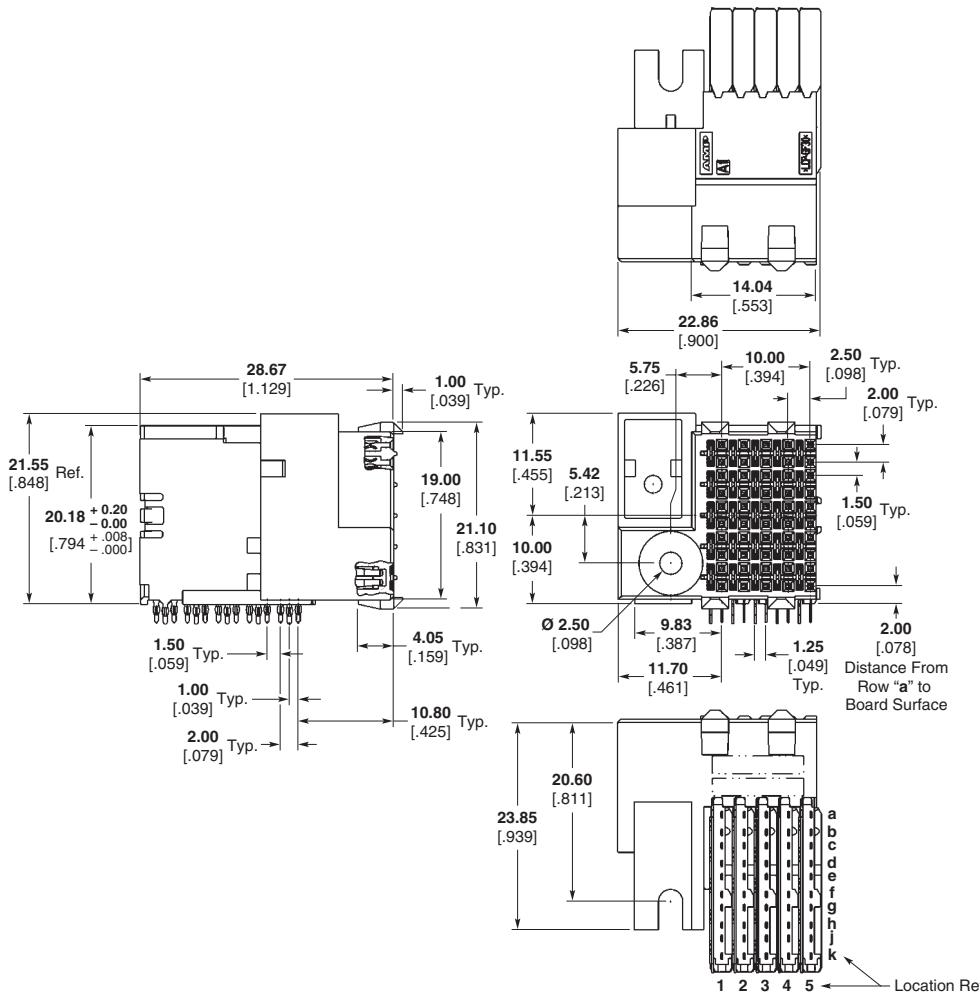
Note: For finishes other than tin-lead, reference Application Specification 114-13020.



Recommended PC Board Layout
(Component Side Shown)

Right Angle Receptacle

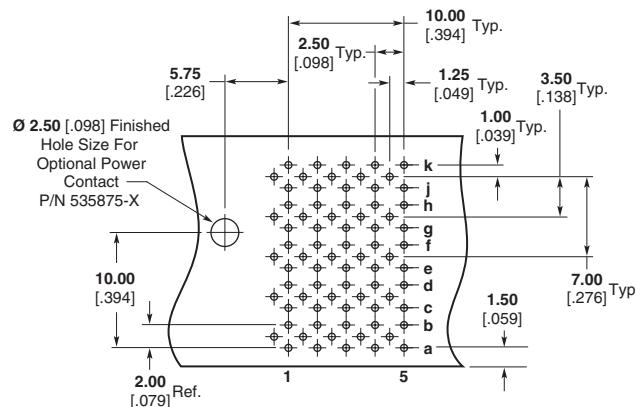
(Continued)

**10 Row, Left Module
(accepts ESD Guide Pin)****Z-PACK HS3 Connector (Continued)****Receptacle Assemblies**

Number of Positions	Part Number	Application Tooling					
		Insertion IS Sheet	Hsg Removal IS Sheet	IS Sheet	Chiclet Removal IS Sheet	IS Sheet	
50	120793-1	1338743-1	408-8394	1338744-1	408-8393	1338746-1	408-8410

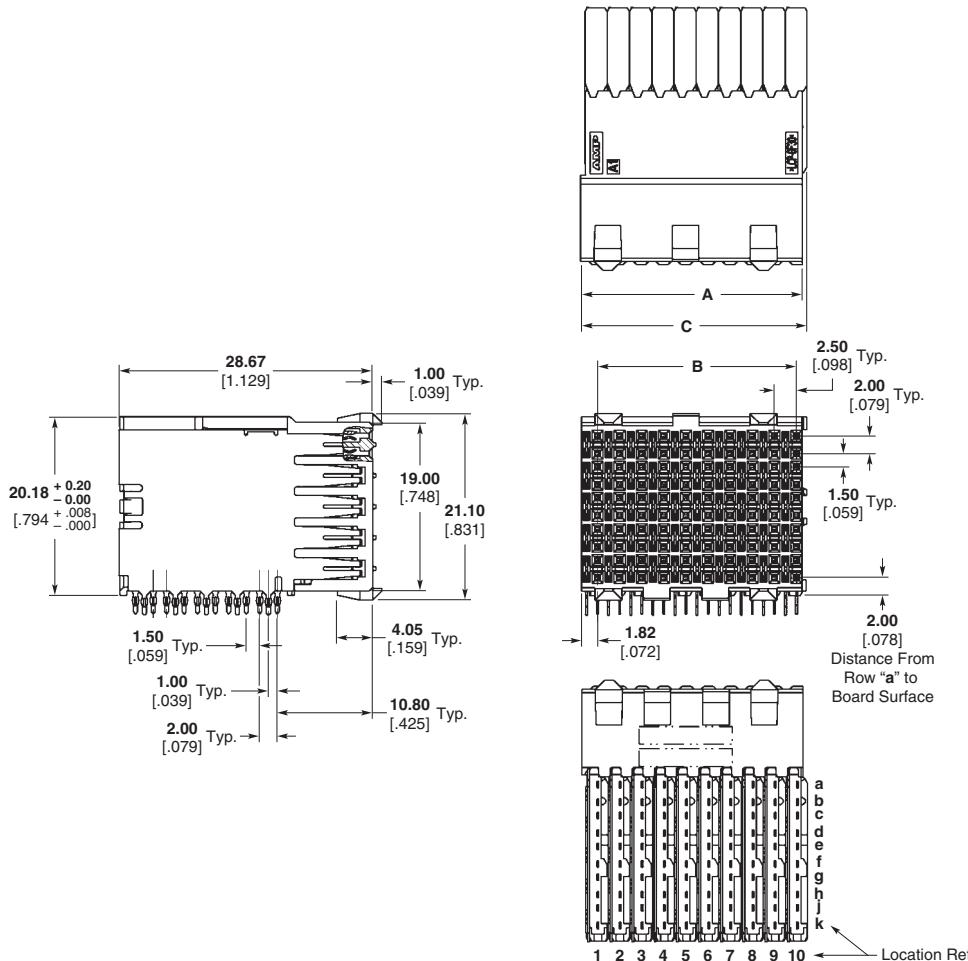
P.C.B. Hole Dimensions**Drilled Hole** — $0.7 \pm 0.025\text{mm}$ **Fin. Hole** — 0.55 to 0.65mm **Cu-thickness** — 0.025 to 0.050mm **SnPb-thickness** — 0.004 to 0.010mm

Note: For finishes other than tin-lead, reference Application Specification 114-13020.

**Recommended PC Board Layout
(Component Side Shown)**

Right Angle Receptacle (Continued)

10 Row, Center Module



Receptacle Assemblies

Number of Positions	Dimensions			Part Number	Application Tooling					
	A	B	C		Insertion	IS Sheet	Hsg Removal	IS Sheet	Chiclet Removal	IS Sheet
100	24.94 .982	22.50 .886	25.48 1.03	120790-1	1338743-2	408-8394	1338744-1	408-8393	1338746-1	408-8410
50	12.44 .490	10.00 .394	12.90 .508	120791-1	1338743-1	408-8394	1338744-1	408-8393	1338746-1	408-8410

P.C.B. Hole Dimensions

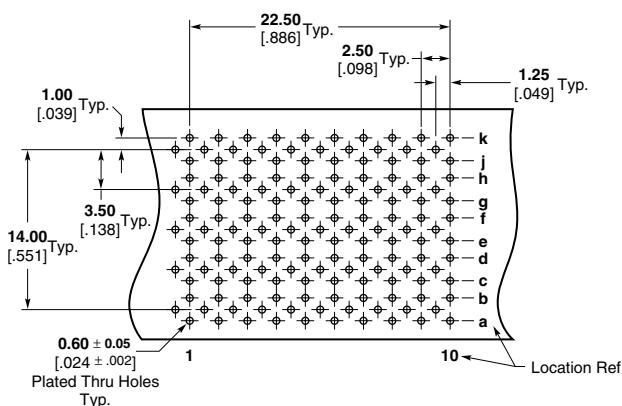
Drilled Hole — $0.7 \pm 0.025\text{mm}$

Fin. Hole — 0.55 to 0.65mm

Cu-thickness — 0.025 to 0.050mm

SnPb-thickness — 0.004 to 0.010mm

Note: For finishes other than tin-lead, reference Application Specification 114-13020.

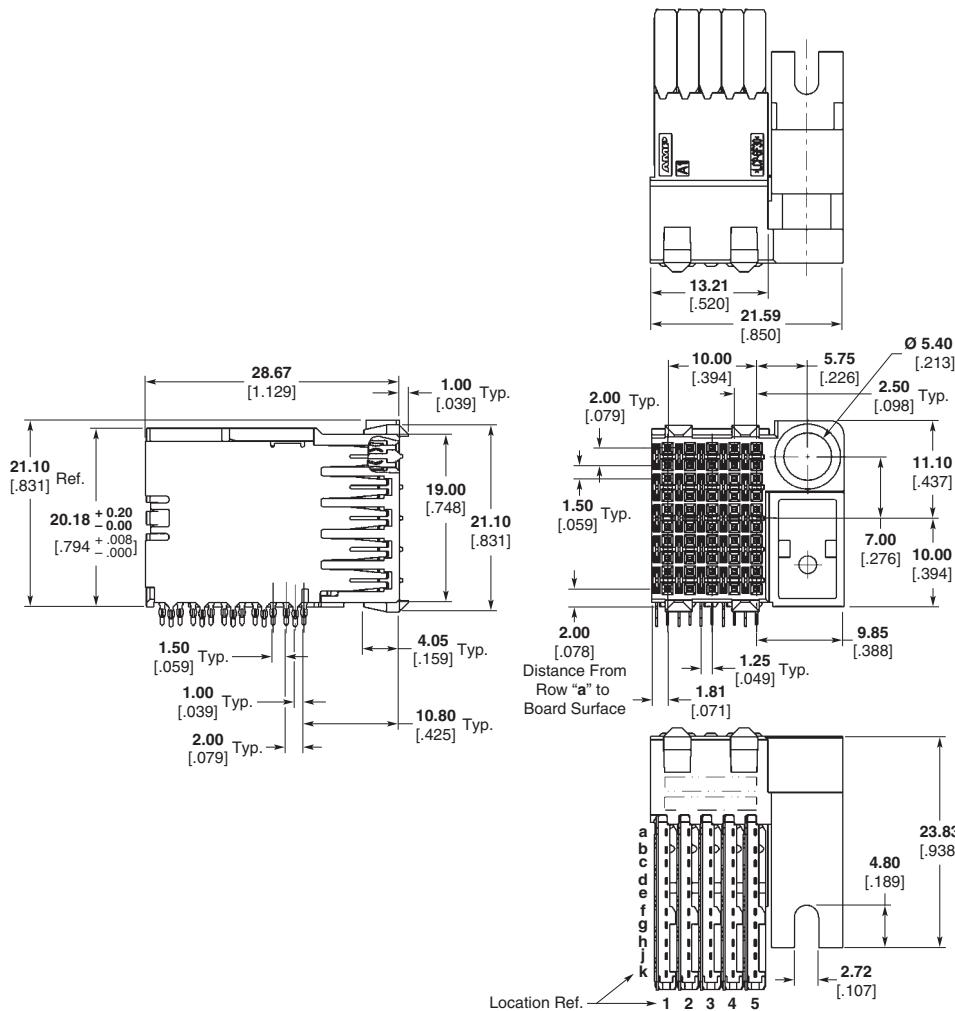


Recommended PC Board Layout
(Component Side Shown)

Right Angle Receptacle

(Continued)

10 Row, Right Module (accepts Universal Guide Pin)



Receptacle Assemblies

Number of Positions	Part Number	Application Tooling					
		Insertion	IS Sheet	Hsg Removal	IS Sheet	Chiclet Removal	IS Sheet
50	120874-1	1338743-1	408-8394	1338744-1	408-8393	1338746-1	408-8410

P.C.B. Hole Dimensions

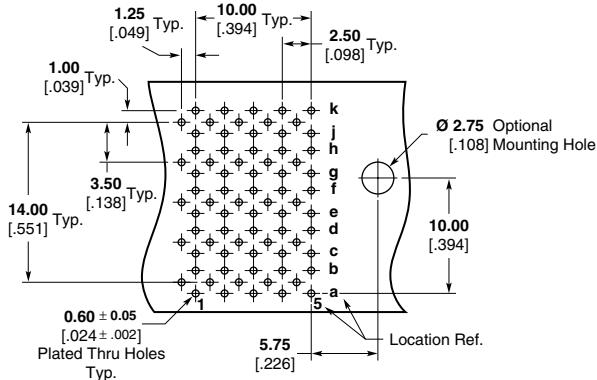
Drilled Hole — $0.7 \pm 0.025\text{mm}$

Fin. Hole — 0.55 to 0.65mm

Cu-thickness = 0.025 to 0.050mm

SnPb-thickness = 0.004 to 0.010mm

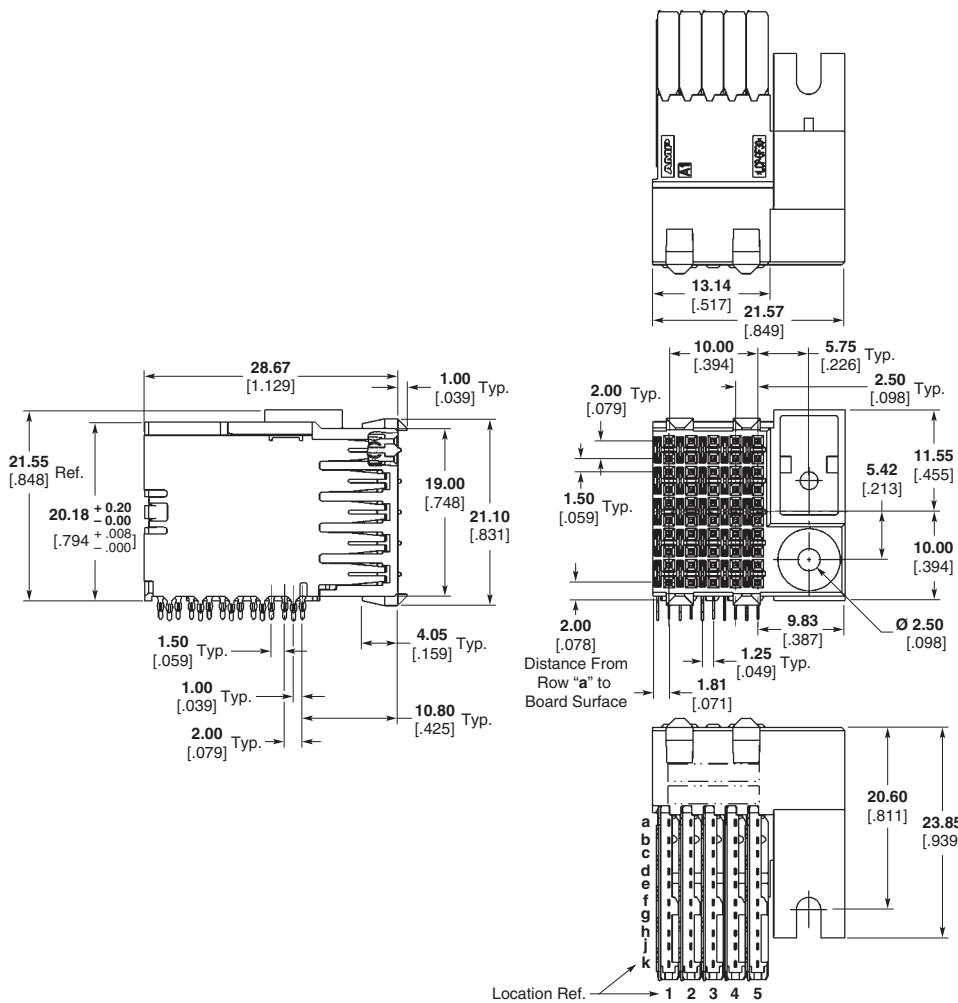
Note: For finishes other than tin-lead, reference Application Specification 114-13020.



Recommended PC Board Layout (Component Side Shown)

Right Angle Receptacle (Continued)

10 Row, Right Module (accepts ESD Guide Pin)



Receptacle Assemblies

Number of Positions	Part Number	Application Tooling					
		Insertion IS Sheet	Hsg Removal IS Sheet	IS Sheet	Chiclet Removal IS Sheet	IS Sheet	
50	120792-1	1338743-1	408-8394	1338744-1	408-8393	1338746-1	408-8410

P.C.B. Hole Dimensions

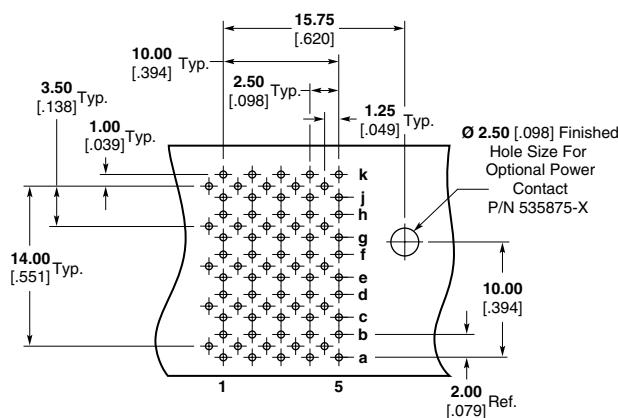
Drilled Hole — $0.7 \pm 0.025\text{mm}$

Fin. Hole — 0.55 to 0.65mm

Cu-thickness — 0.025 to 0.050mm

SnPb-thickness — 0.004 to 0.010mm

Note: For finishes other than tin-lead, reference Application Specification 114-13020.



Recommended PC Board Layout
(Component Side Shown)

Z-PACK HS3 Connector (Continued)

Vertical Pin Header Assemblies

10 Row, Left Module
(accepts Universal Guide Pin)

P.C.B. Hole Dimensions

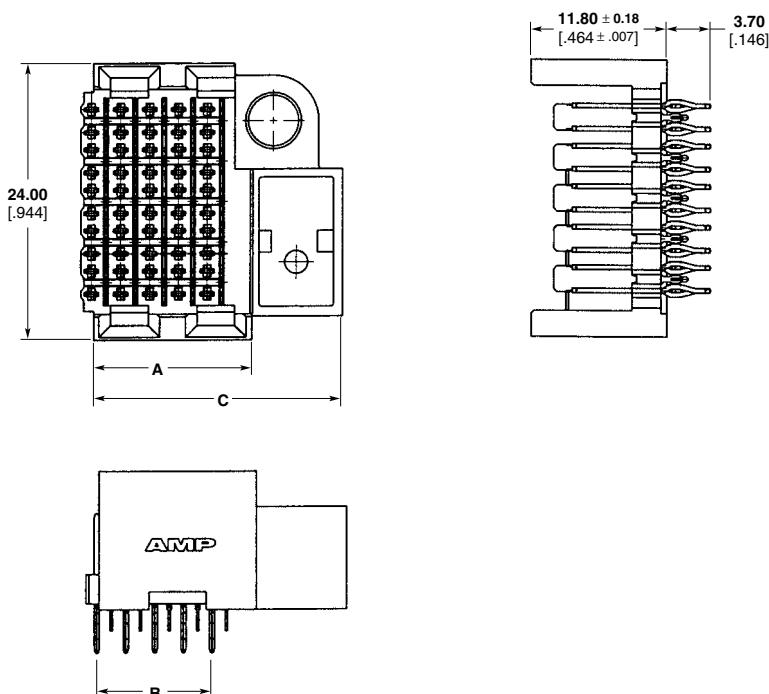
Drilled Hole — 0.7 ± 0.025 mm

Fin. Hole — 0.55 to 0.65mm

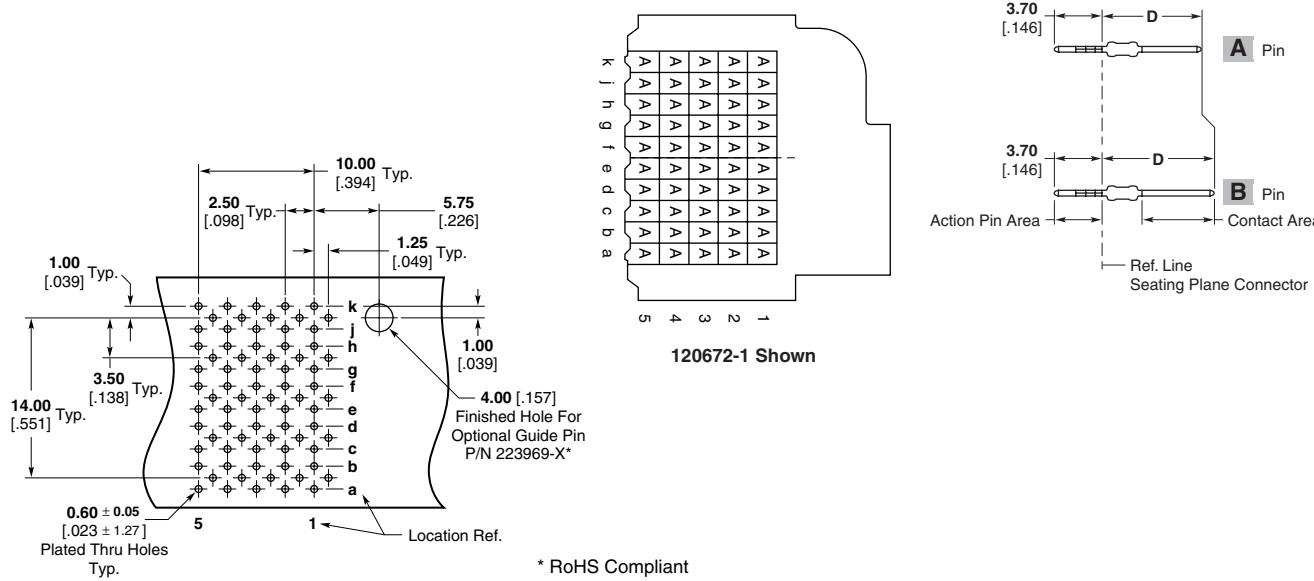
Cu-thickness — 0.025 to 0.050mm

SnPb-thickness — 0.004 to 0.010mm

Note: For finishes other than tin-lead, reference Application Specification 114-13020.



Number of Positions	Dimensions				Pin Ref.	Part Numbers	Application Tooling					
	A	B	C	D			Seating	IS Sheet	Signal Pin Repair Kit	IS Sheet	Ground Blade Repair Kit	IS Sheet
50	13.70 .539	10.00 .394	21.61 .851	8.20 .323	A	120672-1	91312-1	408-4546	354687-2	408-9979	1320534-2	408-4573
	13.70 .539	10.00 .394	21.61 .851	9.70 .383	B	120672-2	91312-1	408-4546	354687-2	408-9979	1320534-2	408-4573



* RoHS Compliant

**Recommended PC Board Layout
(Component Side Shown)
For Non-Midplane Applications
For Midplane Applications Reference Page 74**

Vertical Pin Header Assemblies (Continued)

10 Row, Left Module (accepts ESD Guide Pin)

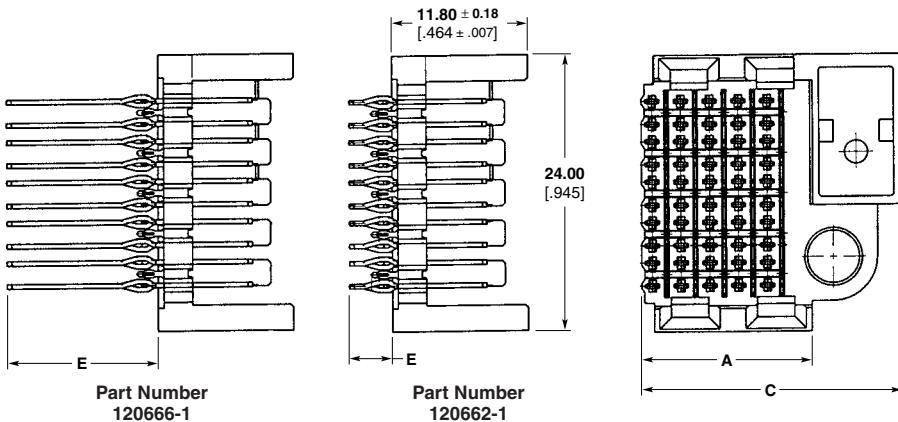
P.C.B. Hole Dimensions

Drilled Hole — 0.7 ± 0.025 mm

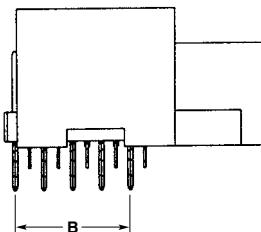
Fin. Hole — 0.55 to 0.65mm

Cu-thickness — 0.025 to 0.050mm

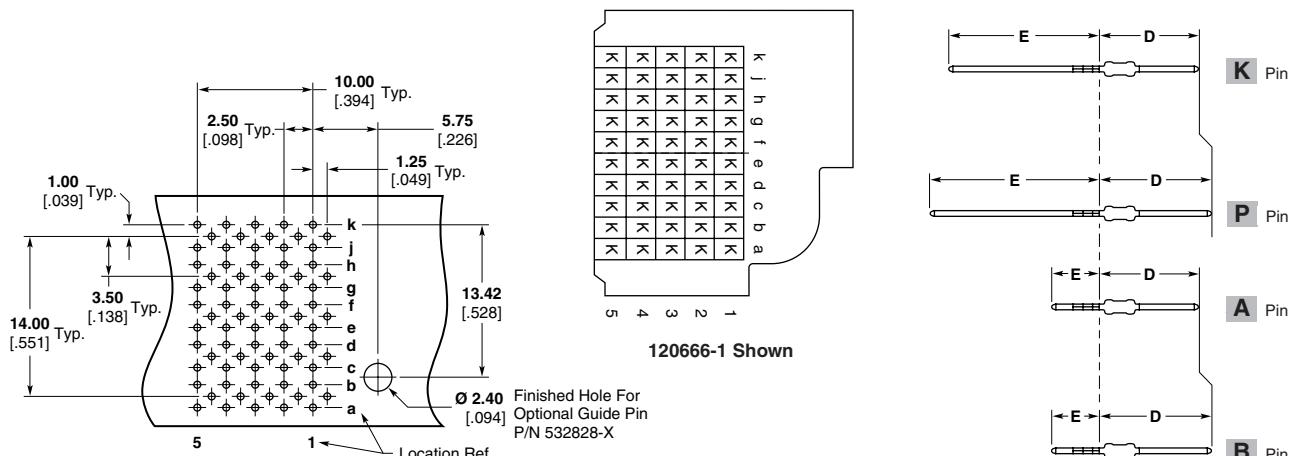
SnPb-thickness — 0.004 to 0.010mm



Note: For finishes other than tin-lead, reference Application Specification 114-13020.



Number of Positions	Dimensions					Pin Ref.	Part Numbers	Application Tooling				
	A	B	C	D	E			Seating	IS Sheet	Signal Pin Repair Kit	IS Sheet	Ground Blade Repair Kit
50	14.80 .583	10.00 .394	22.71 .894	8.20 .323	3.70 .146	A	120662-1	91312-1	408-4546	354687-2	408-9979	1320534-2 408-4573
	14.80 .583	10.00 .394	22.71 .894	9.70 .382	3.70 .146	B	120662-2	91312-1	408-4546	354687-2	408-9979	1320534-2 408-4573
	14.80 .583	10.00 .394	22.71 .894	8.20 .323	13.00 .512	K	120666-1	91312-1	408-4546	354687-2	408-9979	1320534-2 408-4573
	14.80 .583	10.00 .394	22.71 .894	9.70 .382	14.50 .571	P	120666-2	91312-1	408-4546	354687-2	408-9979	1320534-2 408-4573



Electronics

Vertical Pin Header Assemblies (Continued)

10 Row, Center Module

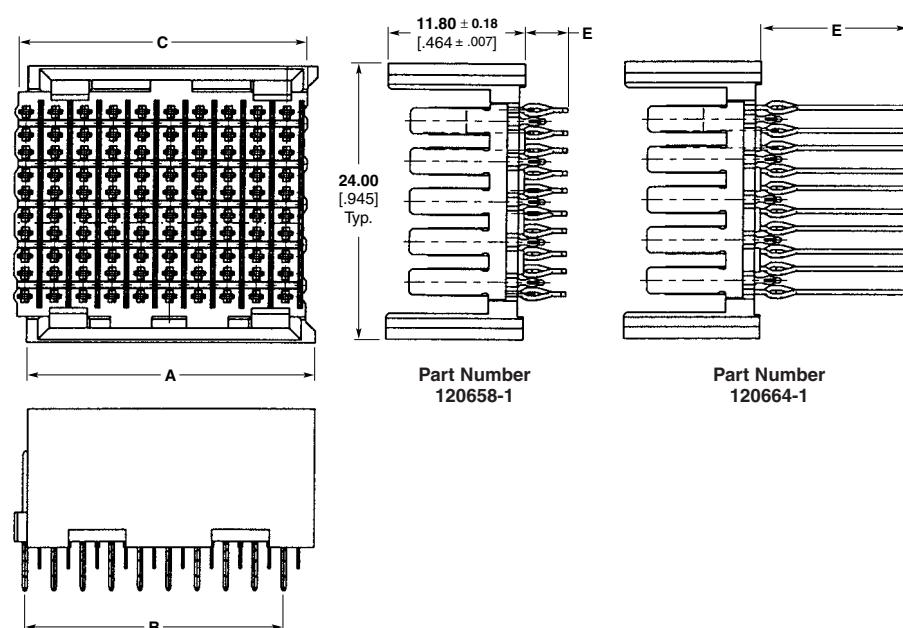
P.C.B. Hole Dimensions

Drilled Hole — 0.7 ± 0.025 mm

Fin. Hole — 0.55 to 0.65mm

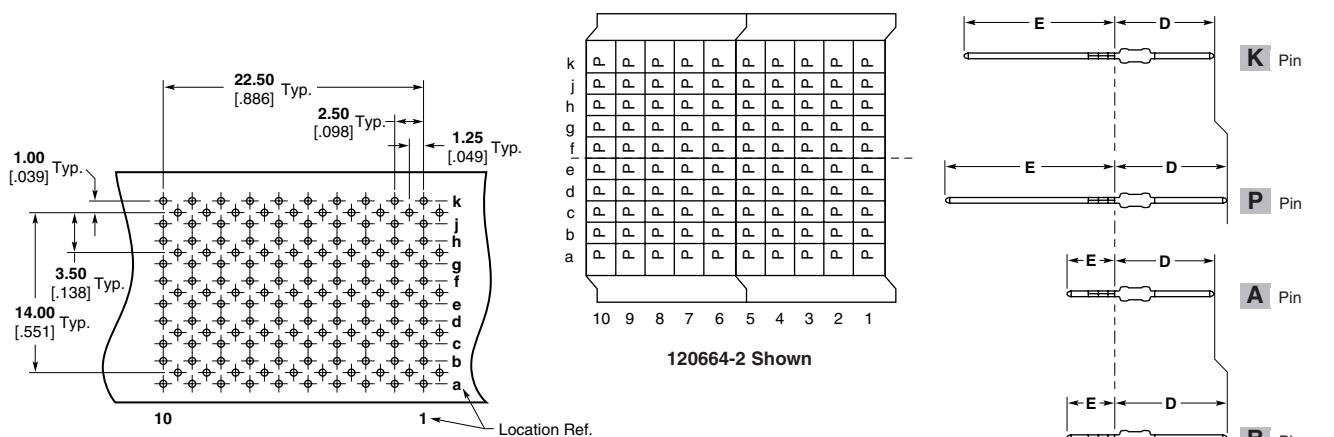
Cu-thickness — 0.025 to 0.050mm

SnPb-thickness — 0.004 to 0.010mm

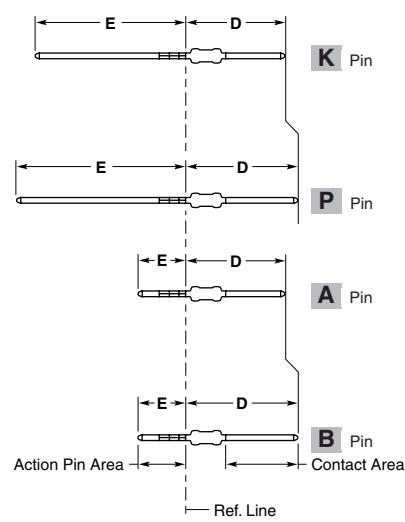


Note: For finishes other than tin-lead, reference Application Specification 114-13020.

