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AdvancedTCA is a trademark of PICMG-PCI Industrial Computer Mfg's. Group.



Catalog 1773095
Revised 12-08

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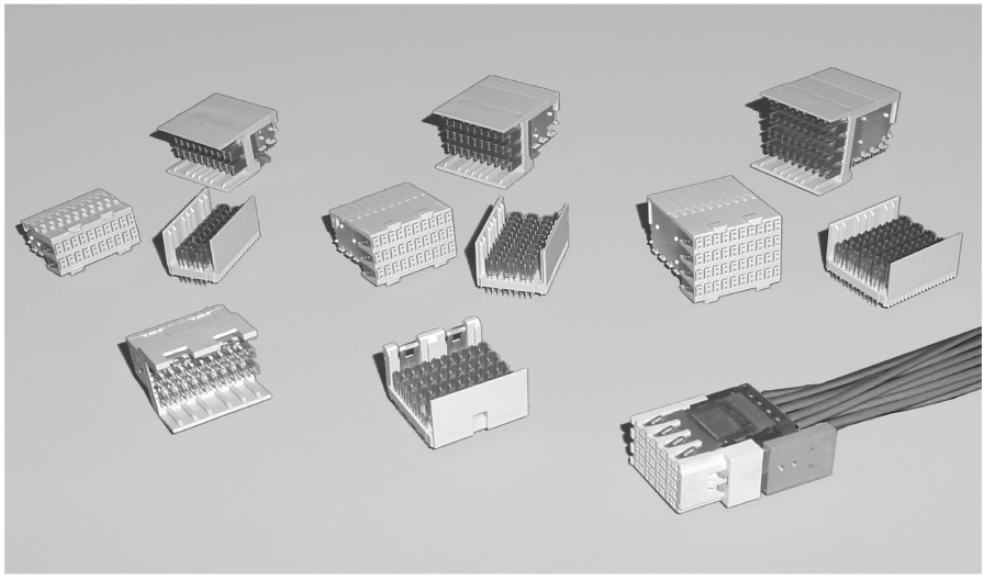
UK: 44-8706-080-208

# Z-PACK HM-Zd Product Line Overview

## 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**





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 #206C014**

**Routing Guide: http://hmzd.tycoelectronics.com**
**Routing Guide #206C015-1**

**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** — 0.80µm Au min. over 1.3µm Ni min.

**Compliant Pin Finish** — 0.8µm SnPb min. over 1.3µm 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.



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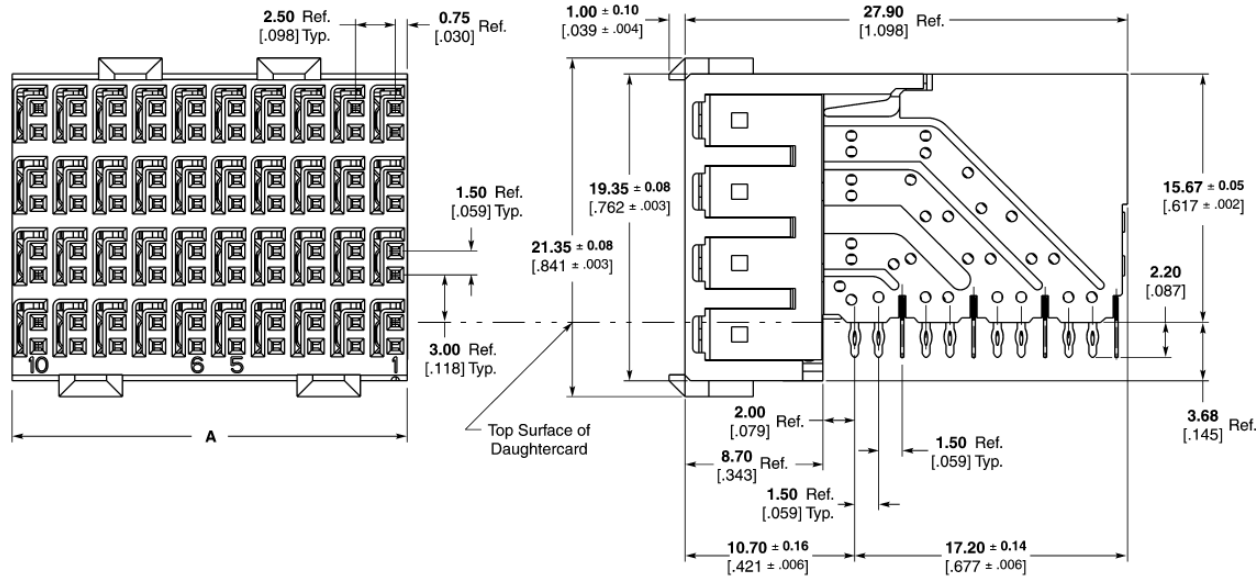
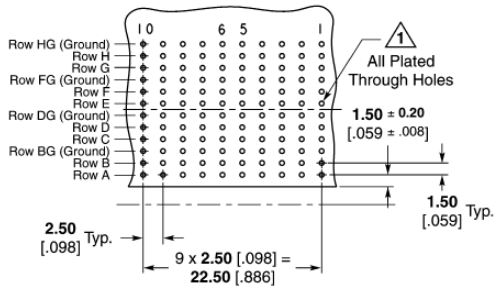
# Z-PACK HM-Zd Connector

## 4 Pair Right Angle Receptacle Assemblies




**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] | | | Mates With* |
|---|---|---|---|---|---|---|---|---|
| | | | | | Insertion | Repair | | |
| | | | | | Receptacle | Housing Removal | Chiclet Removal | |
| 1469251-1 | 5 | **12.40** .488 | 40 | 20 | 91347-5 | 1583224-5 | 1583248-1 | 1469252-1 |
| **6469001-1**[1] | 10 | **25.00** .984 | 80 | 40 | 91347-1 | 1583224-1 | 1583248-1 | 6469002-1, 6469046-1, 6469074-1, 6469048-1 |
| 6469286-1 | 12 | **30.00** 1.181 | 96 | 48 | 91347-3 | 1583224-2 | 1583248-1 | 6469287-1, 6469375-1 |
| 6469294-1 | 15 | **37.50** 1.476 | 120 | 60 | 91347-2 | 1583224-3 | 1583248-1 | 6469296-1 |
| 6469061-1 | 20 | **50.00** 1.969 | 160 | 80 | 91347-4 | 1583224-4 | 1583248-1 | 6469062-1, 6469099-1 |

[1] **AdvancedTCA Zone 2 Daughtercard Connector.**
[2] See page 93 for Instruction Sheet Number.
*Other options may be available. Contact Tyco Electronics at the numbers listed below for more information.

AdvancedTCA is a trademark of PICMG-PCI Industrial Computer Mfg's. Group.

**Note:** All part numbers are RoHS compliant. Tin-Lead parts are RoHS compliant through exemption for lead in press-fit connectors.



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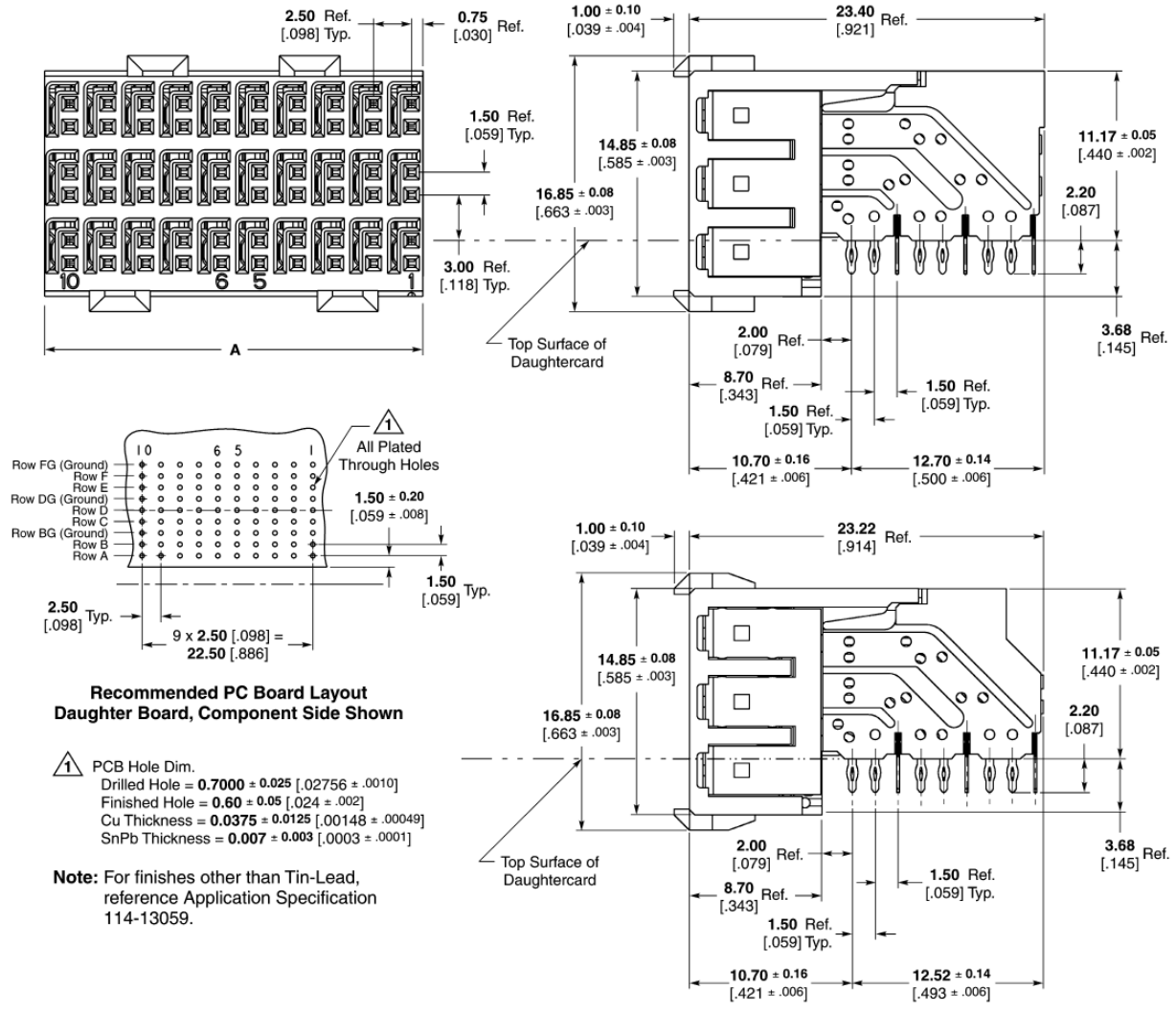
## Z-PACK HM-Zd Connector (Continued)

### 3 Pair Right Angle Receptacle Assemblies




**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 = **0.0375** ± **0.0125** [.00148 ± .00049]
SnPb Thickness = **0.007** ± **0.003** [.0003 ± .0001]

**Note:** For finishes other than Tin-Lead, reference Application Specification 114-13059.

**With Notch For PMC Applications**

| Part Number | Column Count | Module Length (Dim. A) | Signals | Grounds | Application Tooling[2] | | | Mates With* |
|---|---|---|---|---|---|---|---|---|
| | | | | | Insertion | Repair | | |
| | | | | | Receptacle | Housing Removal | Chiclet Removal | |
| 6469081-1 | 10 | **25.00** .984 | 60 | 30 | 91376-1 | 1583224-1 | 1673952-1 | 6469083-1, 6469085-1, 6469183-1 |
| **1469514-1**[1] | 10 | **25.00** .984 | 60 | 30 | 91376-1 | 1583224-1 | 1673952-1 | 6469083-1, 6469085-1, 6469183-1 |
| 6469179-1 | 15 | **37.50** 1.476 | 90 | 90 | 91376-2 | 1583224-3 | 1673952-1 | 6469152-1 |

[1] **For CompactPCI and AdvancedTCA PMC Applications.**
[2] See page 93 for Instruction Sheet Number.
*Other options may be available. Contact Tyco Electronics at the numbers listed below for more information.

AdvancedTCA is a trademark of PICMG-PCI Industrial Computer Mfg's. Group.
CompactPCI is a trademark of PICMG-PCI Industrial Computer Mfg's. Group.

**Note:** All part numbers are RoHS compliant. Tin-Lead parts are RoHS compliant through exemption for lead in press-fit connectors.



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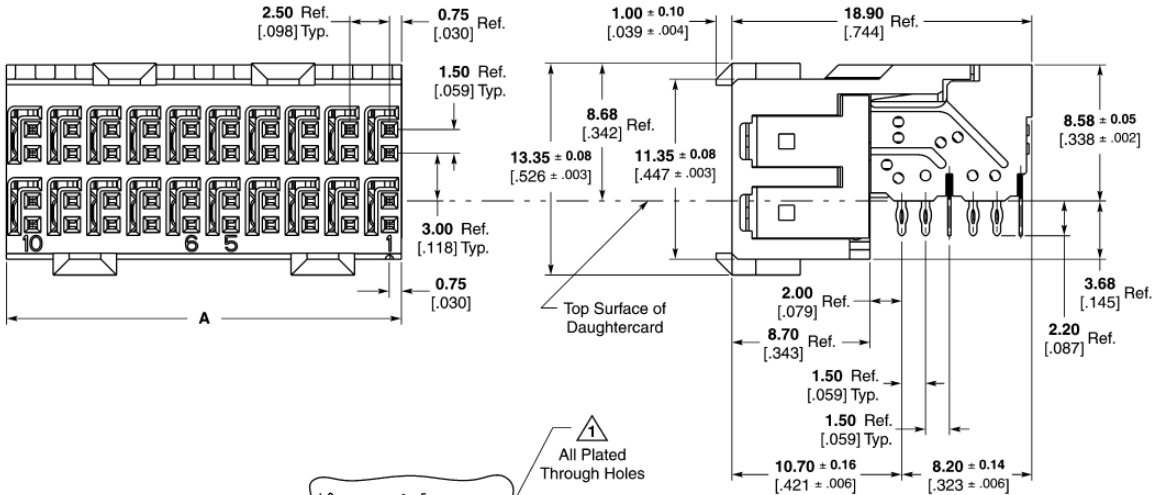
## Z-PACK HM-Zd Connector (Continued)

### 2 Pair Right Angle Receptacle Assemblies




**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] | | | Mates With* |
|---|---|---|---|---|---|---|---|---|
| | | | | | Insertion | Repair | | |
| | | | | | Receptacle | Housing Removal | Chiclet Removal | |
| 6469028-1 | 10 | **25.00** .984 | 40 | 20 | 91350-1 | 1583224-1 | 1583249-1 | 6469025-1, 6469076-1, 6469169-1 |
| 6469077-1 | 20 | **50.00** 1.969 | 80 | 40 | 91350-2 | 1583224-4 | 1583249-1 | 6469078-1, 6469101-1 |

[1] See page 93 for Instruction Sheet Number.
*Other options may be available. Contact Tyco Electronics at the numbers listed below for more information.

**Note:** All part numbers are RoHS compliant. Tin-Lead parts are RoHS compliant through exemption for lead in press-fit connectors.