Number of Positions	Dimensions					Pin Ref.	Part Numbers	Application Tooling				
	A	B	C	D	E			Seating	IS Sheet	Signal Pin Repair Kit	IS Sheet	Ground Blade Repair Kit
100	24.90 .980	22.50 .885	24.90 .980	8.20 .322	3.70 .145	A	120658-1	91312-2	408-4546	354687-2	408-9979	1320534-2 408-4573
	24.90 .980	22.50 .885	24.90 .980	9.70 .381	3.70 .145	B	120658-2	91312-2	408-4546	354687-2	408-9979	1320534-2 408-4573
	24.90 .980	22.50 .885	24.90 .980	8.20 .322	13.00 .511	K	120664-1	91312-2	408-4546	354687-2	408-9979	1320534-2 408-4573
	24.90 .980	22.50 .885	24.90 .980	9.70 .381	14.50 .570	P	120664-2	91312-2	408-4546	354687-2	408-9979	1320534-2 408-4573
50	12.41 .488	10.00 .393	12.40 .488	8.20 .322	3.70 .145	A	120747-1	91312-1	408-4546	354687-2	408-9979	1320534-2 408-4573
	12.41 .488	10.00 .393	12.40 .488	9.70 .381	3.70 .145	B	120747-2	91312-1	408-4546	354687-2	408-9979	1320534-2 408-4573
	12.41 .488	10.00 .393	12.40 .488	8.20 .322	13.00 .511	K	120748-1	91312-1	408-4546	354687-2	408-9979	1320534-2 408-4573
	12.41 .488	10.00 .393	12.40 .488	9.70 .381	14.50 .570	P	120748-2	91312-1	408-4546	354687-2	408-9979	1320534-2 408-4573



Recommended PC Board Layout
(Component Side Shown)
For Non-Midplane Applications
For Midplane Applications Reference Page 74



Vertical Pin Header Assemblies (Continued)

10 Row, Right Module (accepts Universal Guide Pin)

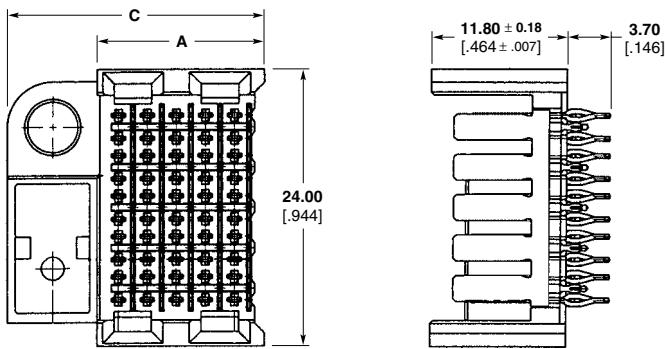
P.C.B. Hole Dimensions

Drilled Hole — 0.7 ± 0.025 mm

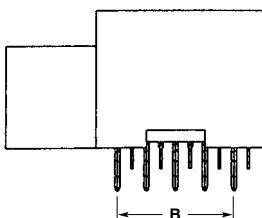
Fin. Hole — 0.55 to 0.65mm

Cu-thickness — 0.025 to 0.050mm

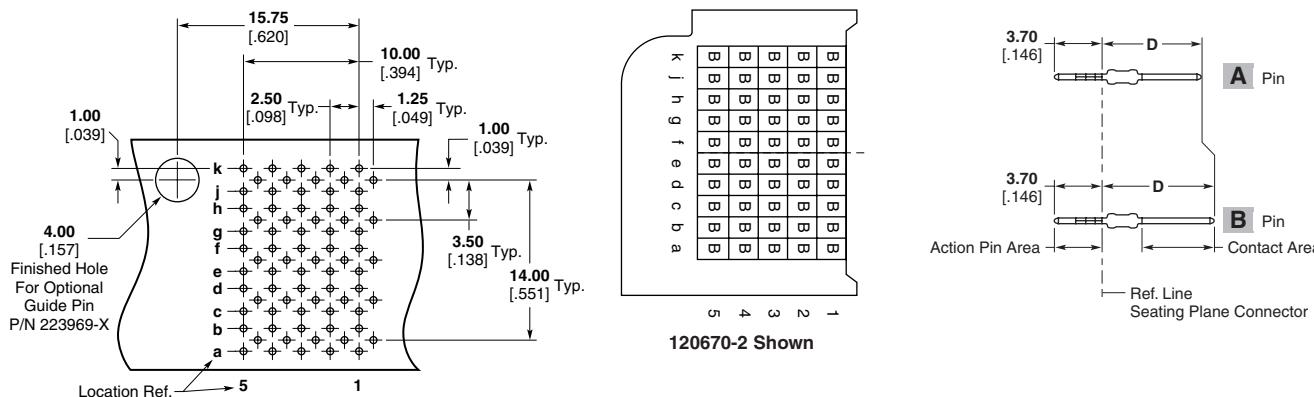
SnPb-thickness — 0.004 to 0.010mm



Note: For finishes other than tin-lead, reference Application Specification 114-13020.



Number of Positions	Dimensions				Pin Ref.	Part Numbers	Application Tooling					
	A	B	C	D			Seating	IS Sheet	Signal Pin Repair Kit	IS Sheet	Ground Blade Repair Kit	IS Sheet
50	14.45 .568	10.00 .393	22.28 .877	8.20 .322	A	120670-1	91312-1	408-4546	354687-2	408-9979	1320534-2	408-4573
	14.45 .568	10.00 .393	22.28 .877	9.70 .381	B	120670-2	91312-1	408-4546	354687-2	408-9979	1320534-2	408-4573



Recommended PC Board Layout (Component Side Shown)

For Non-Midplane Applications

For Midplane Applications Reference Page 74

Vertical Pin Header Assemblies (Continued)

10 Row, Right Module (accepts ESD Guide Pin)

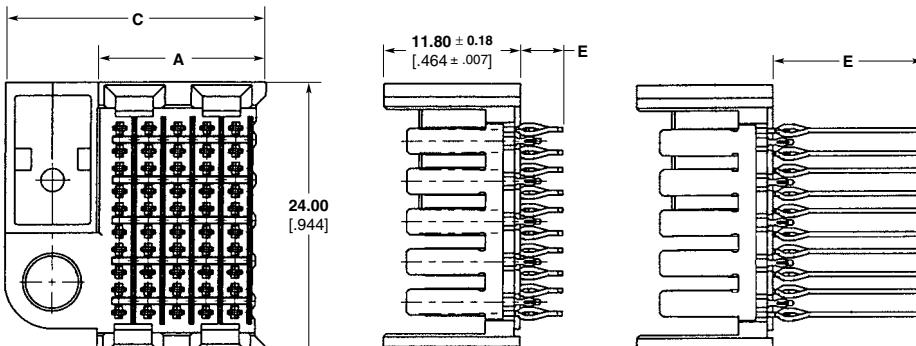
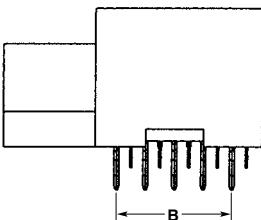
P.C.B. Hole Dimensions

Drilled Hole — 0.7 ± 0.025 mm

Fin. Hole — 0.55 to 0.65mm

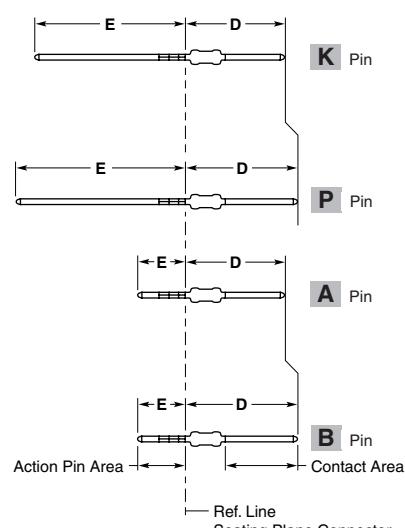
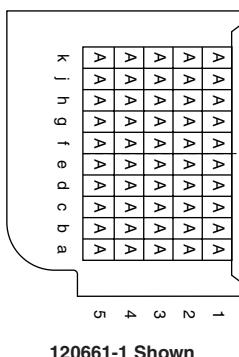
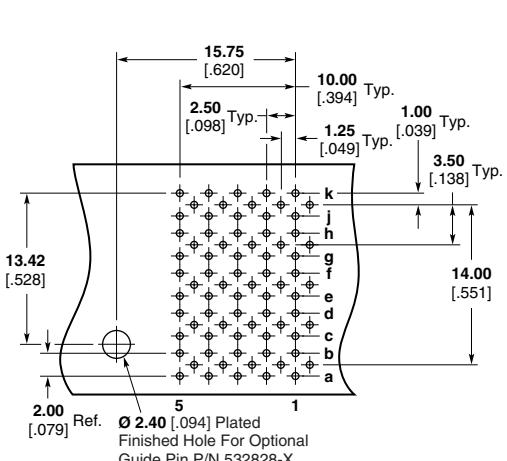
Cu-thickness — 0.025 to 0.050mm

SnPb-thickness — 0.004 to 0.010mm

Part Number
120661-1Part Number
120665-1

Note: For finishes other than tin-lead, reference Application Specification 114-13020.

Number of Positions	Dimensions					Pin Ref.	Part Numbers	Application Tooling				
	A	B	C	D	E			Seating	IS Sheet	Signal Pin		Ground Blade
										Repair Kit	IS Sheet	Repair Kit
50	14.46 .569	10.00 .393	22.28 .877	8.20 .322	3.70 .145	A	120661-1	91312-1	408-4546	354687-2	408-9979	1320534-2
	14.46 .569	10.00 .393	22.28 .877	9.70 .381	3.70 .145	B	120661-2	91312-1	408-4546	354687-2	408-9979	1320534-2
	14.46 .569	10.00 .393	22.28 .877	8.20 .322	13.00 .511	K	120665-1	91312-1	408-4546	354687-2	408-9979	1320534-2
	14.46 .569	10.00 .393	22.28 .877	9.70 .381	14.50 .570	P	120665-2	91312-1	408-4546	354687-2	408-9979	1320534-2

Recommended PC Board Layout
(Component Side Shown)
For Non-Midplane Applications

For Midplane Applications Reference Page 74

Vertical Pin Header
Shrouds

10 Row, Left Module

P.C.B. Hole Dimensions

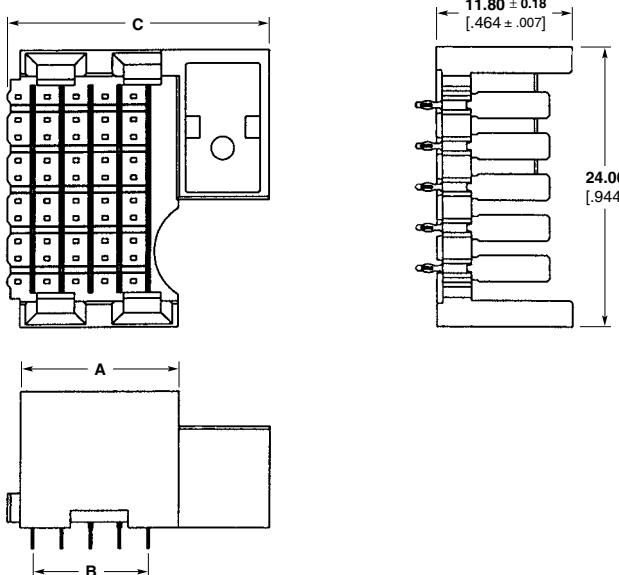
Drilled Hole — 0.7±0.025mm

Fin. Hole — 0.55 to 0.65mm

Cu-thickness — 0.025 to 0.050mm

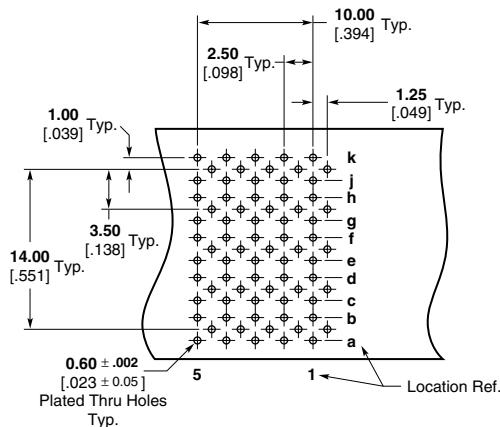
SnPb-thickness — 0.004 to 0.010mm

Note: For finishes other than tin-lead, reference Application Specification 114-13020.

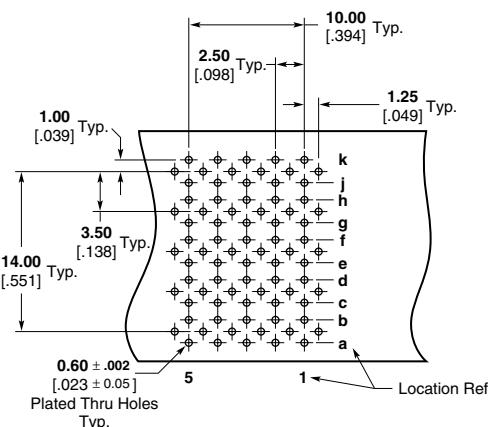


Receptacle Assemblies

Number of Positions	Dimensions			Part Number	Application Tooling		
	A	B	C		Seating	IS Sheet	Ground Blade Repair Kit
50	13.70 .539	10.00 .877	22.80 .322	120668-1	91312-1	408-4546	1320534-2 408-4573



Non-Coplanar Daughtercards
(Pin 1a Header = Pin 1k Shroud Side)
Recommended PC Board Layout — Reference Page 74
(Shroud Side Shown)



Coplanar Daughtercards
(Pin 1a Header = Pin 5a Shroud Side)
Recommended PC Board Layout — Reference Page 74
(Shroud Side Shown)

Vertical Pin Header Shrouds (Continued)

10 Row, Center Module

P.C.B. Hole Dimensions

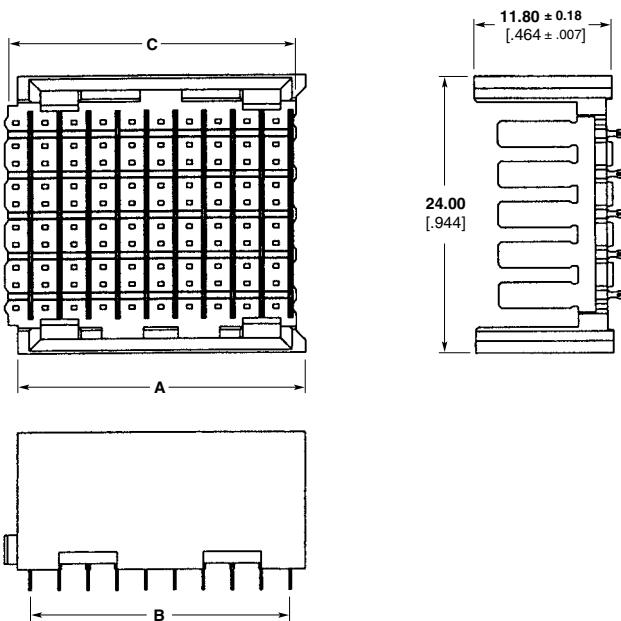
Drilled Hole — 0.7 ± 0.025 mm

Fin. Hole — 0.55 to 0.65mm

Cu-thickness — 0.025 to 0.050mm

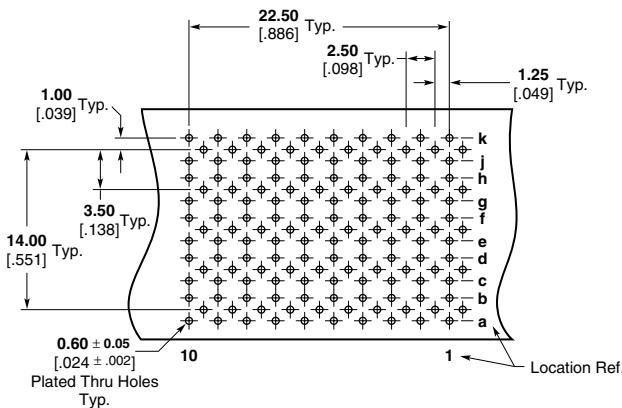
SnPb-thickness — 0.004 to 0.010mm

Note: For finishes other than tin-lead, reference Application Specification 114-13020.

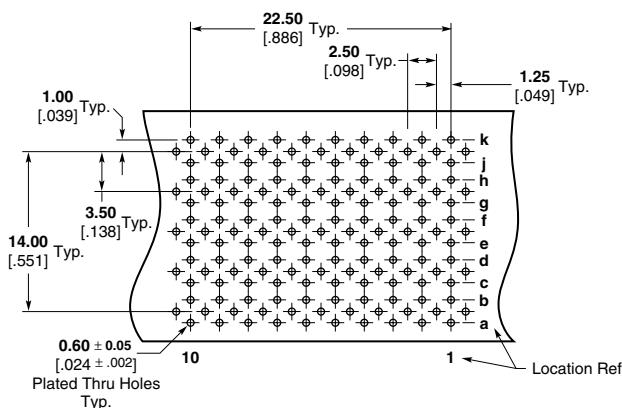


Receptacle Assemblies

Number of Positions	Dimensions			Part Number	Application Tooling			
	A	B	C		Seating	IS Sheet	Ground Blade Repair Kit	IS Sheet
100	24.90 .980	22.50 .886	24.90 .980	120663-1	91312-2	408-4546	1320534-2	408-4573
50	12.41 .488	10.00 .394	12.40 .488	120750-1	91312-1	408-4546	1320534-2	408-4573



Non-Coplanar Daughtercards
(Pin 1a Header = Pin 1k Shroud Side)
Recommended PC Board Layout — Reference Page 74
(Shroud Side Shown)



Coplanar Daughtercards
(Pin 1a Header = Pin 10a Shroud Side)
Recommended PC Board Layout — Reference Page 74
(Shroud Side Shown)

Vertical Pin Header Shrouds (Continued)

10 Row, Right Module

P.C.B. Hole Dimensions

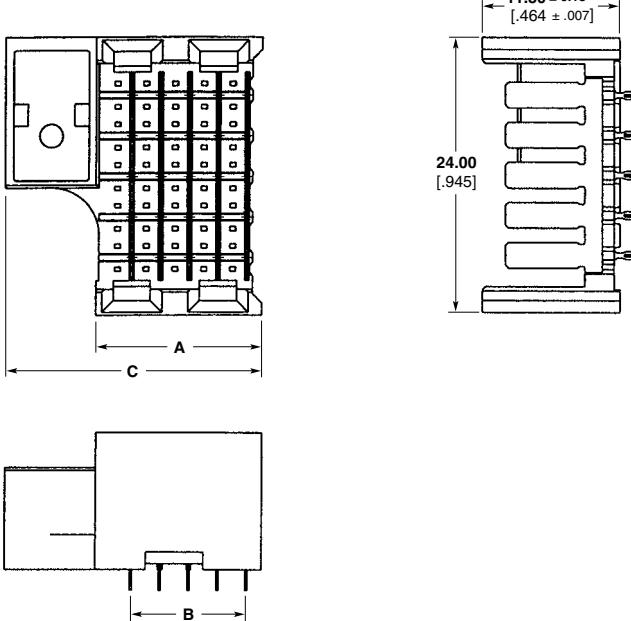
Drilled Hole — 0.7±0.025mm

Fin. Hole — 0.55 to 0.65mm

Cu-thickness — 0.025 to 0.050mm

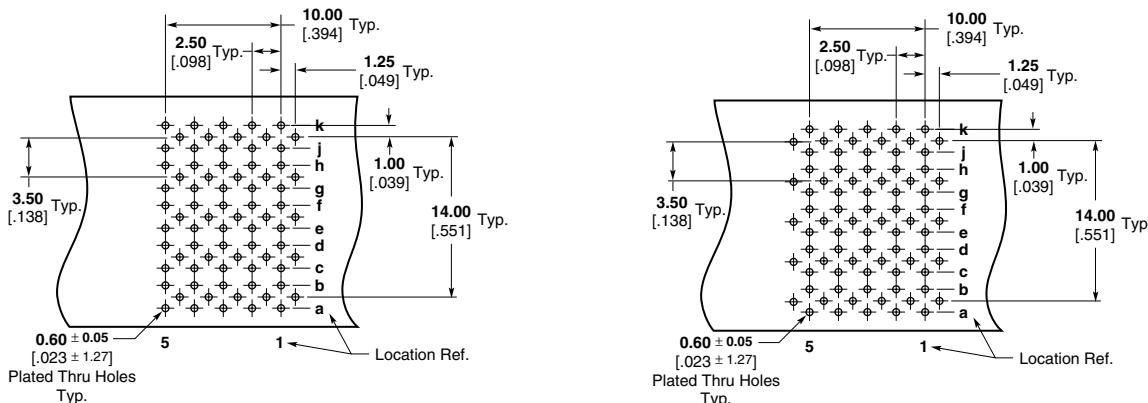
SnPb-thickness — 0.004 to 0.010mm

Note: For finishes other than tin-lead, reference Application Specification 114-13020.



Receptacle Assemblies

Number of Positions	Dimensions			Part Number	Application Tooling			
	A	B	C		Seating	IS Sheet	Ground Blade Repair Kit	IS Sheet
50	14.46 .569	10.00 .394	22.28 .877	120667-1	91312-1	408-4546	1320534-2	408-4573



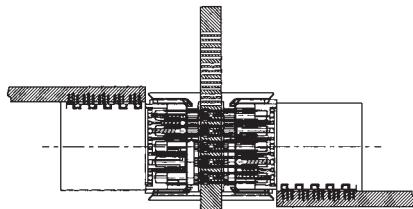
Non-Coplanar Daughtercards
(Pin 1a Header = Pin 1k Shroud Side)
Recommended PC Board Layout — Reference Page 74
(Shroud Side Shown)

Coplanar Daughtercards
(Pin 1a Header = Pin 5a Shroud Side)
Recommended PC Board Layout — Reference Page 74
(Shroud Side Shown)

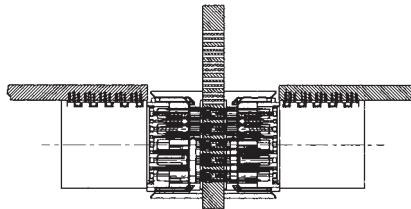
Z-PACK HS3 Connector (Continued)

Layout Guide for Midplane Applications
10 Row Connectors

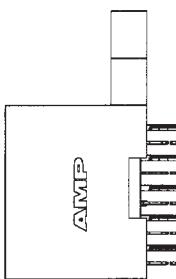
Non-Coplanar Applications



Coplanar Applications

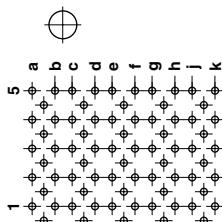


Right Module

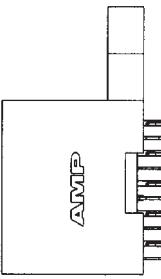


Vertical Pin Header,
Feed-Through
Part No.

120665 120667-1

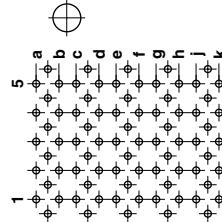


Right Module

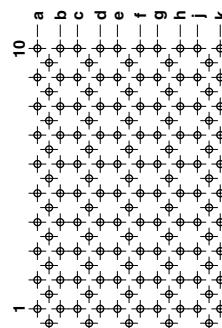
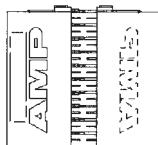


Vertical Pin Header,
Feed-Through
Part No.

120665 120668-1

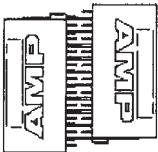


Center Module

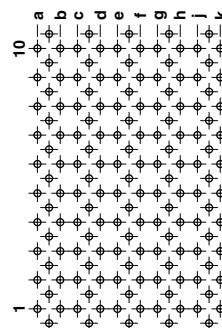


No. of Pos.	Vertical Pin Header, Feed-Through Part No.	Shroud Part No.
100	120664	120663-1
50	—	120750-1

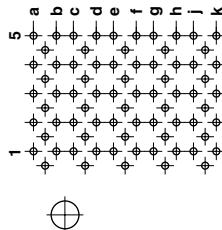
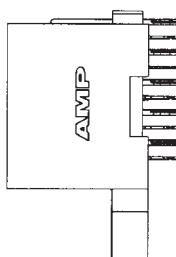
Center Module



No. of Pos.	Vertical Pin Header, Feed-Through Part No.	Shroud Part No.
100	120664	120663-1
50	—	120750-1



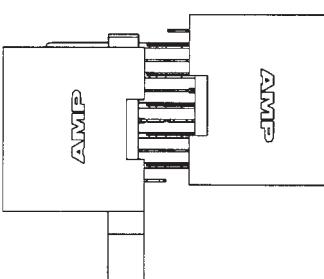
Left Module



Vertical Pin Header,
Feed-Through
Part No.

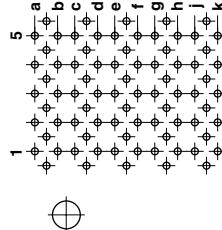
120666 120667-1

Left Module



Vertical Pin Header,
Feed-Through
Part No.

120666 120668-1



Coding Keys (10 Row Only)

Compatibility — Z-PACK HS3, Z-PACK 12 row connectors
 Part Number 120639-3 (white)
 Part Number 120639-6 (red)

Material & Finish — Valox

Power and Guide Hardware**Universal Power Module
Vertical Receptacle (3 Pos.)**

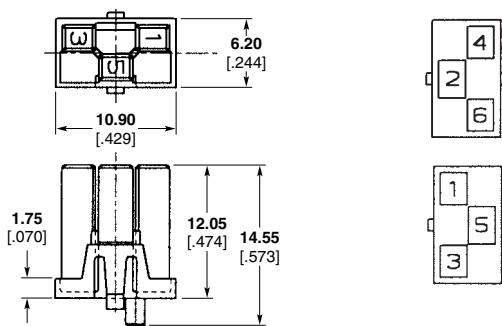
The Tyco Electronics Universal Power Module is a multi-position, modular, Hard Metric board-to-board power connector designed to be compatible with Z-PACK 2mm HM Connectors. The design is in an "inverse-sex" orientation and the vertical receptacle module meets the IEC 950 safety requirements for finger probe protection.

Both the headers and receptacle utilize Tyco Electronics ACTION PIN press-fit leads for ease of assembly onto printed circuit boards. Additionally, the vertical receptacle leads are polarized to allow only one orientation onto the printed circuit board, eliminating the possibility of reverse placement.

The Universal Power Module is compatible with a wide variety of other Tyco Electronics board-to-board connectors including Z-PACK HS3, Z-PACK HM-Zd, Z-PACK Strip-line 100, AMP-HDI, TBC, TBC Plus and Eurocard connectors.

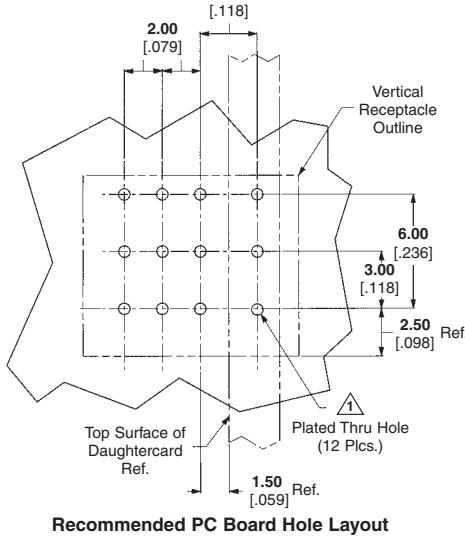
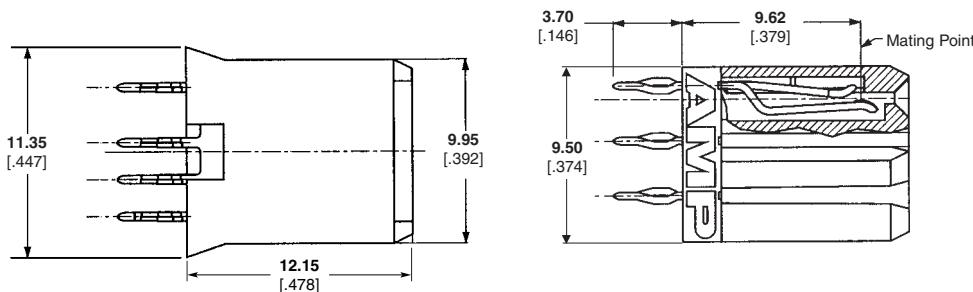
The right angle header contacts are available with sequenced lengths for "make-first/break-last" applications.

Generous alignment features designed into the housings and optional guide pins and receptacles make the Tyco Electronics Universal Power Module ideal for "blind mating" applications.

High Speed Backplane Connectors**Z-PACK HS3 Connector (Continued)**

Part Number 120639-6

Part Number 120639-3



Recommended PC Board Hole Layout

Position Loaded	Part Numbers
Vertical Receptacle	ABC 223955-2 AC 223984-1
High Current	ABC 5-223955-2

⚠ PCB Hole Dim.
 Drilled Hole = **0.7000 ± 0.025** [.02756 ± .0010]
 Finished Hole = **0.60 ± 0.05** [.024 ± .002]
 Cu Thickness = **0.375 ± 0.0125** [.0148 ± .00049]
 SnPb Thickness = **0.007 ± 0.003** [.0003 ± .0001]

Note: For finishes other than tin-lead, reference Application Specification 114-1103.

Power and Guide Hardware (Continued)

Expanded Universal Power Module Vertical Receptacles

Material and Finish

Housing — Polyester, gray

Contact — Copper alloy, plated 0.00127 [.000050] min. gold in mating area, 0.00050 [.000020] min. tin-lead on ACTION PIN area, with entire contact underplated 0.00127 [.000050] min. nickel

Note: Contact lubrication with Bellcore approved lubricant

Related Product Data

Guiding Hardware (Optional) —
pages 80 and 81

Application Tooling

Header

Seating Tool, 224441-1
Board Support Fixture, 224442-1

Receptacle

Seating Tool, 224421-1
Board Support Fixture, 217602-1

Technical Documents

Product Specification
108-1651

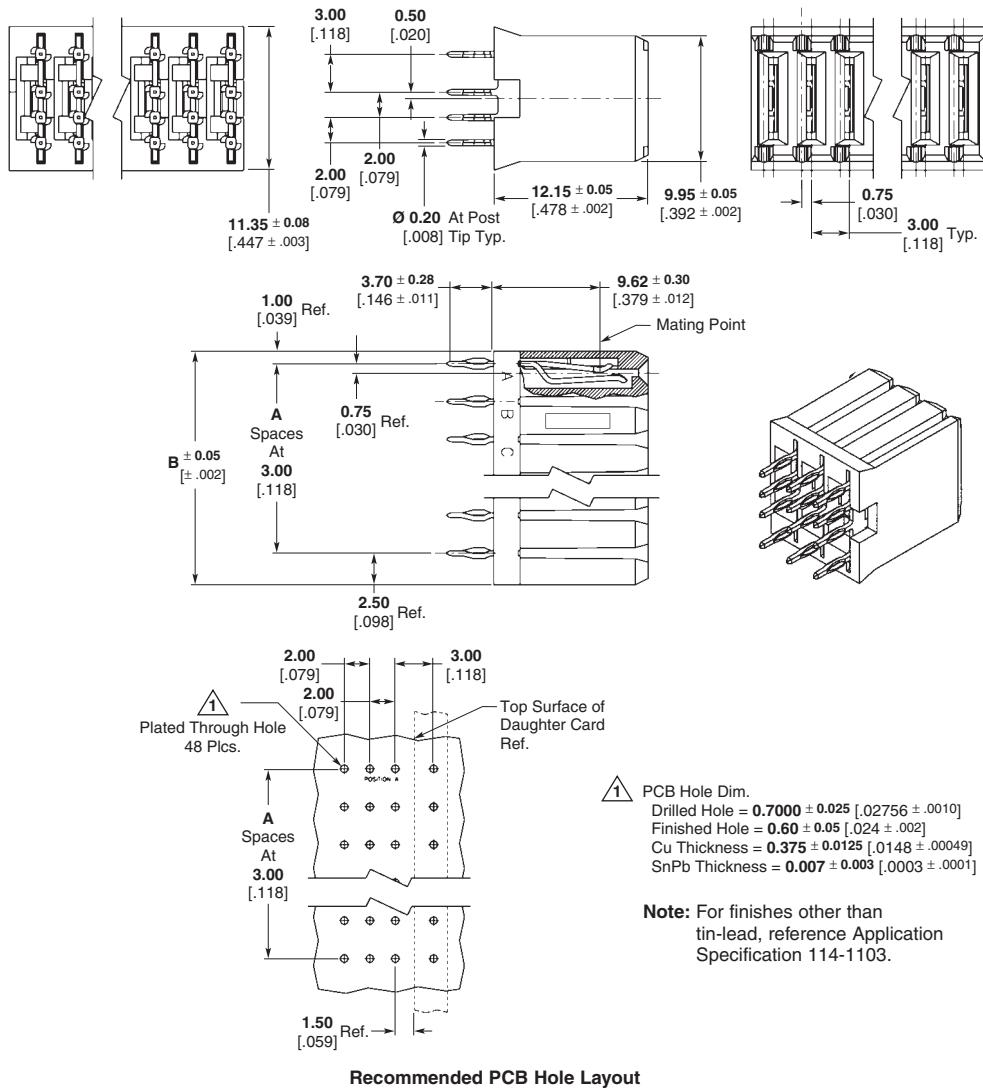
Application Specification
114-1103

Tyco Electronics Instruction Sheet
408-4169 (Receptacle)
Seating Tool 224421-1)

High Speed Backplane Connectors

AMP

Z-PACK HS3 Connector (Continued)



Position	A	B Ref.	Standard *10A Part Number	High Current *15A Part Number
4	3	12.50 .492	223995-1	120953-1
5	4	15.50 .610	223995-2	120953-2
6	5	18.50 .728	223995-3	120953-3
7	6	21.50 .846	223995-4	120953-4
8	7	24.50 .965	223995-5	120953-5

*Reference Product Specification 108-1651.

Note: For additional Power Module options reference Catalog 1773096, "Power Connectors and Interconnection Systems," or contact your Tyco Electronics Sales Representative.

Power and Guide Hardware (Continued)

Universal Power Module Right Angle Headers (3 Pos.)