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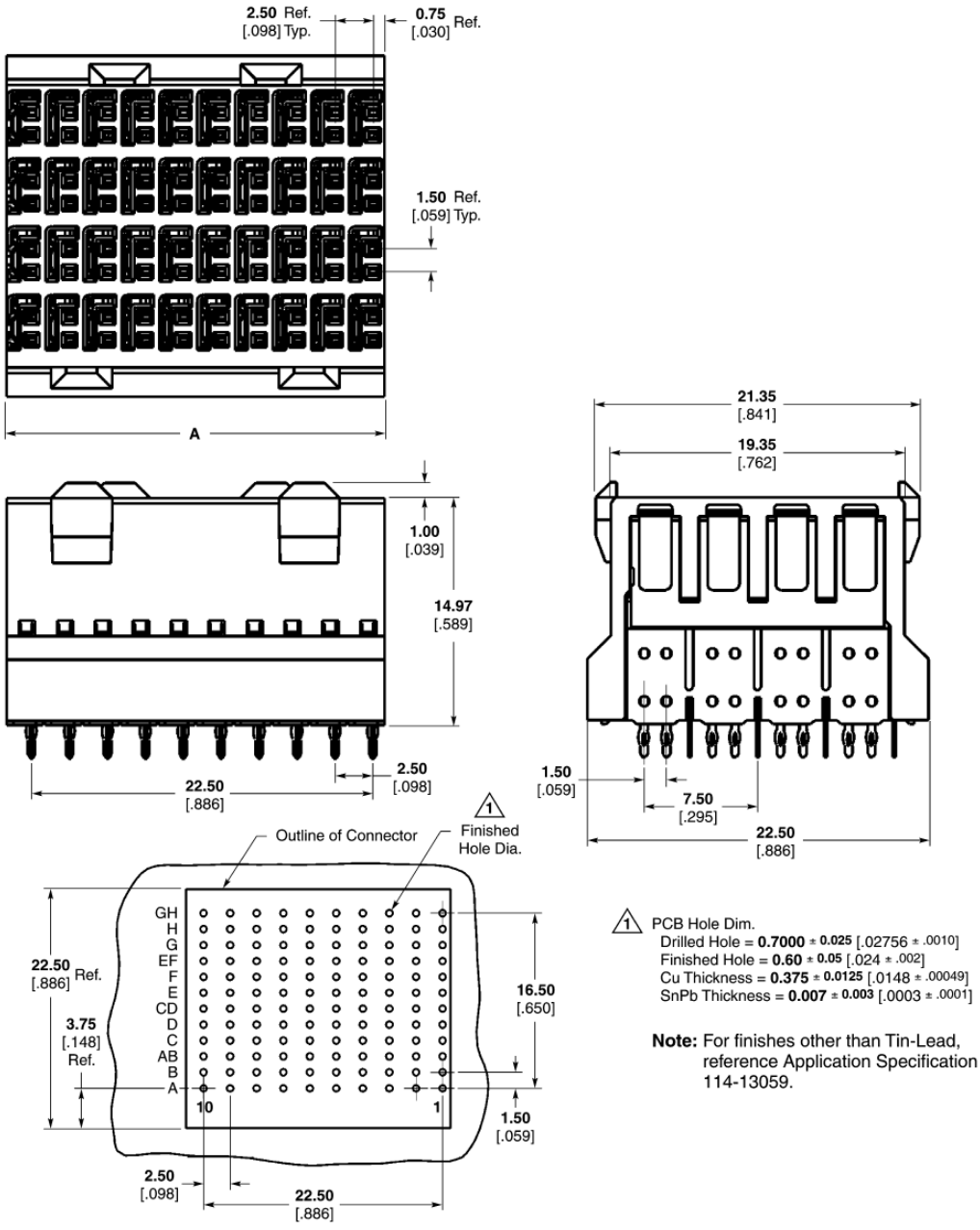
## Z-PACK HM-Zd Connector (Continued)

### 4 Pair Vertical Receptacle Assemblies




**Recommended PC Board Layout**

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[1] | | Mates With |
|---|---|---|---|---|---|---|---|
| | | | | | Insertion Receptacle | Repair Housing Removal | |
| 1469362-1 | 10 | **25.00** .984 | 80 | 40 | 1804401-1 | 1804402-1 | 6469002-1, 6469046-1, 6469074-1, 6469048-1 |

[1] See page 93 for Instruction Sheet Number.

**Note:** All part numbers are RoHS compliant. Tin-Lead parts are RoHS compliant through exemption for lead in press-fit connectors.



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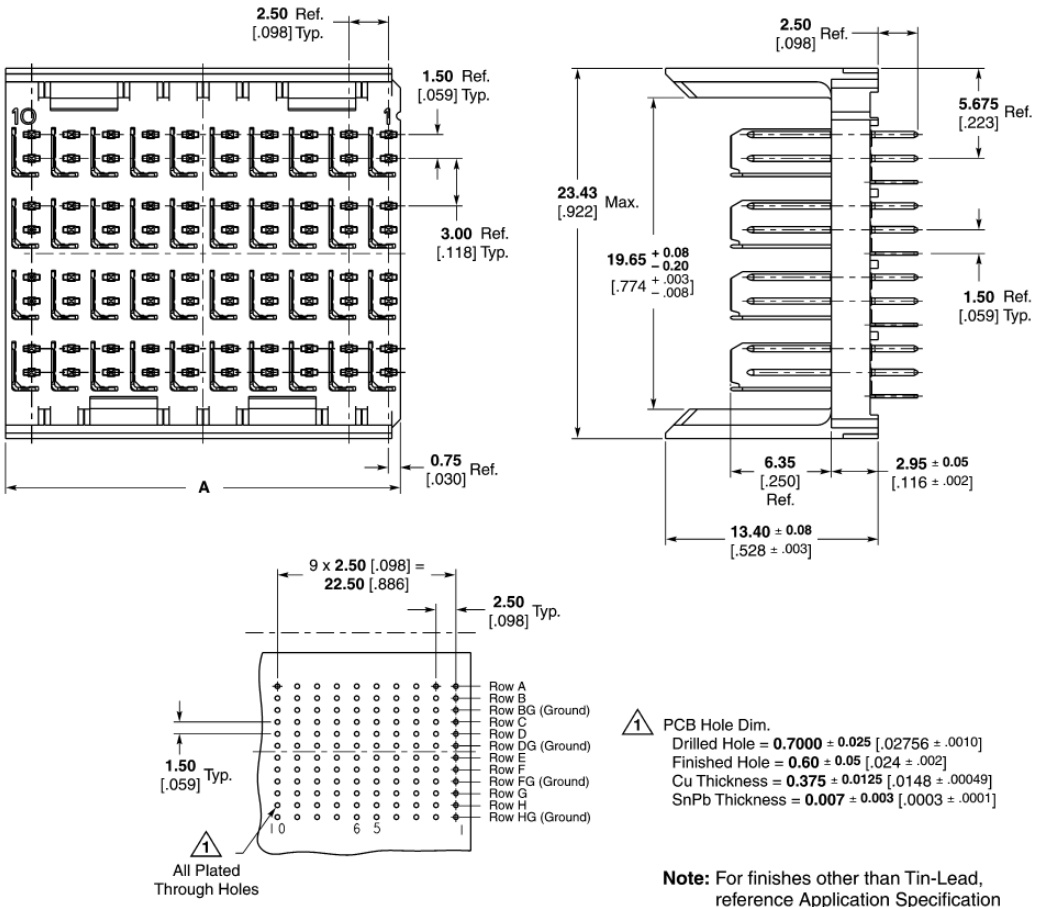
## Z-PACK HM-Zd Connector (Continued)

### 4 Pair Vertical Pin Header Assemblies




**Recommended PC Board Layout**
**Backplane Component Side Shown**

**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] | | | | Mates With* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Insertion | Repair | | | |
| | | | | | | | Pin Header | Pin Removal | Housing Removal | Pin Insertion | |
| 6469252-1 | **2.50** .098 | **5.30** .209 | 5 | **12.40** .488 | 40 | 20 | 91349-5 | 1583237-1 | 1583220-1 | 1583255-1 | 1469251-1 |
| **6469002-1**[1] | **2.50** .098 | **5.30** .209 | 10 | **25.00** .984 | 80 | 40 | 91349-1 | 1583237-1 | 1583220-1 | 1583255-1 | 6469001-1, 1469362-1 |
| 6469046-1[2] | **2.50** .098 | **5.30** .209 | 10 | **25.00** .984 | 80 | 40 | 91349-1 | 1583237-1 | 1583220-1 | 1583255-1 | 6469001-1, 1469362-1 |
| 6469074-1 | **1.80** .071 | **5.30** .209 | 10 | **25.00** .984 | 80 | 40 | 91349-1 | 1583237-1 | 1583220-1 | 1583255-1 | 6469001-1, 1469362-1 |
| 6469287-1 | **2.50** .098 | **5.30** .209 | 12 | **30.00** 1.181 | 96 | 48 | 91349-3 | 1583237-1 | 1583220-1 | 1583255-1 | 6469286-1 |
| 6469296-1 | **2.50** .098 | **5.30** .209 | 15 | **37.50** 1.476 | 120 | 60 | 91349-2 | 1583237-1 | 1583220-1 | 1583255-1 | 6469294-1 |
| 6469062-1 | **2.50** .098 | **5.30** .209 | 20 | **50.00** 1.969 | 160 | 80 | 91349-4 | 1583237-1 | 1583220-1 | 1583255-1 | 6469061-1 |
| 6469099-1 | **1.80** .071 | **5.30** .209 | 20 | **50.00** 1.969 | 160 | 80 | 91349-4 | 1583237-1 | 1583220-1 | 1583255-1 | 6469061-1 |

[1] AdvancedTCA Zone 2 Backplane Connector.
[2] Shallow Wall for Daughtercards thicker than 3.50 [.138].
[3] See page 93 for Instruction Sheet Number.
*Other options may be available. Contact Tyco Electronics at the numbers listed below for more information.

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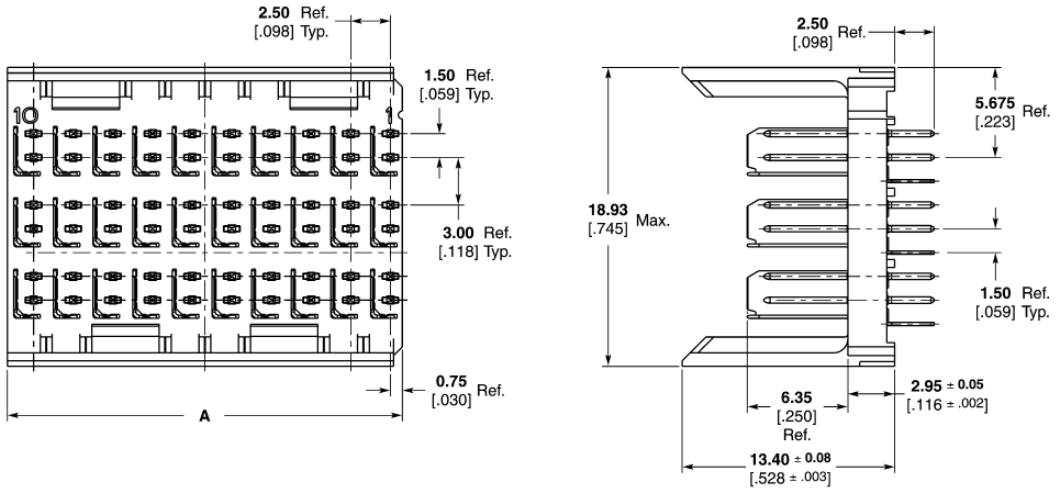
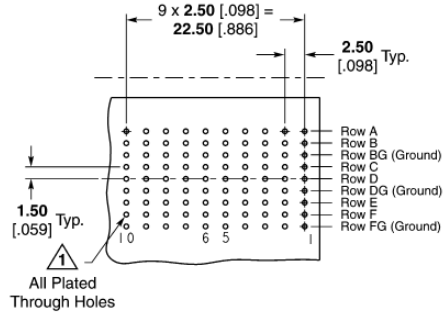
## Z-PACK HM-Zd Connector (Continued)

### 3 Pair Vertical Pin Header Assemblies




**Recommended PC Board Layout**
**Backplane, 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] | | | | Mates With* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Insertion | Repair | | | |
| | | | | | | | Pin Header | Pin Removal | Housing Removal | Pin Insertion | |
| 6469083-1 | **2.50** .098 | **5.30** .209 | 10 | **25.00** .984 | 60 | 30 | 91375-1 | 1583237-1 | 1725634-1 | 1583255-1 | 6469081-1 |
| 6469085-1 | **1.80** .071 | **5.30** .209 | 10 | **25.00** .984 | 60 | 30 | 91375-1 | 1583237-1 | 1725634-1 | 1583255-1 | 1469514-1 |
| 6469152-1 | **2.50** .098 | **5.30** .209 | 15 | **37.50** 1.476 | 30 | 15 | 91375-2 | 1583237-1 | 1725634-1 | 1583255-1 | 6469179-1 |

[1] See page 93 for Instruction Sheet Number.
*Other options may be available. Contact Tyco Electronics at the numbers listed below for more information.

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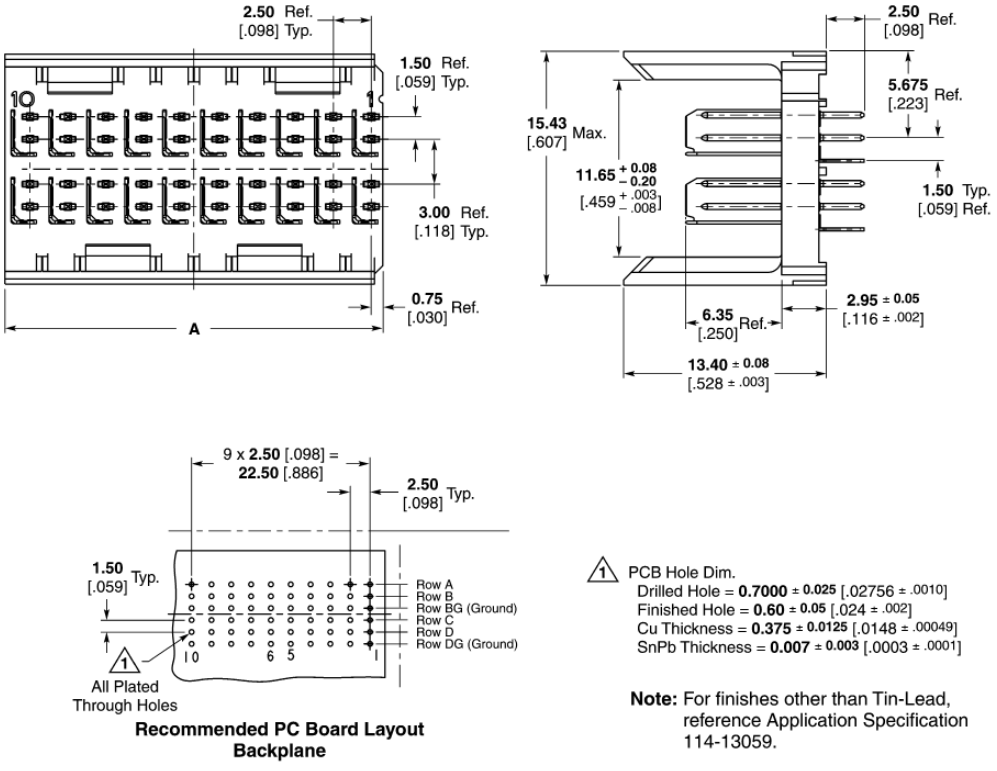
## Z-PACK HM-Zd Connector (Continued)

### 2 Pair Vertical Pin Header Assemblies




**Recommended PC Board Layout Backplane**

**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] | | | | Mates With* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Insertion | Repair | | | |
| | | | | | | | Pin Header | Pin Removal | Housing Removal | Pin Insertion | |
| 6469025-1 | **2.50** .098 | **5.30** .209 | 10 | **25.00** .984 | 40 | 20 | 91348-1 | 1583237-1 | 1583234-1 | 1583255-1 | 6469028-1 |
| 6469076-1 | **1.80** .071 | **5.30** .209 | 10 | **25.00** .984 | 40 | 20 | 91348-1 | 1583237-1 | 1583234-1 | 1583255-1 | 6469028-1 |
| 6469078-1 | **2.50** .098 | **5.30** .209 | 20 | **50.00** 1.969 | 80 | 40 | 91348-2 | 1583237-1 | 1583234-1 | 1583255-1 | 6469077-1 |
| 6469101-1 | **1.80** .071 | **5.30** .209 | 20 | **50.00** 1.969 | 80 | 40 | 91348-2 | 1583237-1 | 1583234-1 | 1583255-1 | 6469077-1 |

[1] See page 93 for Instruction Sheet Number.
*Other options may be available. Contact Tyco Electronics at the numbers listed below for more information.

**Note:** All part numbers are RoHS compliant. Tin-Lead parts are RoHS compliant through exemption for lead in press-fit connectors.





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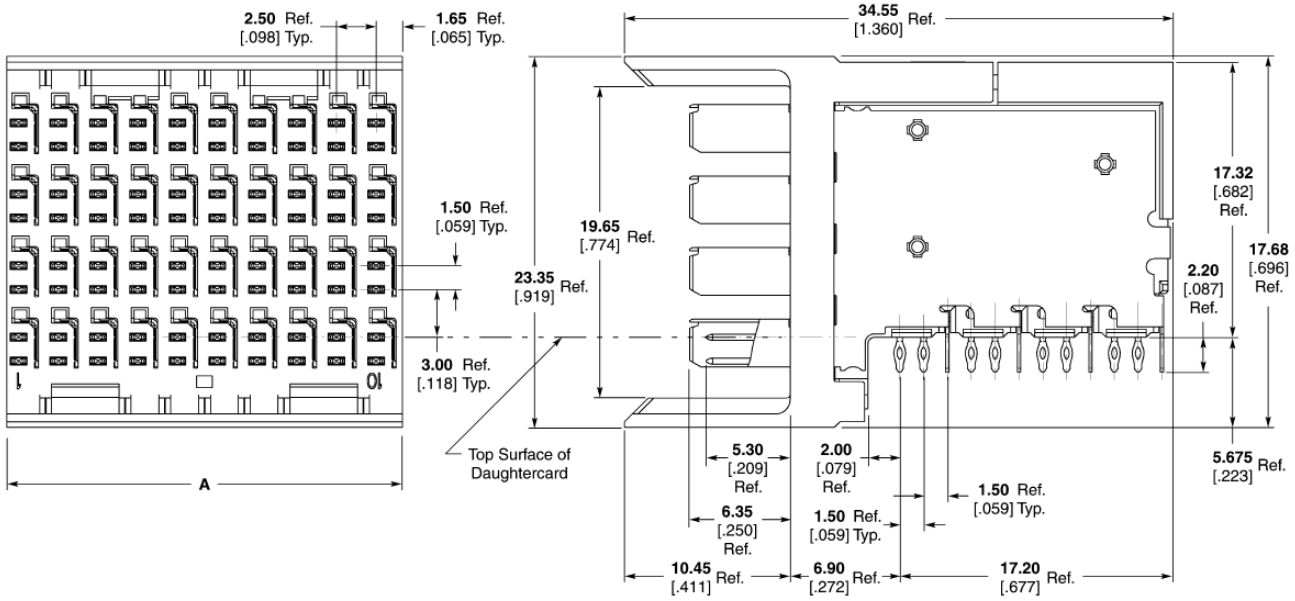
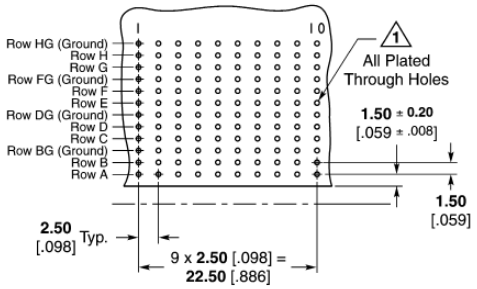
## Z-PACK HM-Zd Connector (Continued)

### 4 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] | | | Mates With* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Insertion | Repair | | |
| | | | | | | | Receptacle | Housing Removal | Chiclet Removal | |
| 6469048-1 | **2.20** .087 | **5.30** .209 | 10 | **25.00** .984 | 80 | 40 | 91378-1 | 1804174-1 | 1804177-1 | 6469001-1, 1469362-1 |
| 6469375-1 | **2.20** .087 | **5.30** .209 | 12 | **30.00** 1.181 | 96 | 48 | 91378-3 | 1804174-1 | 1804177-1 | 6469286-1 |

[1] See page 93 for Instruction Sheet Number.
*Other options may be available. Contact Tyco Electronics at the numbers listed below for more information.

**Note:** All part numbers are RoHS compliant. Tin-Lead parts are RoHS compliant through exemption for lead in press-fit connectors.



Catalog 1773095
Revised 12-08

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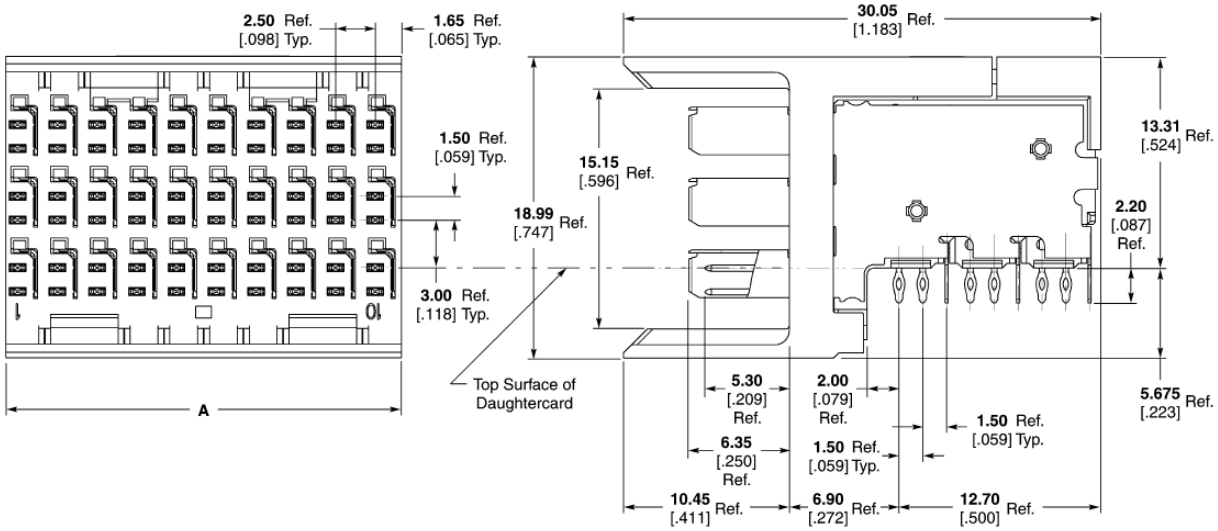
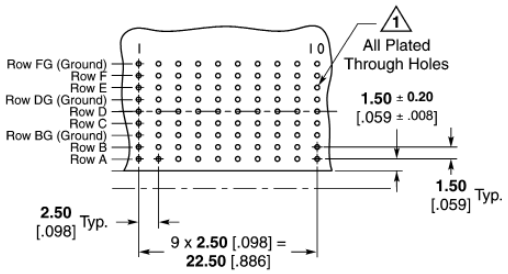
Japan: 81-44-844-8013
UK: 44-8706-080-208

## Z-PACK HM-Zd Connector (Continued)

### 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] | | | Mates With* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Insertion | Repair | | |
| | | | | | | | Pin Header | Housing Removal | Chiclet Removal | |
| 6469183-1 | **2.20** .087 | **5.30** .209 | 10 | **25.00** .984 | 60 | 30 | 1804179-1 | 1804173-1 | 1804176-1 | 6469081-1, 1469514-1 |

[1] See page 93 for Instruction Sheet Number.
*Other options may be available. Contact Tyco Electronics at the numbers listed below for more information.

**Note:** All part numbers are RoHS compliant. Tin-Lead parts are RoHS compliant through exemption for lead in press-fit connectors.





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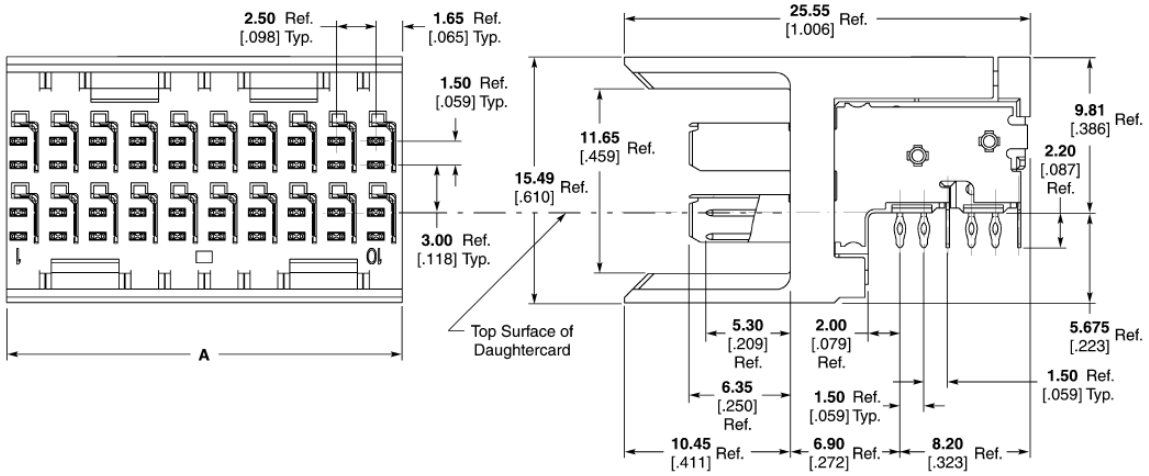
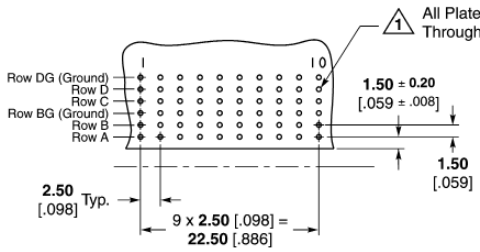
UK: 44-8706-080-208

## Z-PACK HM-Zd Connector (Continued)

### 2 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] | | | Mates With* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Insertion | Repair | | |
| | | | | | | | Pin Header | Housing Removal | Chiclet Removal | |
| 6469169-1 | **2.20** .087 | **5.30** .209 | 10 | **25.00** .984 | 40 | 20 | 91377-1 | 1804171-1 | 1804175-1 | 6469028-1 |

[1] See page 93 for Instruction Sheet Number.
*Other options may be available. Contact Tyco Electronics at the numbers listed below for more information.

**Note:** All part numbers are RoHS compliant. Tin-Lead parts are RoHS compliant through exemption for lead in press-fit connectors.



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## Z-PACK HM-Zd Connector (Continued)

### 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.

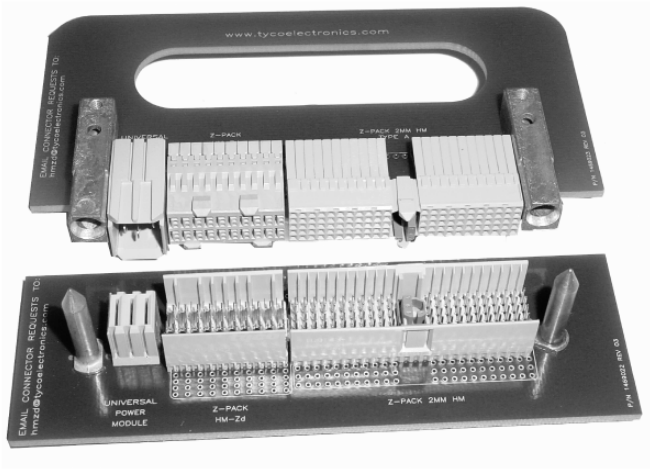
Both the headers and receptacle utilize Tyco Electronics ACTION PIN press-fit leads for ease of assembly onto printed circuit boards. Additionally, the vertical receptacle leads are polarized to allow only one orientation onto the printed circuit board, eliminating the possibility of reverse placement.

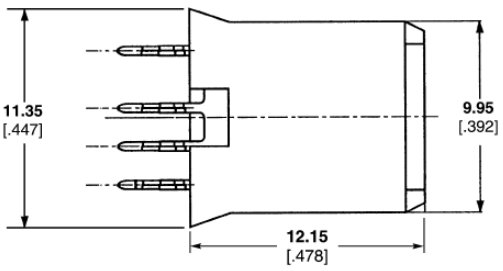
The Universal Power Module is compatible with a wide variety of other Tyco Electronics board-to-board connectors including Z-PACK HS3, Z-PACK HM-Zd and Z-PACK TinMan connectors.

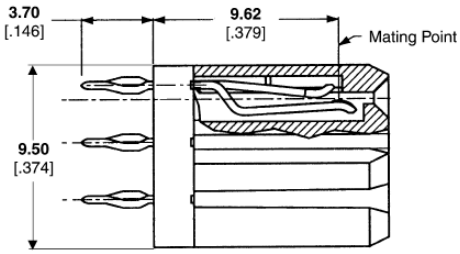
The housings are thermoplastic and the contacts are offered in either a standard or high current copper alloy. Contact finish is gold over nickel on the mating surfaces. The contacts are designed to carry 10 amperes per contact in standard assemblies and 15 amperes per contact in the high current assemblies.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

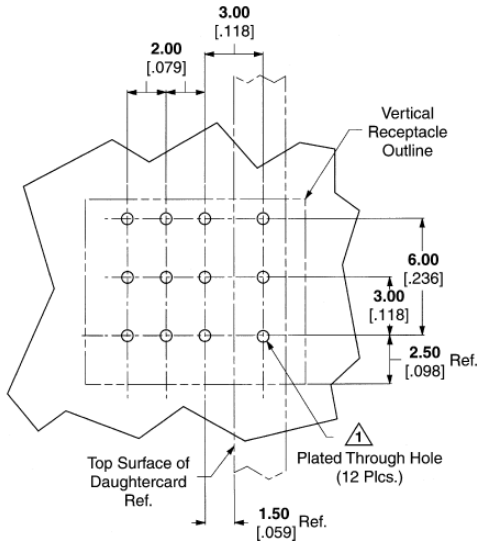
The right angle header contacts are available with sequenced lengths for "make-first/break-last" applications.

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.




**Recommended PC Board Hole Layout**

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

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 114-1103.

**Note:** All part numbers are RoHS compliant. Tin-Lead parts are RoHS compliant through exemption for lead in press-fit connectors.





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Japan: 81-44-844-8013
UK: 44-8706-080-208

## Z-PACK HM-Zd Connector (Continued)

### Power and Guide Hardware
(Continued)

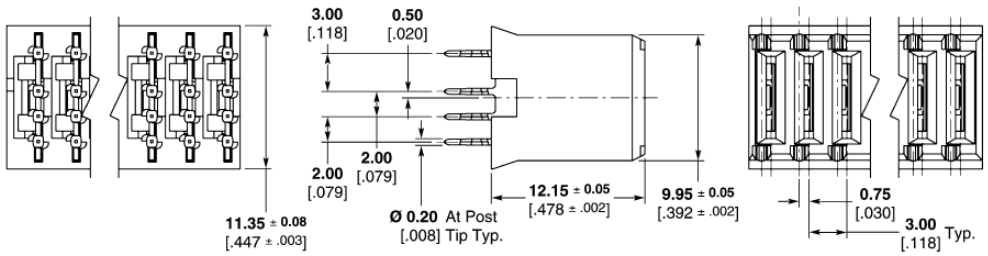
### Expanded Universal Power Module Vertical Receptacles

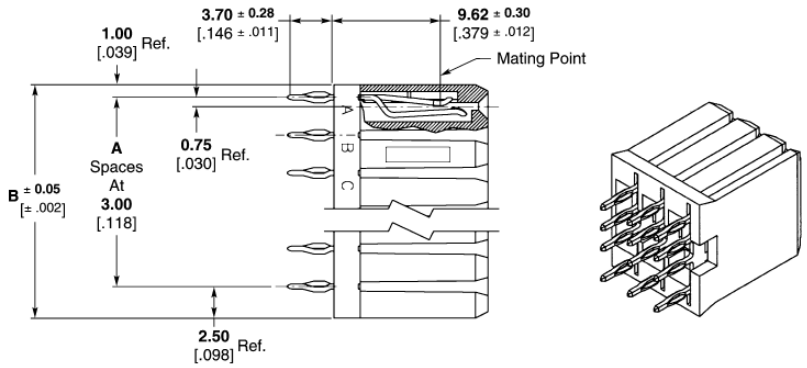
### Material and Finish
**Housing** — Polyester, gray
**Contact** — Copper alloy, plated 0.00127 [.000050] min. gold in mating area, 0.00050 [.000020] min. Tin-Lead on ACTION PIN product area, with entire contact underplated 0.00127 [.000050] min. nickel

### Related Product Data
**Guiding Hardware** (Optional) — pages 71-73

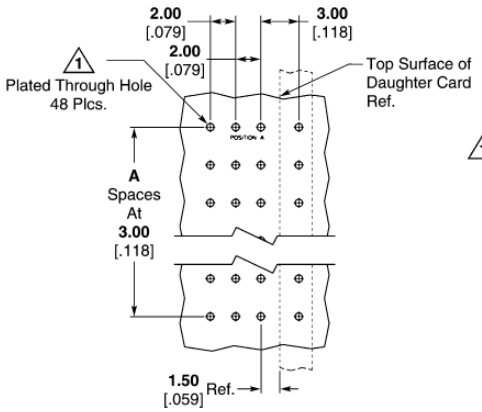
### Application Tooling
**Header**
Seating Tool, 224441-1
Board Support Fixture, 224442-1
**Receptacle**
Seating Tool, 224421-1
Board Support Fixture, 217602-1

### Technical Documents
**Product Specification**
108-1651
**Application Specification**
114-1103
**Tyco Electronics Instruction Sheet**
408-4169 (Receptacle Seating Tool 224421-1)






**Recommended PCB Hole Layout**

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 114-1103.

| Position | A | B Ref. | Standard *10A Part Number | High Current *15A Part Number |
|---|---|---|---|---|
| 4 | 3 | **12.50** .492 | 5223995-1 | 120953-1 |
| 5 | 4 | **15.50** .610 | 5223995-2 | 120953-2 |
| 6 | 5 | **18.50** .728 | 5223995-3 | 120953-3 |
| 7 | 6 | **21.50** .846 | 5223995-4 | 120953-4 |
| 8 | 7 | **24.50** .965 | 5223995-5 | 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.**

**Note:** All part numbers are RoHS compliant. Tin-Lead parts are RoHS compliant through exemption for lead in press-fit connectors.