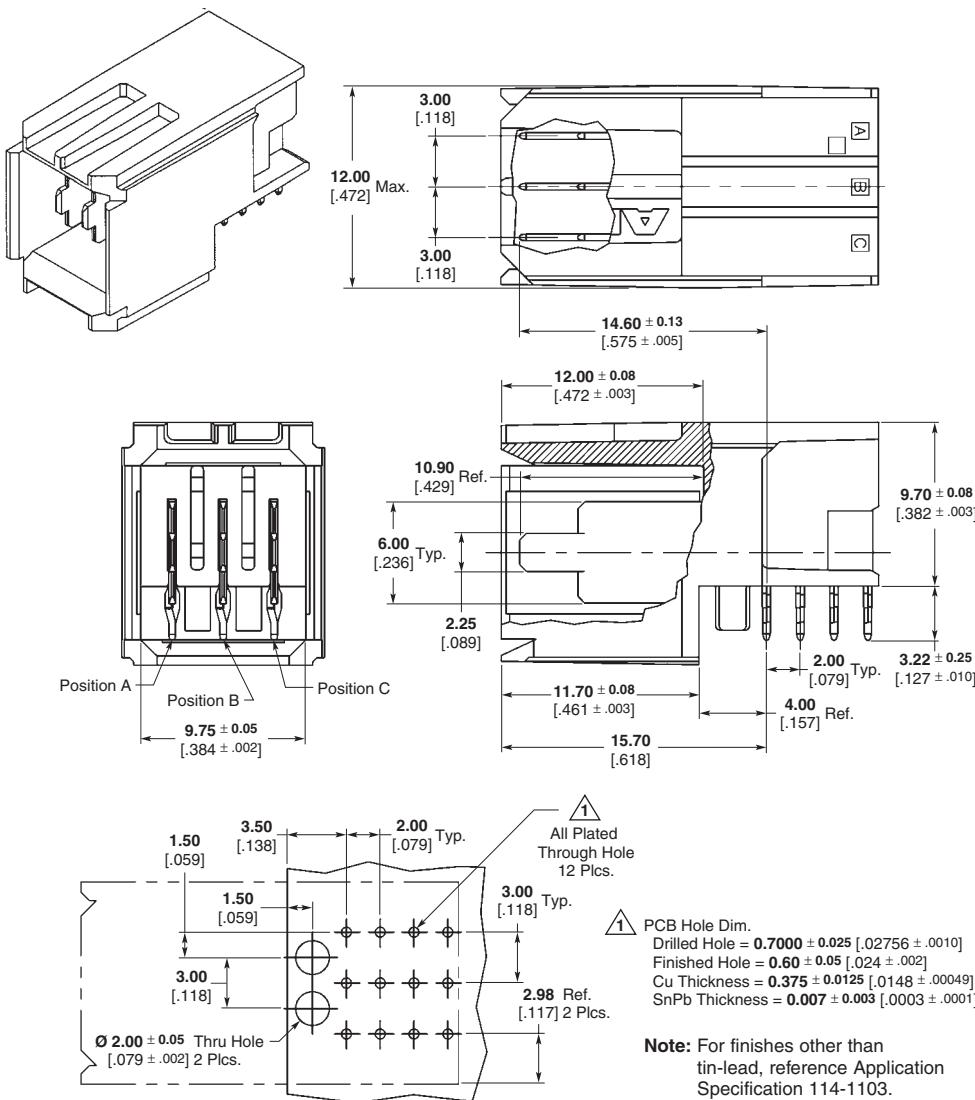
Material and Finish

Housing — polyester, natural color

Contacts — Copper alloy, plated 0.00127 [.000050] min. gold in mating area, 0.00050 [.000020] min. tin-lead on ACTION PIN post area, with entire contact underplated 0.00127 [.000050] min. nickel

High Speed Backplane Connectors

Z-PACK HS3 Connector (Continued)



Recommended PC Board Hole Layout

Blade Length Dimensions			Standard *10A Right Angle Header Part Numbers	High Current *15A Right Angle Header Part Numbers
Position A	Position B	Position C		
10.90 [.429]	10.90 [.429]	10.90 [.429]	223961-1	5-223961-1
10.90 [.429]	9.30 [.366]	10.90 [.429]	223962-1	—
10.90 [.429]	9.30 [.366]	9.30 [.366]	223968-1	—
10.90 [.429]	7.68 [.302]	10.90 [.429]	223972-1	—
10.90 [.429]	7.68 [.302]	9.30 [.366]	223971-1	—
10.90 [.429]	7.68 [.302]	7.68 [.302]	223970-1	—
9.30 [.429]	10.90 [.429]	9.30 [.366]	223963-1	—
9.30 [.366]	10.90 [.429]	7.68 [.302]	223964-1	—
9.30 [.366]	9.30 [.366]	9.30 [.366]	223967-1	—
9.30 [.366]	—	9.30 [.366]	223975-1	—
9.30 [.366]	9.30 [.366]	7.68 [.302]	223981-1	—
9.30 [.366]	7.68 [.302]	9.30 [.366]	223965-1	—
7.68 [.302]	9.30 [.366]	7.68 [.302]	223983-1	—
7.68 [.302]	7.68 [.302]	9.30 [.366]	223980-1	—
7.68 [.302]	7.68 [.302]	7.68 [.302]	223974-1	5-223974-1

Note: For additional Power Module options reference Catalog 1773096, "Power Connectors and Interconnection Systems," or contact your Tyco Electronics Sales Representative.

*Reference Product Specification 108-1651.

Power and Guide Hardware (Continued)

Expanded Universal Power Module Right Angle Headers

Material and Finish

Housing — Polyester, gray

Contacts — Phosphor bronze, plated 0.00127 [.000050] min. gold in mating area, 0.00054 [.000021] min. tin-lead on ACTION PIN area, with entire contact underplated 0.00127 [.000050] min. nickel

Note: Contact lubrication with Bellcore approved lubricant

Related Product Data

Guiding Hardware (Optional) —
pages 80 and 81

Application Tooling

Header

Seating Tool, 224441-1
Board Support Fixture, 224442-1

Receptacle

Seating Tool, 224421-1
Board Support Fixture, 217602-1

Technical Documents

Product Specification

108-1651

Application Specification

114-1103

Tyco Electronics Instruction Sheet

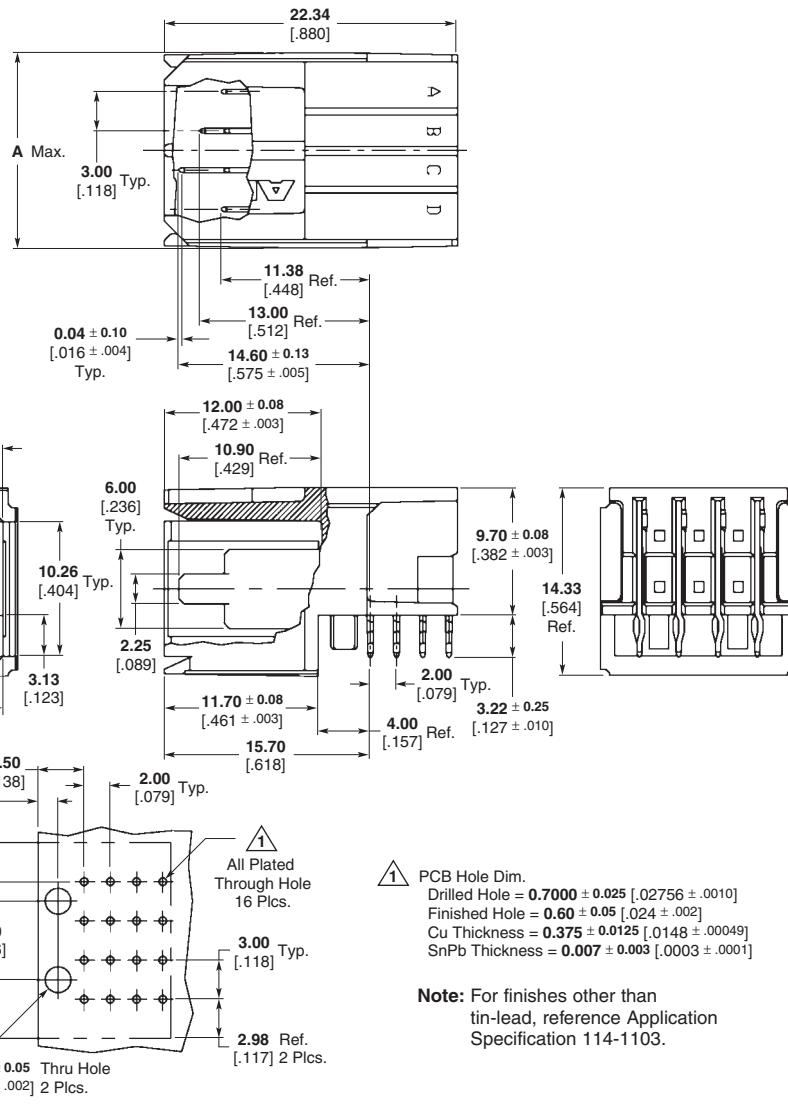
408-4169 (Receptacle)

Seating Tool 224421-1)

High Speed Backplane Connectors

AMP

Z-PACK HS3 Connector (Continued)



Recommended PC Board Hole Layout

Note: For finishes other than tin-lead, reference Application Specification 114-1103.

Positions	Dimensions		Standard *10A Base Part Number ¹	High Current *15A Base Part Number ¹
	A	B		
4	15.00 .591	12.75 .502	646954	120954
5	18.00 .709	15.75 .620	646955	120955
6	21.00 .827	18.75 .738	646956	120956
7	24.00 .945	21.75 .856	646957	120957
8	27.00 1.063	24.75 .974	646958	120958

¹ Dash number indicates sequence pattern. See customer drawing for specific dash numbers.

*Reference Product Specification 108-1651.

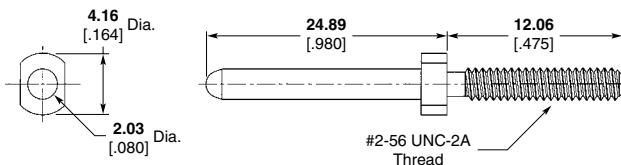
Note: For additional Power Module options reference Catalog 1773096, "Power Connectors and Interconnection Systems," or contact your Tyco Electronics Sales Representative.

Power and Guide Hardware

(Continued)

AMP-HDI-Static Discharge Guide/Power Pins**Compatibility** — Z-PACK HS3, Z-PACK 2mm HM connectors**Part Number** — 532828-5***Nut** — 21124-4**Washer** — 986794-1**Max. Current Rating** — 10 Amperes

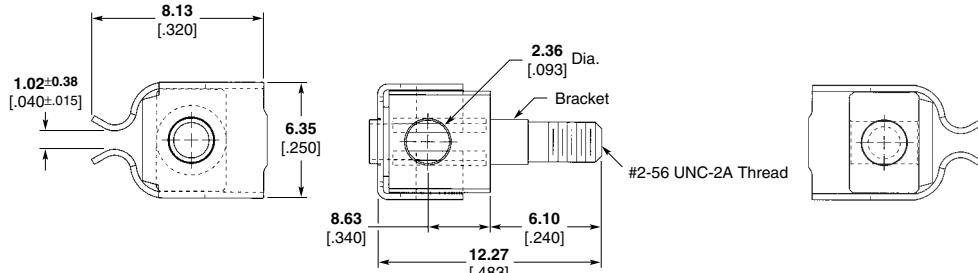
*Additional sequence lengths are available, contact Tyco Electronics

**Material and Finish**

Brass, plated 0.00076 [.000030] gold over 0.00127-0.00254 [.000050-.000100] nickel

AMP-HDI-Guide Pin/Power Receptacles**Compatibility** — Z-PACK HS3 Connector**Part Number** — 535875-1***Max. Current Rating** — 10 Amperes

*Additional lengths are available, see customer drawing.

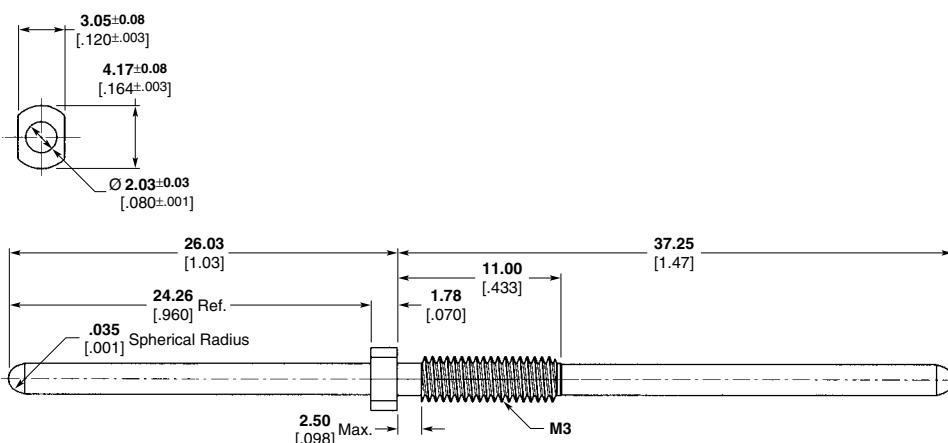
**Material and Finish****Contact Finish** — 0.00076 [.000030] gold in contact area, over 0.00127 [.000050] min. nickel underplate. Gold flash on remainder of the contact.**ESD-Guide Pin/Feed-through****Compatibility** — Z-PACK HS3 Connector**Part Number** — 120759-2* †**Max. Current Rating** — 10 Amperes

*Additional sequence lengths are available, contact Tyco Electronics

† RoHS Compliant

Material and Finish

Brass, plated 0.00076 [.000030] gold all over 0.001427-0.00254 [.000050-.000100] nickel underplate

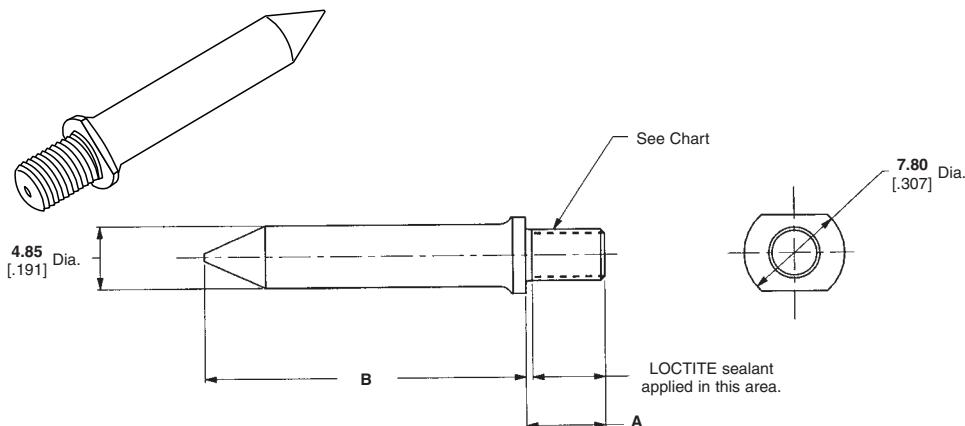


Power and Guide Hardware

(Continued)

Guide Pin (Unkeyed)**Material and Finish**

Guide Pin — Passivated stainless steel
Part Number 223956-1



Dimension		Thread	Part Numbers
A	B		
7.50 [.295]	24.73 [.974]	M4 x 7-6g	223982-1*
9.20 [.362]	25.16 [.991]	M4 x 7-6g	223969-7
12.70 [.500]	25.16 [.991]	8-32 UNC-2A	223969-4
12.70 [.500]	25.16 [.991]	M4 x 7-6g	223969-1
6.20 [.244]	25.16 [.991]	M4 x 7-6g	223956-1
12.70 [.500]	31.25 [1.230]	8-32 UNC-2A	1-223969-0
3.80** [.150]	27.16 [1.069]	M4 x 7-6h	120646-1
2.00** [.079]	27.16 [1.069]	M3 x 0.5	223988-1

*6.35 Hex Base

**Internal Thread

Female Guide Module (Unkeyed)**Material and Finish**

Guide Module — Zinc alloy, chromate conversion coated

Related Product Data

Application Tooling — Seating Tool, 224440-1.
 Board Support Fixture, 217603-1.

Technical Documents

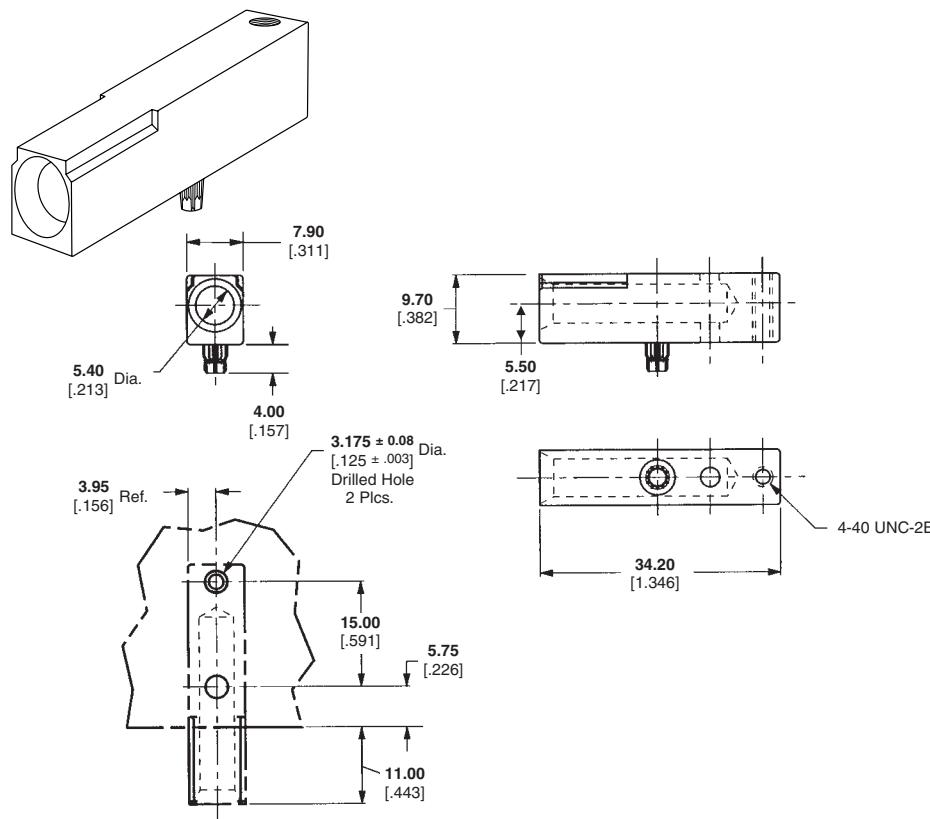
Product Specification
 108-1651

Application Specification

114-1103

Part Number 223957-1
 (as shown)

Part Number 223979-1
 (dual alignment posts)



LOCTITE is a trademark of Henkel Corp.

Recommended PC Board Hole Layout

Power and Guide Hardware (Continued)

Guide Pin (Keyed)

Material and Finish

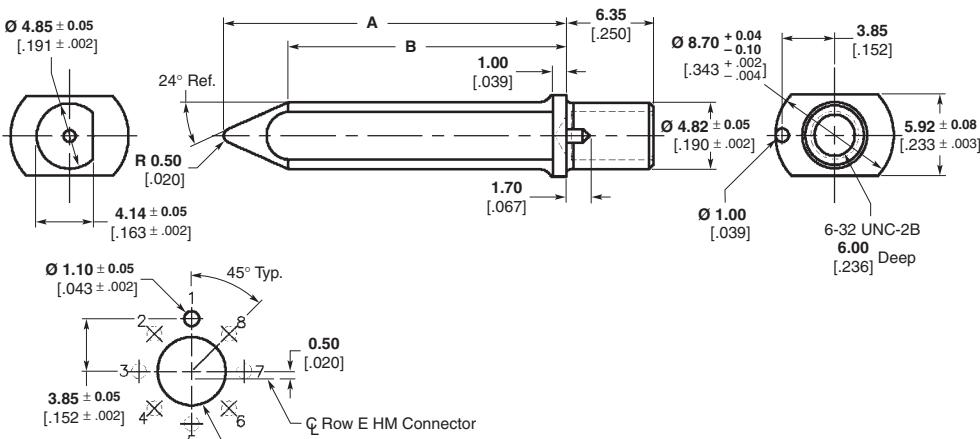
Guide Pin — Zinc alloy, chromate conversion coated

Part Number 223985

Dimension		Part Number
A	B	
25.16	20.39	223985-1
.991	.803	
29.00	24.23	223985-3
1.142	.954	

High Speed Backplane Connectors

Z-PACK HS3 Connector (Continued)



Recommended PC Board Layout
(Position Shown Used with
Part Number 223986-1)

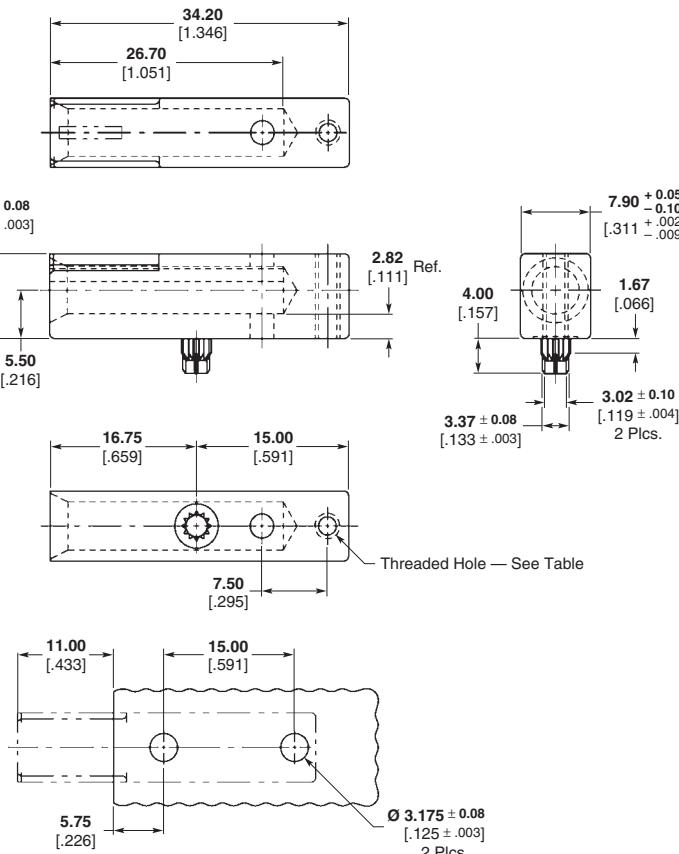
Female Guide Module (Keyed)

Material and Finish

Guide Module — Zinc alloy, chromate conversion coated

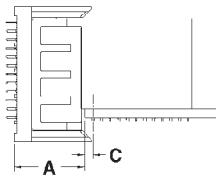
Part Number 223986

Dim. A	Thread	Part Number
0°	4-40	223986-1
45°	4-40	223986-2
90°	4-40	223986-3
135°	4-40	223986-4
180°	4-40	223986-5
225°	4-40	223986-6
270°	4-40	223986-7
315°	4-40	223986-8
0°	M2.6	120913-1
45°	M2.6	120913-2
90°	M2.6	120913-3
135°	M2.6	120913-4
180°	M2.6	120913-5
225°	M2.6	120913-6
270°	M2.6	120913-7
315°	M2.6	120913-8

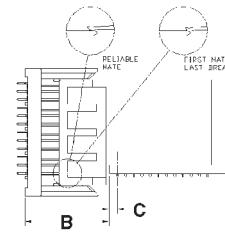


**Z-PACK HS-3 Connector
Mating Sequence Chart**

High Speed Backplane Connectors

AMP
Z-PACK HS3 Connector (Continued)


Fully Mated

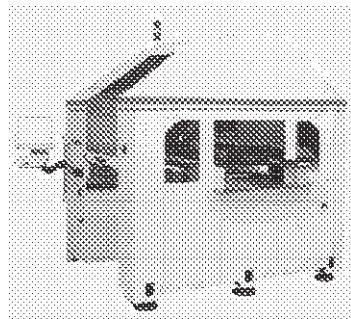


Reliable Mate

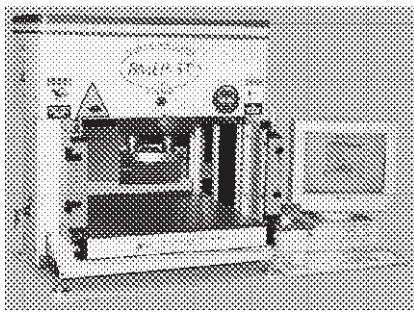
Product Family	Dim. C	Dim. A Fully Mated	Contact	Dim B.		Fully Mated Wipe Length
				Reliable Mate	First Mate Last Break	
HM-Zd	1.50 .059	12.50 .492	Ground Shield	16.78 [.661]	17.55 [.691]	4.28 [.169]
			Signal Level 2	15.41 [.607]	15.85 [.624]	2.91 [.115]
			Signal Level 1	13.91 [.548]	14.35 [.565]	1.41 [.056]
HM-Zd Guide Hardware	3.00 .118	12.50 .492	24.0 mm Pin	27.50 [1.083]	33.40 [1.315]	N/A
			22.2 mm Pin	25.70 [1.012]	31.60 [1.244]	N/A
			Key Blocking Point	N/A	22.03 [.867]	N/A
HM-2mm	1.50 .059	12.50 .492	Signal Level 3	18.27 [.719]	18.84 [.742]	5.77 [.227]
			Signal Level 2	16.77 [.660]	17.34 [.683]	4.27 [.168]
			Signal Level 1	15.27 [.601]	15.84 [.624]	2.77 [.109]
MULTIGIG RT T1	2.50 .098	12.50 .492	Ground	18.00 [.709]	—	5.50 [.217]
			Signal Level 3	18.00 [.709]	—	5.50 [.217]
			Signal Level 2	16.50 [.650]	—	4.00 [.157]
			Signal Level 1	15.00 [.591]	—	2.50 [.098]
MULTIGIG RT T2	2.25 .089	12.50 .492	Ground	18.00 [.709]	—	5.50 [.217]
			Signal Level 3	18.00 [.709]	—	5.50 [.217]
			Signal Level 2	16.50 [.650]	—	4.00 [.157]
			Signal Level 1	15.00 [.591]	—	2.50 [.098]
MULTIGIG RT T3	2.25 .089	12.50 .492	Ground	16.50 [.650]	—	4.00 [.157]
			Signal Level 1	15.00 [.591]	—	2.50 [.098]
MULTIGIG RT Power Module	5.50 .217	12.50 .492	Power Level 3	23.75 [.935]	—	11.25 [.443]
			Power Level 2	22.25 [.876]	—	9.75 [.384]
			Power Level 1	20.75 [.817]	—	8.25 [.325]
MULTIGIG RT Guide Hardware	N/A	12.50 .492	Guide Pin Key	33.25 [1.309]	N/A	20.75 [.817]
			Guide ESD Contact	30.75 [1.211]	—	18.25 [.719]
HS-3	1.50 .059	12.50 .492	Ground	17.08 [.672]	17.60 [.693]	4.78 [.188]
			Signal Level 2	16.05 [.632]	16.47 [.648]	3.75 [.148]
			Signal Level 1	14.55 [.573]	14.97 [.589]	2.25 [.089]
UPM	3.50 .138	12.50 .492	Power Level 3	20.25 [.797]	20.95 [.825]	8.10 [.319]
			Power Level 2	18.65 [.734]	19.35 [.762]	6.50 [.256]
			Power Level 1	17.03 [.670]	17.73 [.698]	4.88 [.192]
UPM Guide Hardware	5.75 .226	12.50 .492	Guide Pin Key	31.39 [1.236]	36.16 [1.424]	N/A
			Keyed Guide Pin	31.39 [1.236]	36.16 [1.424]	N/A
			Keyed Guide Pin	35.23 [1.387]	40.00 [1.575]	N/A
MULTI-BEAM XL Right Angle Header to Vertical Receptacle	5.08 .200	14.73 .580	PreMate Power — Level 1	—	16.84 [.663]	5.61 [.221] Min.
			PostMate Power — Level 2	—	17.81 [.701]	4.34 [.171] Min.
			PreMate Signal — Level 2	—	18.26 [.719]	3.81 [.150] Min.
			PostMate Signal — Level 3	—	19.53 [.769]	2.54 [.100] Min.
MULTI-BEAM XL Right Angle Receptacle to Vertical Header	3.81 .150	13.21 .520	PreMate Power — Level 1	—	15.32 [.603]	5.61 [.221] Min.
			PostMate Power — Level 2	—	16.28 [.641]	4.34 [.171] Min.
			PreMate Signal — Level 2	—	16.74 [.659]	3.81 [.150] Min.
			PostMate Signal — Level 3	—	18.01 [.709]	2.54 [.100] Min.

Z-PACK HS3 Connector (Continued)

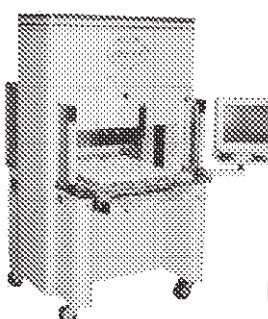
Application Tooling and Equipment



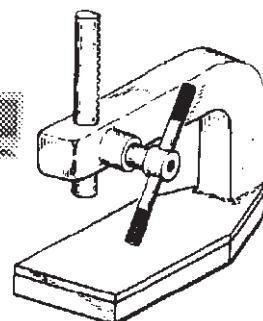
1585280-1 Model AP3



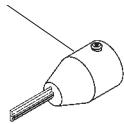
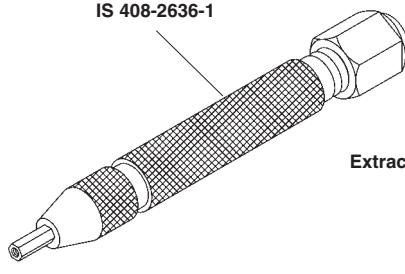
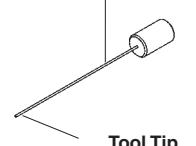
1585696-1 Model BMEP 5T



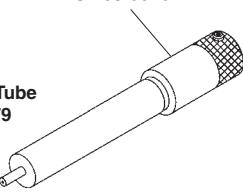
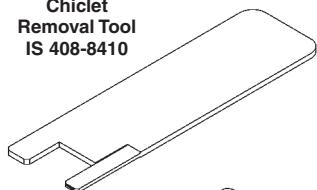
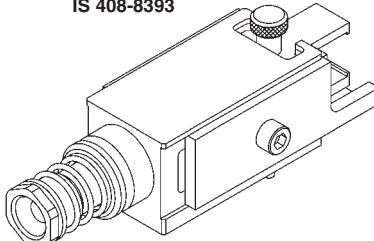
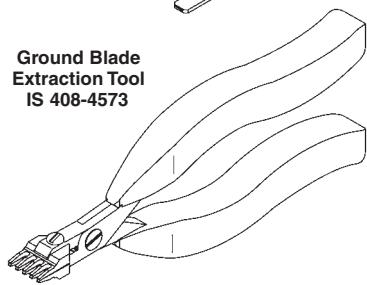
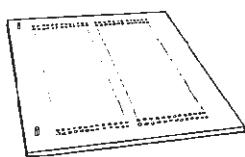
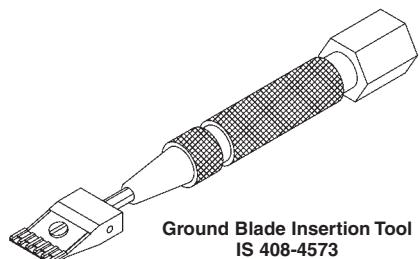
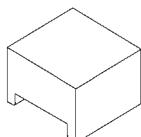
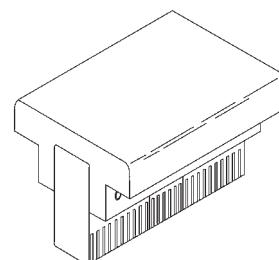
1585699-1 Model MEP 6T



Typical Manual Arbor Frame Assembly (Commercially Available)

Insertion Tool Assembly
IS 408-9979Contact Replacement Tool
IS 408-2636-1Replacement Pin Assembly
IS 408-9979Setscrew
IS 408-9979

Spacer

Pusher
IS 408-9979Extraction Tool Assembly
IS 408-9979Pin Support Tube
IS 408-9979Pin Repair Kit
IS 408-9979Chiclet Removal Tool
IS 408-8410Housing Removal Tool Kit
IS 408-8393Ground Blade Extraction Tool
IS 408-4573Ground Blade Repair Kit
IS 408-4573Typical PC Board Support
(Customer Supplied)Typical Receptacle Seating Tool
IS 408-8500Typical Pin Header Seating Tool
IS 408-8501



Electronics

High Speed Backplane Connectors



Engineering Notes

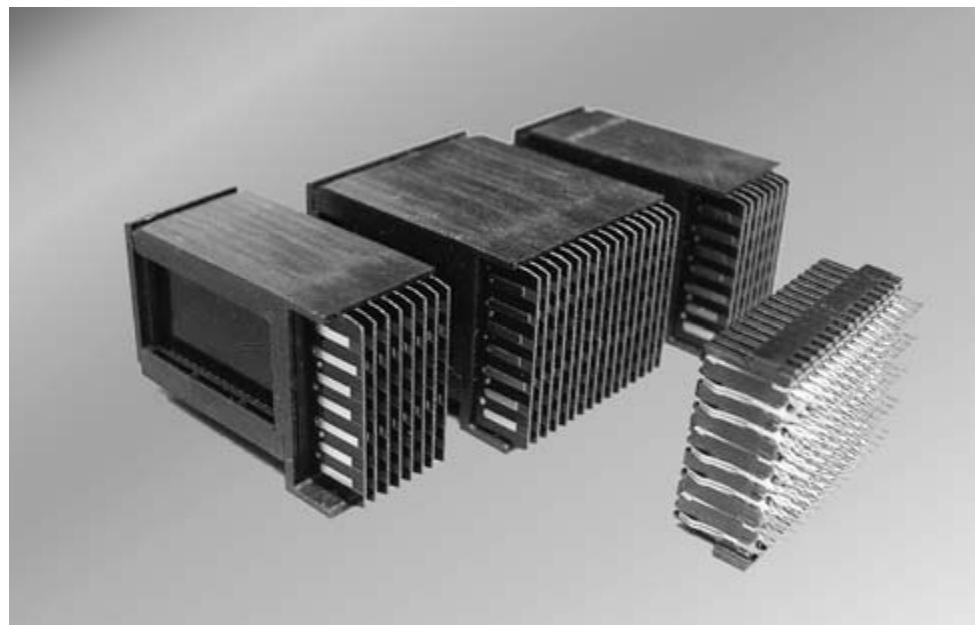
Table of Contents**MULTIGIG RT Connector**

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Product Facts

- Customizable impedance matched printed circuit wafer interface
- Inverse sex backplane connector system with "pinless" interface
- Superior crosstalk performance
- Optimized footprints for signal integrity and ease of board design
- Utilizes a 0.56 [.022] diameter via for lower cost board fabrication
- Three levels of signal contact sequencing
- Telcordia/Bellcore Compliant
- Available in modular or monoblock style
- Available for 20.30 [.800] or 25.40 [1.00] card pitch systems
- Durability rated for 200 cycles
- Fully compatible with MP based fiber optic array interconnects
- Complete connector family includes
 - Power Modules => Maximize Amps/inch density, voltages in pairs
 - Guidance Modules
 - Die cast for strength
 - Optional ESD contact
 - Three sequence levels
 - Press fit or hardware mounted
 - Backplane drill pattern enabled keying
 - Cable assemblies proposals available
- MULTIGIG RT connector products are fully compatible with 2mm HM equipment practices

High Speed Backplane Connectors

MULTIGIG RT Connector Products

The MULTIGIG RT product line is a backplane interconnect family that offers levels of flexibility and customization never before seen in the industry. This printed circuit based, pinless, interconnect family is comprised of modular components which can be used in a variety of combinations. The connectors in this innovatively flexible platform can be combined to provide the density, data throughput, and signal integrity required for any application in today's computer, military, medical, or industrial control industries.