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UK: 44-8706-080-208

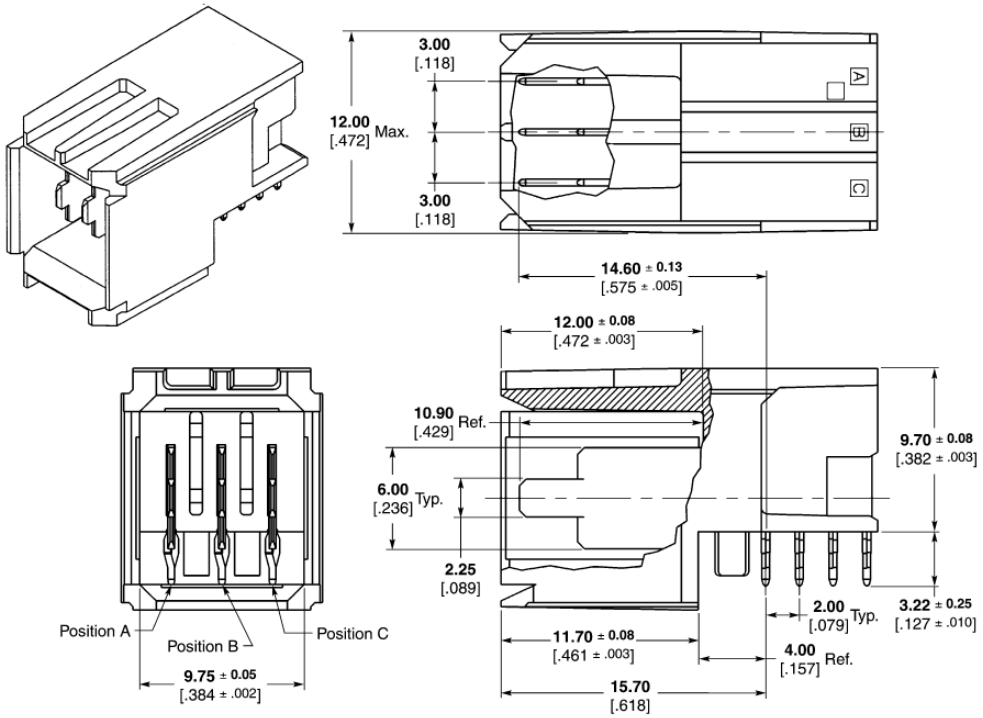
## Z-PACK HM-Zd Connector (Continued)

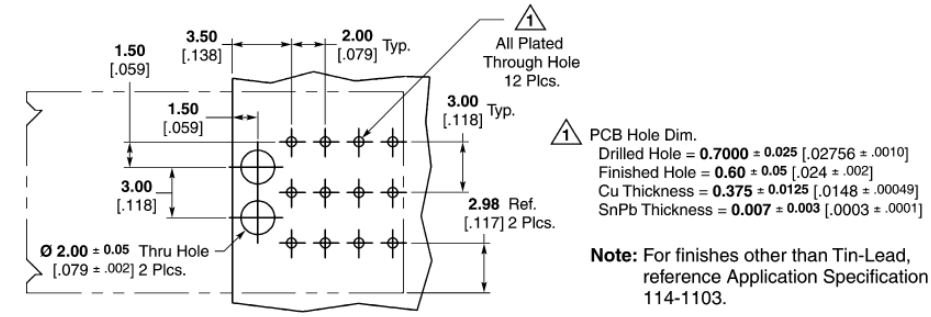
### Power and Guide Hardware
(Continued)

### 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




**Note:** For finishes other than Tin-Lead, reference Application Specification 114-1103.

**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] | 5223961-1 | 5-5223961-1 |
| **10.90** [.429] | **9.30** [.366] | **10.90** [.429] | 5223962-1 | — |
| **10.90** [.429] | **9.30** [.366] | **9.30** [.366] | 5223968-1 | — |
| **10.90** [.429] | **7.68** [.302] | **10.90** [.429] | 5223972-1 | — |
| **10.90** [.429] | **7.68** [.302] | **9.30** [.366] | 5223971-1 | — |
| **10.90** [.429] | **7.68** [.302] | **7.68** [.302] | 5223970-1 | — |
| **9.30** [.429] | **10.90** [.429] | **9.30** [.366] | 5223963-1 | — |
| **9.30** [.366] | **10.90** [.429] | **7.68** [.302] | 5223964-1 | — |
| **9.30** [.366] | **9.30** [.366] | **9.30** [.366] | 5223967-1 | — |
| **9.30** [.366] | — | **9.30** [.366] | 5223975-1 | — |
| **9.30** [.366] | **9.30** [.366] | **7.68** [.302] | 5223981-1 | — |
| **9.30** [.366] | **7.68** [.302] | **9.30** [.366] | 5223965-1 | — |
| **7.68** [.302] | **9.30** [.366] | **7.68** [.302] | 5223983-1 | — |
| **7.68** [.302] | **7.68** [.302] | **9.30** [.366] | 5223980-1 | — |
| **7.68** [.302] | **7.68** [.302] | **7.68** [.302] | 5223974-1 | 5-5223974-1 |

*Reference Product Specification 108-1651.

**Note:** All part numbers are RoHS compliant. Tin-Lead parts are RoHS compliant through exemption for lead in press-fit connectors.

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





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## Z-PACK HM-Zd Connector (Continued)

### 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 product area, with entire contact underplated 0.00127 [.000050] min. nickel

### Related Product Data
**Guiding Hardware** (Optional) — pages 71-73

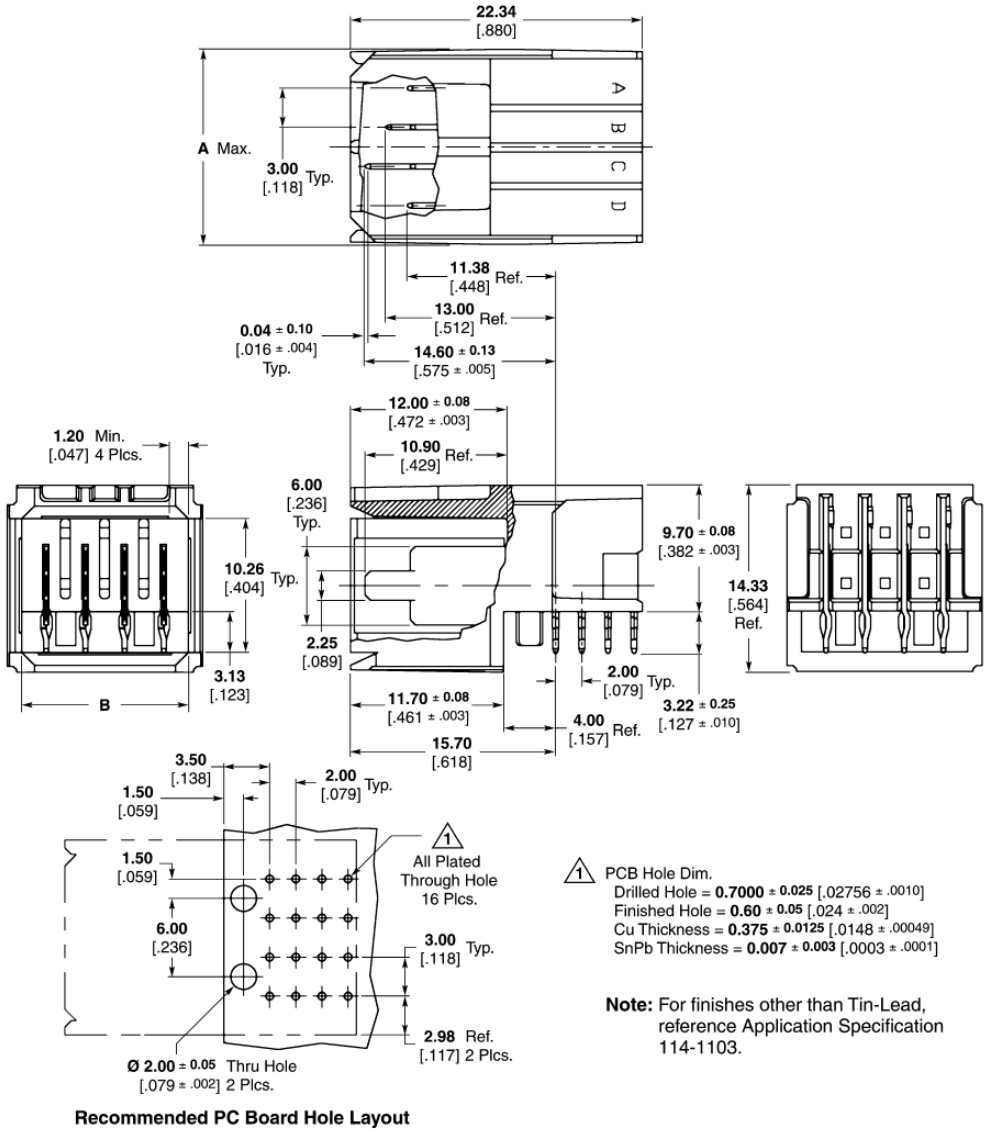
### Application Tooling
**Header**
Seating Tool, 224441-1
Board Support Fixture, 224442-1

**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)




**Recommended PC Board Hole Layout**

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 114-1103.

| Positions | Dimensions A | Dimensions B | Standard *10A Base Part Number[1] | High Current *15A Base Part Number[1] |
|---|---|---|---|---|
| 4 | **15.00** .591 | **12.75** .502 | 5646954 | 120954 |
| 5 | **18.00** .709 | **15.75** .620 | 5646955 | 120955 |
| 6 | **21.00** .827 | **18.75** .738 | 5646956 | 120956 |
| 7 | **24.00** .945 | **21.75** .856 | 5646957 | 120957 |
| 8 | **27.00** 1.063 | **24.75** .974 | 5646958 | 120958 |

[1] Dash number indicates sequence pattern. See customer drawing for specific dash numbers.
*Reference Product Specification 108-1651.

**Note:** All part numbers are RoHS compliant. Tin-Lead parts are RoHS compliant through exemption for lead in press-fit connectors.

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



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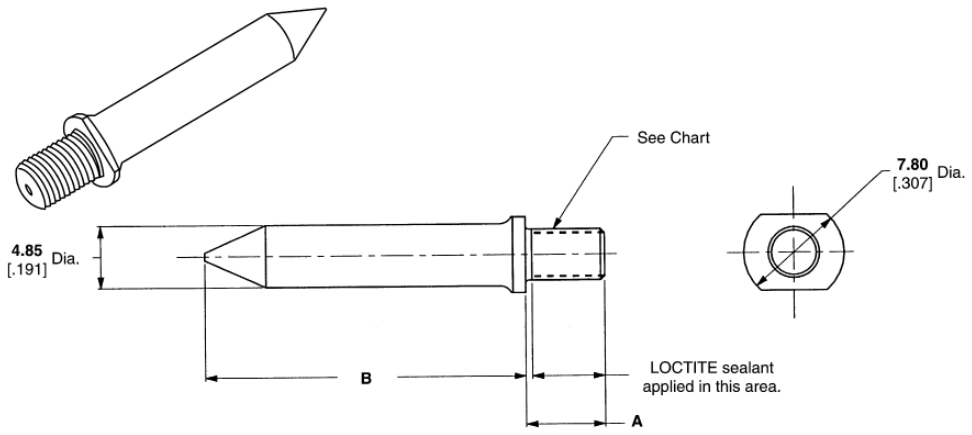
## Z-PACK HM-Zd Connector (Continued)

### Power and Guide Hardware
(Continued)

### Guide Pin (Unkeyed)

### Material and Finish
**Guide Pin** — Passivated stainless steel
**Part Number 223956-1**




| Dimension A | Dimension B | Thread | Part Numbers |
|---|---|---|---|
| **7.50** [.295] | **24.73** [.974] | M4 x 7-6g | 223982-1 [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** [2] [.150] | **27.16** [1.069] | M4 x 7-6h | 120646-1 |
| **2.00** [2] [.079] | **27.16** [1.069] | M3 x 0.5 | 223988-1 |

[1] 6.35 Hex Base.
[2] Internal Thread.

### Female Guide Module (Unkeyed)

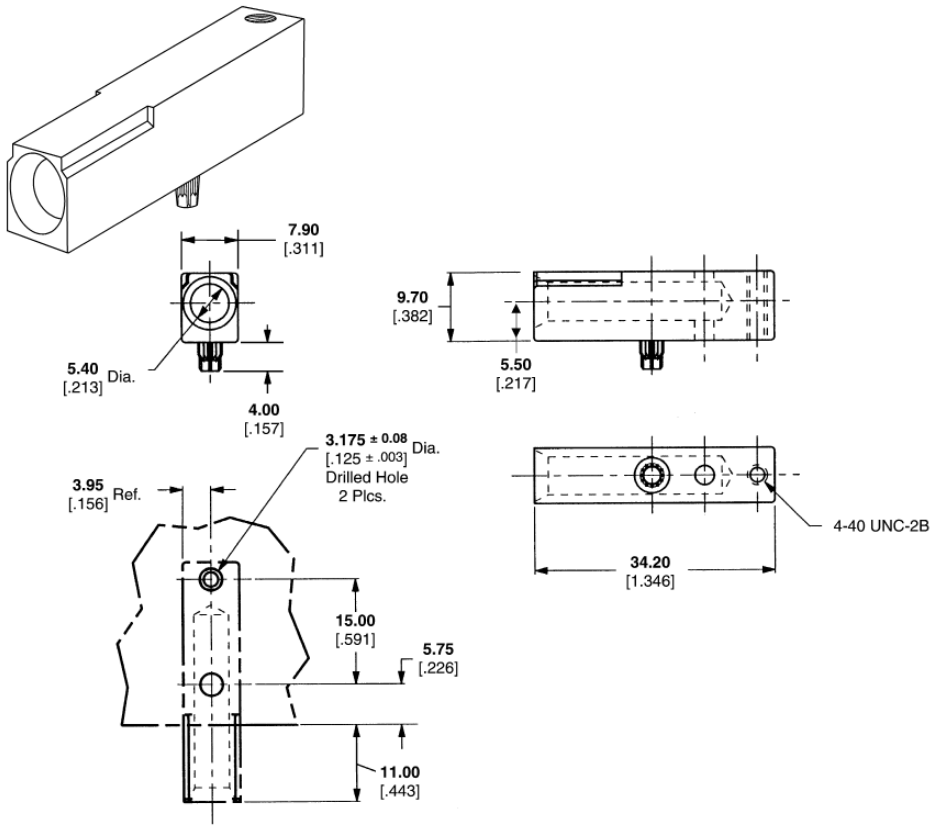
### Material and Finish
**Guide Module** — Zinc alloy, chromate conversion coated

### 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.

**Note:** All part numbers are RoHS compliant.




**Recommended PC Board Hole Layout**





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## Z-PACK HM-Zd Connector (Continued)

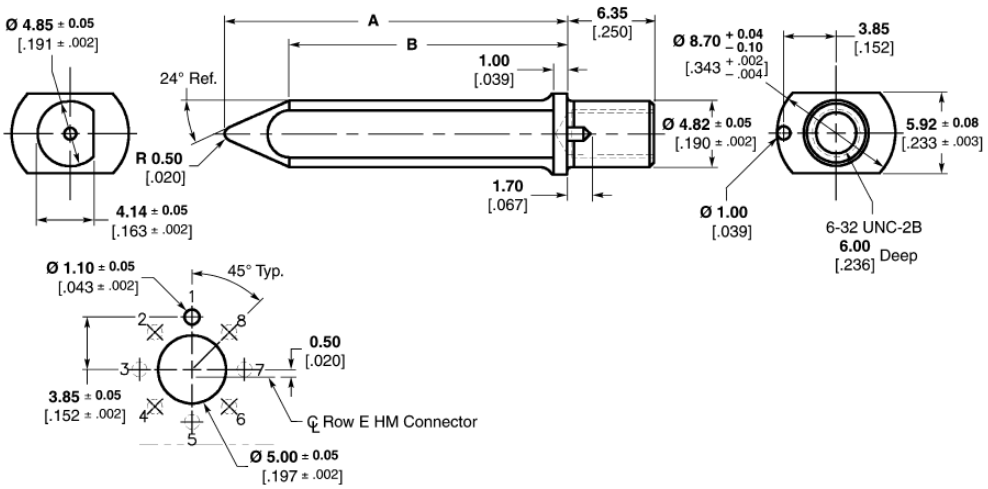
### Power and Guide Hardware
(Continued)

### Guide Pin (Keyed)

### Material and Finish
**Guide Pin** — Zinc alloy, chromate conversion coated

**Part Number 223985**

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







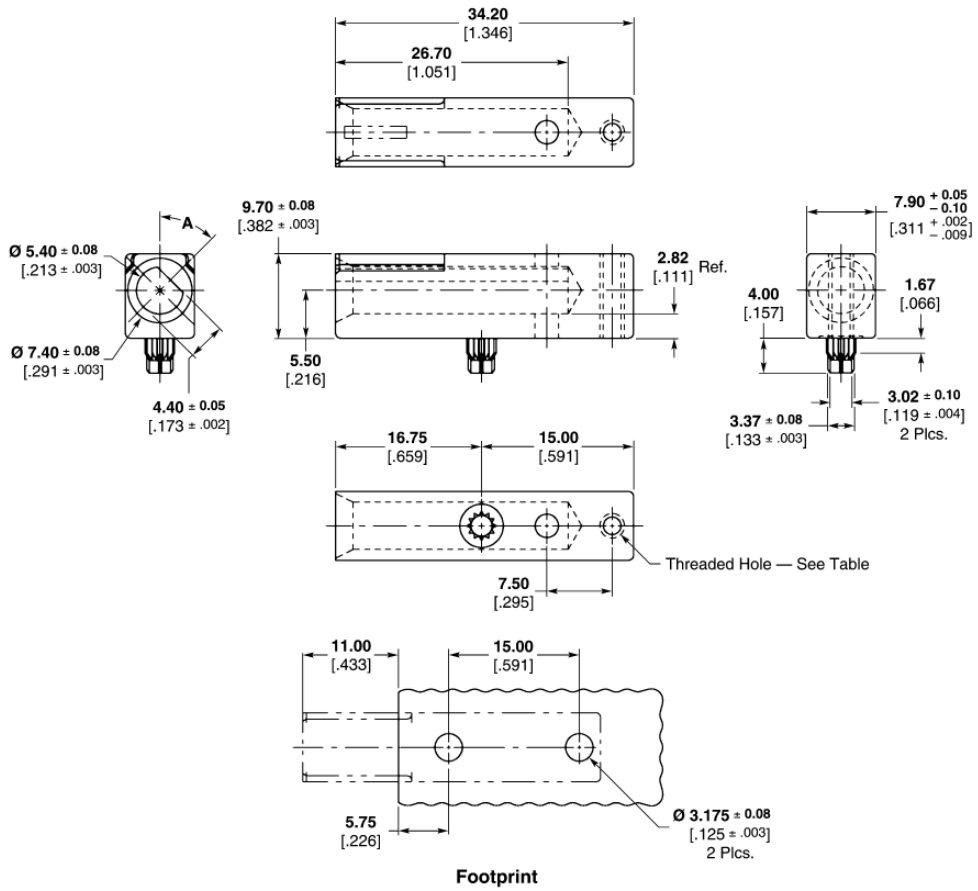
**Recommended PC Board Layout (Position Shown Used with Part Number 5223986-1)**

### Female Guide Module (Keyed)

### Material and Finish
**Guide Module** — Zinc alloy, chromate conversion coated

**Part Number 5223986**

| Dim. A | Thread | Part Number |
|---|---|---|
| 0° | 4-40 | 5223986-1 |
| 45° | 4-40 | 5223986-2 |
| 90° | 4-40 | 5223986-3 |
| 135° | 4-40 | 5223986-4 |
| 180° | 4-40 | 5223986-5 |
| 225° | 4-40 | 5223986-6 |
| 270° | 4-40 | 5223986-7 |
| 315° | 4-40 | 5223986-8 |
| 0° | M2.6 | 5120913-1 |
| 45° | M2.6 | 5120913-2 |
| 90° | M2.6 | 5120913-3 |
| 135° | M2.6 | 5120913-4 |
| 180° | M2.6 | 5120913-5 |
| 225° | M2.6 | 5120913-6 |
| 270° | M2.6 | 5120913-7 |
| 315° | M2.6 | 5120913-8 |




**Footprint**

**Note:** All part numbers are RoHS compliant.



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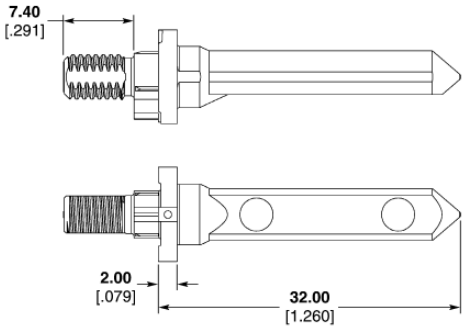
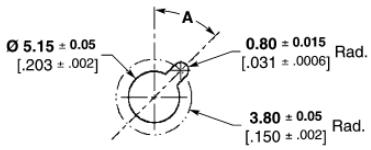
UK: 44-8706-080-208

## Z-PACK HM-Zd Connector (Continued)

### Power and Guide Hardware
(Continued)

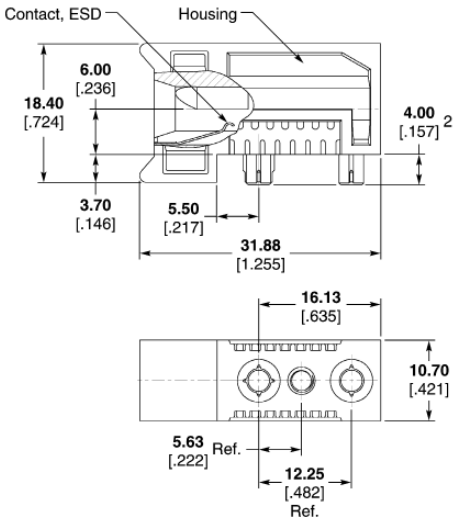


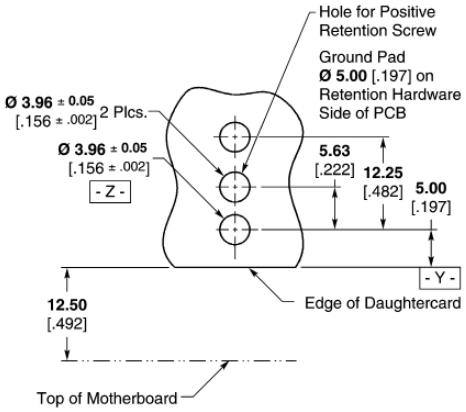

1-1410773-1 Series




PCB Layout for Guidepost

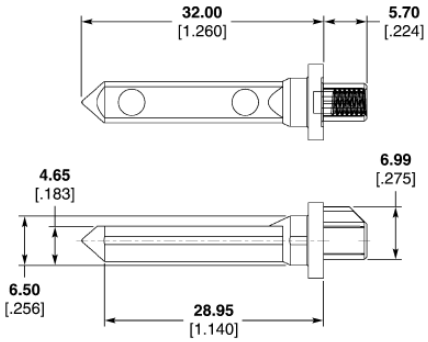
**Note:** Key hole orientation (Dim. A) per mating guide module Part Number table (Orientation shown on PCB layout is for Part Number 1-1410297-2).

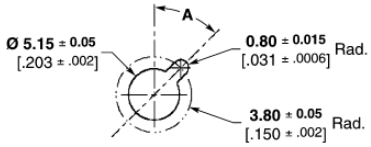



PCB Layout
Connector Side

1-1410297 Series




PCB Layout for Guidepost

**Note:** Key hole orientation (Dim. A) per mating guide module Part Number table (Orientation shown on PCB layout is for Part Number 1-1410297-2).

1410548 Series

### MULTIGIG RT Product Guide Modules

| Description | Part Number |
|---|---|
| Keyed/ESD Guide Module Assembly, Daughtercard* | 1-1410297-X |
| Keyed Guide Pin, Backplane** | 1-1410773-X |
| Keyed Guide Pin, Backplane** | 1410548-X |

* See customer drawing for specific keying options.
** Internal and external threaded versions available, see customer drawings for available options.

**Note:** All part numbers are RoHS compliant.





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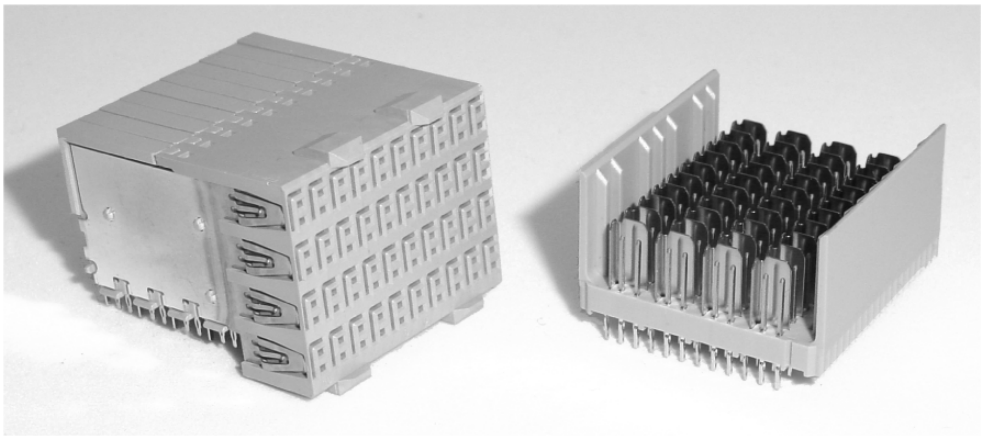
## Z-PACK HM-Zd Connector (Continued)

### AdvancedTCA Connectors

### AdvancedTCA Zone 2

**Front Board Connector**
**4 Pair Right Angle Receptacle**
**Part Number 6469001-1**
**See page 57 for more details**

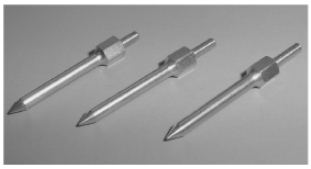
**Backplane Connector**
**4 Pair Vertical Header**
**Part Number 6469002-1**
**See page 61 for more details**



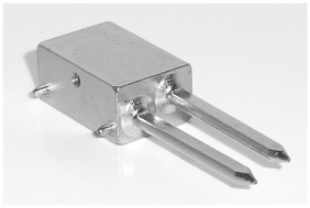
Front Board Connector | Backplane Connector

### AdvancedTCA Product Guide/Keying Modules

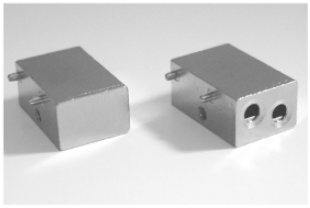
The AdvancedTCA Guide Modules can be used in a wide variety of applications. For *motherboard-to-daughtercard applications* the vertical pin and right angle socket are used. This popular configuration is further supported by our wide offering of available keying positions. Each of the two keyed guide 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.



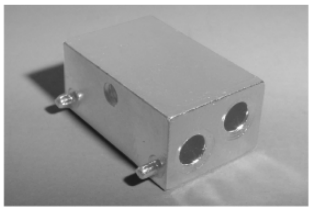
rA1



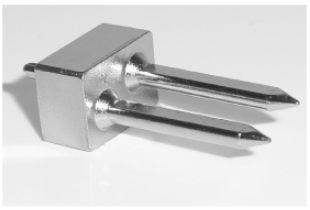
A2 (RTM)



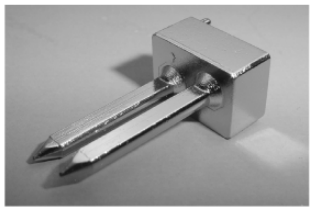
K1/K2



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 | Midplane | Vertical Male, Keyed, Long | 1-1469388-1 |

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**Note:** All part numbers are RoHS compliant.



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## Z-PACK HM-Zd Connector (Continued)

### AdvancedTCA Power Connectors (Zone 1)

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

#### Material and Finish

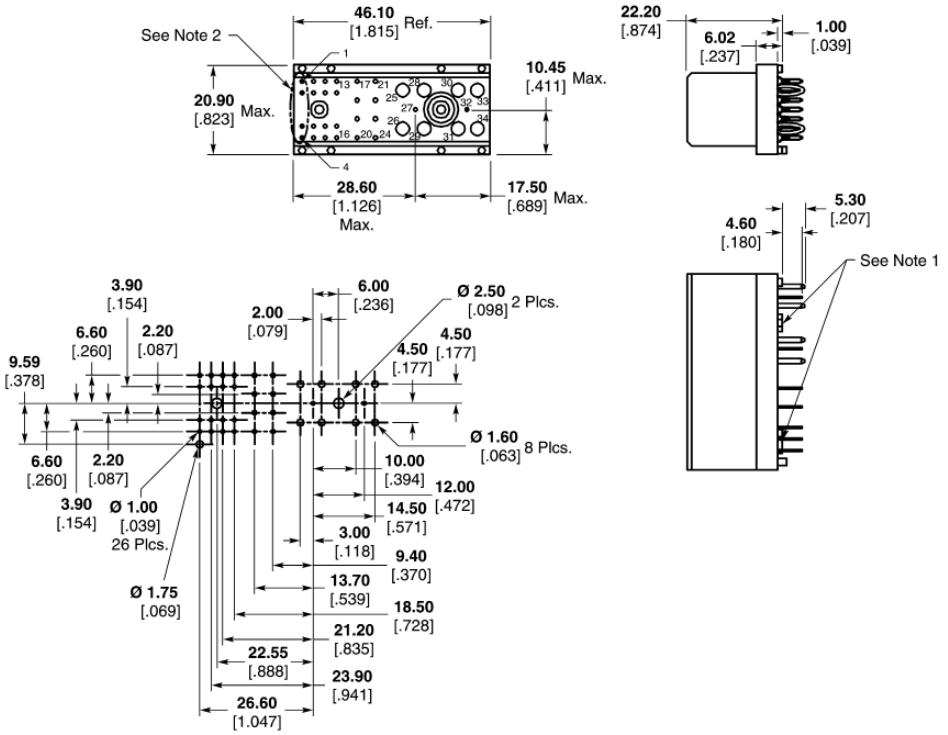
**Insulators** — Thermoplastic, glass reinforced, black, UL94V-0

**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:**
1. Mounting Holes (Ø2.00 [.079] x 5.00 [.197] DP) for use with self tapping screw (customer supplied).
2. Positions 1–4 not populated and reserved for future use.




**Printed Circuit Layout**

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

#### Material and Finish

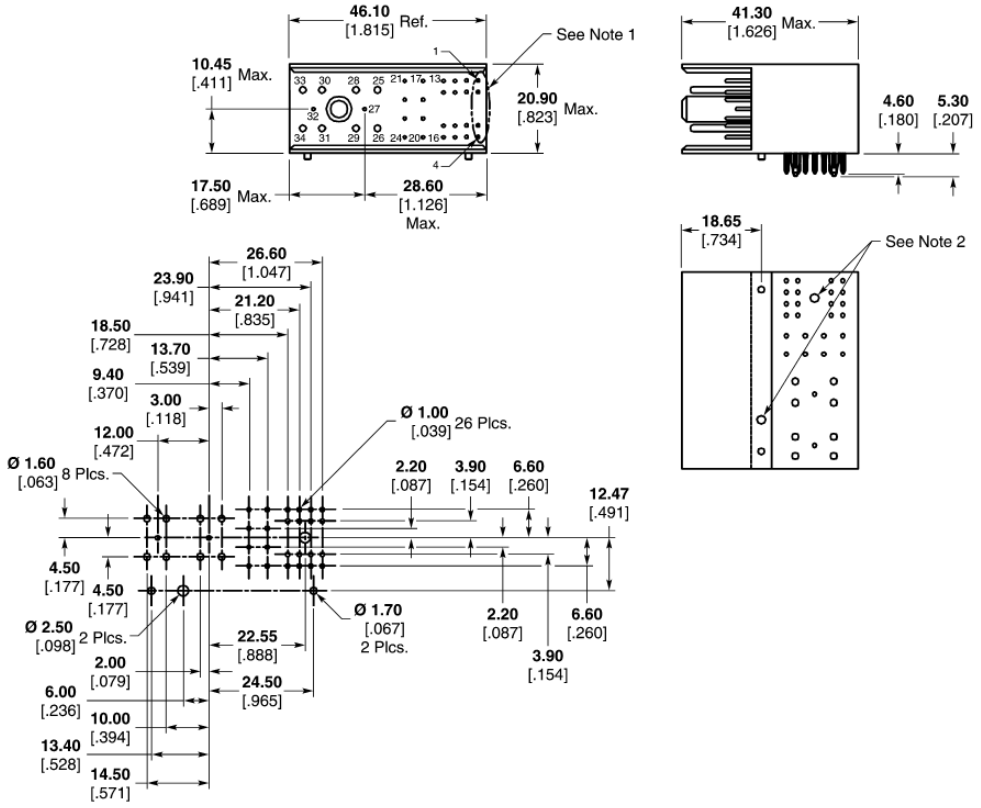
**Insulators** — Thermoplastic, glass reinforced, black, UL94V-0

**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:**
1. Mounting Holes (Ø 2.00 [.079] x 5.00 [.197] DP) for use with self tapping screw (customer supplied).
2. Positions 1–4 not populated and reserved for future use.