The use of printed circuit wafers in this connector system allows for cost effective sequencing and electrical customization of the connector. Wafers can be manufactured specifically for differential or signal ended performance and the impedance, propagation delay, and crosstalk of the connector can be altered per customer requirements. This scalable board to backplane connector family is a robust, "pinless" design which eliminates the pin field on backplane boards and reduces the end user's

exposure to field failure in card cage systems. The MULTIGIG RT connector family is designed specifically for 20.30 [.800] or 25.40 [1.00] card pitch systems.

- **MULTIGIG RT 1** — 141 signals/inch, data rates up to 3.125 Gb/s
- **MULTIGIG RT 2** — 113 signals/inch, data rates of 3.125 Gb/s to 6.4+ Gb/s and has been demonstrated to support 10 Gb/s
- **MULTIGIG RT 3** — 85 signals/inch, data rates above 10 Gb/s

Applications

- **Telecommunications Equipment**
 - Metro Optical Networking equipment
 - SONET switched platforms
 - Aggregation switches
- **Midrange Servers**
- **High End Servers**
- **High speed custom platforms**
- **Mass data storage**
- **Rugged, mission-critical applications**

Technical Documents

- Application Specifications**
114-13062 Power Modules
114-13056 Signal Connectors

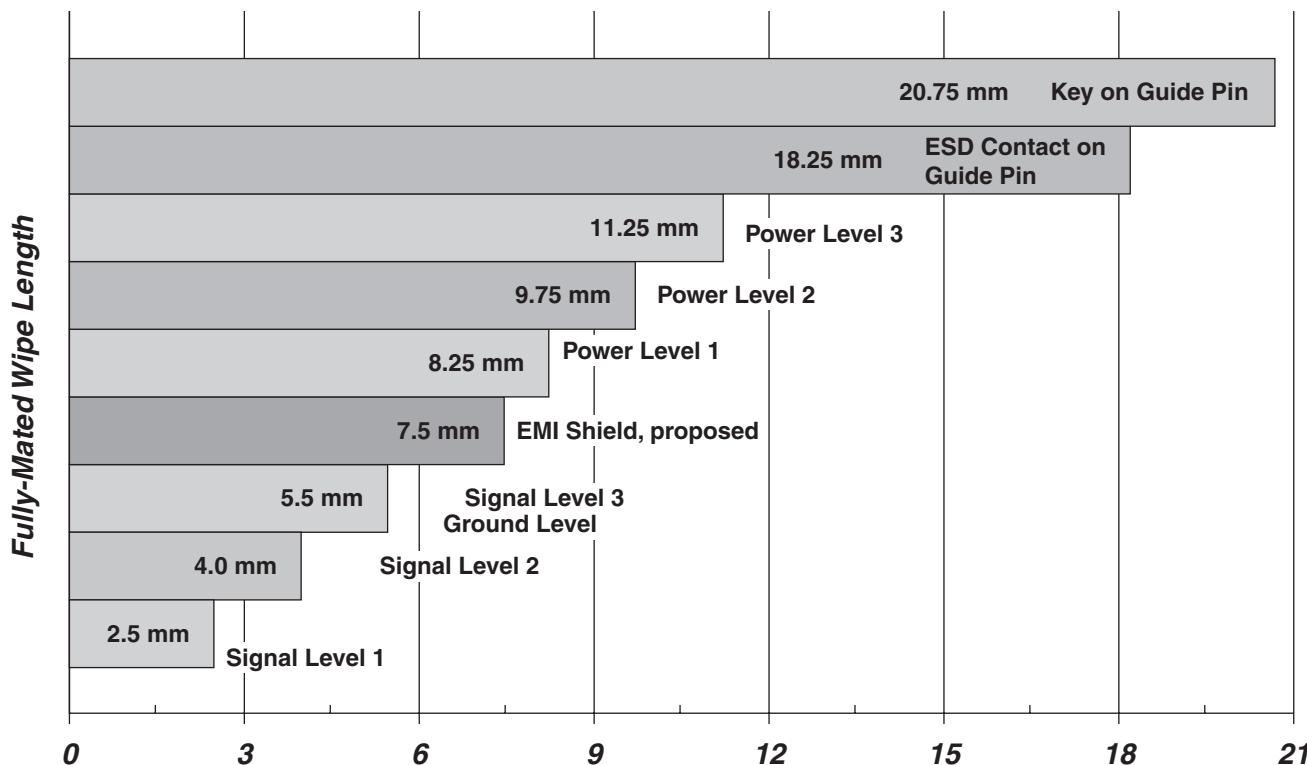
- Product Specifications**
108-2062 Power Modules
108-2072 Signal Connectors

Qualification Test Reports

- 501-538 Power Connectors
501-544 Signal Connectors

Engineering Report

- 502-1130 Power Connectors
Routing Guide RT 2 on
tycoelectronics.com

MULTIGIG RT Connector Sequencing Chart

3

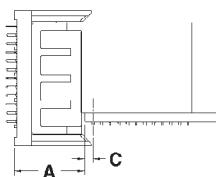
MULTIGIG RT Connector

MULTIGIG RT Connector Mating Sequence Chart which shows the relationship of MULTIGIG RT Connector products with other Tyco Electronics products

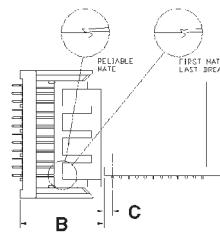
High Speed Backplane Connectors

AMP

MULTIGIG RT Connector Products (Continued)



Fully Mated



Reliable Mate

Product Family	Dim. C	Dim. A Fully Mated	Contact	Dim B.		Fully Mated Wipe Length
				Reliable Mate	First Mate Last Break	
HM-Zd	1.50 .059	12.50 .492	Ground Shield	16.78 [.661]	17.55 [.691]	4.28 [.169]
			Signal Level 2	15.41 [.607]	15.85 [.624]	2.91 [.115]
			Signal Level 1	13.91 [.548]	14.35 [.565]	1.41 [.056]
HM-Zd Guide Hardware	3.00 .118	12.50 .492	24.0 mm Pin	27.50 [1.083]	33.40 [1.315]	N/A
			22.2 mm Pin	25.70 [1.012]	31.60 [1.244]	N/A
			Key Blocking Point	N/A	22.03 [.867]	N/A
HM-2mm	1.50 .059	12.50 .492	Signal Level 3	18.27 [.719]	18.84 [.742]	5.77 [.227]
			Signal Level 2	16.77 [.660]	17.34 [.683]	4.27 [.168]
			Signal Level 1	15.27 [.601]	15.84 [.624]	2.77 [.109]
MULTIGIG RT T1	2.50 .098	12.50 .492	Ground	18.00 [.709]	—	5.50 [.217]
			Signal Level 3	18.00 [.709]	—	5.50 [.217]
			Signal Level 2	16.50 [.650]	—	4.00 [.157]
			Signal Level 1	15.00 [.591]	—	2.50 [.098]
MULTIGIG RT T2	2.25 .089	12.50 .492	Ground	18.00 [.709]	—	5.50 [.217]
			Signal Level 3	18.00 [.709]	—	5.50 [.217]
			Signal Level 2	16.50 [.650]	—	4.00 [.157]
			Signal Level 1	15.00 [.591]	—	2.50 [.098]
MULTIGIG RT T3	2.25 .089	12.50 .492	Ground	16.50 [.650]	—	4.00 [.157]
			Signal Level 1	15.00 [.591]	—	2.50 [.098]
MULTIGIG RT Power Module	5.50 .217	12.50 .492	Power Level 3	23.75 [.935]	—	11.25 [.443]
			Power Level 2	22.25 [.876]	—	9.75 [.384]
			Power Level 1	20.75 [.817]	—	8.25 [.325]
MULTIGIG RT Guide Hardware	N/A	12.50 .492	Guide Pin Key	33.25 [1.309]	N/A	20.75 [.817]
			Guide ESD Contact	30.75 [1.211]	—	18.25 [.719]
HS-3	1.50 .059	12.50 .492	Ground	17.08 [.672]	17.60 [.693]	4.78 [.188]
			Signal Level 2	16.05 [.632]	16.47 [.648]	3.75 [.148]
			Signal Level 1	14.55 [.573]	14.97 [.589]	2.25 [.089]
UPM	3.50 .138	12.50 .492	Power Level 3	20.25 [.797]	20.95 [.825]	8.10 [.319]
			Power Level 2	18.65 [.734]	19.35 [.762]	6.50 [.256]
			Power Level 1	17.03 [.670]	17.73 [.698]	4.88 [.192]
UPM Guide Hardware	5.75 .226	12.50 .492	Guide Pin Key	31.39 [1.236]	36.16 [1.424]	N/A
			Keyed Guide Pin	31.39 [1.236]	36.16 [1.424]	N/A
			Keyed Guide Pin	35.23 [1.387]	40.00 [1.575]	N/A
MULTI-BEAM XL Right Angle Header to Vertical Receptacle	5.08 .200	14.73 .580	PreMate Power — Level 1	—	16.84 [.663]	5.61 [.221] Min.
			PostMate Power — Level 2	—	17.81 [.701]	4.34 [.171] Min.
			PreMate Signal — Level 2	—	18.26 [.719]	3.81 [.150] Min.
			PostMate Signal — Level 3	—	19.53 [.769]	2.54 [.100] Min.
MULTI-BEAM XL Right Angle Receptacle to Vertical Header	3.81 .150	13.21 .520	PreMate Power — Level 1	—	15.32 [.603]	5.61 [.221] Min.
			PostMate Power — Level 2	—	16.28 [.641]	4.34 [.171] Min.
			PreMate Signal — Level 2	—	16.74 [.659]	3.81 [.150] Min.
			PostMate Signal — Level 3	—	18.01 [.709]	2.54 [.100] Min.

Product Selection Guide**High Speed Backplane Connectors****MULTIGIG RT Connector Products (Continued)**

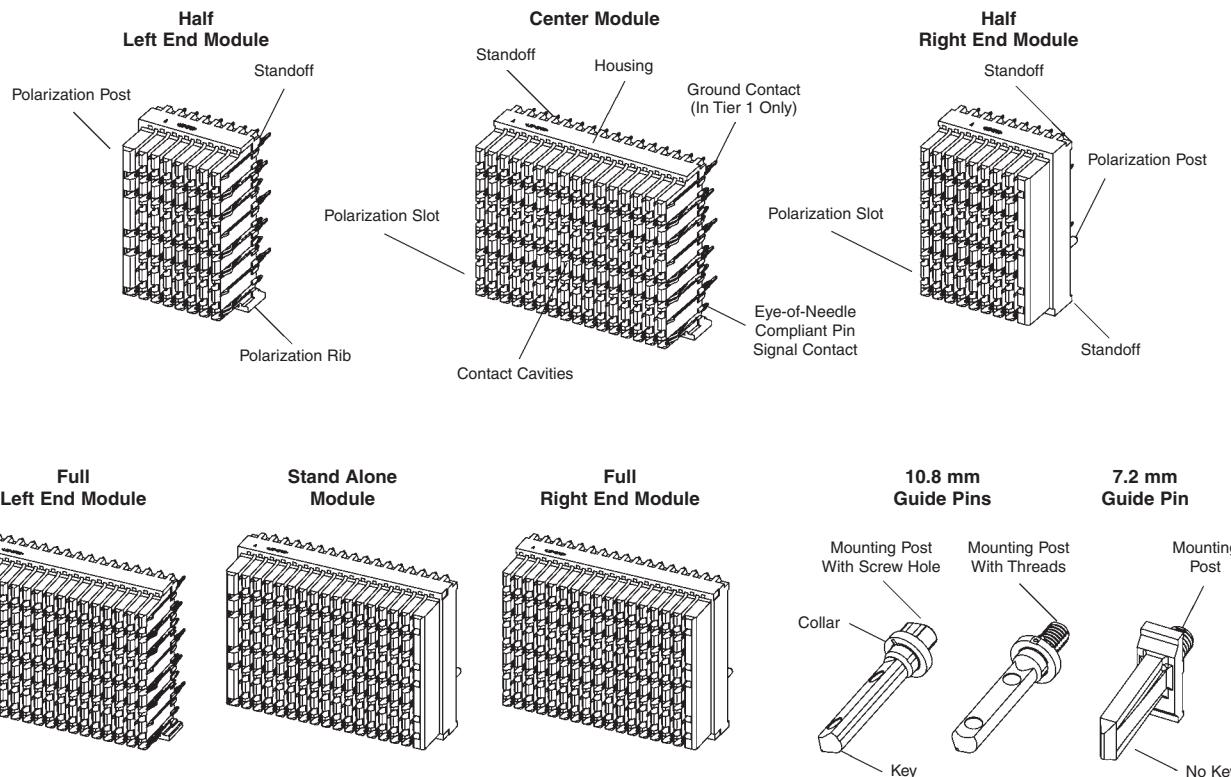
MULTIGIG RT connectors consist of interlocking left end and right end signal modules (half or full), center signal modules, and stand alone modules available in vertical receptacles (backplane application) and right angle plugs (daughtercard application), and complementary mechanical guide assemblies (available in size 10.80 [.425] or 7.20 [.283]. The guide assembly provides blind mating and misalignment for the connectors. The 10.80 [.425] guide assembly also provides keying and is available with or without an internal contact for electrostatic discharge (ESD) protection.

The modules are capable of being stacked in any configuration within the limitations given in this catalog to a maximum length of 120 between guide assemblies. These connectors perform at two separate density levels: Tier 1 and Tier 2. The connectors are placed on the pc board by manually-operated or automatic machines.

The modules have 6, 8, or 10 rows of signal contacts with 20.30 [.800], 25.40 [1.000], or 30.50 [1.201] centerline spacing (profile size). A right angle plug module having 7 rows with 20.30 [.800] spacing is also available for Tier 2 only to

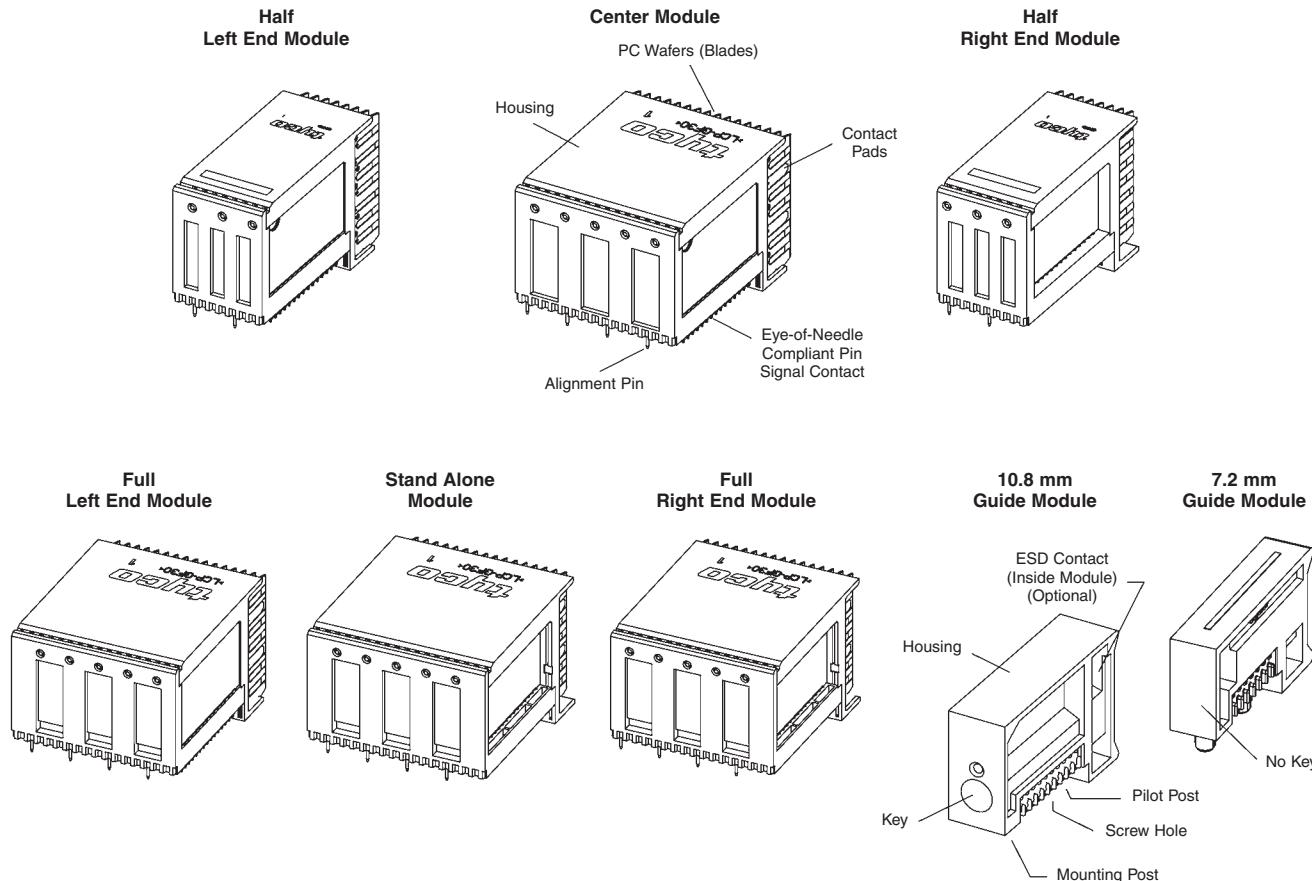
accommodate special applications used by the VMEbus International Trade Association (VITA). The signal contacts, along with the ground contacts (in Tier 1 modules only) and ESD contacts (if using the 10.80 [.425] guide assembly with ESD contact) provide sequencing for each group of modules.

When corresponding with personnel, use the terminology provided to facilitate your inquiries for information. Basic terms and features of this product are provided in the art below and on the following page.

Vertical Receptacle (Backplane) Connector

MULTIGIG RT Connector Products (Continued)**Product Selection Guide**

(Continued)

**Right Angle Plug
(Daughtercard) Connector****Signal Modules**

Tier 1 and Tier 2 receptacles contain eye-of-needle compliant pin signal contacts; the Tier 1 receptacle also contains ground contacts. Each housing features standoffs for thermal venting, polarization ribs (on end modules) and polarization slots (on the center module) for proper stacking of the modules, and polarization posts to ensure correct orientation on the pc board.

Plugs contain eye-of-needle compliant pin signal contacts and pc wafers (blades). The housing features alignment pins to ensure correct orientation on the pc board.

Guide Assemblies

The guide assembly consists of a guide pin (used with receptacles) and a guide module (used with plugs).

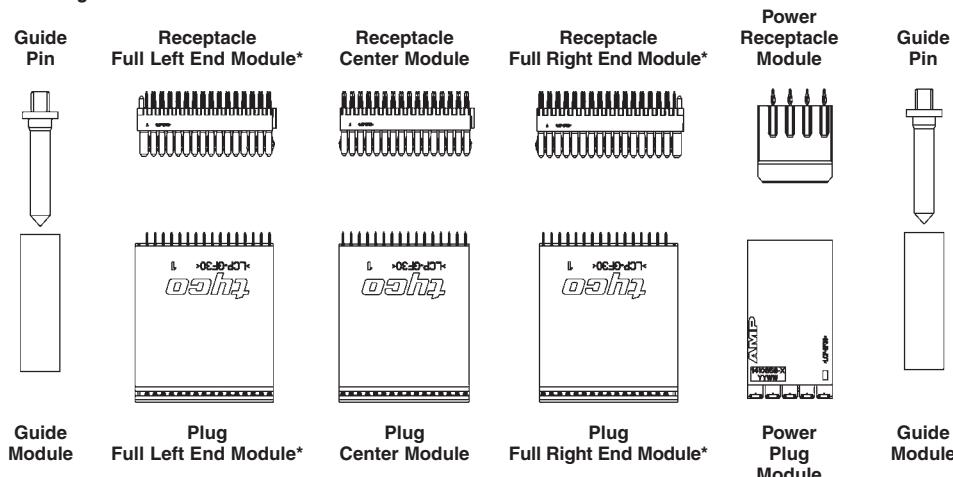
The guide pin features a collar and mounting post

(having a screw hole or threads) with or without a key. The guide pins are available with various length mounting posts. The mounting post is used with customer supplied hardware to attach the guide pin to the pc board. Guide pins must be chosen according to thickness of pc board being used; otherwise, interference with proper mating or damage to system components will occur. Guide pins with keys are available in various keying positions.

The guide module features a housing with or without a key and with a screw hole, mounting post, and pilot post. The mounting post and pilot post are used to position the guide module on the pc board, and the screw hole is used with customer supplied hardware to attach the module to the pc board. The 10.80 [.425] guide module is available with or without an ESD contact located inside the module.

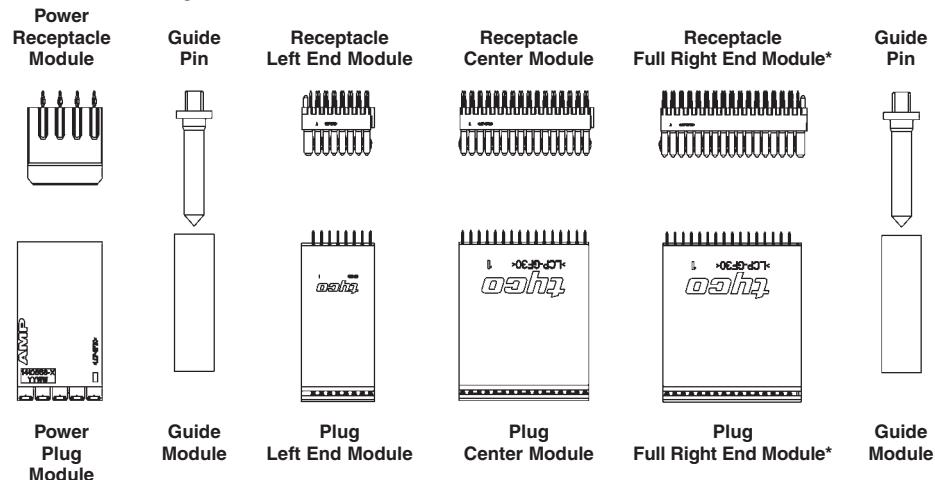
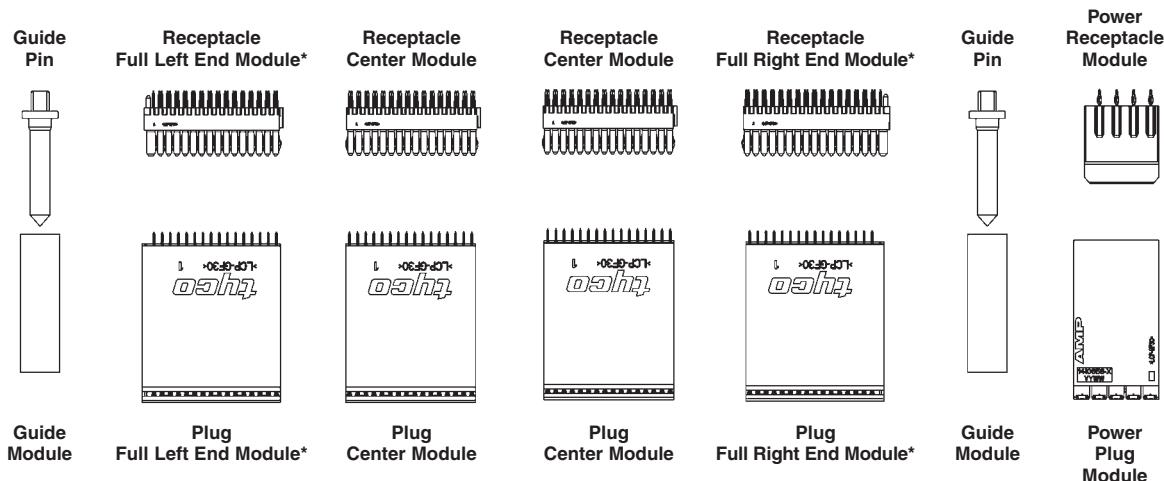
Product Selection Guide

(Continued)

Possible Module Configurations Used with Power Modules**MULTIGIG RT Connector Products (Continued)****Three Signal Modules and One Power Module**

3

MULTIGIG RT Connector

Two and One-Half Signal Modules and One Power Module**Four Signal Modules with One Power Module**

* A Half Left End Module and a Half Right End Module can be used instead.

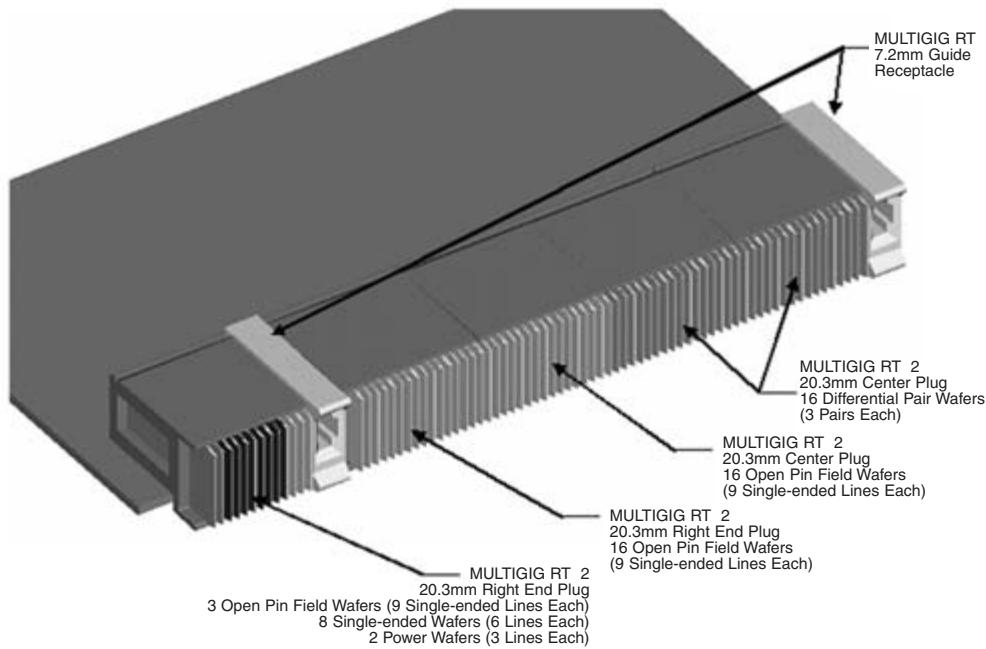
Customization Options

The MULTIGIG RT Product Line is fully customizable. This is accomplished by means of stacking the PCB wafers in the correct location to achieve the desired mix of High Speed Differential, High Speed Single-ended, and low

speed/high speed density signals. In addition, power can be carried through the PCB wafers by replacing one or more signal wafers for a power wafer.

Shown below is a Tyco Electronics proposal for a typical MULTIGIG RT

Connector application. As you can see, we took full advantage of the MULTIGIG RT Connector capabilities. Contact your Tyco Electronics representative to have a proposal drawn-up to meet your specific needs.

Typical MULTIGIG RT Connector Implementation

Customization Options

(Continued)

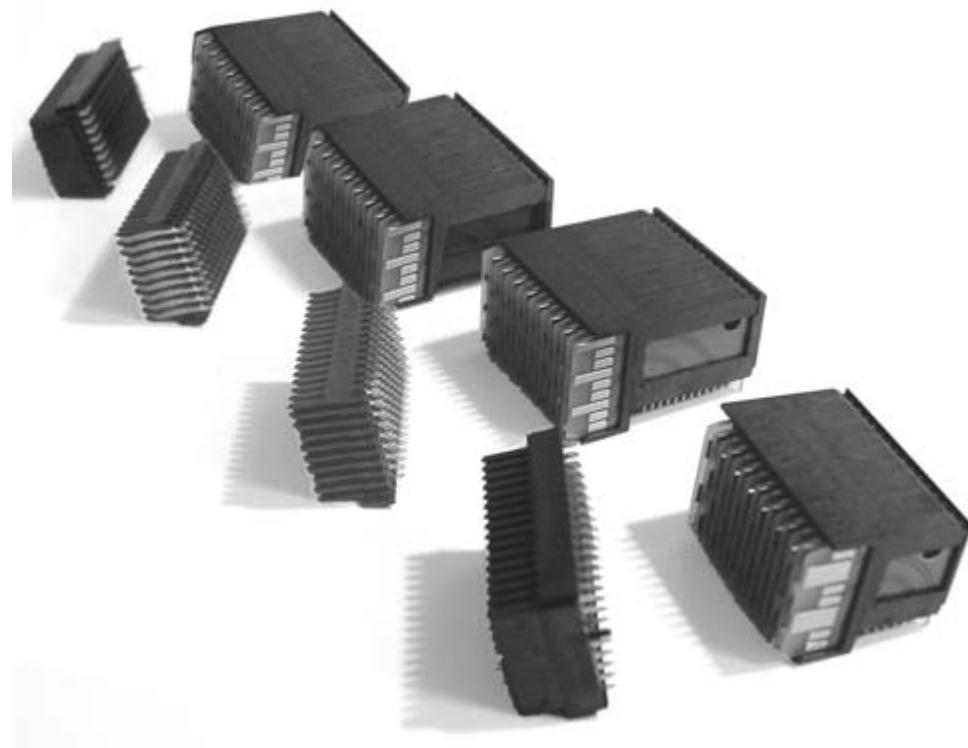
Tier 1 Options

High Speed Backplane Connectors

MULTIGIG RT Connector Products (Continued)

The Tier 1 connector system can be customized with Differential and Single-ended wafers. In addition, a power wafer is available for the 25.40 [1.000] pitch

product that provides 4 power lines and 2 sense lines per wafer. Shown below are differential, single-ended and power options.

**3**

MULTIGIG RT Connector

Customization Options

(Continued)

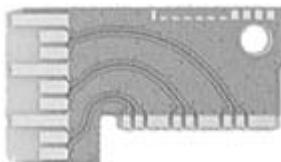
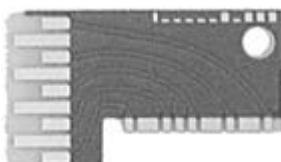
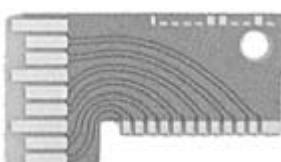
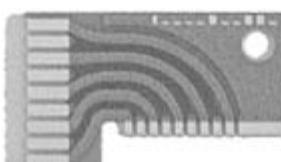
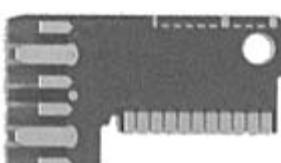
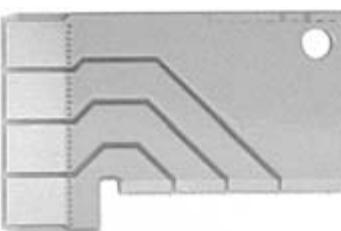
Tier 2 and Tier 3 Options**Signal Options Available:**
0.8" Shown

High Speed Backplane Connectors

MULTIGIG RT Connector Products (Continued)

The Tier 2 and Tier 3 connector system is fully customizable due to the lack of a bussed ground system. This allows us to stack the many options available (with more being

developed as needed) in any configuration that is necessary to meet the customers needs. Shown here are some of the options that are currently available.

Differential Wafers**Single-ended w/ 1:1 S/G Ratio****Single-ended w/ 2:1 S/G Ratio****Open Pin Field
(No Reference Ground)****Mixed, Differential and S/E Lines****Custom, Vita 41, Mixed****Up to 4 Power Lines/Wafer
Total of 19 AMPS/Wafer**

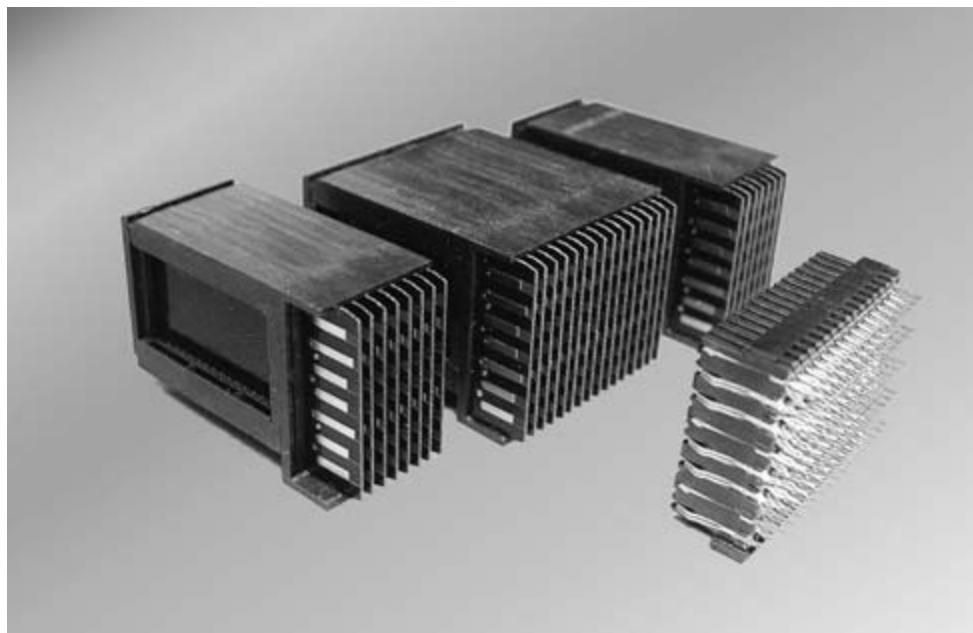
Target Applications

- High speed telecommunications equipment
- Midrange and high-end servers
- Networking equipment
- Blindmate design
- High speed custom platforms
- Mass data storage
- Rugged, mission-critical applications

Product Features

- Excellent performance to 3.125 Gb/s
- High density: 140 contacts per inch provides 70 contact pairs per inch for differential signaling
- Options include 20.32 [.800] and 25.40 [1.000] pitch card spacing
- Modular options for signal, power, keying and guidance
- Optimized footprints
- Robust design
- Low noise levels
- Supports differential pair widths of 6 mils with 9 mil spacings
- Single-ended option available; contact Tyco Electronics for performance data

High Speed Backplane Connectors

MULTIGIG RT Tier 1 Connector System**3**

MULTIGIG RT Connector

The MULTIGIG RT Tier 1 connector meets customer requirements for high-density and high-performance two-piece interconnects. In Tyco Electronics and independent lab tests, the MULTIGIG RT Tier 1 connector has performed in excess of 3 Gb/s using standard FR-4 board material and routing techniques. The MULTIGIG RT Tier 1 connector is a differential connector with a contact density of 70 pairs per inch. The robust connector uses daughtercard plugs with a

printed circuit board (PCB) wafer design and backplane receptacles with a completely enclosed dual-beam design. All signal lines use redundant points of contact for high reliability.

The MULTIGIG RT Tier 1 connector is available for both 20.32 [.800] and 25.40 [1.000] pitch card spacing. The totally modular system allows flexibility in choosing signal and power modules as well as guidance, keying, and electrostatic discharge (ESD) modules to meet the most demanding

applications. Signal modules can be customized for specific electrical requirements—such as sequencing—that are critical in high speed applications.

Power modules are available with two- and four-voltage options, each circuit capable of carrying 15 amps. The robust metal guide pin provides eight keying options and a unique ESD contact to discharge static when daughtercards are hot-plugged.

Availability

Fully validated SPICE models: E-mail requests to modeling@tycoelectronics.com

Pro/E models and IGES models: E-mail requests to TycoCAD@tycoelectronics.com

www.tycoelectronics.com

High Speed Backplane Connectors

Mechanical Design Summary**Mechanical Features**

- **Extremely rugged connector for mission critical applications**
- **Three signal sequencing levels plus an additional three power sequencing levels**
- **Keyed guide modules standard: cannot mate connector incorrectly, and provide ± 3 mm of gather**
- **Options available include:**
 - Power modules
 - Electrostatic discharge guide pins
 - Multiple guide pin keying options
- **High signal density: 70 pairs for differential signals**

MULTIGIG RT Tier 1 Connector System (Continued)**20.30 [.800] Pitch Connector**

Type	Style	Signal Pattern	Part Number
(Backplane) Receptacle	Center	N/A	1410200-1
	Stand Alone	N/A	1410420-1
	Half Left	N/A	1410226-1
	Half Right	N/A	1410227-1
	Full Left	N/A	1410201-1
(Daughtercard) Plug	Full Right	N/A	1410202-1
	Center	S.E.	1410205-1
	Stand Alone	S.E.	1410421-1
	Half Left	S.E.	1410228-1
	Half Right	S.E.	1410229-1
	Full Left	S.E.	1410206-1
	Full Right	S.E.	1410207-1
	Center	Diff.	1410205-2
	Stand Alone	Diff.	1410421-2
	Half Left	Diff.	1410228-2

25.40 [1.00] Pitch Connector

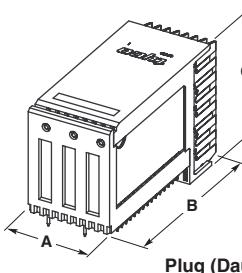
Type	Style	Signal Pattern	Part Number
(Backplane) Receptacle	Center	N/A	1410210-1
	Stand Alone	N/A	1410412-1
	Half Left	N/A	1410231-1
	Half Right	N/A	1410230-1
	Full Left	N/A	1410211-1
(Daughtercard) Plug	Full Right	N/A	1410212-1
	Center	S.E.	1410215-1
	Stand Alone	S.E.	1410413-1
	Half Left	S.E.	1410232-1
	Half Right	S.E.	1410233-1
	Full Left	S.E.	1410216-1
	Full Right	S.E.	1410217-1
	Center	Diff.	1410215-2
	Stand Alone	Diff.	1410413-2
	Half Left	Diff.	1410232-2

The drawings below show the nominal dimensions for the MULTIGIG RT 1 connector modules

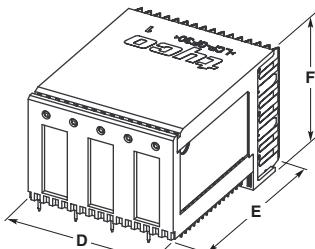
Dim.	20.32 [.800] Connector	25.40 [1.000] Connector
A	16.10 .630	16.10 .630
B	21.60 .850	27.40 1.080
C	18.40 .720	24.20 .950
D	28.70 1.130	28.70 1.130
E	21.60 .850	27.40 1.080
F	18.40 .720	24.20 .950

Dim.	20.32 [.800] Connector	25.40 [1.000] Connector
AA	R = 17.00 .067	R = 17.00 .067
BB	L = 15.20 .600	L = 15.20 .600
CC	10.50 .410	10.50 .410
DD	18.60 .730	24.40 .960
EE	28.70 1.130	28.70 1.130
FF	10.50 .410	10.50 .410
	18.60 .730	24.40 .960

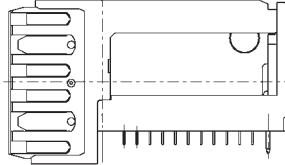
Left/Right End Module



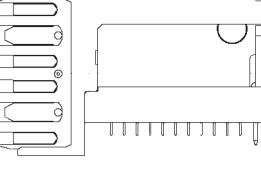
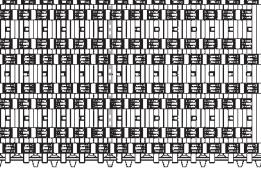
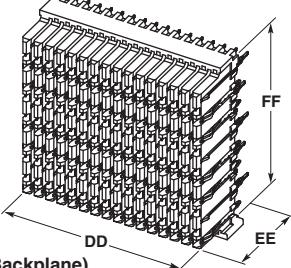
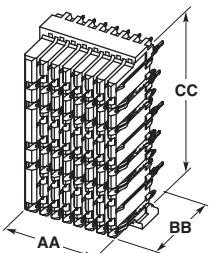
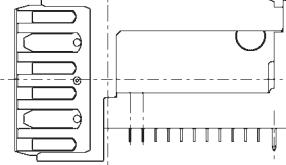
Center Module



Left Full End Module



Right Full End Module



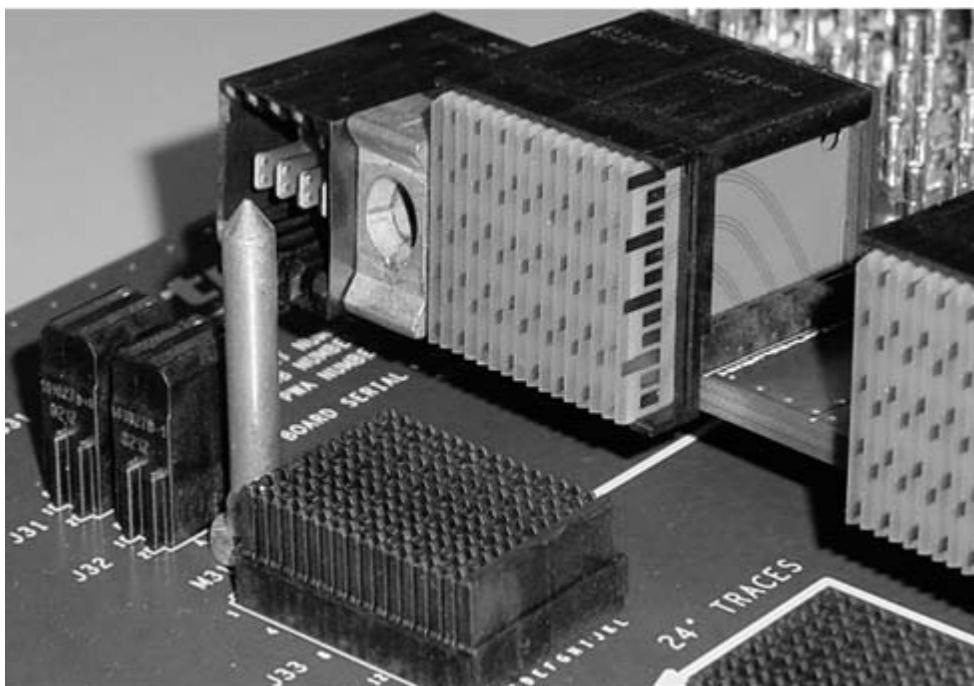
Target Applications

- High speed telecommunications equipment
- Midrange and high-end servers
- Networking equipment
- Blindmate design
- High speed custom platforms
- Mass data storage
- Rugged, mission-critical applications

Product Features

- Excellent performance to 6.25+ Gb/s-
- High density: 113 contacts per inch provides 56 contact pairs per inch for differential signaling
- Options include 20.32 [.800] and 25.40 [1.000] pitch card spacing
- Modular options for signal, power, keying and guidance
- Optimized footprints
- Robust design
- Low noise levels
- Supports differential pair widths of 6 mils with 9 mil spacings
- Single-ended, open pin field and power wafers available

High Speed Backplane Connectors

MULTIGIG RT Tier 2 Connector System

The MULTIGIG RT Tier 2 connector is the latest product release to meet customer requirements for high-density and high-performance two-piece interconnects. In Tyco Electronics and independent lab tests, the MULTIGIG RT Tier 2 connector has performed in excess of 6 Gb/s using standard FR-4 board material and routing techniques, and has **been demonstrated to 10 Gb/s**.

The MULTIGIG RT Tier 2 connector system provides the flexibility to configure the daughtercard for Differential, Single-ended,

Open Pin Field, or Power within a single connector module. All of these options then mate into a common Backplane Receptacle. The robust connector uses daughtercard plugs with a printed circuit board (PCB) wafer design and backplane receptacles with a completely enclosed dual-beam design. All signal lines use redundant points of contact for high reliability.

The MULTIGIG RT Tier 2 connector is available for both 20.32 [.800] and 25.40 [1.000] pitch card spacing. The totally modular system allows flexibility in choosing signal and power modules

as well as guidance, keying, and electrostatic discharge (ESD) modules to meet the most demanding applications. Signal modules can be customized for specific electrical requirements—such as sequencing—that are critical in high speed applications.

Power modules are available with two- and four-voltage options, each circuit capable of carrying 15 amps. The robust metal guide pin provides eight keying options and a unique ESD contact to discharge static when daughtercards are hot-plugged.

Availability

Fully validated SPICE models: E-mail requests to modeling@tycoelectronics.com

Pro/E models and IGES models: E-mail requests to TycoCAD@tycoelectronics.com

www.tycoelectronics.com

Mechanical Design Summary

High Speed Backplane Connectors

MULTIGIG RT Tier 2 Connector System (Continued)**20.30 [.800] Pitch Connector**

Type	Style	Signal Pattern	Part Number
(Backplane) Receptacle	Center	N/A	1410140-1
	Stand Alone	N/A	1410133-1
	Half Left	N/A	1410186-1
	Half Right	N/A	*
	Full Left	N/A	1410141-1
	Full Right	N/A	1410142-1
(Daughtercard) Plug	Right End	N/A	1410456-1
	Center	S.E.	*
		Diff.	1410137-1
	Stand Alone	S.E.	*
		Diff.	1410134-1
	Half Left	S.E.	*
		Diff.	*
	Half Right	S.E.	*
		Diff.	*
	Full Left	S.E.	*
Full Right		Diff.	1410138-1
		S.E.	*
		Diff.	1410139-1

25.40 [1.00] Pitch Connector

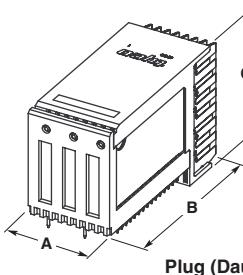
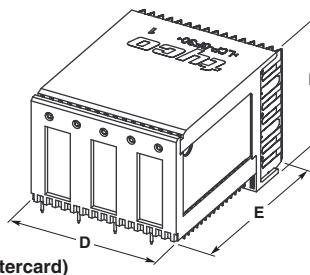
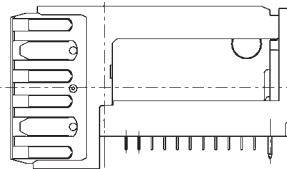
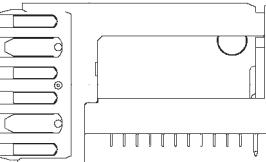
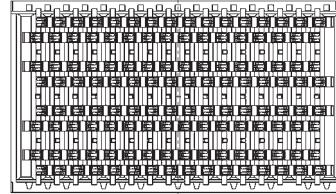
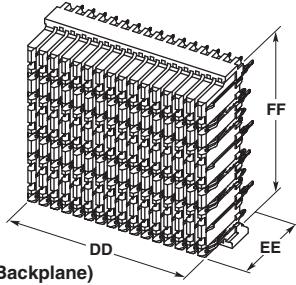
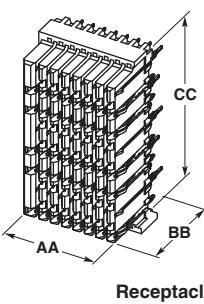
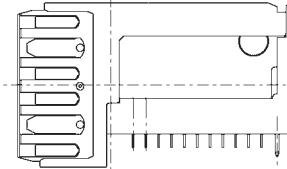
Type	Style	Signal Pattern	Part Number
(Backplane) Receptacle	Center	N/A	1410127-1
	Stand Alone	N/A	1410131-1
	Half Left	N/A	*
	Half Right	N/A	*
	Full Left	N/A	1410129-1
	Full Right	N/A	1410128-1
(Daughtercard) Plug	S.E.	*	
	Center	Diff.	1410123-1
	Stand Alone	S.E.	*
		Diff.	1410132-1
	Half Left	S.E.	*
		Diff.	*
	Half Right	S.E.	*
		Diff.	*
	Full Left	S.E.	*
		Diff.	1410124-1
	Full Right	S.E.	*
		Diff.	1410125-1

* Contact Tyco Electronics.

The drawings below show the nominal dimensions for the MULTIGIG RT 2 connector modules

Dim.	20.32 [.800] Connector	25.40 [1.000] Connector
A	16.10 .630	16.10 .630
B	21.60 .850	27.40 1.080
C	18.40 .720	24.20 .950
D	28.70 1.130	28.70 1.130
E	21.60 .850	27.40 1.080
F	18.40 .720	24.20 .950

Dim.	20.32 [.800] Connector	25.40 [1.000] Connector
AA	R = 17.00 .067	R = 17.00 .067
BB	L = 15.20 .600	L = 15.20 .600
CC	10.50 .410	10.50 .410
DD	18.60 .730	24.40 .960
EE	28.70 1.130	28.70 1.130
FF	10.50 .410	10.50 .410
	18.60 .730	24.40 .960

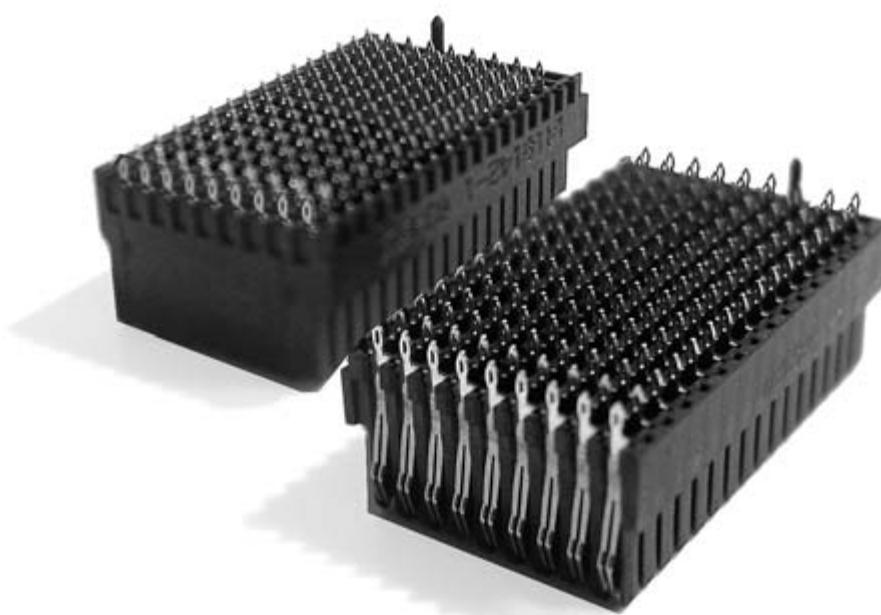
Left/Right End Module**Center Module****Left Full End Module****Right Full End Module**

Target Applications

- High speed telecommunications equipment
- Midrange and high-end servers
- Networking equipment
- Blindmate design
- High speed custom platforms
- Mass data storage
- Rugged, mission-critical applications

Product Features

- Excellent performance to 10+ Gb/s
- High density: 85 contacts per inch provides 42 contact pairs per inch for differential signaling
- Options include 20.32 [.800] and 25.40 [1.000] pitch card spacing
- Modular options for signal, power, keying and guidance
- Optimized footprints
- Robust design
- Low noise levels
- Supports differential pair widths of 6 mils with 9 mil spacings
- Single-ended, open pin field and power wafers available
- Supports Quad routing
- MULTIGIG RT 3 products are on 2.4mm column spacing



The MULTIGIG RT Tier 3 connector is the latest product release to meet customer requirements for high-density and high-performance two-piece interconnects. In Tyco Electronics and independent lab tests, the MULTIGIG RT Tier 3 connector has performed in excess of 10 Gb/s using standard FR-4 board material and routing techniques, and has been demonstrated to 10 Gb/s.

The MULTIGIG RT Tier 3 connector system provides the flexibility to configure the daughtercard for Differential, Single-ended,

Open Pin Field, or Power within a single connector module. All of these options then mate into a common Backplane Receptacle. The robust connector uses daughtercard plugs with a printed circuit board (PCB) wafer design and backplane receptacles with a completely enclosed dual-beam design. All signal lines use redundant points of contact for high reliability.

The MULTIGIG RT Tier 3 connector is available for both 20.32 [.800] and 25.40 [1.000] pitch card spacing. The totally modular system allows flexibility in choosing signal and power modules

as well as guidance, keying, and electrostatic discharge (ESD) modules to meet the most demanding applications. Signal modules can be customized for specific electrical requirements—such as sequencing—that are critical in high speed applications.

Power modules are available with two- and four-voltage options, each circuit capable of carrying 15 amps. The robust metal guide pin provides eight keying options and a unique ESD contact to discharge static when daughtercards are hot-plugged.

Availability

Fully validated SPICE models: E-mail requests to modeling@tycoelectronics.com

Pro/E models and IGES models: E-mail requests to TycoCAD@tycoelectronics.com

www.tycoelectronics.com

Mechanical Design Summary

High Speed Backplane Connectors

MULTIGIG RT Tier 3 Connector System (Continued)**20.30 [.800] Pitch Connector**

Type	Style	Signal Pattern	Part Number
(Backplane) Receptacle	Center	N/A	1410000-1
	Full Right	N/A	1410001-1
(Daughtercard) Plug	Center	S.E.	*
	Diff.	1410005-1	
	S.E.	*	
	Full Right	Diff.	1410003-1

* Contact Tyco Electronics.

25.40 [1.00] Pitch Connector

Type	Style	Signal Pattern	Part Number
(Backplane) Receptacle	Center	N/A	1410006-1
	Full Right	N/A	1410018-1
(Daughtercard) Plug	Center	S.E.	*
	Diff.	1410009-1	
	S.E.	*	
	Full Right	Diff.	1410024-1

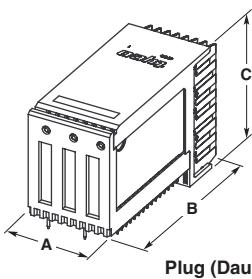
* Contact Tyco Electronics.

The drawings below show the nominal dimensions for the MULTIGIG RT 3 connector modules

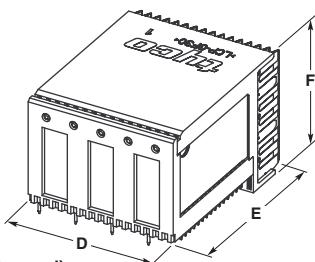
Dim.	20.32 [.800] Connector	25.40 [1.000] Connector
A	16.10 .630	16.10 .630
B	21.60 .850	27.40 1.080
C	18.40 .720	24.20 .950
D	28.70 1.130	28.70 1.130
E	21.60 .850	27.40 1.080
F	18.40 .720	24.20 .950

Dim.	20.32 [.800] Connector	25.40 [1.000] Connector
AA	R = 17.00 .067	R = 17.00 .067
	L = 15.20 .600	L = 15.20 .600
BB	10.50 .410	10.50 .410
CC	18.60 .730	24.40 .960
DD	28.70 1.130	28.70 1.130
EE	10.50 .410	10.50 .410
FF	18.60 .730	24.40 .960

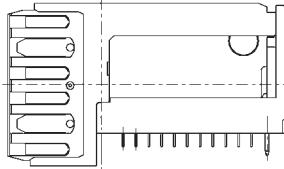
Left/Right End Module



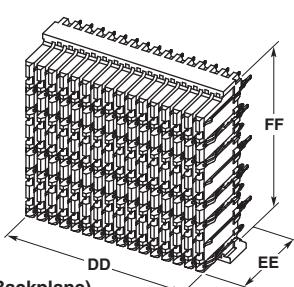
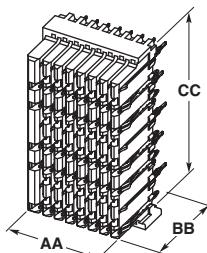
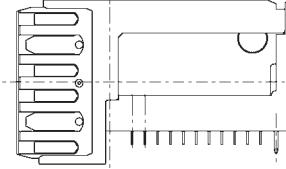
Center Module



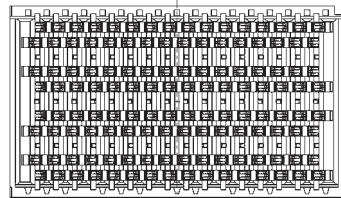
Left Full End Module



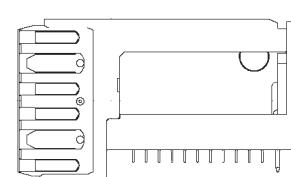
Right Full End Module



Receptacle (Backplane)



Stand Alone Backplane

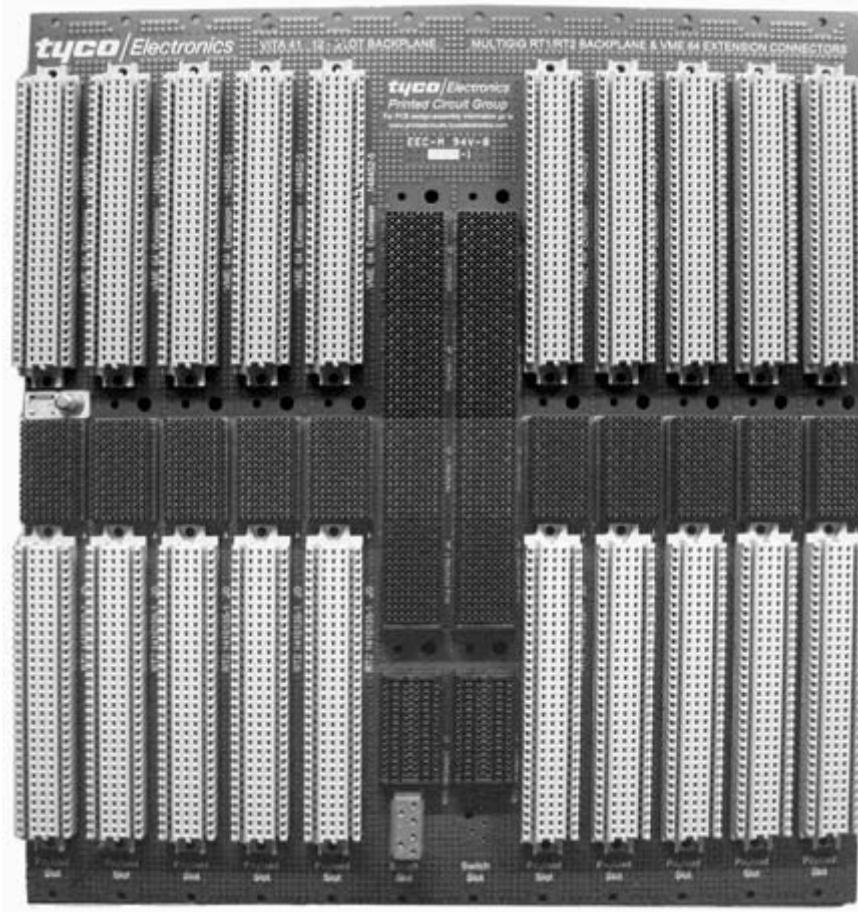


Stand Alone Daughtercard

**Actual VITA 41,
12 Slot Backplane**

**VITA 41, referred to as VXS,
is the next Generation of
VME Backplanes**

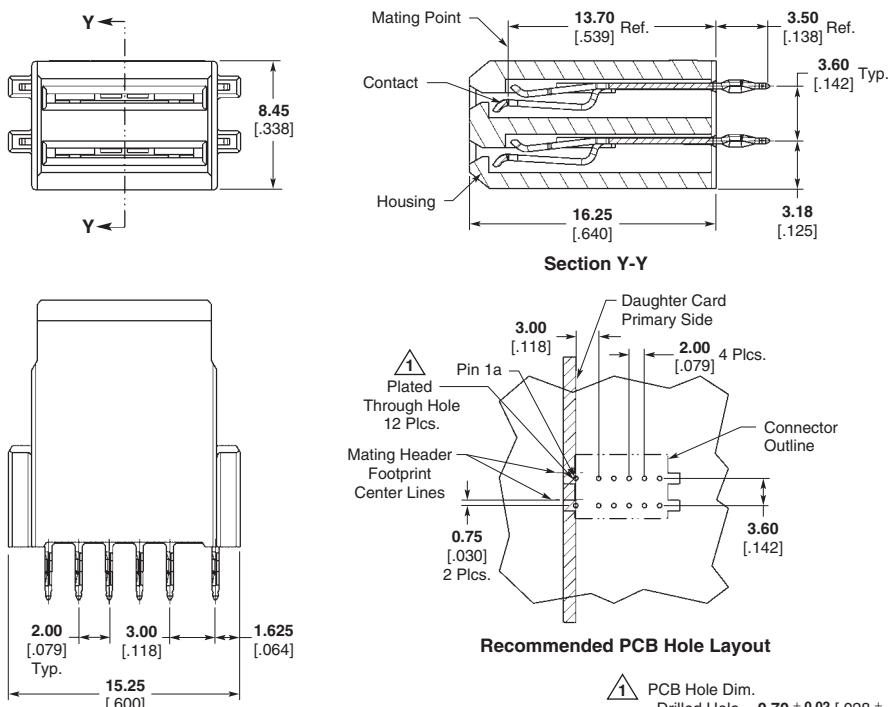
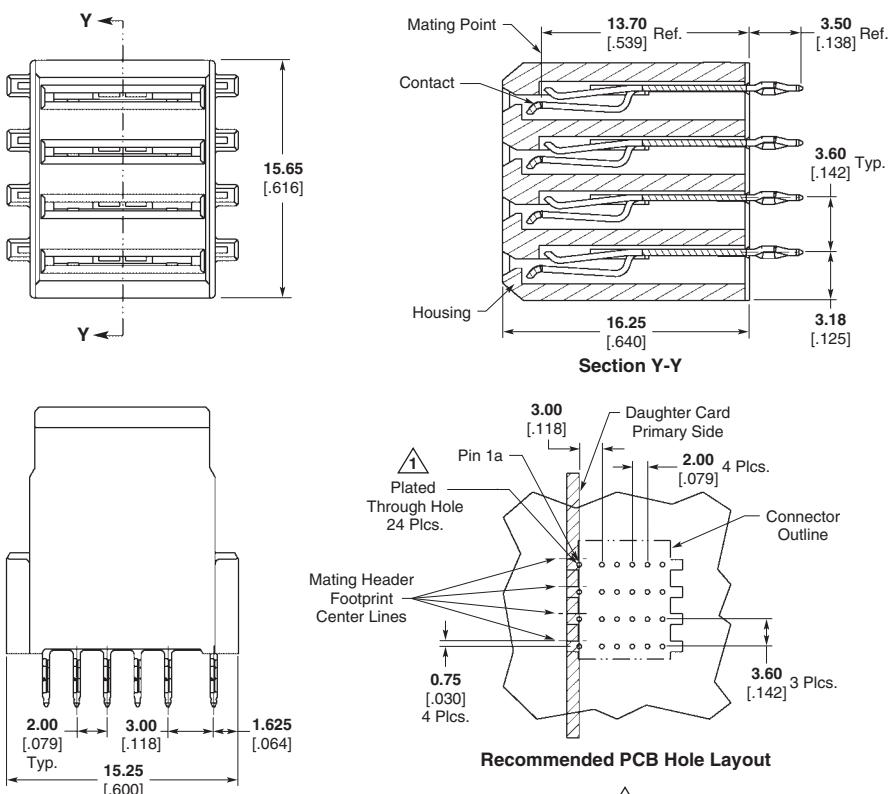
High Speed Backplane Connectors

VITA 41 Connector Selection Grid

3

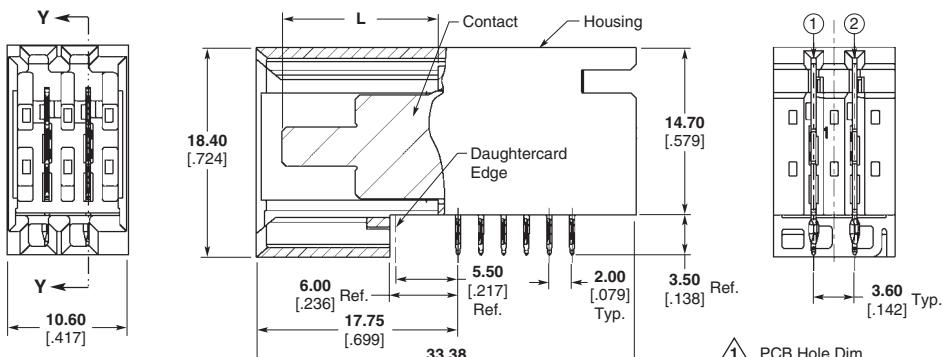
MULTIGIG RT Connector

Connector	Description	Part Number
P0	Tier 2, 7 Row, Center Module, 20.30 [.800] Pitch, Right Angle	1410147-1
P5	Tier 2, Left End Module, 20.30 [.800] Pitch, Right Angle	1410138-1
P4	Tier 2, Center Module, 20.30 [.800] Pitch, Right Angle	1410137-1
P3	Tier 2, Center Module, 20.30 [.800] Pitch, Right Angle	1410137-1
P2	Tier 2, Right End Module, 20.30 [.800] Pitch, Right Angle	1410139-1
P1	Tier 1, Monolithic, 20.30 [.800] Pitch, Right Angle	1410421-1
J0	Tier 2, Center Module, 20.30 [.800] Pitch, Vertical	1410135-1
J5	Tier 2, Left End Module, 20.30 [.800] Pitch, Vertical	1410141-1
J4	Tier 2, Center Module, 20.30 [.800] Pitch, Vertical	1410140-1
J3	Tier 2, Center Module, 20.30 [.800] Pitch, Vertical	1410140-1
J2	Tier 2, Right End Module, 20.30 [.800] Pitch, Vertical	1410142-1
J1	Tier 1, Monolithic Module, 20.30 [.800] Pitch, Vertical	1410420-1

Part Number 1410278-1**2-Position Vertical Receptacle****Part Number 1410270-1****4-Position Vertical Receptacle**

Part Number 1410279-X

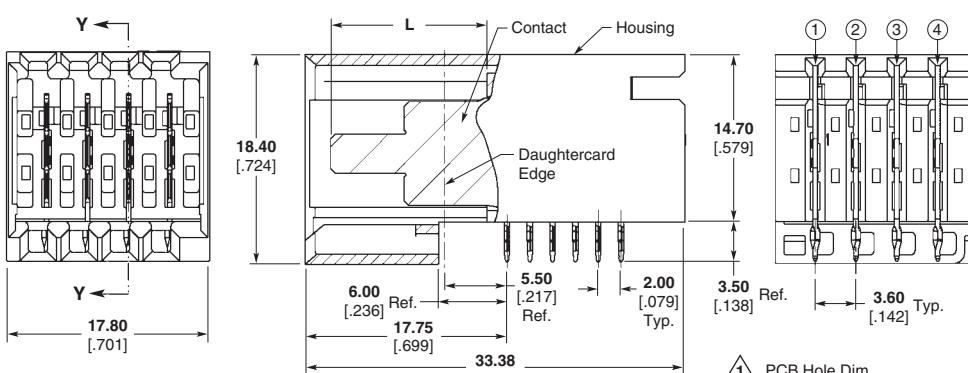
2-Position Right Angle Plug



Dim. L		Part Number
Circuit 1	Circuit 2	
13.75 .541	13.75 .541	1410279-1
13.75 .541	12.25 .482	1410279-2
13.75 .541	10.75 .423	1410279-3
10.75 .423	10.75 .423	1410279-4
12.25 .482	10.75 .423	1410279-5
12.25 .482	12.25 .482	1410279-6