**Printed Circuit Layout**

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**Note:** All part numbers are RoHS compliant.





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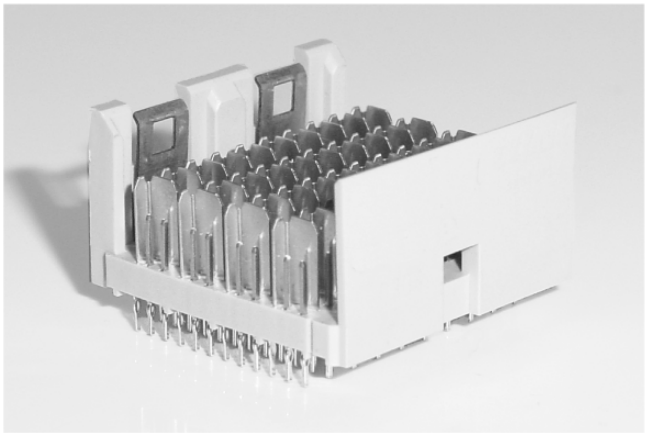
## Z-PACK HM-Zd Connector (Continued)

### Vertical Pin Headers for Cable Assemblies

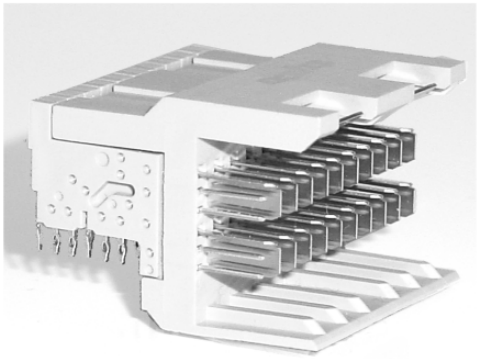


Note: 4 Pair Shown Above

| Pair Count | Part Number | Tail Length | Mating Pin Length | Column Count | Module Length | Signals | Grounds | Application Tooling[2] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Insertion | Repair | | |
| | | | | | | | | Pin Header | Pin Removal | Housing Removal | Pin Insertion |
| 4 | 6469105-1[1] | **2.50** .098 | **5.30** .209 | 10 | **25.00** .984 | 80 | 40 | 91373-1 | 1583237-1 | 1725635-1 | 1583255-1 |
| 4 | 6469124-1[1] | **1.80** .071 | **5.30** .209 | 10 | **25.00** .984 | 80 | 40 | 91373-1 | 1583237-1 | 1725635-1 | 1583255-1 |
| 2 | 6469106-1[1] | **2.50** .098 | **5.30** .209 | 10 | **25.00** .984 | 40 | 20 | 91372-1 | 1583237-1 | 1804170-1 | 1583255-1 |
| 2 | 6469125-1[1] | **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 93 for Instruction Sheet Number.
For PCB Layout, see page 61-63.

### Right Angle Pin Headers for Cable Assemblies



Note: 2 Pair Shown Above

| Pair Count | Part Number | Tail Length | Mating Pin Length | Column Count | Module Length | Signals | Grounds | Application Tooling[2] | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Insertion | Repair | |
| | | | | | | | | Pin Header | Housing Removal | Chiclet Removal |
| 4 | 6469668-1[1] | **2.20** .087 | **5.30** .209 | 10 | **25.00** .984 | 80 | 40 | 1804244-1 | 1804239-1 | 1804177-1 |
| 2 | 6469354-1[1] | **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 93 for Instruction Sheet Number.
For PCB Layout, see pages 64-66.

**Note:** All part numbers are RoHS compliant.



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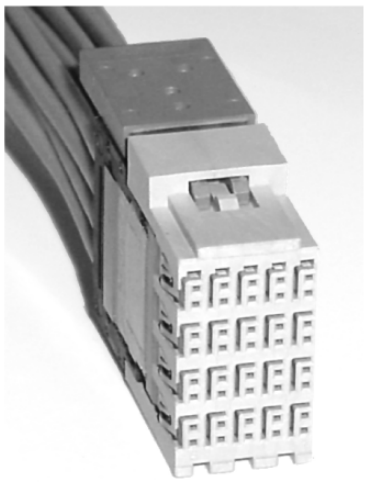
UK: 44-8706-080-208

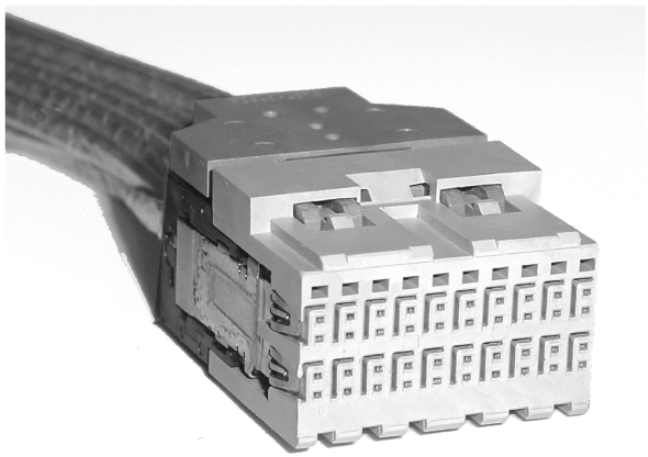
## Z-PACK HM-Zd Connector (Continued)

### 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.

### 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.





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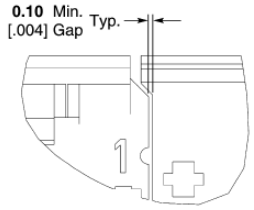
## Z-PACK HM-Zd Connector (Continued)

### Recommended Printed Circuit Board Layouts

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

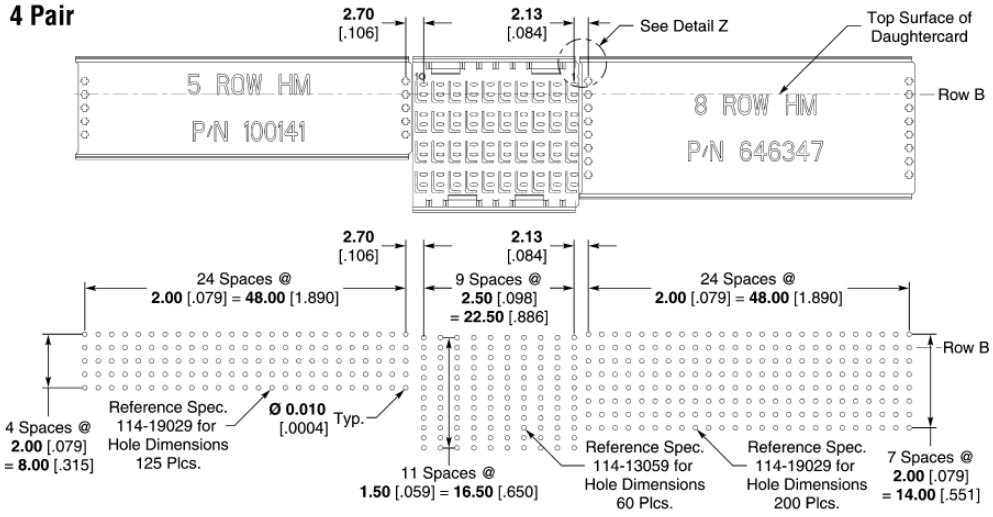



Detail Z

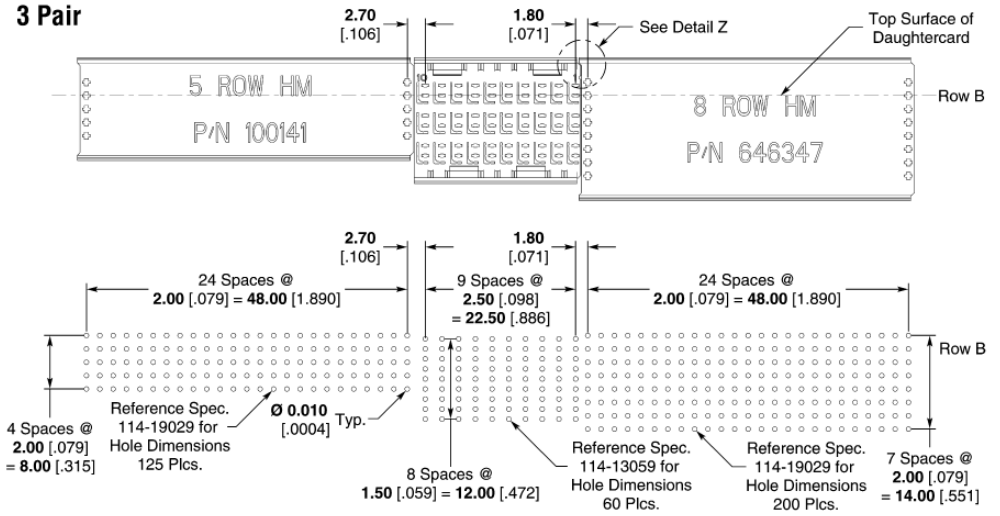
**Note:**

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

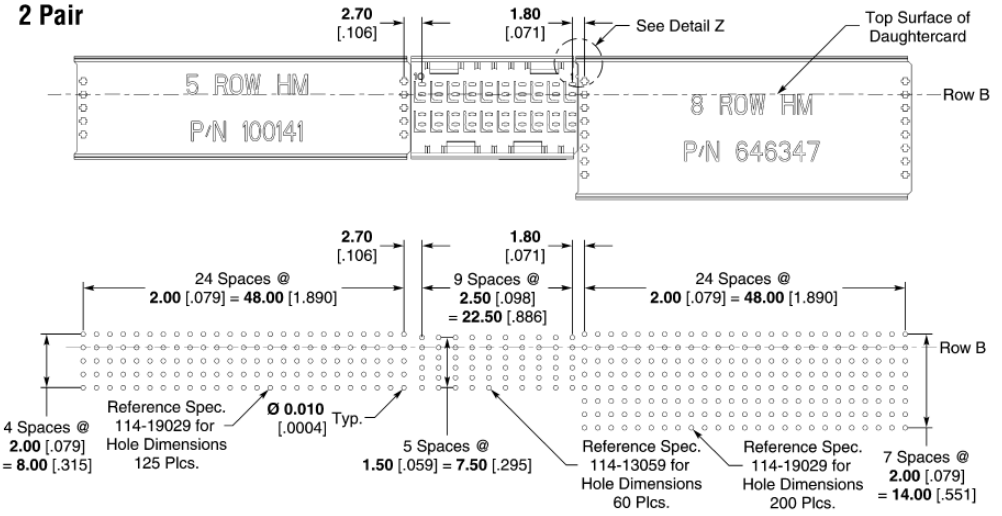
**4 Pair**




**3 Pair**




**2 Pair**



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## Z-PACK HM-Zd Connector (Continued)

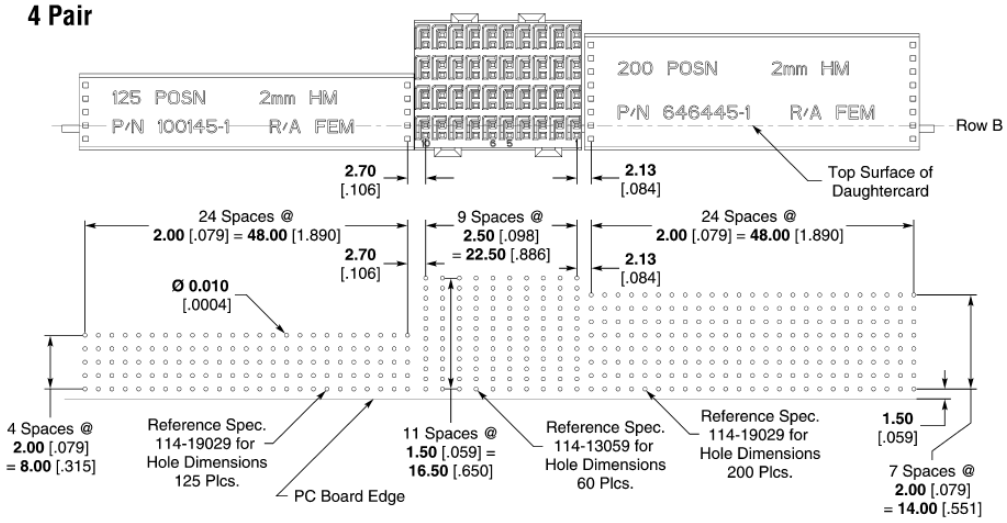
### Recommended Printed Circuit Board Layouts
(Continued)

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

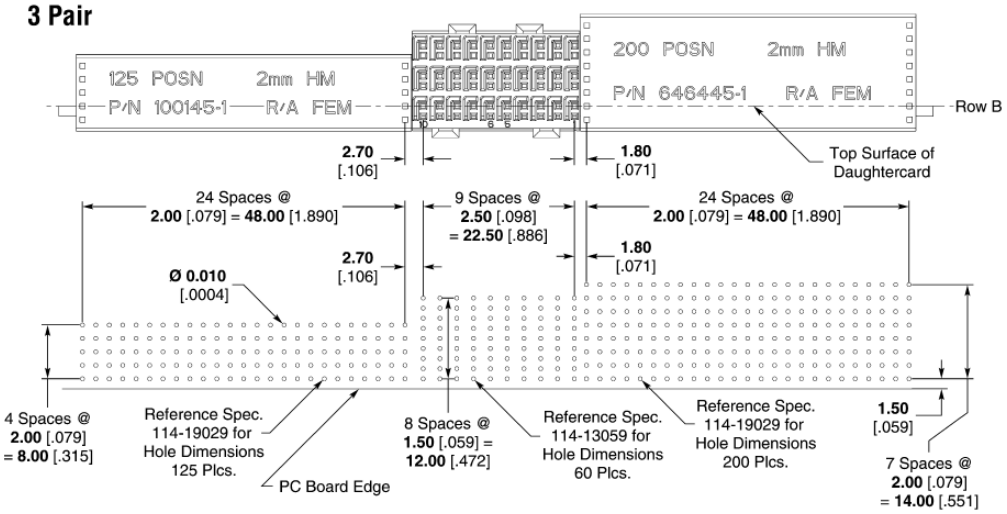
**Note:**

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

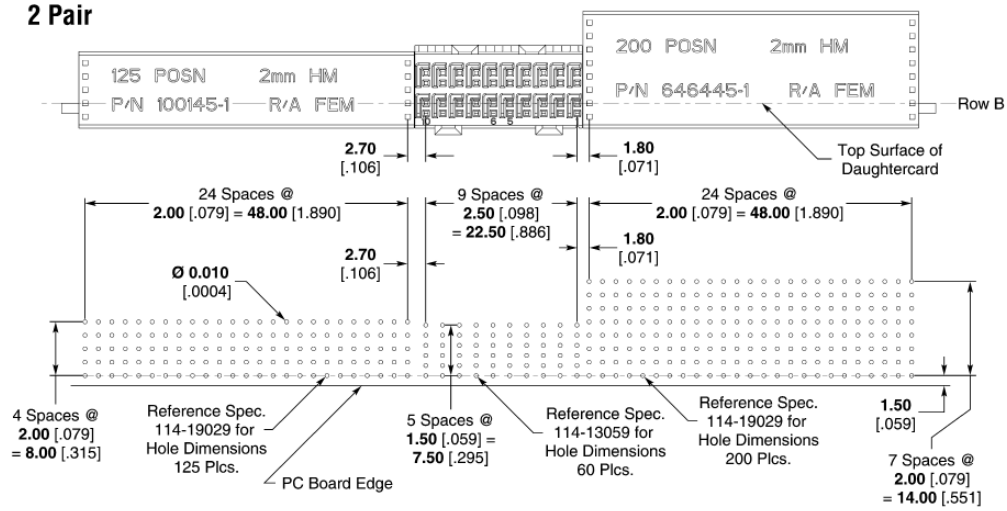
#### 4 Pair




#### 3 Pair




#### 2 Pair





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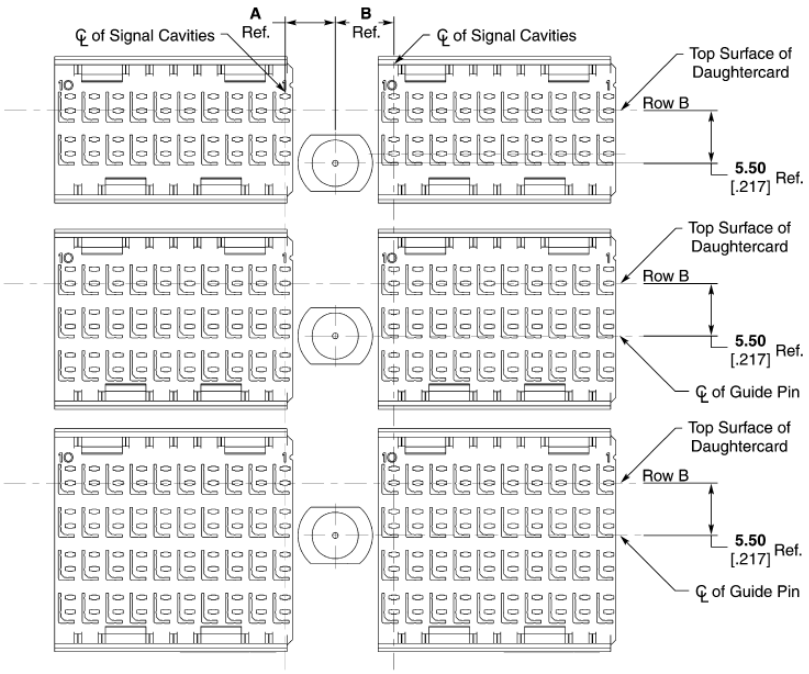
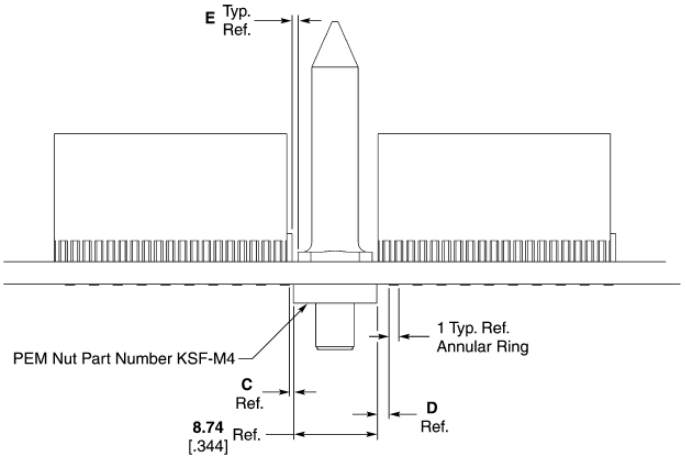
## Z-PACK HM-Zd Connector (Continued)

### 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.

| Dimension | | | | | Part Number |
|---|---|---|---|---|---|
| A | B | C | D | E | |
| **5.25**<br>.207 | **6.15**<br>.242 | **0.40**<br>.016 | **1.30**<br>.051 | **0.60**<br>.024 | 223956 |
| **5.52**<br>.217 | **6.42**<br>.253 | **0.65**<br>.026 | **1.55**<br>.061 | **0.42**<br>.017 | 5223985 |

**Note:** All part numbers are RoHS compliant.



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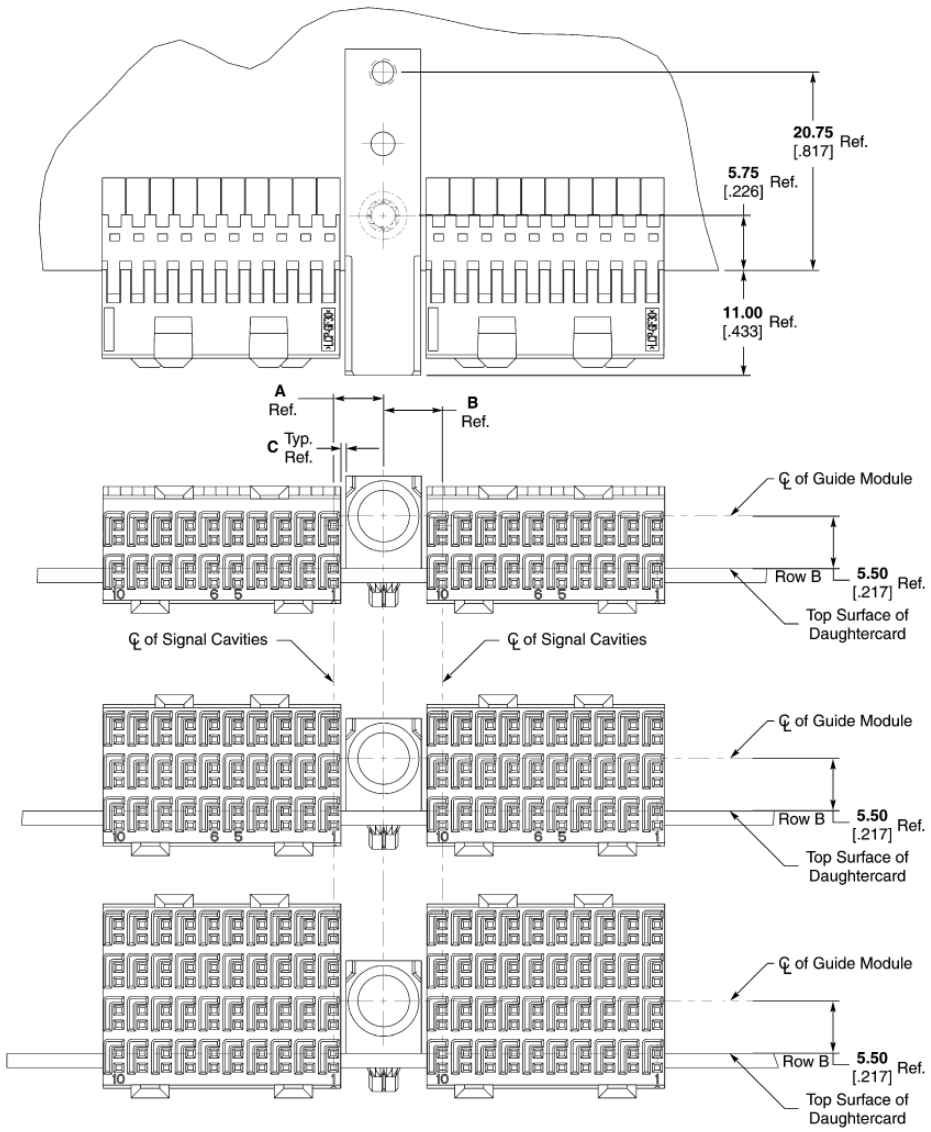
C. America: 52-55-1106-0803

South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-8706-080-208

## Z-PACK HM-Zd Connector (Continued)

### 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 | 5223957 |
| **5.52** .217 | **6.42** .253 | **0.83** .033 | 5223986 |

**Note:** All part numbers are RoHS compliant.





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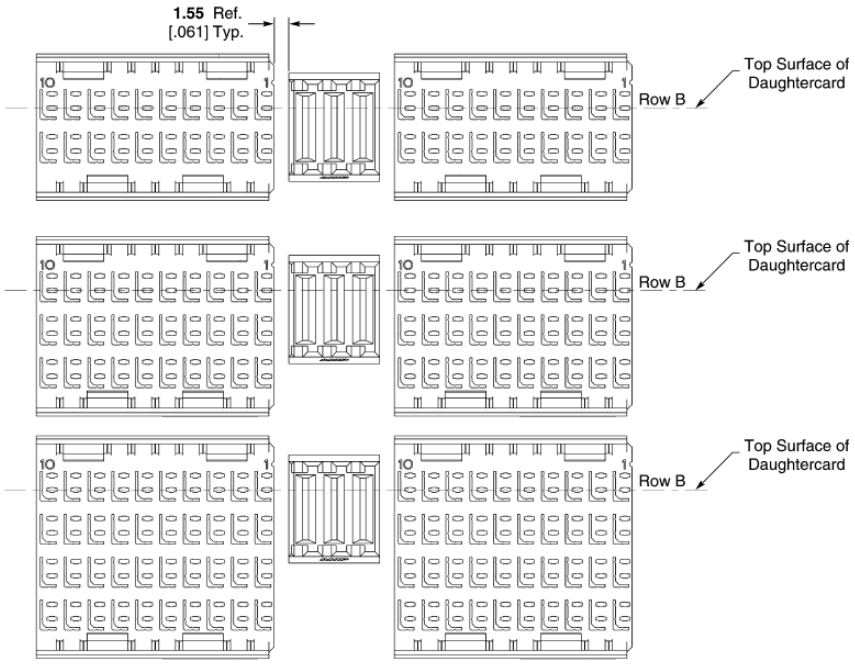
## Z-PACK HM-Zd Connector (Continued)

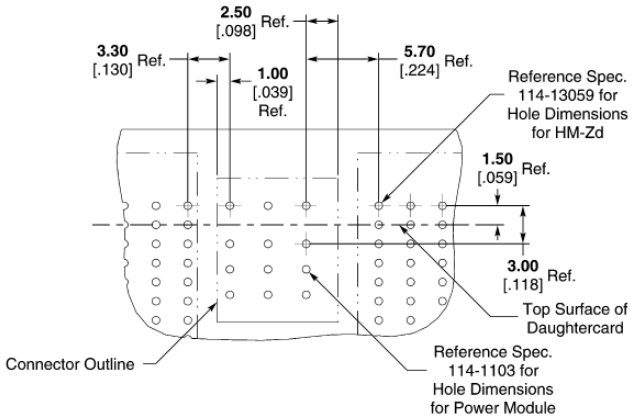
### Recommended Printed Circuit Board Layouts
(Continued)

#### 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.




**Recommended PC Board Layout**
**Component Side**



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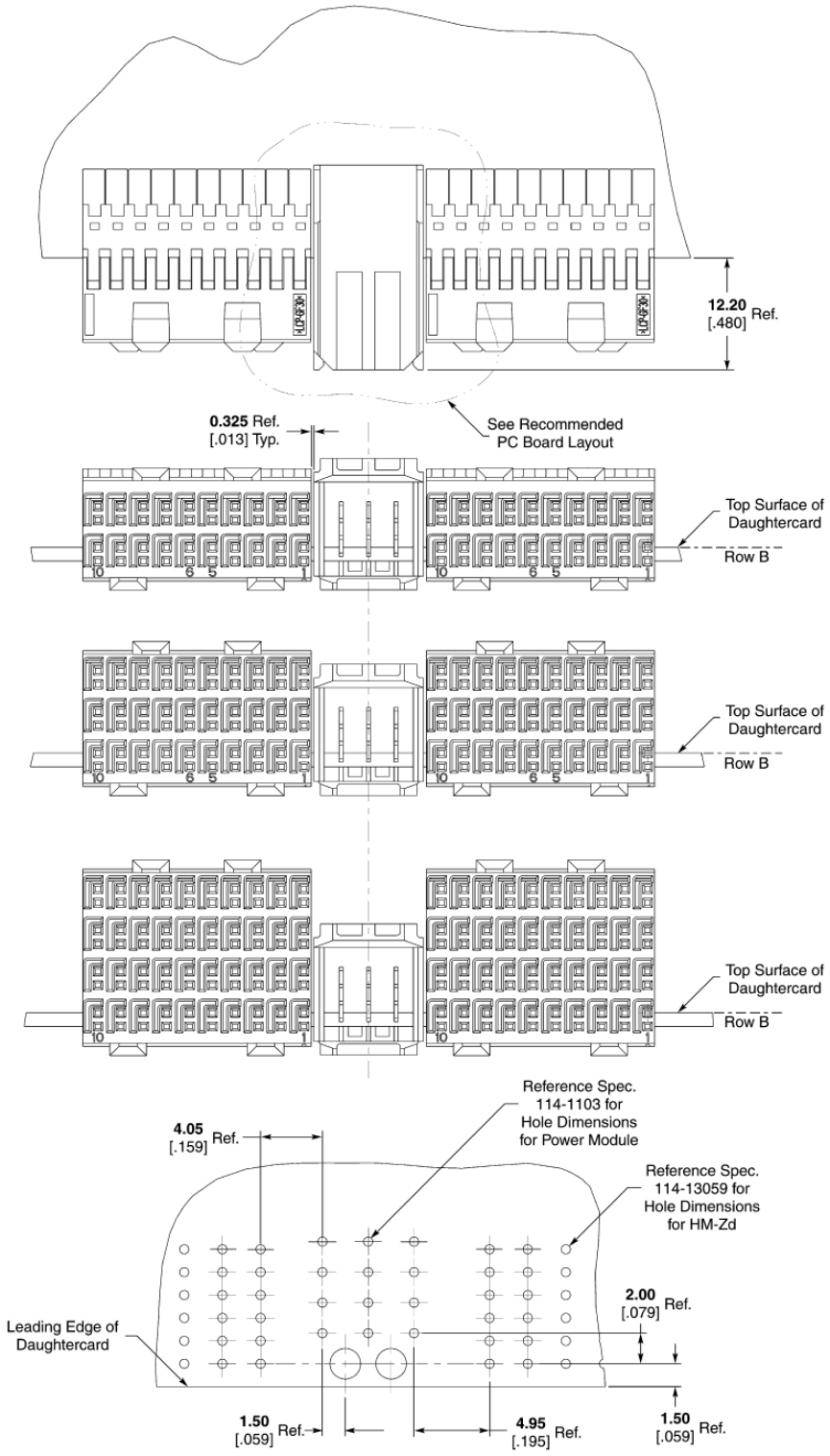
## Z-PACK HM-Zd Connector (Continued)

### 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.




**Recommended PC Board Layout**
**Component Side**





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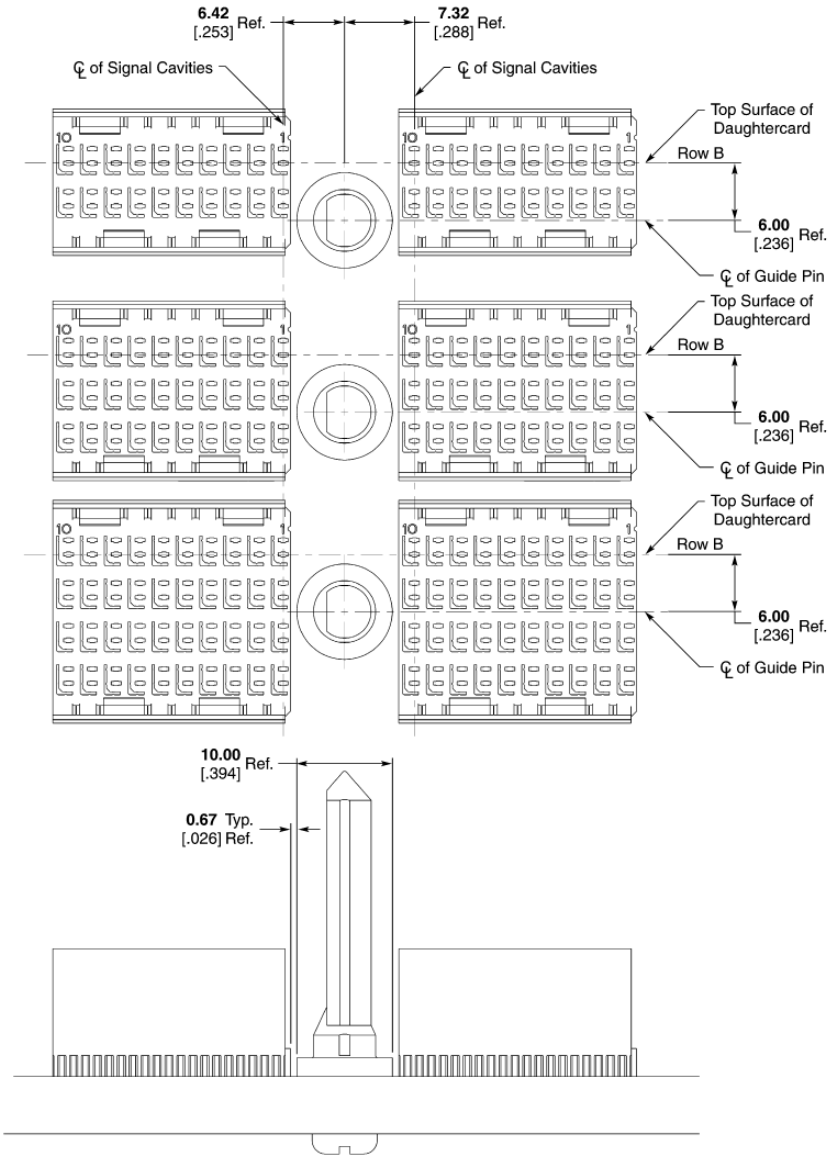
## Z-PACK HM-Zd Connector (Continued)