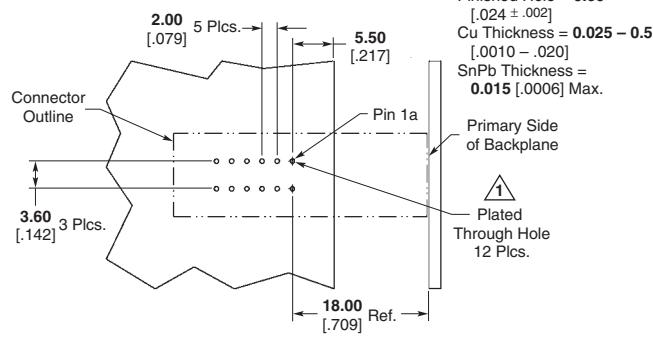
Part Number 1410271-X

4-Position Right Angle Plug



Dim. L				Part Number
Cavity 1	Cavity 2	Cavity 3	Cavity 4	
13.75 .541	13.75 .541	13.75 .541	13.75 .541	1410271-1
12.25 .482	13.75 .541	13.75 .541	12.25 .482	1410271-2
12.25 .482	13.75 .541	13.75 .541	10.75 .423	1410271-3
10.75 .423	13.75 .541	13.75 .541	10.75 .423	1410271-4
12.25 .482	13.75 .541	12.25 .482	10.75 .423	1410271-5
12.25 .482	12.25 .482	12.25 .482	12.25 .482	1410271-6
10.75 .423	12.25 .482	12.25 .482	10.75 .423	1410271-7
10.75 .423	10.75 .423	10.75 .423	10.75 .423	1410271-8
10.75 .423	13.75 .541	12.25 .482	10.75 .423	1410271-9
12.25 .482	10.75 .423	10.75 .541	12.25 .482	1-1410271-0

Section Y-Y



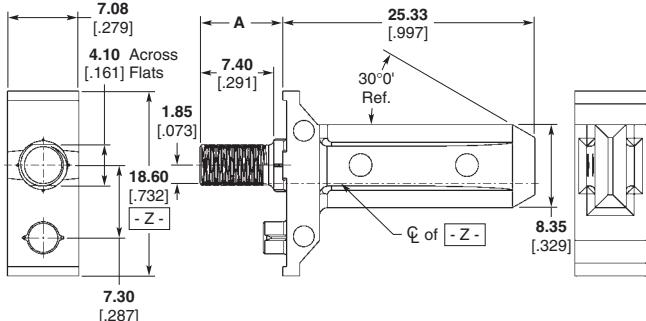
Recommended PCB Hole Layout

3

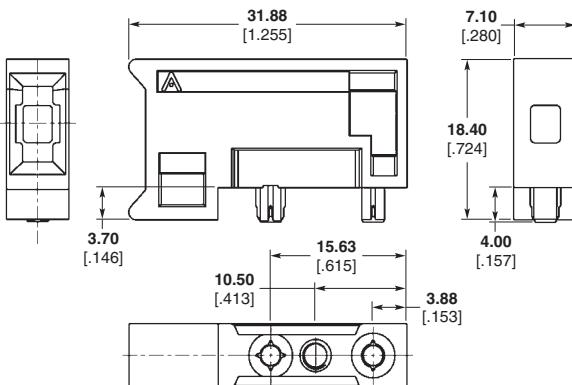
MULTIGIG RT Connector

Power Modules and Guide Hardware Reference (Continued)

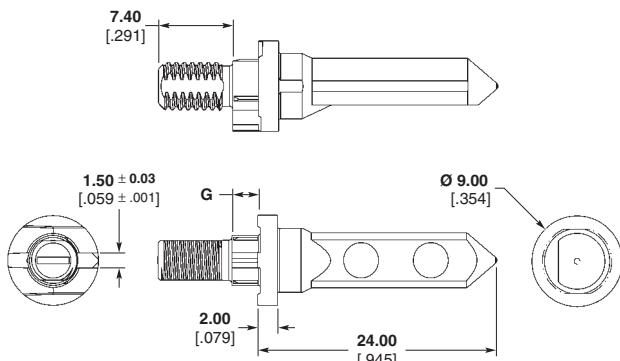
7.2 mm Wide, No Key



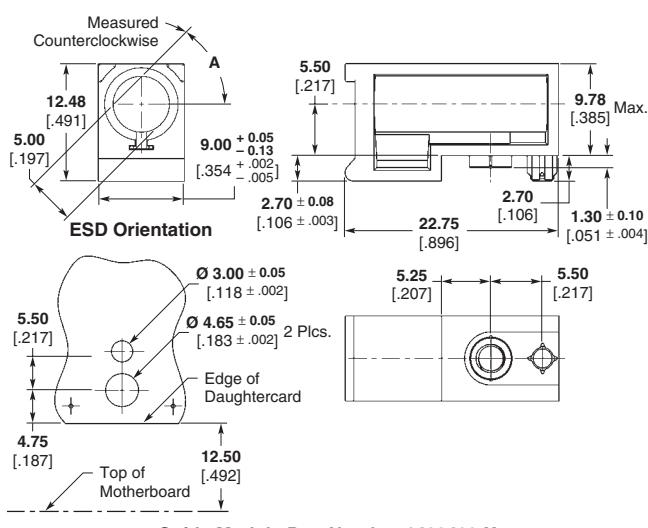
Dim. A	Part Number
8.72 .343	1410710-1
10.00 .394	1410710-2
11.60 .457	1410710-3
13.10 .516	1410710-4



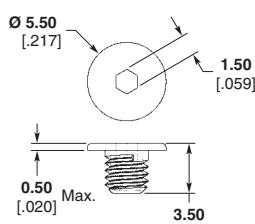
9.0 mm Wide, with Keying



Dim. G	Part Number
2.60 .102	1469491-2
4.20 .165	1469491-3
5.70 .224	1469491-4



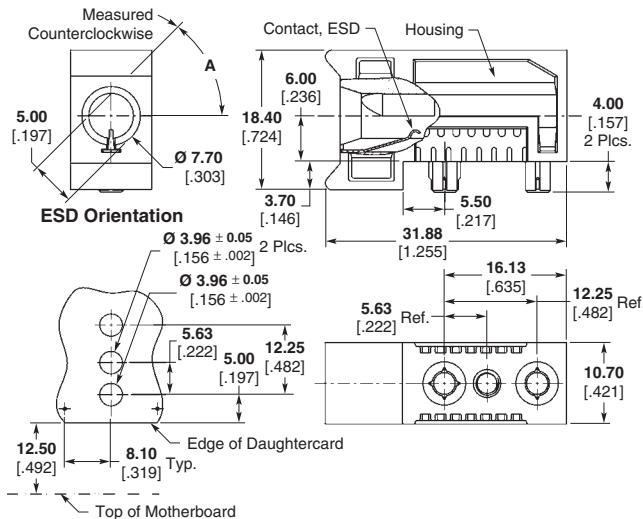
Mounting Screw for 9.0 mm Guide Modules



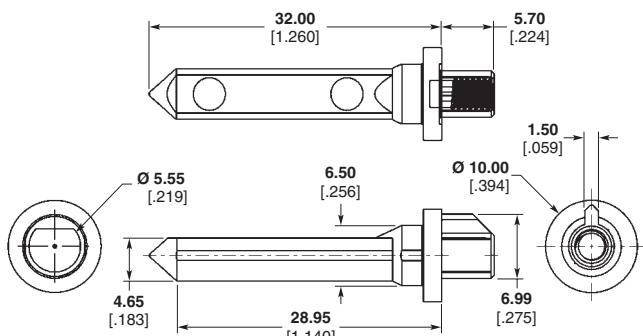
Dim. A	Part Number
0°	1469492-1
45°	1469492-2
90°	1469492-3
270°	1469492-7
315°	1469492-8
No Key	1469492-9

Power Modules and Guide Hardware Reference (Continued)

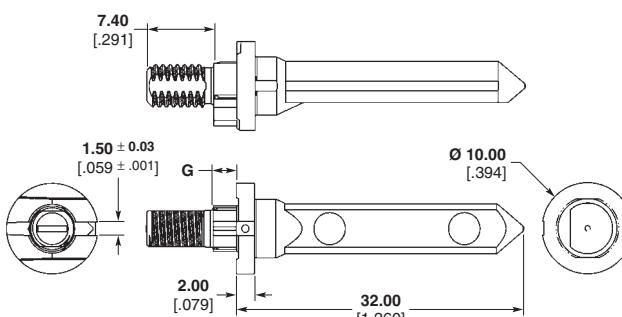
10.8 mm Wide, Guide Module, with Keying, with ESD Contact



Guide Module Part Number 1410297-X

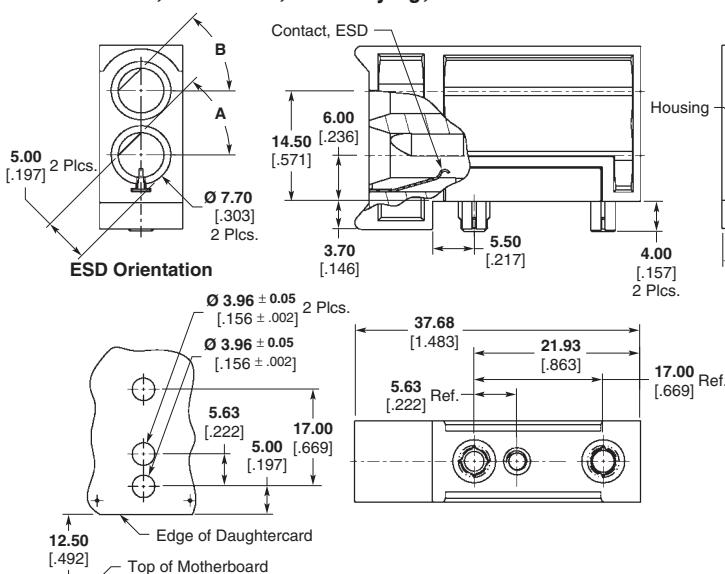


Pin Part Number 1410548-2



Pin Part Number 1410773-X

10.8 mm Wide, Guide Pin, with Keying, with ESD Contact



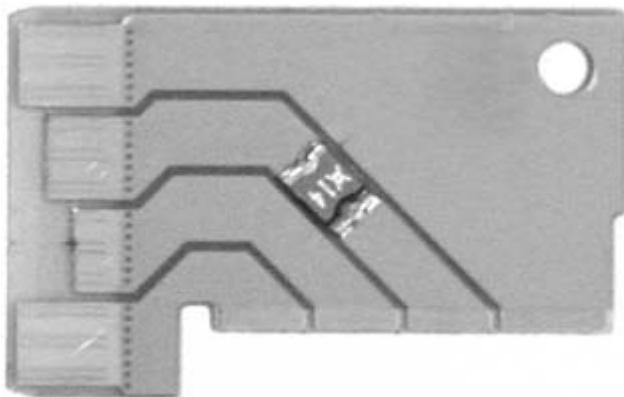
Guide Module Part Number 1410298

Dim. A	Dim. B	Part Number
0°	0°	1410298-1
45°	0°	1410298-2
90°	0°	1410298-3
135°	0°	1410298-4
180°	0°	1410298-5
225°	0°	1410298-6
270°	0°	1410298-7
315°	0°	1410298-8
0°	45°	1410298-9
45°	45°	1-1410298-0

Coming Soon: MULTIGIG RT Future Products

In development — We continue to develop new and exciting options for the MULTIGIG RT Product Line. Shown here are two examples of this effort.

Options with Integrated POLYSWITCH Device for Hot Swap Applications (In Development)



10 Gb/s Active Equalization Chip Integrated Unto a PCB Wafer

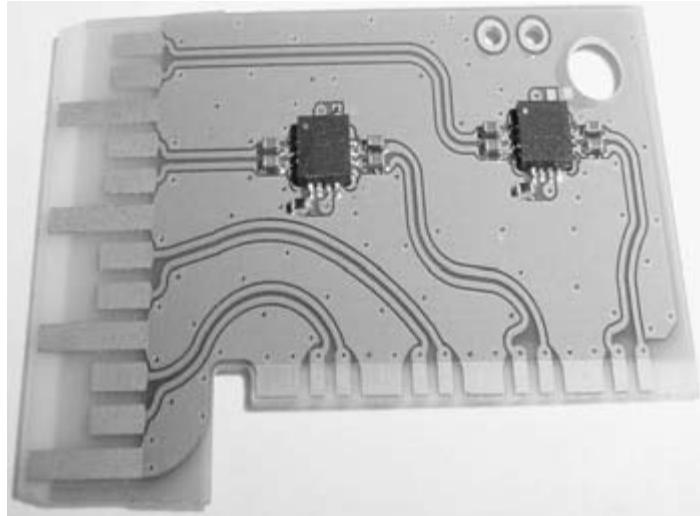


Table of Contents**Z-DOK and Z-DOK + Connectors**

Product Line Overview	108
Electrical Performance and Applications	109, 110
Z-DOK Connector	111, 112
Z-DOK +2 Connector	113, 114
Z-DOK +4 Connector	115, 116
Z-DOK +6 Connector	117-119
Sequencing Chart	120
Work Sheet	121

Product Facts Z-DOK Connector

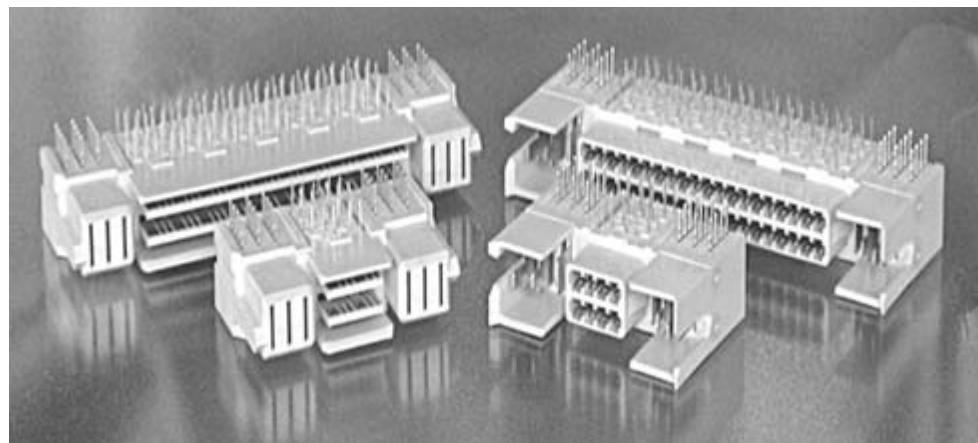
- Data rates up to 10+ Gb/s
- Familiar robust blindmate design derived from CHAMP .050 Series connector family
- Maximizes data throughput while minimizing pair to pair crosstalk and impedance discontinuities
- Available in size increments of 8 to 72 differential pairs
- Sequenced mating of ESD, ground and signal circuits to insure proper initialization of the mating cards
- Unique ESD contact system to insure dissipation of ESD in a make first break last mating sequence

Product Facts Z-DOK + Connector

- The CHAMP Z-DOK + Connector is the latest addition to the CHAMP connector family
- Includes high speed and utility contacts in one connector
- Operating bandwidth up to 10+ Gb/s
- Robust 4 row, blindmate design
- Utilizes TRI-Q differential pair contact system providing 2 to 1 signal to ground ratio
- Uniform 100 ohm impedance with less than 3% crosstalk
- Available in 8 pair increments from 8 to 72 pair
- Utility contacts can be arranged on either end of the connector
- Utility contacts are available in 4 lengths to accommodate power, ground, ESD and sensing design requirements

High Speed Backplane Connectors

Product Line Overview



The CHAMP Z-DOK Connector System includes two options for system designers. The first option is the Z-DOK Connector, which provides the following features:

1. Robust, blind-mateable, high speed connector
2. Data rates in excess of 10+ Gb/s (Double XAUI speeds)
3. Differential pair, 100 ohm, low crosstalk
4. Available with and without sensing contacts
5. Position sizes from 8 to 72 differential pair in increments of 8 differential pair modules
6. Unique TRI-Q contact system that provides a 2 to 1 signal to ground ratio for maintaining superior signal integrity

The second option is the CHAMP Z-DOK + Connector, which includes a high speed section with the same features as standard the Z-DOK Connector and adds up to 3 "Utility" modules to each side of the connector. Each "Utility" module provides flexibility for systems designers to include power, ground, ESD and sensing functions to I/O adapter cards and docking applications.

The Z-DOK + Connector System can be provided in the same position sizes as the standard Z-DOK Connector (8 to 72 differential pair). The Utility modules can be added to either side of the high speed section with a maximum of three (3) on each side. This arrangement will provide a total of six (6) positions for the power, ground, ESD and sensing functions. Four different length contacts can be loaded into the "Utility" modules to provide the ultimate design flexibility.

Applications

- The Z-DOK and Z-DOK + Connector Systems are suitable for use in high speed, co-planar docking applications.
 - Enterprise Switching Equipment
 - High Speed Telecommunications Equipment
 - Mid Range and High End Servers
 - Storage Area Networks
 - High Speed Custom Platforms

■ The Z-DOK Connector TRI-Q contact arrangement is well suited for high speed serial switching architectures and the robust design assures a highly reliable interconnect between host and media adapter cards. Z-DOK Connectors can handle escalating data rates without sacrificing line density to achieve higher signal integrity. If I/O flexibility is what you seek, the Z-DOK Connector will help insure the longevity of your packaging scheme through ease in changeability.

Availability

Fully validated SPICE models: E-mail requests to modeling@tycoelectronics.com

Samples: E-mail requests to zdok@tycoelectronics.com

Pro/E models and IGES models: E-mail requests to TycocAD@tycoelectronics.com

Application Specification 114-13068

Product Specification Design Objectives 108-1985

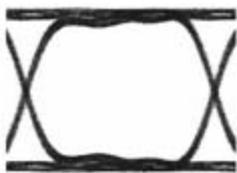
<http://zdok.tycoelectronics.com>

Z-DOK + Connector Electrical Performance

High Speed Backplane Connectors

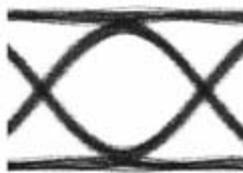
Electrical Performance and Applications

3.125 Gb/s over 6" of FR4



Maximum Opening — 89.2%
Jitter — 2.2% U.I.

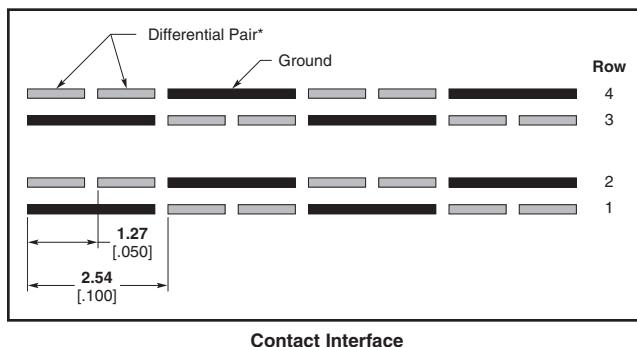
10 Gb/s over 6" of FR4



Maximum Opening — 69.8%
Jitter — 10.5% U.I.

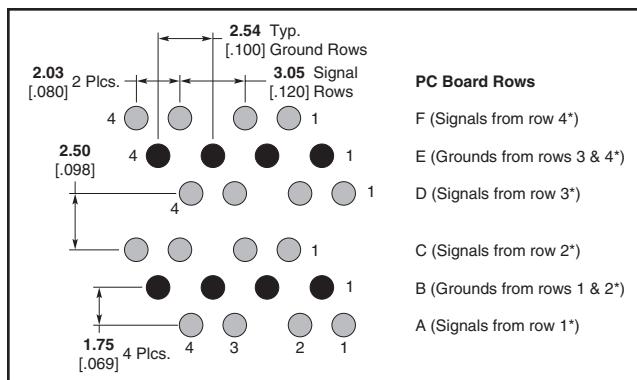
TRI-Q Contact System

Each differential pair is carefully designed to be in close proximity to a dedicated ground, providing true symmetrical impedance and low noise in a $100\ \Omega$ system.



* The differential pair contacts may be used for single ended lines. Consult Tyco Electronics for more information.

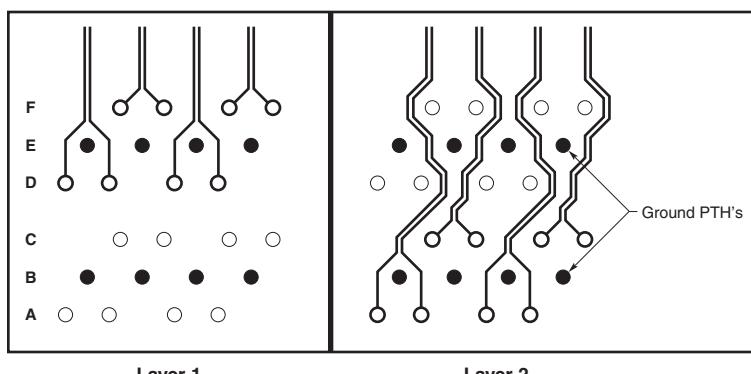
The ground contacts are confined to rows B & E to simplify trace routing, control pair-to-pair crosstalk, and to minimize impedance discontinuities at the connector to board interface.



* Contact interface rows.

Host and Adapter Board Trace Routing

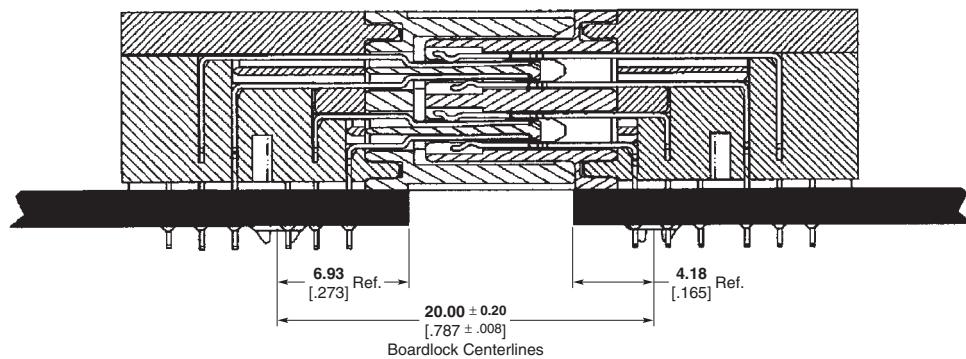
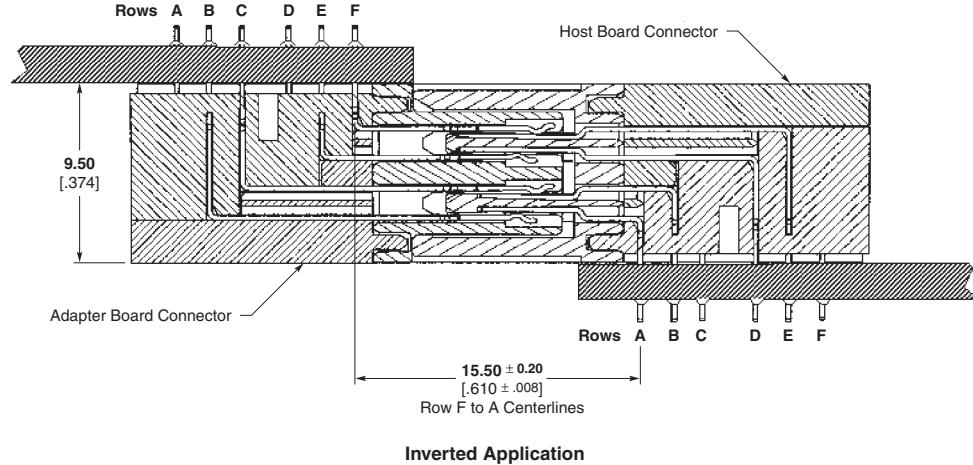
Suggested two-layer routing pattern



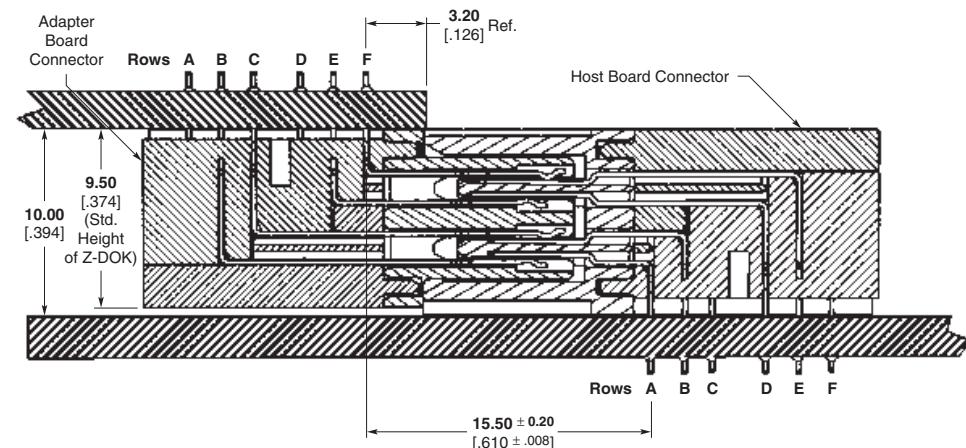
Electrical Performance and Applications (Continued)

Plug

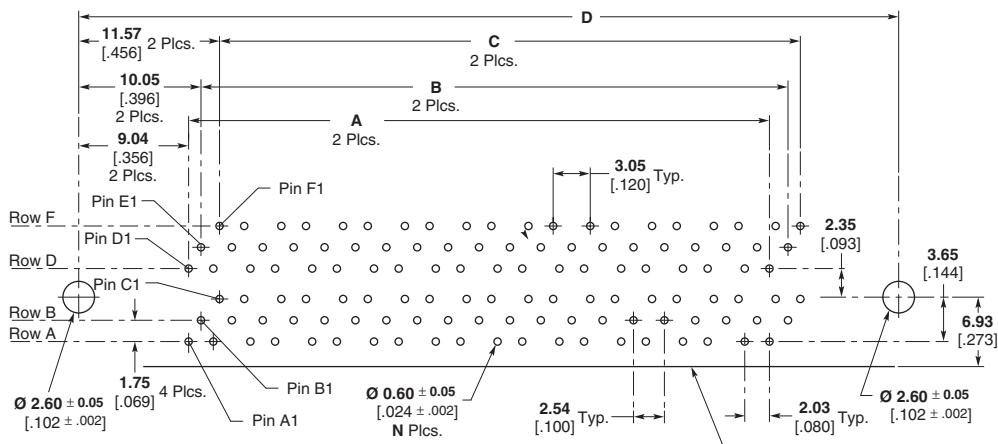
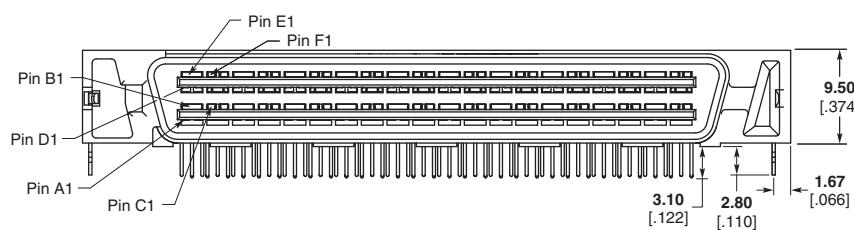
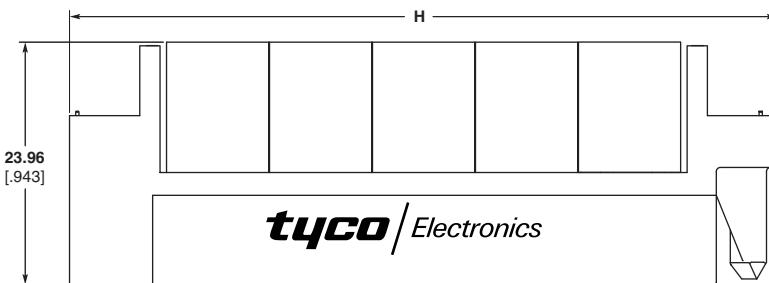
Receptacle

**Z-DOK + Connector Applications**

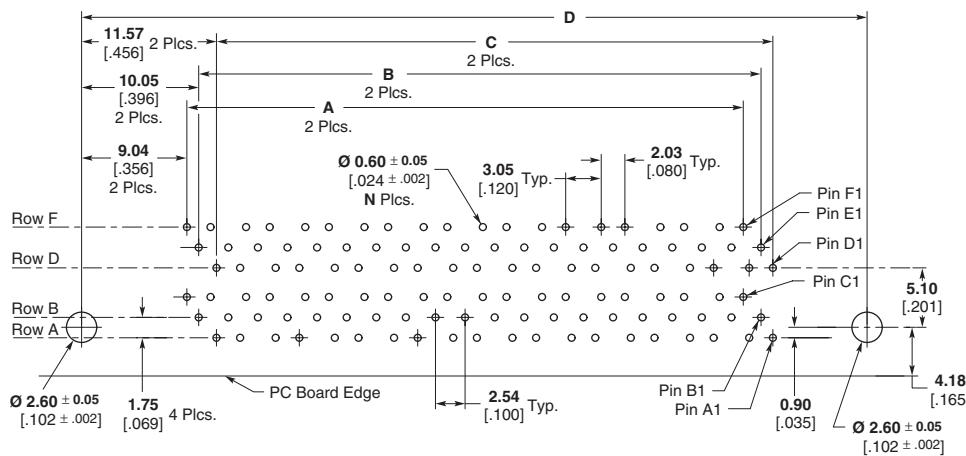
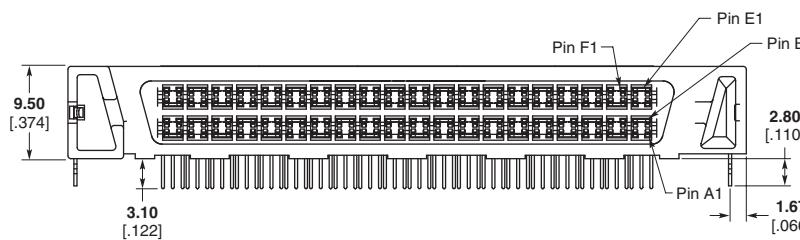
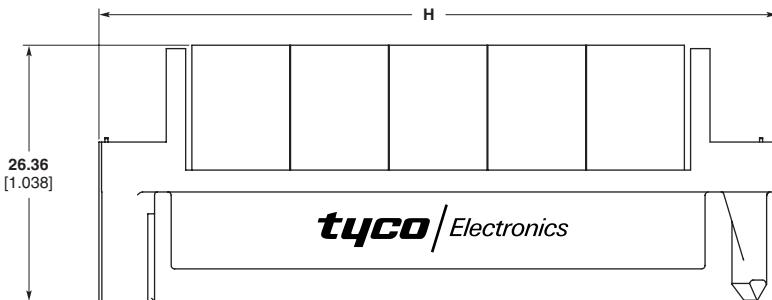
Inverted Application



Inverted Mid-Board Application

Host**Part Number 1367198-X****Material and Finish****Housing** — Polyester, natural**Contacts** — Copper alloy**Boardlocks** — Brass**Plating****Boardlocks** — 2.0 µm tin-lead over 1.00 µm nickel**Contacts** — 0.76 µm min. gold in contact area, 2.5 µm tin-lead in termination area, over 1.27 µm min. nickel.Recommended PC Board Footprint
Component Side Shown

Dimensions	Pairs	Part Number	Description				
59.70 2.350	57.25 2.254	37.59 1.480	38.10 1.500	37.59 1.480	32	1367198-6	with ESD Boardlocks
49.54 1.950	47.09 1.854	27.43 1.080	27.94 1.100	27.43 1.080	24	1367198-5	with ESD Boardlocks
100.34 3.950	97.89 3.854	78.23 3.080	78.74 3.100	78.23 3.080	64	1367198-4	with ESD Boardlocks
90.18 3.550	87.73 3.454	68.07 2.680	68.58 2.700	68.07 2.680	56	1367198-3	with ESD Boardlocks
80.02 3.150	77.57 3.054	57.91 2.280	58.42 2.300	57.91 2.280	48	1367198-2	with ESD Boardlocks
69.86 2.750	67.41 2.654	47.75 1.880	48.26 1.900	47.75 1.880	40	1367198-1	with ESD Boardlocks

Adapter
Part Number 1367130-X
Material and Finish**Housing** — Polyester, natural**Contacts** — Copper alloy**Boardlocks** — Brass**Plating****Boardlocks** — 2.0 µm tin-lead over 1.00 µm nickel**Contacts** — 0.76 µm min. gold in contact area, 2.5 µm tin-lead in termination area, over 1.27 µm min. nickel.Recommended PC Board Footprint
Component Side Shown

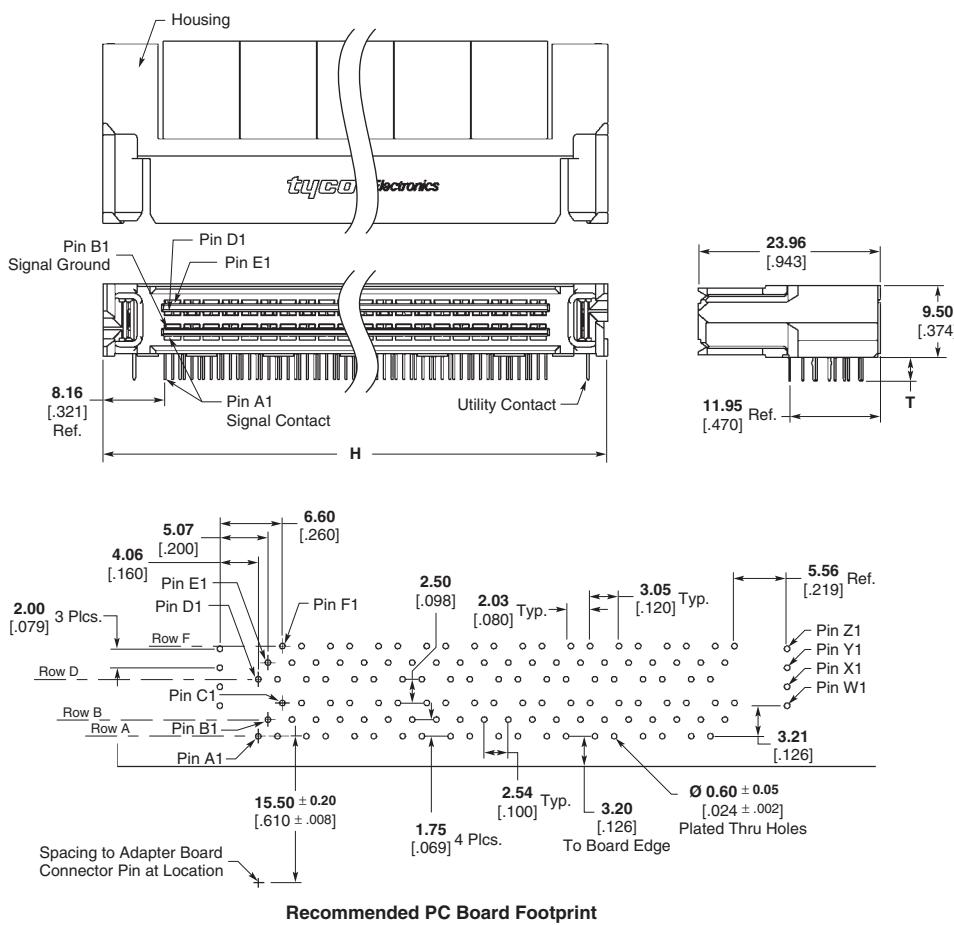
Dimensions					Pairs	Part Number	Description
H	D	C	B	A			
59.70 2.350	57.25 2.254	37.59 1.480	38.10 1.500	37.59 1.480	32	1367130-6	with ESD Boardlocks
49.54 1.950	47.09 1.854	27.43 1.080	27.94 1.100	27.43 1.080	24	1367130-5	with ESD Boardlocks
100.34 3.950	97.89 3.854	78.23 3.080	78.74 3.100	78.23 3.080	64	1367130-4	with ESD Boardlocks
90.18 3.550	87.73 3.454	68.07 2.680	68.58 2.700	68.07 2.680	56	1367130-3	with ESD Boardlocks
80.02 3.150	77.57 3.054	57.91 2.280	58.42 2.300	57.91 2.280	48	1367130-2	with ESD Boardlocks
69.86 2.750	67.41 2.654	47.75 1.880	48.26 1.900	47.75 1.880	40	1367130-1	with ESD Boardlocks

Host

Part Number 1367590-X

High Speed Backplane Connectors

Z-DOK +2 Connector System



4

Z-DOK and Z-DOK + Connectors

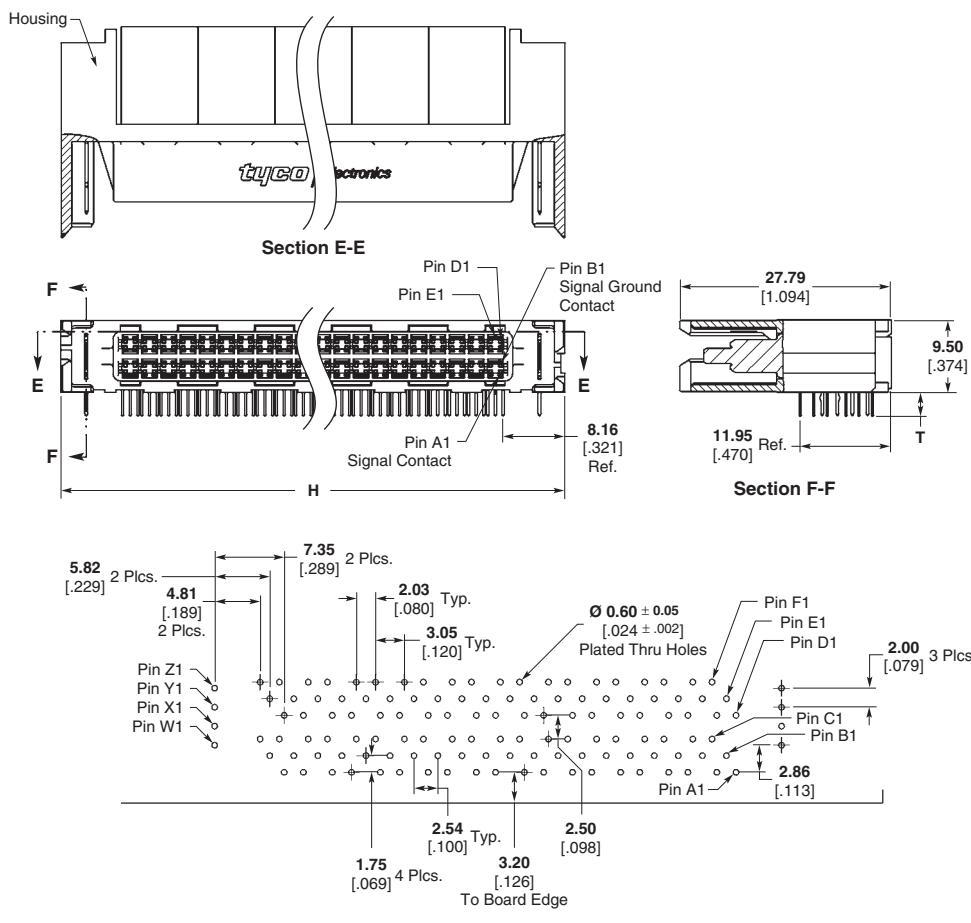
Z-DOK +2 Host Connector Part Numbers

Type	Dim. H	Dim. T	Number of Utility Contacts	Number of Diff. Pairs	Part Number
Host Connector +2	25.96 1.022	3.10 .122	2	8	1367590-1
	36.12 1.422	3.10 .122	2	16	1367590-2
	46.28 1.822	3.10 .122	2	24	1367590-3
	56.44 2.222	3.10 .122	2	32	1367590-4
	66.60 2.622	3.10 .122	2	40	1367590-5
	76.76 3.022	3.10 .122	2	48	1367590-6
	86.92 3.422	3.10 .122	2	56	1367590-7
	97.08 3.822	3.10 .122	2	64	1367590-8
	107.24 4.222	3.10 .122	2	72	1367590-9

Different Tail Lengths available upon request, contact Tyco Electronics.

Adapter

Z-DOK +2 Connector System (Continued)



Recommended PC Board Footprint

Z-DOK +2 Adapter Connector Part Numbers

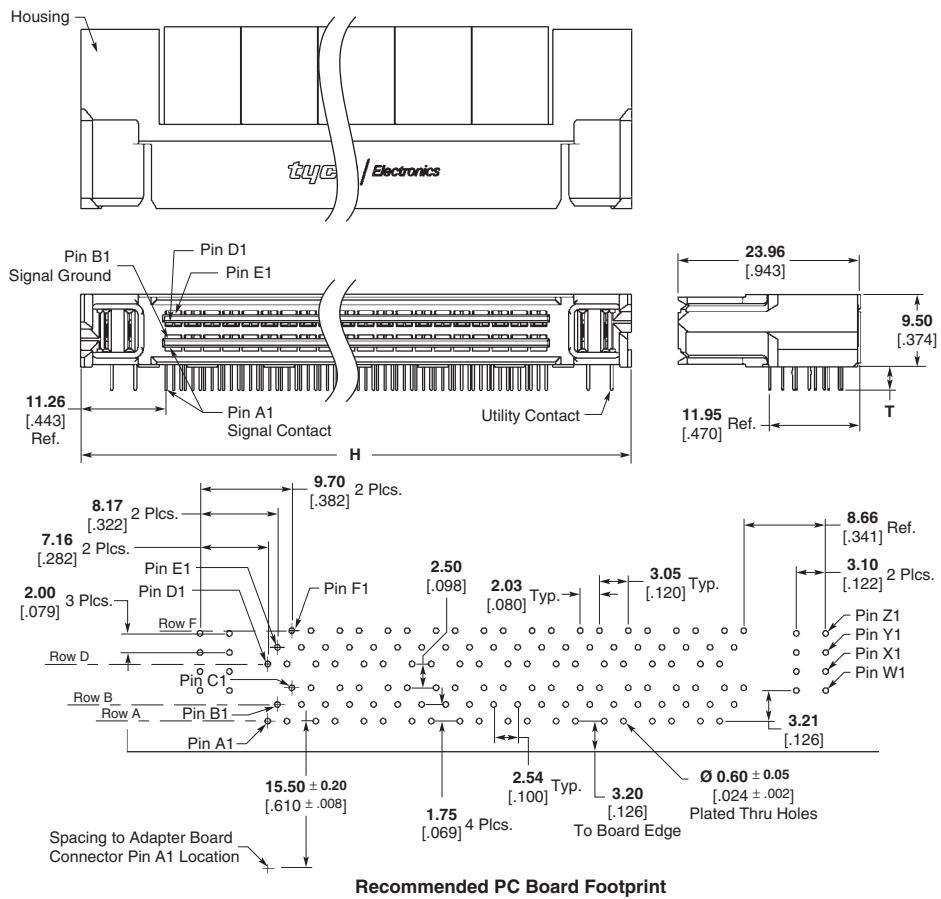
Type	Dim. H	Dim. T	Sequence for Utility Pin Loc. 1	Sequence for Utility Pin Loc. 2	Number of Utility Contacts	Number of Diff. Pairs	Part Number
Adapter Connector +2	25.96 1.022	3.10 .122	4	4	2	8	1367591-1
	36.12 1.422	3.10 .122	4	4	2	16	1367592-1
	46.28 1.822	3.10 .122	4	4	2	24	1367593-1
	56.44 2.222	3.10 .122	4	4	2	32	1367594-1
	66.60 2.622	3.10 .122	4	4	2	40	1367595-1
	76.76 3.022	3.10 .122	4	4	2	48	1367596-1
	86.92 3.422	3.10 .122	4	4	2	56	1367597-1
	97.08 3.822	3.10 .122	4	4	2	64	1367598-1
	107.24 4.222	3.10 .122	4	4	2	72	1367599-1

Different Tail Lengths available upon request, contact Tyco Electronics.

Host

Part Number 1367680-X

Z-DOK +4 Connector System



Z-DOK +4 Host Connector Part Numbers

Type	Dim. H	Dim. T	Number of Utility Contacts	Number of Diff. Pairs	Part Number
Host Connector +4	32.16 1.266	3.10 .122	4	8	1367580-1
	42.32 1.666	3.10 .122	4	16	1367580-2
	52.48 2.066	3.10 .122	4	24	1367580-3
	62.64 2.466	3.10 .122	4	32	1367580-4
	72.80 2.866	3.10 .122	4	40	1367580-5
	82.96 3.266	3.10 .122	4	48	1367580-6
	93.12 3.666	3.10 .122	4	56	1367580-7
	103.28 4.066	3.10 .122	4	64	1367580-8
	113.44 4.466	3.10 .122	4	72	1367580-9

Different Tail Lengths available upon request, contact Tyco Electronics.

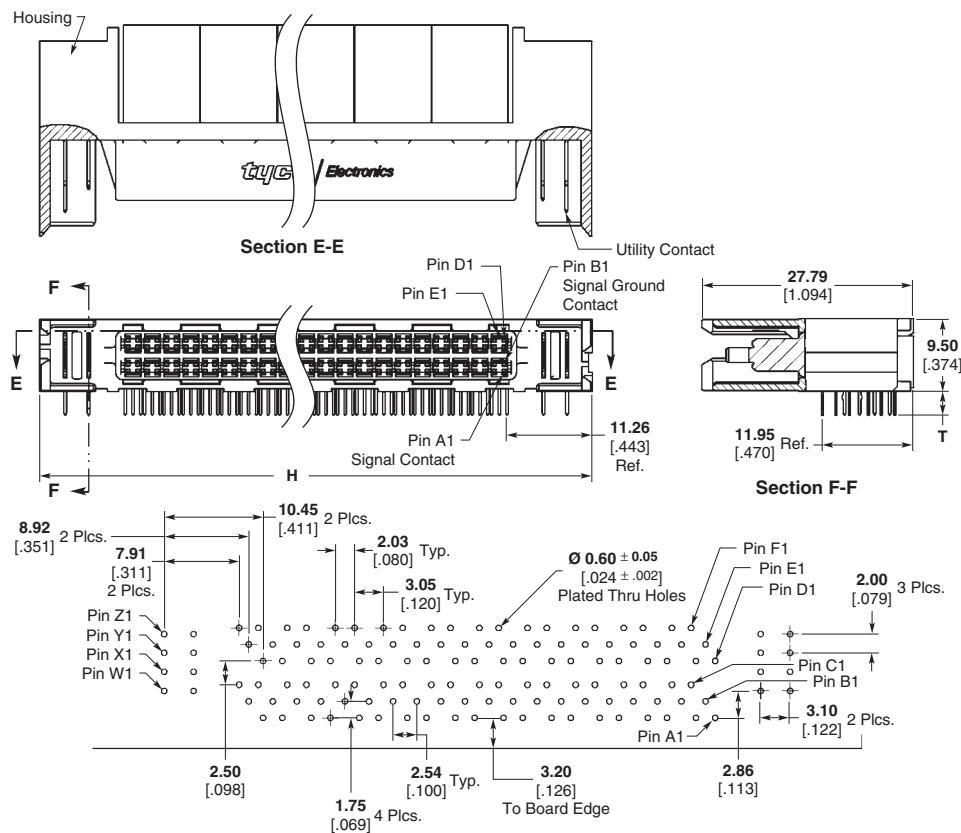
Z-DOK +4 Host Connector Part Numbers (Continued)

Type	Dim. H	Dim. T	Number of Utility Contacts	Number of Diff. Pairs	Part Number
Host Connector +4	32.16 1.266	3.85 .152	4	8	1367680-1
	42.32 1.666	3.85 .152	4	16	1367680-2
	52.48 2.066	3.85 .152	4	24	1367680-3
	62.64 2.466	3.85 .152	4	32	1367680-4
	72.80 2.866	3.85 .152	4	40	1367680-5
	82.96 3.266	3.85 .152	4	48	1367680-6
	93.12 3.666	3.85 .152	4	56	1367680-7
	103.28 4.066	3.85 .152	4	64	1367680-8
	113.44 4.466	3.85 .152	4	72	1367680-9

Different Tail Lengths available upon request, contact Tyco Electronics.

Z-DOK +4 Connector System (Continued)

Adapter



Z-DOK +4 Adapter Connector Part Numbers

Recommended PC Board Footprint

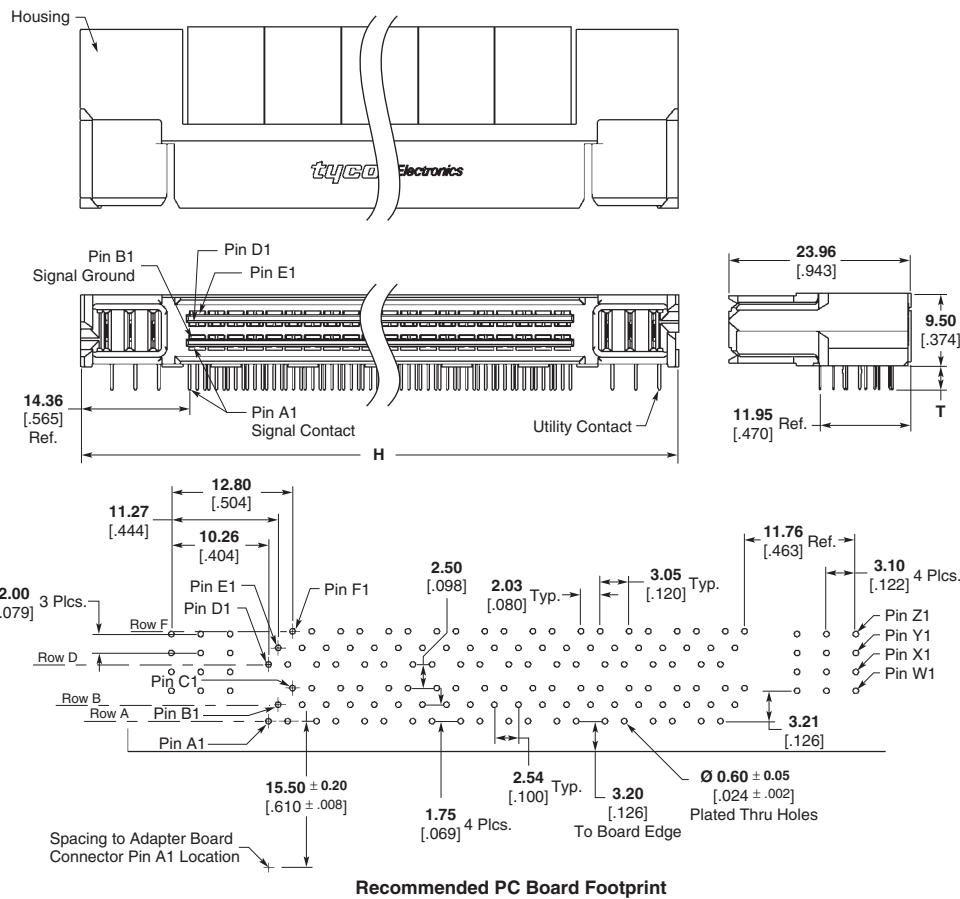
Type	Dim. H	Dim. T	Sequence for Utility Pin Loc. 1	Sequence for Utility Pin Loc. 2	Sequence for Utility Pin Loc. 3	Sequence for Utility Pin Loc. 4	Number of Utility Contacts	Number of Diff. Pairs	Part Number
Adapter Connector +4	25.96 1.022	3.10 .122	4	3	3	4	4	8	1367581-1
	36.12 1.422	3.10 .122	4	3	3	4	4	16	1367582-1
	46.28 1.822	3.10 .122	4	3	3	4	4	24	1367583-1
	56.44 2.222	3.10 .122	4	3	3	4	4	32	1367584-1
	56.44 2.222	3.10 .122	4	1	3	4	4	32	1367584-2
	56.44 2.222	3.10 .122	3	2	2	3	4	32	1367584-3
	56.44 2.222	3.10 .122	2	2	3	3	4	32	1367584-4
	66.60 2.622	3.10 .122	4	3	3	4	4	40	1367585-1
	66.60 2.622	3.10 .122	4	1	3	4	4	40	1367585-2
	76.76 3.022	3.10 .122	4	3	3	4	4	48	1367586-1
	76.76 3.022	3.10 .122	3	4	4	3	4	48	1367586-2
	76.76 3.022	3.10 .122	1	4	3	2	4	48	1367586-3
	86.92 3.422	3.10 .122	4	3	3	4	4	56	1367587-1
	97.08 3.822	3.10 .122	4	3	3	4	4	64	1367588-1
	107.24 4.222	3.10 .122	4	3	3	4	4	72	1367589-1
	56.44 2.222	3.85 .152	2	2	3	3	4	32	1367584-1

Different Tail Lengths available upon request, contact Tyco Electronics.

Host

Part Number 1367550-X

Z-DOK +6 Connector System



4

Z-DOK and Z-DOK + Connectors

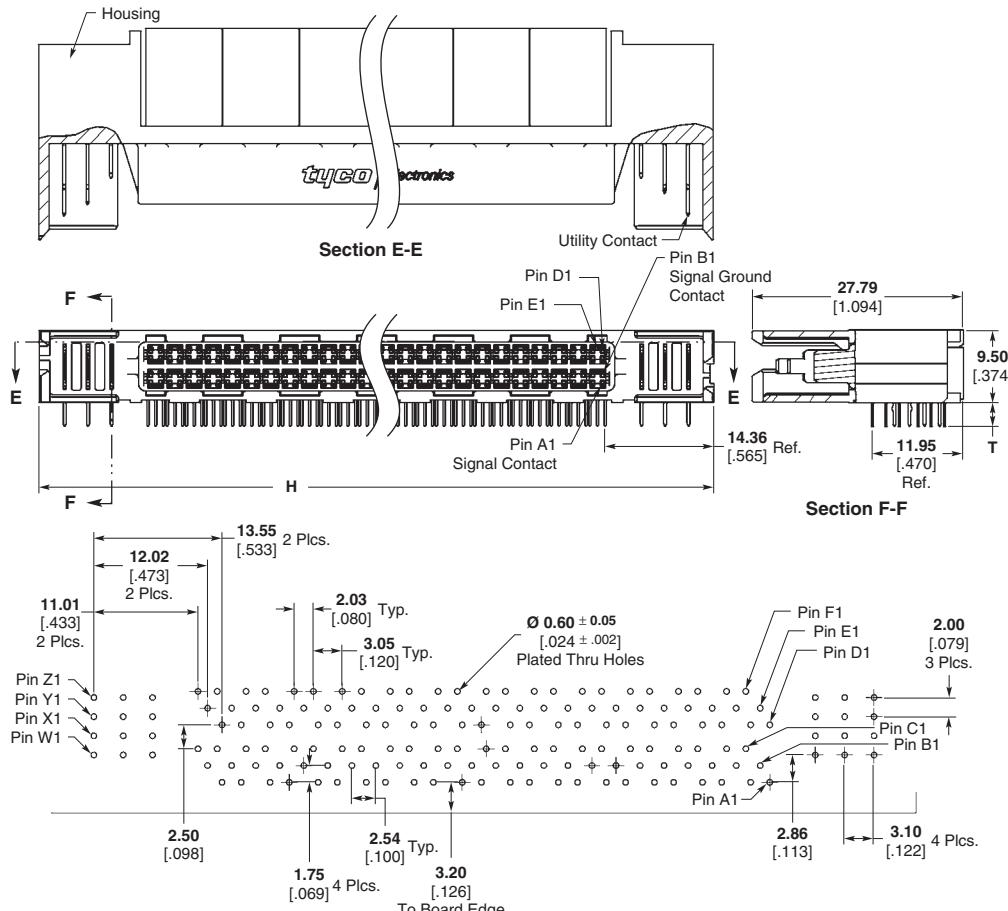
Z-DOK +6 Host Connector Part Numbers

Type	Dim. H	Dim. T	Number of Utility Contacts	Number of Diff. Pairs	Part Number
Host Connector +6	38.36 1.510	3.10 .122	6	8	1367550-1
	48.52 1.910	3.10 .122	6	16	1367550-2
	58.68 2.310	3.10 .122	6	24	1367550-3
	68.84 2.710	3.10 .122	6	32	1367550-4
	79.00 3.110	3.10 .122	6	40	1367550-5
	89.16 3.510	3.10 .122	6	48	1367550-6
	99.32 3.910	3.10 .122	6	56	1367550-7
	109.48 4.310	3.10 .122	6	64	1367550-8
	119.64 4.710	3.10 .122	6	72	1367550-9

Different Tail Lengths available upon request, contact Tyco Electronics.

Z-DOK +6 Connector System (Continued)

Adapter



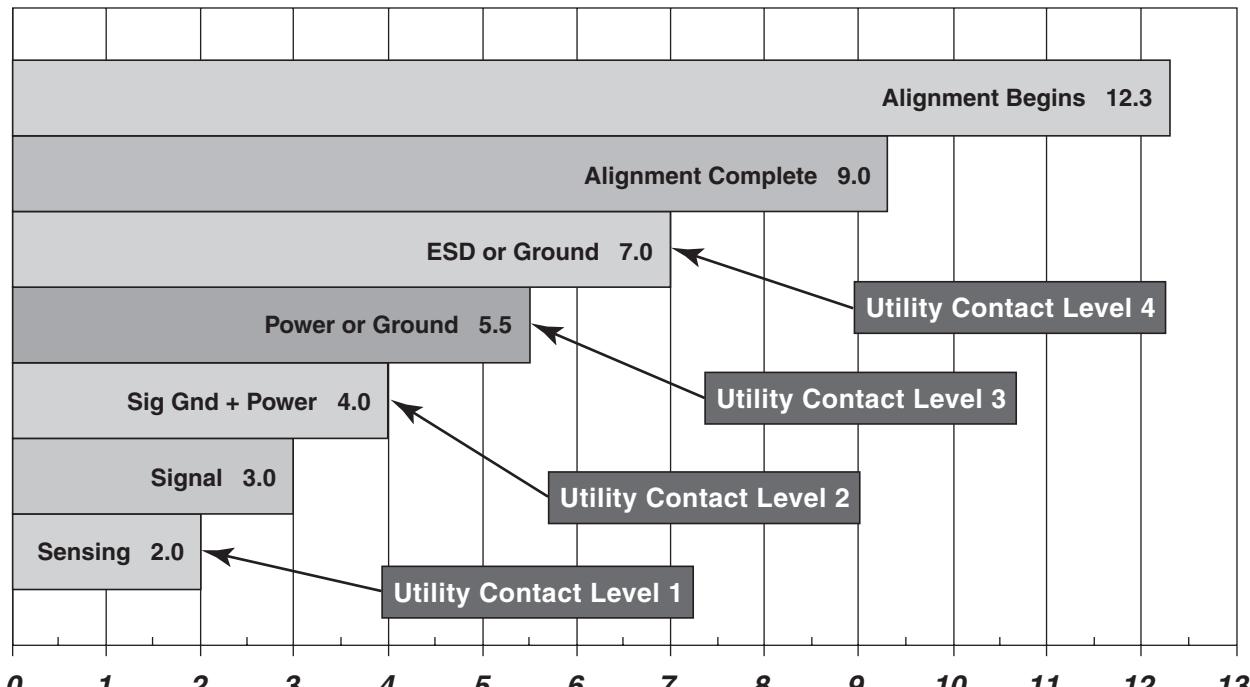
Recommended PC Board Footprint

Z-DOK +6 Connector System (Continued)

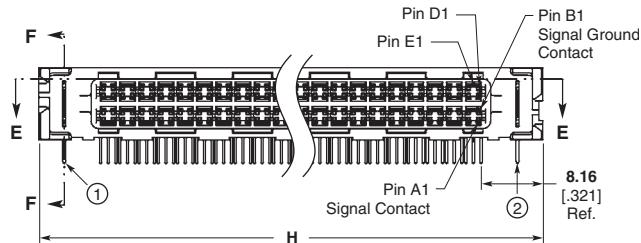
Z-DOK +6 Adapter Connector Part Numbers

Type	Dim. H	Dim. T	Sequence for Utility Pin Loc. 1	Sequence for Utility Pin Loc. 2	Sequence for Utility Pin Loc. 3	Sequence for Utility Pin Loc. 4	Sequence for Utility Pin Loc. 5	Sequence for Utility Pin Loc. 6	Number of Utility Contacts	Number of Diff. Pairs	Part Number
	38.36 1.510	3.10 .122	4	3	2	2	3	4	6	8	1367551-1
	38.36 1.510	3.10 .122	1	2	4	4	2	2	6	8	1367551-2
	48.52 1.910	3.10 .122	4	3	2	2	3	4	6	16	1367552-1
	58.68 2.310	3.10 .122	4	3	2	2	3	4	6	24	1367553-1
	68.84 2.710	3.10 .122	4	3	2	2	3	4	6	32	1367554-1
	79.00 3.110	3.10 .122	4	3	2	2	3	4	6	40	1367555-1
	79.00 3.110	3.10 .122	4	2	1	1	2	4	6	40	1367555-2
	79.00 3.110	3.10 .122	1	2	3	3	2	1	6	40	1367555-3
	89.16 3.510	3.10 .122	4	3	2	2	3	4	6	48	1367556-1
Adapter Connector +6	89.16 3.510	3.10 .122	1	2	3	3	2	1	6	48	1367556-2
	99.32 3.910	3.10 .122	4	3	2	2	3	4	6	56	1367557-1
	99.32 3.910	3.10 .122	4	2	2	2	2	4	6	56	1367557-2
	99.32 3.910	3.10 .122	4	3	1	1	3	4	6	56	1367557-3
	99.32 3.910	3.10 .122	2	3	4	4	3	2	6	56	1367557-4
	99.32 3.910	3.10 .122	4	3	1	2	2	4	6	56	1367557-5
	109.48 4.310	3.10 .122	4	3	2	2	3	4	6	64	1367558-1
	109.48 4.310	3.10 .122	4	3	3	3	3	4	6	64	1367558-2
	109.48 4.310	3.10 .122	4	3	1	1	3	4	6	64	1367558-3
	119.64 4.710	3.10 .122	4	3	2	2	3	4	6	72	1367559-1
	119.64 4.710	3.10 .122	2	3	4	3	2	1	6	72	1367559-2

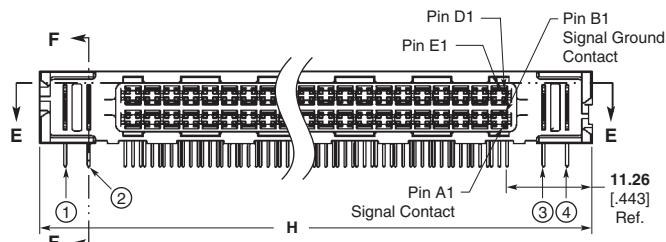
Different Tail Lengths available upon request, contact Tyco Electronics.

Sequencing Chart**Fully-Mated Wipe Length**

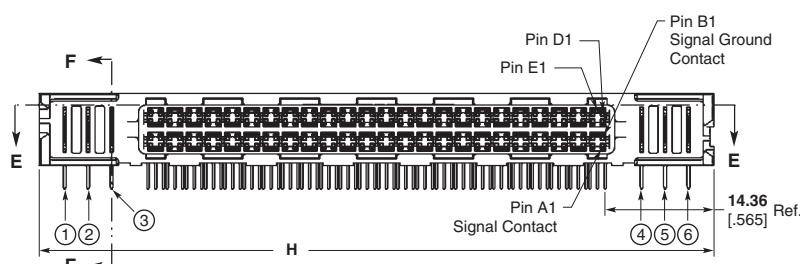
(“Fully-Mated Wipe Length” based on 15.5mm nominal separation of rows A-A or A-F)

Z-DOK + Connector Sequencing Worksheet**Z-DOK +2 Connector**

Location	①	②
Sequence		

Z-DOK +4 Connector

Location	①	②	③	④
Sequence				

Z-DOK +6 Connector

Location	①	②	③	④	⑤	⑥
Sequence						



Electronics

High Speed Backplane Connectors



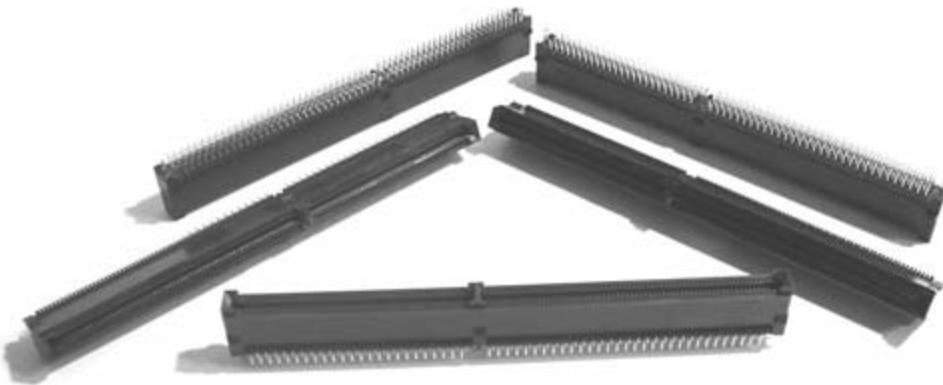
Engineering Notes

Table of Contents**High Speed Card Edge Products**

High Speed Standard Edge Connector	124-129
SEC-Z Connector	130-133

Product Facts

- **1:1 signal-to-ground ratio**
- **Designed for signal transmissions with rise and fall times of 0.5 nanoseconds or greater**
- **40 signal/ground pairs per linear inch**
- **Less than 10 picosecond skew**
- **Propagation delay is typically 75 picoseconds from motherboard to daughtercard at the top of the connector**
- **43 ohm impedance**
- **Multiple simultaneous switching: 7% max. @ 0.5 ns; 5% max. @ 1.0 ns**
- **High performance maintained when using up to 50% of the ground contacts for power**
- **50 to 130 dual positions (in increments of 10) and 73 dual position**

High Speed Standard Edge Connector

High Speed Standard Edge Connectors are the answer for a low cost, one-piece approach to high speed signal transmissions or density requirements. These Tyco Electronics connectors have an upper row of signal contacts on 1.27 [.050] centerline with a lower row of ground contacts within each circuit cavity. This achieves 0.64 [.025] center-

line density in a 1.27 [.050] centerline connector with 40 signal/ground pairs per linear inch and a 1:1 signal-to-ground ratio. The staggered contact height also reduces the daughtercard mating force.

Board retainers align the connector with the motherboard and retain it for soldering. The use of high temperature tolerant materi-

als ensures that these connectors will withstand various wave and reflow soldering techniques.

Tyco Electronics High Speed Standard Edge Connectors are available in sizes of 50 to 130 dual positions (in increments of 10) and a 73 dual position, with solder lead lengths of 2.54 [.100] and 3.18 [.125].

Performance Specifications**Contact Current Rating —**

Signal contact — 1 ampere max.
Ground contact — 1.5 amperes max.
Preground contact — 1 ampere max.

Termination Resistance —

20 milliohms max. (initial)
40 milliohms max. (final)

Dielectric Withstanding Voltage —

500 volts AC min.

Insulation Resistance —

1000 megohms min.

Mating Force —

2.78 N [10 oz] max.
per dual signal/ground contact pair
using test blade

Durability (Mating Cycles) —

Tested to 25 cycles with test blade

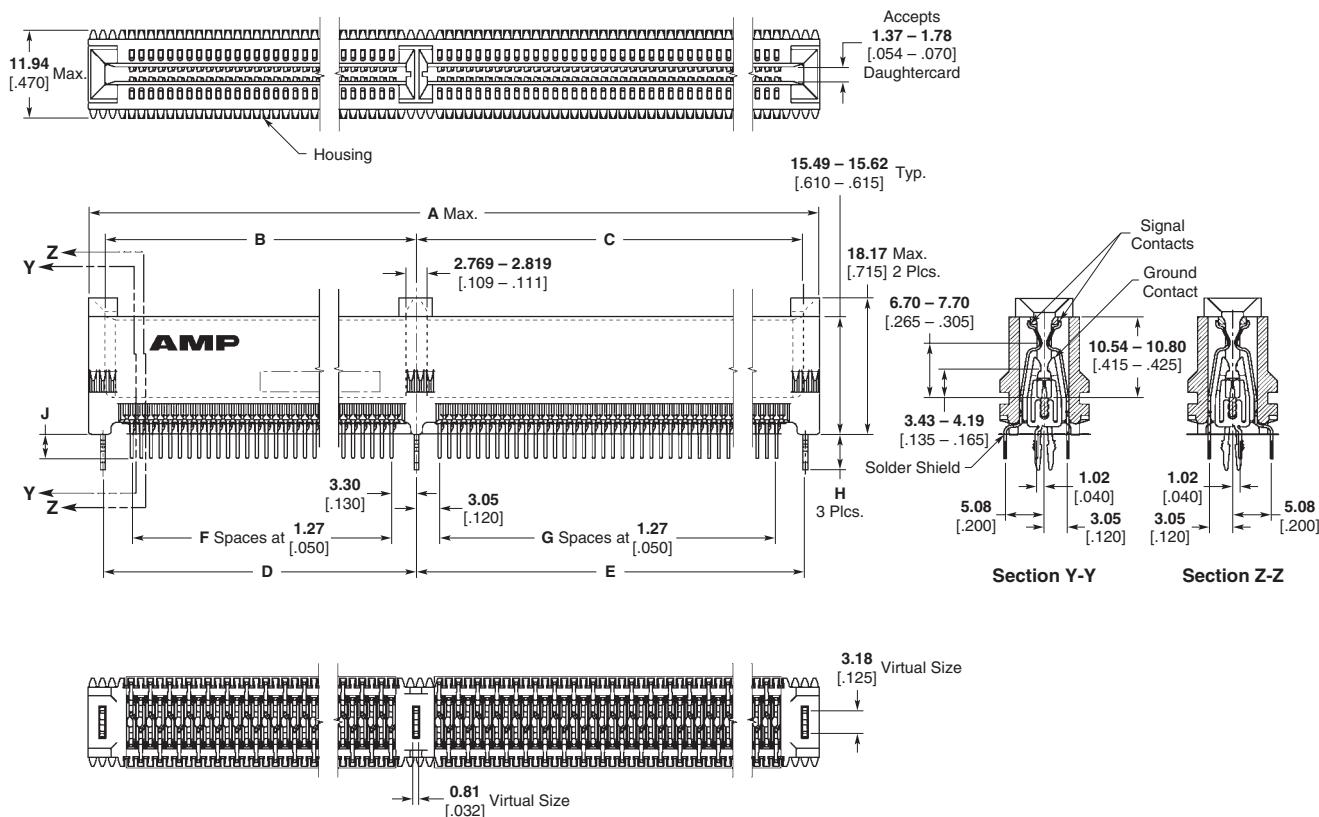
Application Temperature —

+215°C for 120 seconds max.

Operating Temperature Range —

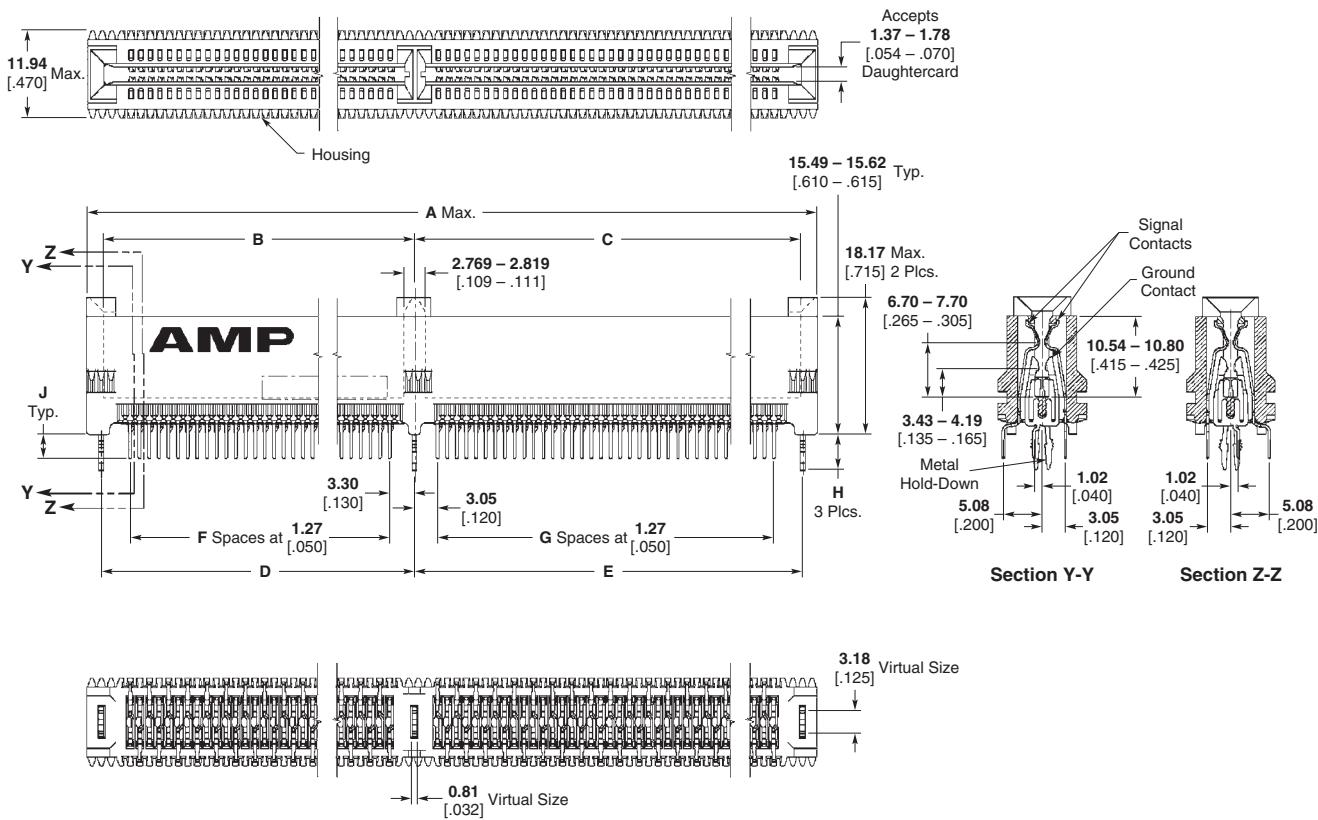
-55°C to +85°C

High Speed Standard Edge Connector (Continued)



Dimensions										No. of Dual Positions	Part Number
A	B	C	D	E	F	G	H	J			
155.35 6.116	66.42-66.68 2.615-2.625	83.95-84.20 3.305-3.315	66.73-66.88 2.627-2.633	84.25-84.40 3.317-3.323	47	61	4.44-4.95 .175-.195	2.29-2.79 .090-.110	110	145236-1	
108.36 4.266	46.10-46.36 1.815-1.825	57.28-57.53 2.255-2.265	46.41-46.56 1.827-1.833	57.58-57.73 2.267-2.273	31	40	4.44-4.95 .175-.195	2.29-2.79 .090-.110	73	145236-2	
155.35 6.116	66.42-66.68 2.615-2.625	83.95-84.20 3.305-3.315	66.73-66.88 2.627-2.633	84.25-84.40 3.317-3.323	47	61	4.44-4.95 .175-.195	2.92-3.43 .115-.135	110	145236-3	

High Speed Standard Edge Connector (Continued)

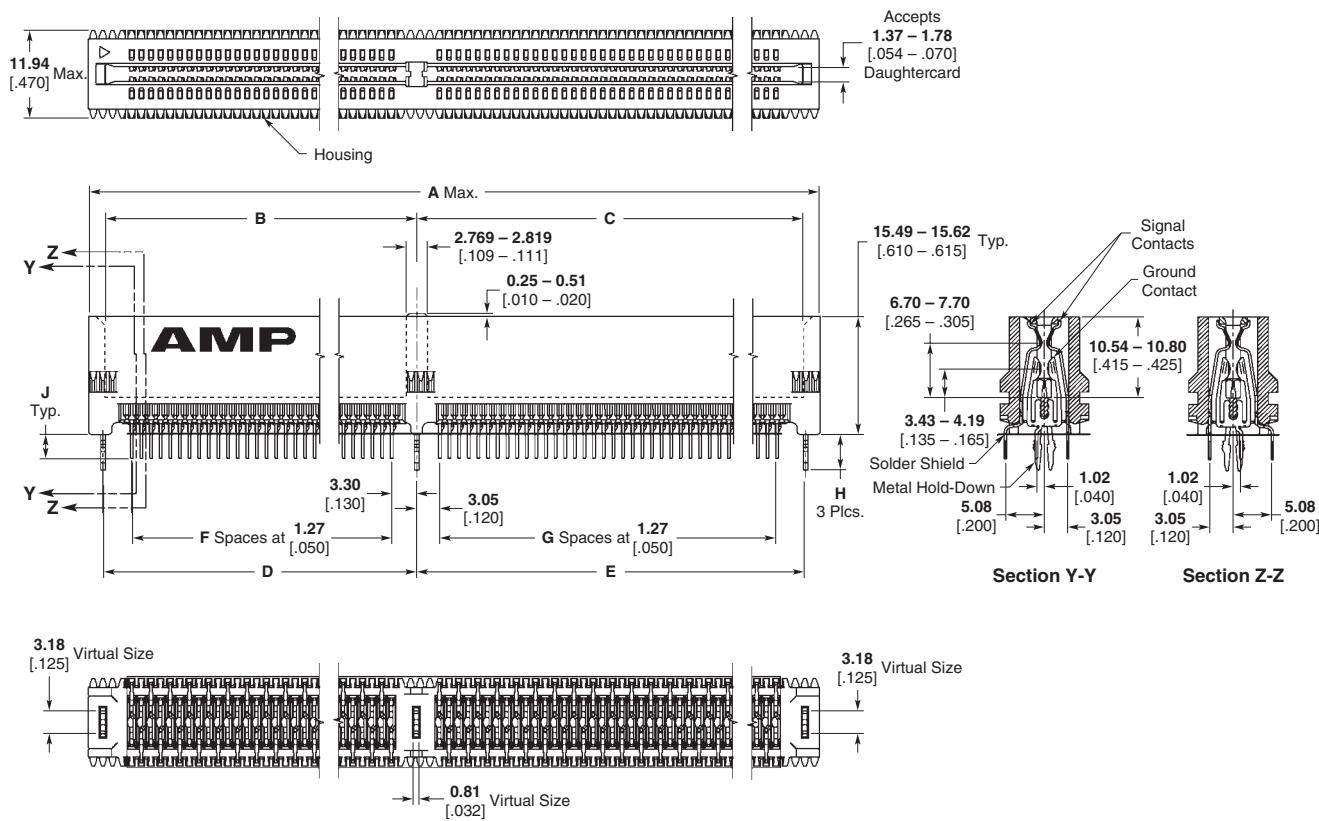


High Speed Standard Edge Connector (Continued)

Dimensions										No. of Dual Positions	Part Number
A	B	C	D	E	F	G	H	J			
79.15 3.116	33.40-33.66 1.315-1.325	40.77-41.02 1.605-1.615	33.71-33.66 1.327-1.333	41.07-41.22 1.617-1.623	21	27	4.44-4.95 .175-.195	2.29-2.79 .090-.110	50	145090-1	
								2.92-3.43 .115-.135	50	145090-2	
								2.29-2.79 .090-.110	60	145090-5	
91.85 3.616	38.48-38.74 1.515-1.525	48.39-48.64 1.905-1.915	38.79-38.94 1.527-1.533	46.69-48.84 1.917-1.923	25	33	4.44-4.95 .175-.195	2.92-3.43 .115-.135	60	145090-6	
								4.57-5.08 .180-.200	60	145090-8	
104.55 4.116	43.56-43.82 1.715-1.725	55.01-56.26 2.205-2.215	43.87-44.02 1.727-1.733	56.31-56.46 2.217-2.223	29	39	4.44-4.95 .175-.195	2.29-2.79 .090-.110	70	145090-9	
								2.92-3.43 .115-.135	70	1-145090-0	
117.25 4.616	51.18-51.44 2.015-2.025	61.09-61.34 2.405-2.415	51.49-51.64 2.027-2.033	61.39-61.54 2.417-2.423	35	43	4.44-4.95 .175-.195	2.29-2.79 .090-.110	80	1-145090-3	
								2.92-3.43 .115-.135	80	1-145090-4	
129.95 5.116	56.26-56.52 2.215-2.225	68.71-68.96 2.705-2.715	56.57-56.72 2.227-2.233	69.01-69.16 2.717-2.723	39	49	4.44-4.95 .175-.195	2.29-2.79 .090-.110	90	1-145090-7	
								2.92-3.43 .115-.135	90	1-145090-8	
142.65 5.616	61.34-61.60 2.415-2.425	76.33-76.58 3.005-3.015	61.65-61.80 2.427-2.433	76.63-76.78 3.017-3.023	43	55	4.44-4.95 .175-.195	2.29-2.79 .090-.110	100	2-145090-1	
								2.92-3.43 .115-.135	100	2-145090-2	
155.35 6.116	66.42-66.68 2.615-2.625	83.95-84.20 3.305-3.315	66.73-66.88 2.627-2.633	84.25-84.40 3.317-3.323	47	61	4.44-4.95 .175-.195	2.29-2.79 .090-.110	110	2-145090-5	
								2.92-3.43 .115-.135	110	2-145090-6	
								3.68-4.19 .145-.165	110	2-145090-7	
								4.57-5.08 .180-.200	110	2-145090-8	
								2.29-2.79 .090-.110	120	2-145090-9	
168.05 6.616	71.50-71.76 2.815-2.825	91.57-91.82 3.605-3.615	71.81-71.96 2.827-2.833	91.87-92.02 3.617-3.623	51	67	4.44-4.95 .175-.195	2.92-3.43 .115-.135	120	3-145090-0	
								3.68-4.19 .145-.165	120	3-145090-1	
180.75 7.116	79.12-79.38 3.115-3.125	96.65-96.90 3.805-3.815	79.43-79.58 3.127-3.133	96.95-97.10 3.817-3.823	57	71	4.44-4.95 .175-.195	2.29-2.79 .090-.110	130	3-145090-3	
								2.92-3.43 .115-.135	130	3-145090-4	
								3.68-4.19 .145-.165	130	3-145090-5	
108.36 4.266	46.10-46.36 1.815-1.825	57.28-57.53 2.255-2.265	46.41-46.56 1.827-1.833	57.58-57.73 2.267-2.273	31	40	4.44-4.95 .175-.195	2.29-2.79 .090-.110	73	3-145090-7*	
								2.92-3.43 .115-.135	73	3-145090-8*	

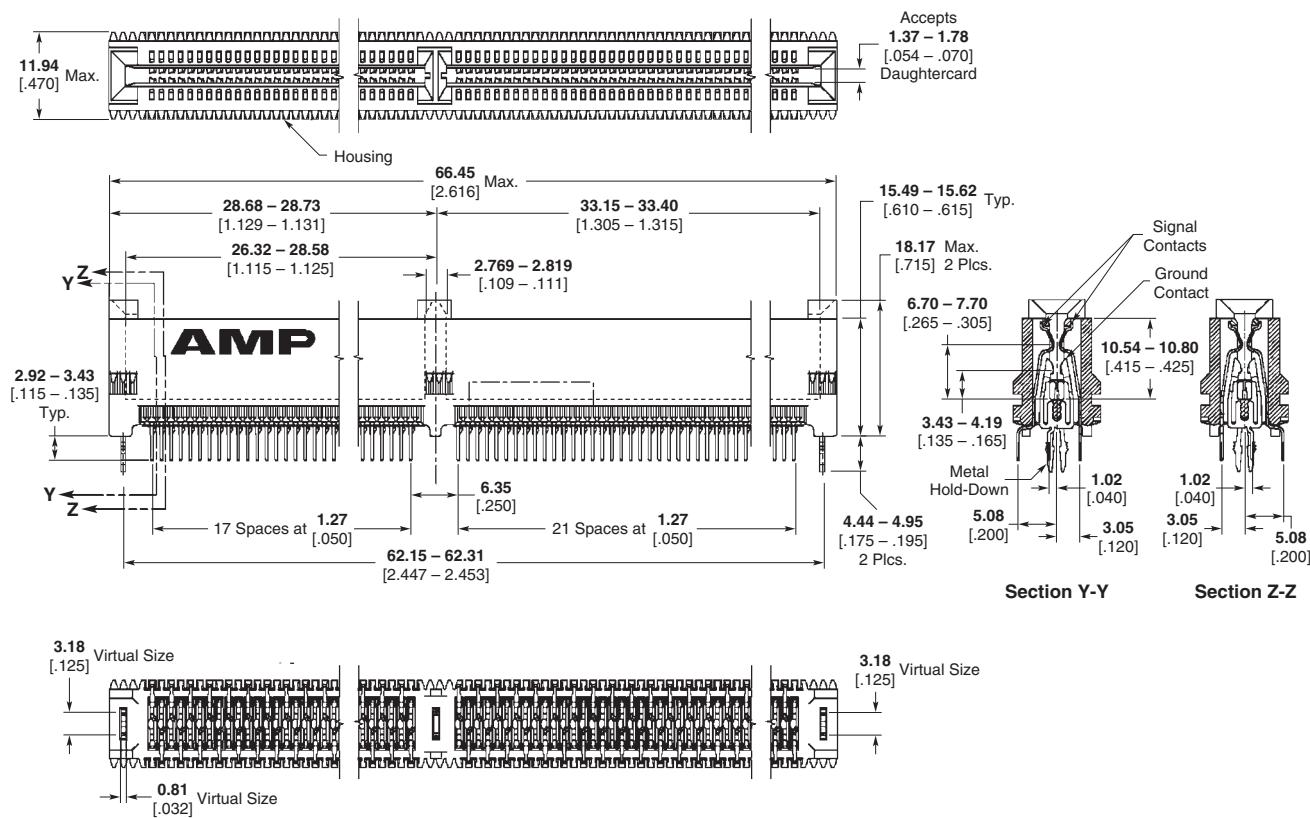
*Alternate Pattern Applies.

High Speed Standard Edge Connector (Continued)



Dimensions										No. of Dual Positions	Part Number
A	B	C	D	E	F	G	H	J			
108.36 4.266	46.10-46.36 1.815-1.825	57.28-57.53 2.255-2.265	46.41-46.56 1.827-1.833	57.58-57.73 2.267-2.273	31	40	4.44-4.95 .175-.195	2.29-2.79 .090-.110	73	145349-1	

Part Number 145094-6
30 Dual Positions



SEC-Z Connector**Product Facts**

- **High density card edge connector for high speed signal applications**
- **Used in servers, workstations, high-end PCs**
 - Memory Expansion Connector
 - High performance and multiple CPU interface (SPARC®, Alpha, AMD)
- **0.64 [.025] centerline density with 1.27 [.050] centerline daughtercard allowances**
- **High density: 80 lines/inch**
- **100 cycles, min. durability**
- **Available in sizes from 240 position to 520 position (40 position increments)**

**Active Part Numbers
(additional sizes may be available)****1.57 [.062] thick daughtercard**

240 position	145427-5
280 position	145427-5
360 position	1-145427-7
440 position	1658664-2
520 position	3-145427-3

2.36 [.093] thick daughtercard

480 position	2-145400-9
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Product Specification

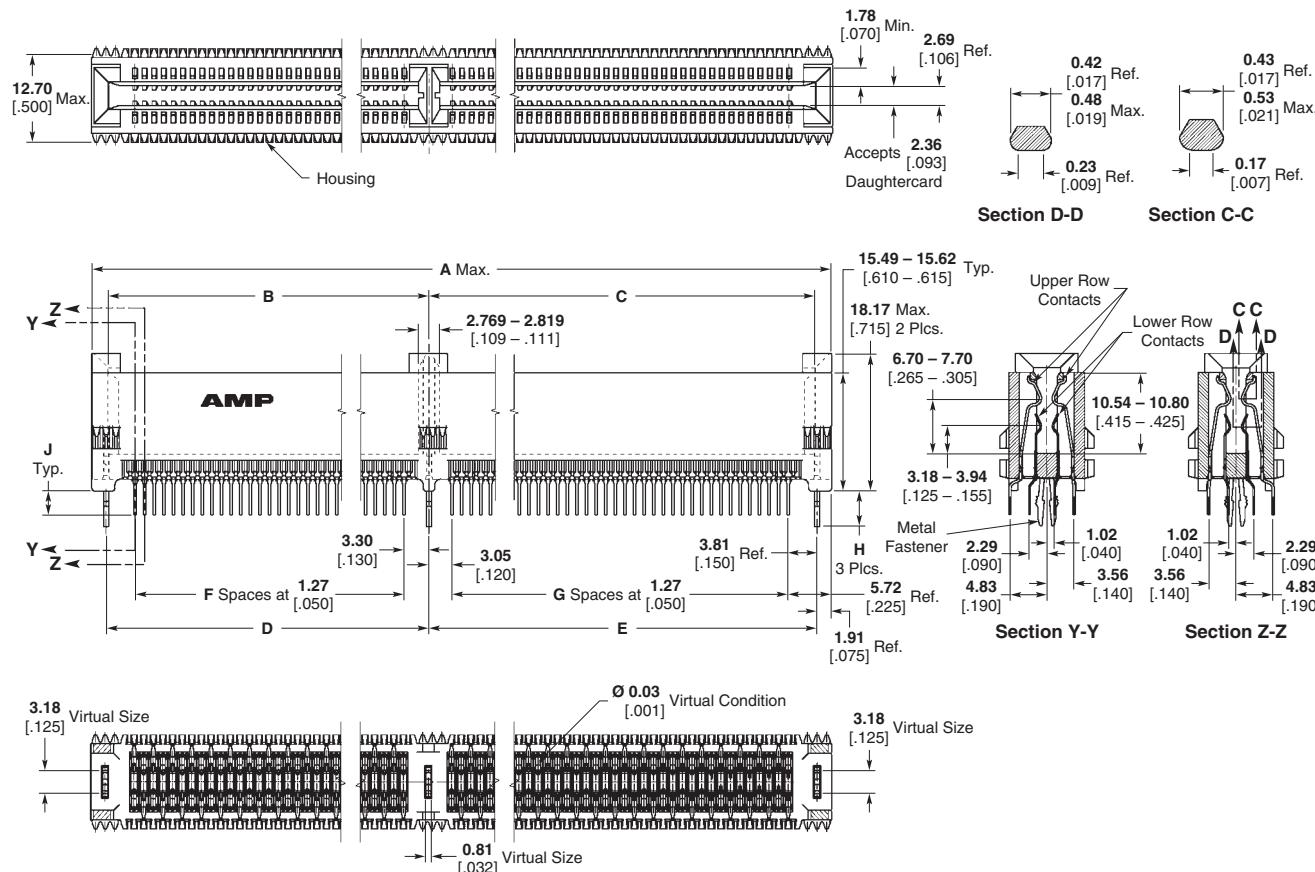
108-1863

Electrical Characteristics**Crosstalk** — Less than 1% @ 200 pS,
1:1 signal/ground ratio**Current Rating** — 1 ampere/contact

SPARC is a trademark of SPARC International.

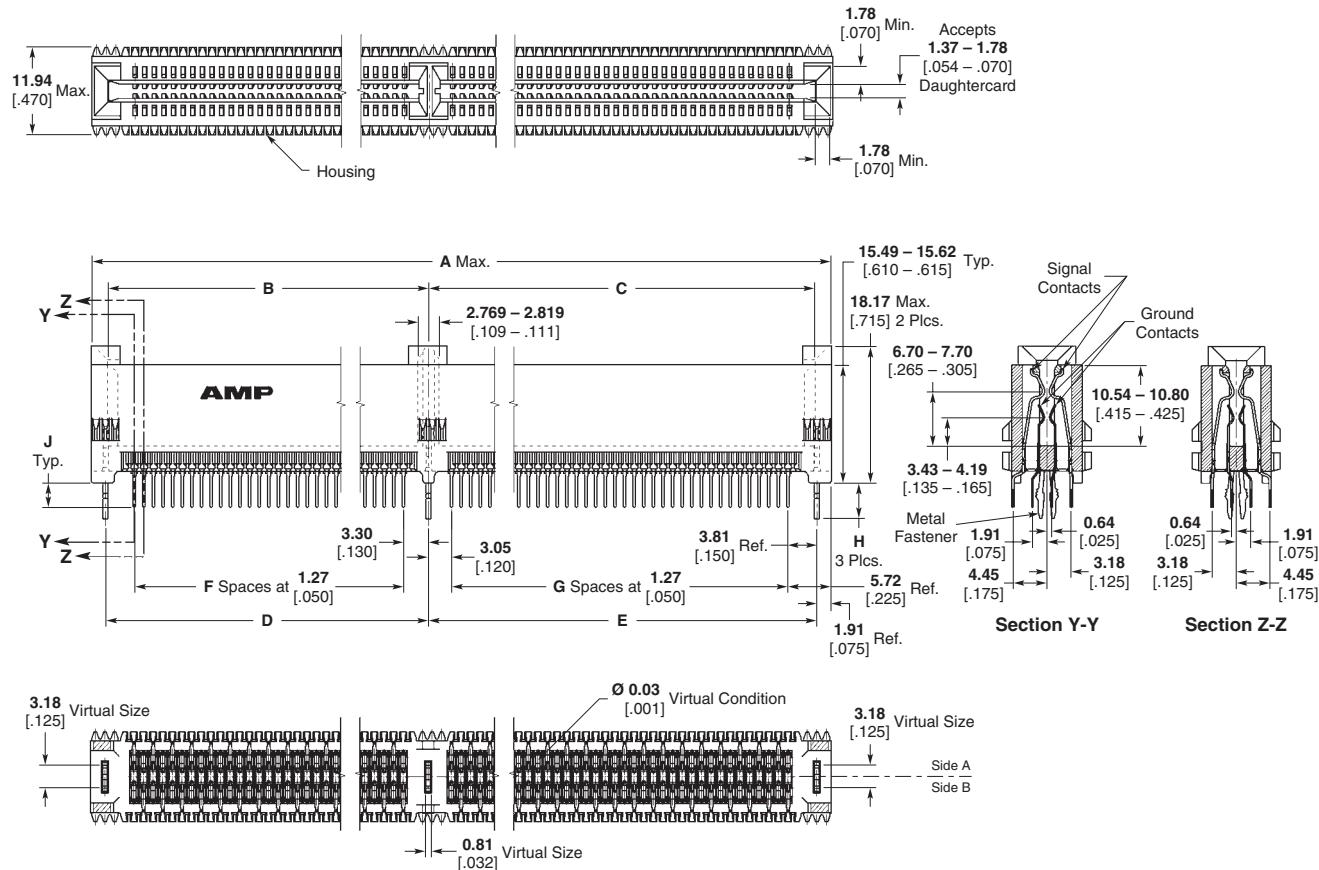
AMD is a trademark of Advanced Micro Devices, Inc.

SEC-Z Connector (Continued)



Dimensions										No. of Total Positions	No. of Quad Positions	Part Number
A	B	C	D	E	F	G	H	J				
168.05 6.616	71.50-71.76 2.815-2.825	91.57-91.82 3.605-3.615	71.81-71.96 2.827-2.833	91.87-92.02 3.617-3.623	51	67	4.44-4.95 .175-.195	2.29-2.79 .090-.110	480	120	6-145400-1	
47.40 1.866	18.16-18.41 .715-.725	24.26-24.51 .955-.965	18.47-18.62 .727-.733	24.56-24.71 .967-.973	9	14	4.44-4.95 .175-.195	2.29-2.79 .090-.110	100	25	2-145400-9	

SEC-Z Connector (Continued)



Dimensions										No. of Total Positions	No. of Quad Positions	Part Number
A	B	C	D	E	F	G	H	J				
91.85 3.616	38.48-38.74 1.515-1.525	48.39-48.64 1.905-1.915	38.79-38.94 1.527-1.533	48.69-48.84 1.917-1.923	25	33	4.44-4.95 .175-.195	2.29-2.79 .090-.110	240	60	145427-5	
104.55 4.116	43.56-43.82 1.715-1.725	56.01-56.26 2.205-2.215	43.87-44.02 1.727-1.733	56.31-56.46 2.217-2.223	29	39	4.44-4.95 .175-.195	2.29-2.79 .090-.110	280	70	145427-9	
129.95 5.116	56.26-56.52 2.215-2.225	68.71-68.96 2.705-2.715	56.57-56.72 2.227-2.233	69.01-69.16 2.717-2.723	39	49	4.44-4.95 .175-.195	2.29-2.79 .090-.110	360	90	1-145427-7	
155.35 6.116	66.42-66.68 2.615-2.625	83.95-84.20 3.305-3.315	66.73-66.88 2.627-2.633	84.25-84.40 3.317-3.323	47	61	4.44-4.95 .175-.195	2.29-2.79 .090-.110	440	110	1658664-2*	
180.75 7.116	79.12-79.38 3.115-3.125	96.65-96.90 3.805-3.815	79.43-79.58 3.127-3.133	96.95-97.10 3.817-3.823	57	71	4.44-4.95 .175-.195	2.29-2.79 .090-.110	520	130	3-145427-3	
206.15 8.116	89.28-89.54 3.515-3.525	111.89-112.14 4.405-4.415	89.59-89.74 3.527-3.533	112.19-112.34 4.417-4.423	65	83	4.44-4.95 .175-.195	2.29-2.79 .090-.110	600	150	4-145427-1	
237.90 9.366	103.25-103.51 4.065-4.075	129.67-129.92 5.105-5.115	103.56-103.71 4.077-4.083	129.97-130.12 5.12-5.12	76	97	4.44-4.95 .175-.195	2.29-2.79 .090-.110	700	175	5-145427-3	

*Contact Area Lubricated with Bellcore Approved Lubricant. Technical Reference GR-1217-Core, Issue 1, November 1995.

RoHS Compliant Part Number Cross Reference

Non-RoHS Part No.	RoHS Compliant Part No.	Non-RoHS Part No.	RoHS Compliant Part No.	Non-RoHS Part No.	RoHS Compliant Part No.	Non-RoHS Part No.	RoHS Compliant Part No.
RoHS Compliant	120646-1	120913-7	5120913-7	RoHS Compliant	223969-1	1367550-6	6367550-6
120658-1	5120658-1	120913-8	5120913-8	RoHS Compliant	223969-4	1367550-7	6367550-7
120658-2	5120658-2	120953-3		RoHS Compliant	223969-7	1367550-8	6367550-8
120661-1	5120661-1	120953-4		RoHS Compliant	1-223969-0	1367550-9	6367550-9
120661-2	5120661-2	120953-5		223970-1	5223970-1	1367551-1	6367551-1
120662-1	5120662-1	RoHS Compliant	120954-x	223971-1	5223971-1	1367551-2	6367551-2
120662-2	5120662-2	RoHS Compliant	120955-x	223972-1	5223972-1	1367552-1	6367552-1
120663-1	5120663-1	RoHS Compliant	120956-x	223973-1	5223973-1	1367553-1	6367553-1
120664-1	5120664-1	RoHS Compliant	120957-x	223974-1	5223974-1	1367554-1	6367554-1
120664-2	5120664-2	RoHS Compliant	120958-x	5-223974-1	5-5223974-1	1367555-1	6367555-1
120665-1	5120665-1	145090-1	5145090-1	223975-1	5223975-1	1367555-2	6367555-2
120665-2	5120665-2	145090-2	5145090-2	223979-1	5223979-1	1367555-3	6367555-3
120666-1	5120666-1	145090-5	5145090-5	223980-1	5223980-1	1367556-1	6367556-1
120667-1	5120667-1	145090-6	5145090-6	223981-1	5223981-1	1367556-2	6367556-2
120668-1	5120668-1	145090-8	5145090-8	RoHS Compliant	223982-1	1367557-1	6367557-1
120670-1	5120670-1	145090-9	5145090-9	223983-1	5223983-1	1367557-2	6367557-2
120670-2	5120670-2	1-145090-0	1-5145090-0	223984-1	5223984-1	1367557-3	6367557-3
120672-1	5120672-1	1-145090-3	1-5145090-3	223985-1	5223985-1	1367557-4	6367557-4
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1367680-3	6367680-3	1410215-1	1410215-3	1410298-1		1469105-1	6469105-1
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Engineering Notes



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Fax: +48-22-5490-880

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Phone: +40-1-311-3479+3596
Fax: +40-1-312-0574

Russia – Moscow
Phone: +7-095-926-55-06...09
Fax: +7-095-926-55-05

Russia – St. Petersburg
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Fax: +7-812-325-32-88

Scotland – Dundee
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Phone: +44-1382-508080
Fax: +44-1382-505060

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Fax: +421-48-415-20-13

Slovenia – Ljubljana
Phone: +386-1561-3270
Fax: +386-1561-3240

South Africa – Port Elizabeth
Phone: +27-41-405-4500
Fax: +27-41-486-1314

Spain – Barcelona
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Fax: +34-93-201-7879

Product Information Center:
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Sweden – Upplands Väsby
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Fax: +46-8-50-72-50-01

Switzerland – Steinach
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Fax: +41-71-447-0444

Turkey – İstanbul
Phone: +90-212-281-8181...3
+90-212-282-5130/5430
Fax: +90-212-281-8184

Ukraine – Kiev
Phone: +38-044-238-6908
Fax: +38-044-568-5740

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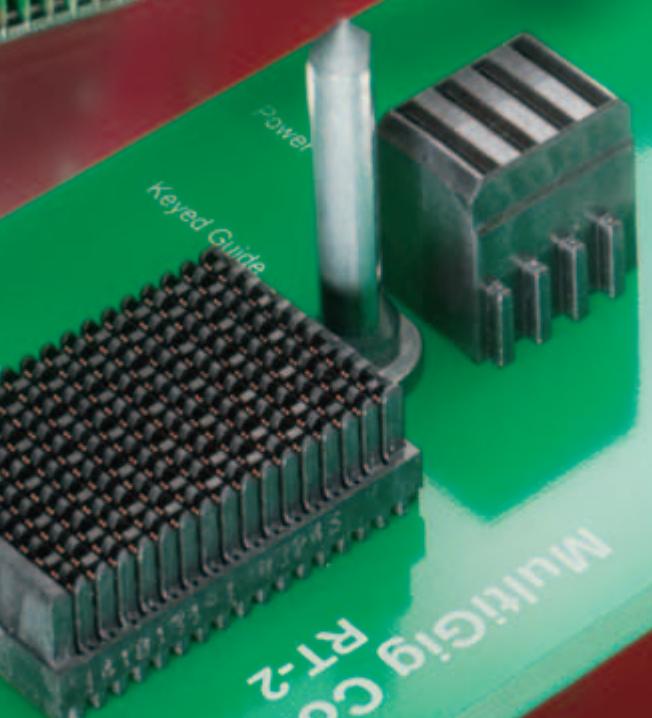
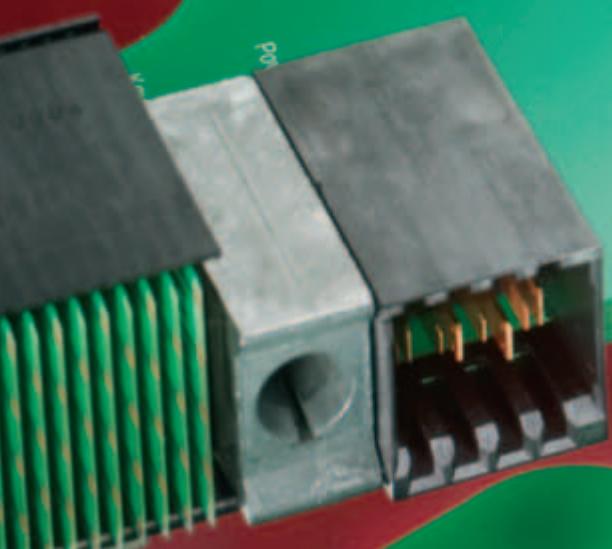
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