### Recommended Printed Circuit Board Layouts
(Continued)

#### Z-PACK HM-Zd Backplane Connector and MULTIGIG RT Connector Guide Modules




**Note:**

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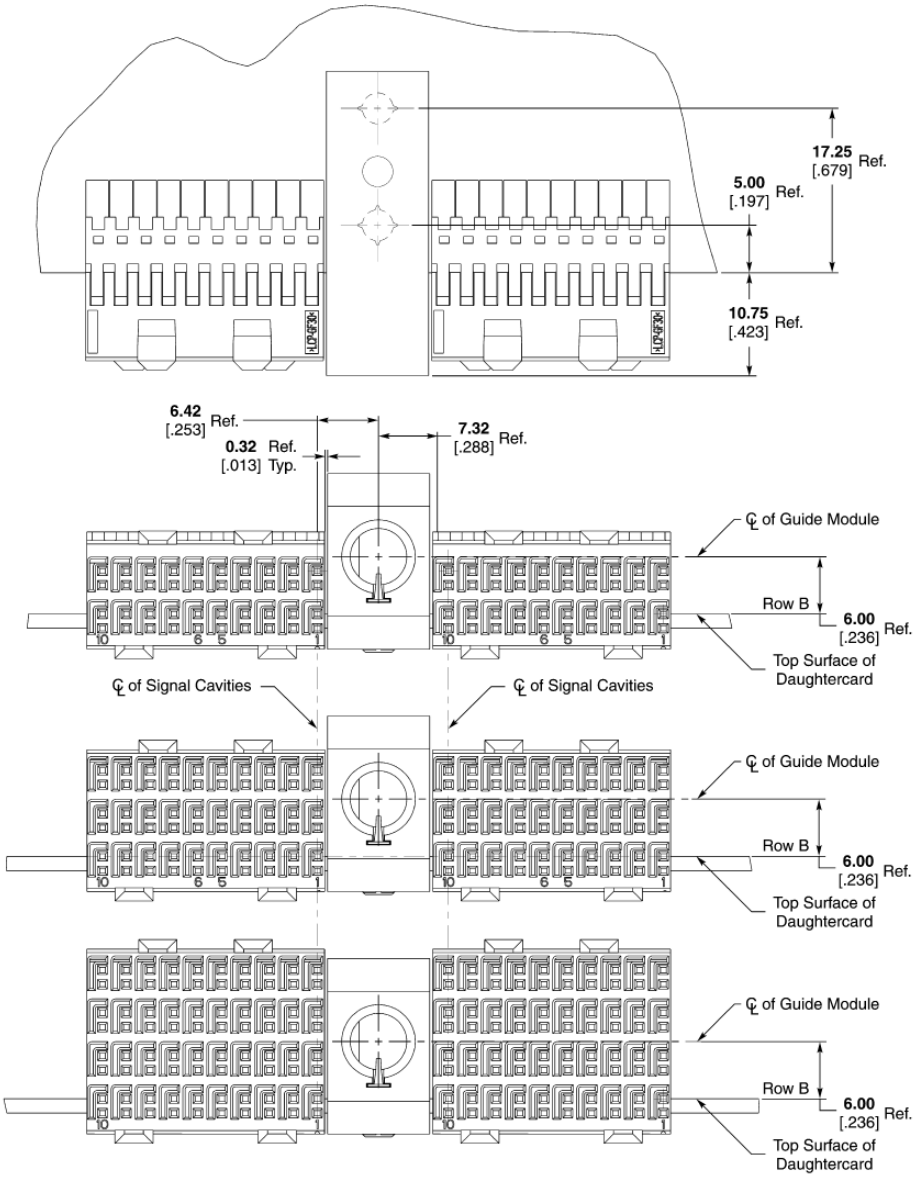
## Z-PACK HM-Zd Connector (Continued)

### Recommended Printed Circuit Board Layouts
(Continued)

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




**Note:**

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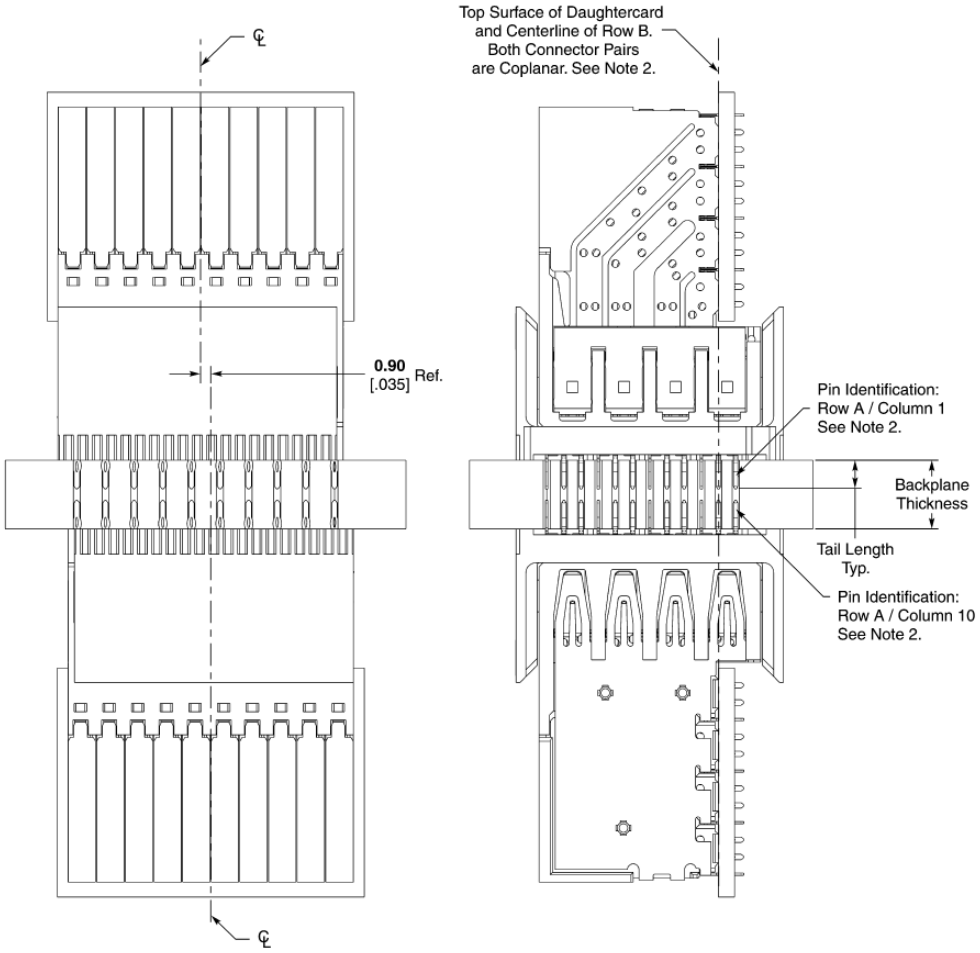
## Z-PACK HM-Zd Connector (Continued)

### Recommended Printed Circuit Board Layouts
(Continued)

### Z-PACK HM-Zd Connector Recommended Midplane 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.

| Tail Length | Min. Recommended Backplane Thickness |
|---|---|
| **1.80**<br>.071 | **4.00**<br>.157 |
| **2.50**<br>.098 | **5.40**<br>.213 |



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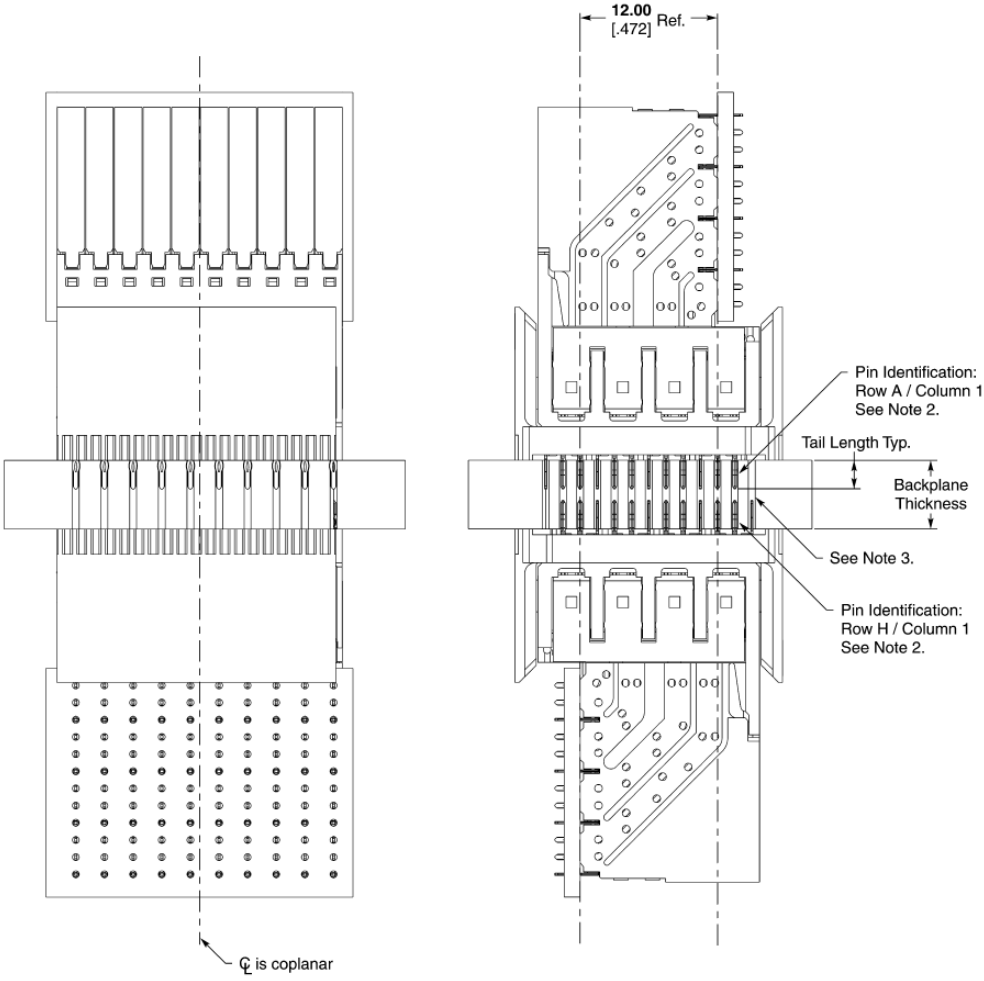
## Z-PACK HM-Zd Connector (Continued)

### Recommended Printed Circuit Board Layouts
(Continued)

**Z-PACK HM-Zd Connector Recommended Midplane 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.**

| Tail Length | Min. Recommended Backplane Thickness |
|---|---|
| **1.80**<br>.071 | **4.00**<br>.157 |
| **2.50**<br>.098 | **5.40**<br>.213 |





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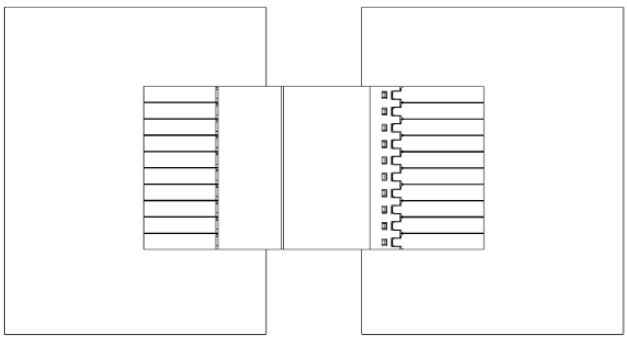
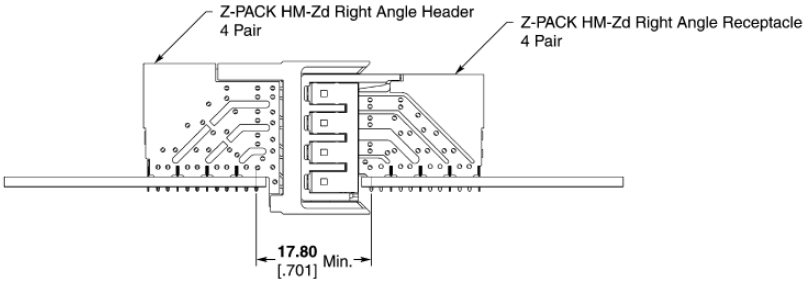
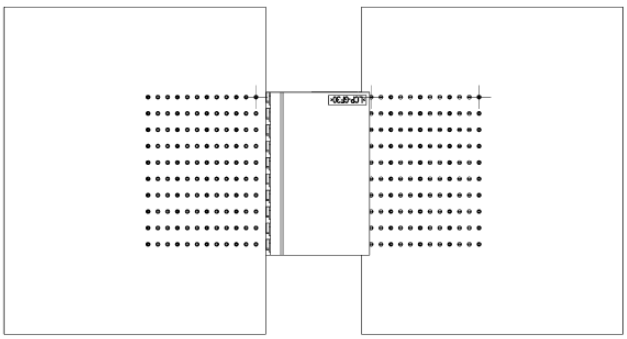
## Z-PACK HM-Zd Connector (Continued)

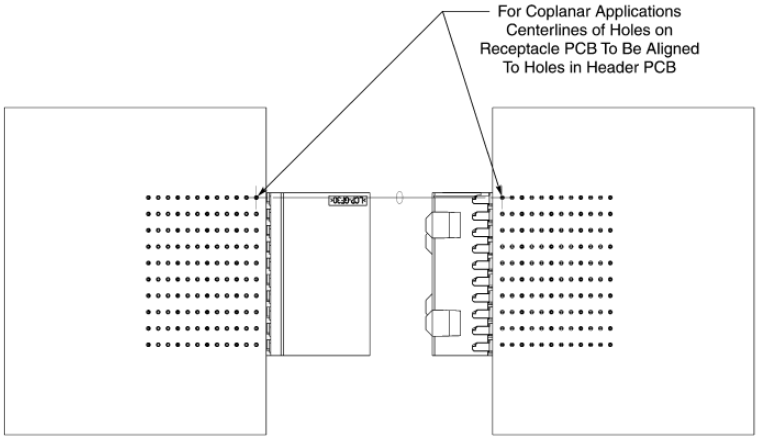
### Recommended Printed Circuit Board Layouts
(Continued)

#### Z-PACK HM-Zd Connector Coplanar







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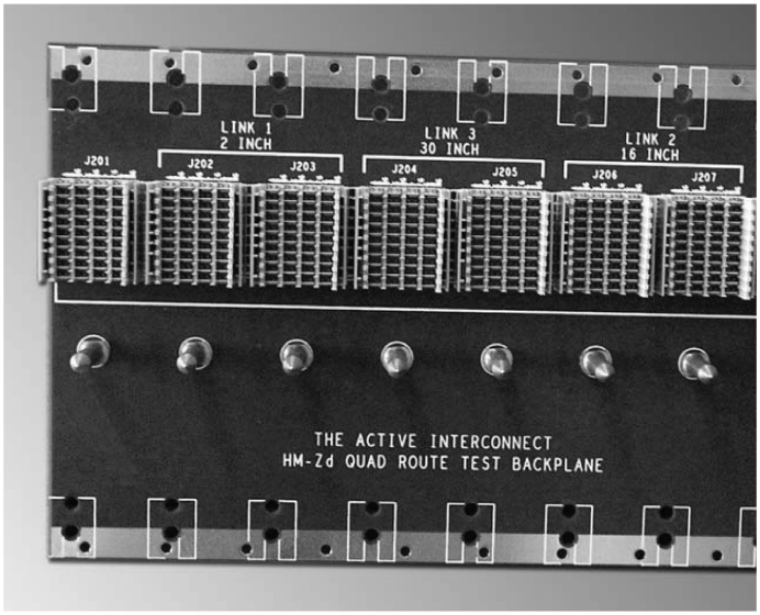
## Z-PACK HM-Zd Connector (Continued)

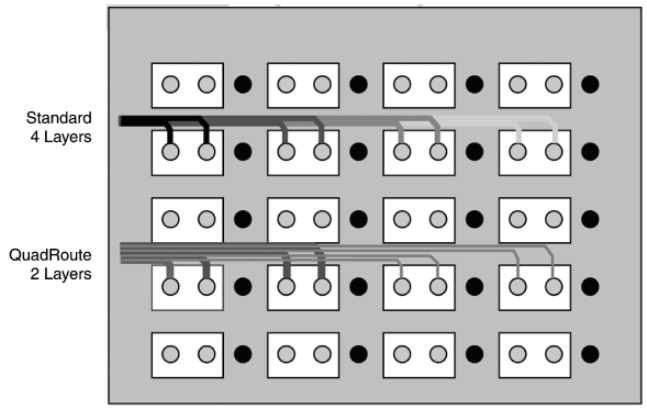
### Z-PACK HM-Zd Connector Footprint and PC Board Trace Routing

- 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)



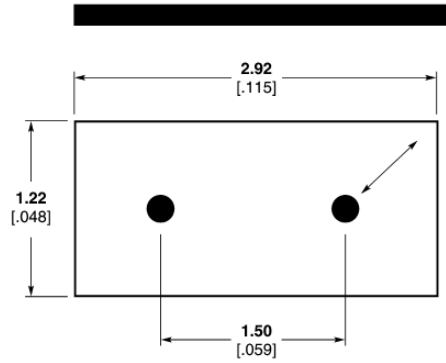

### Benefits of Quad Routing

- 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**





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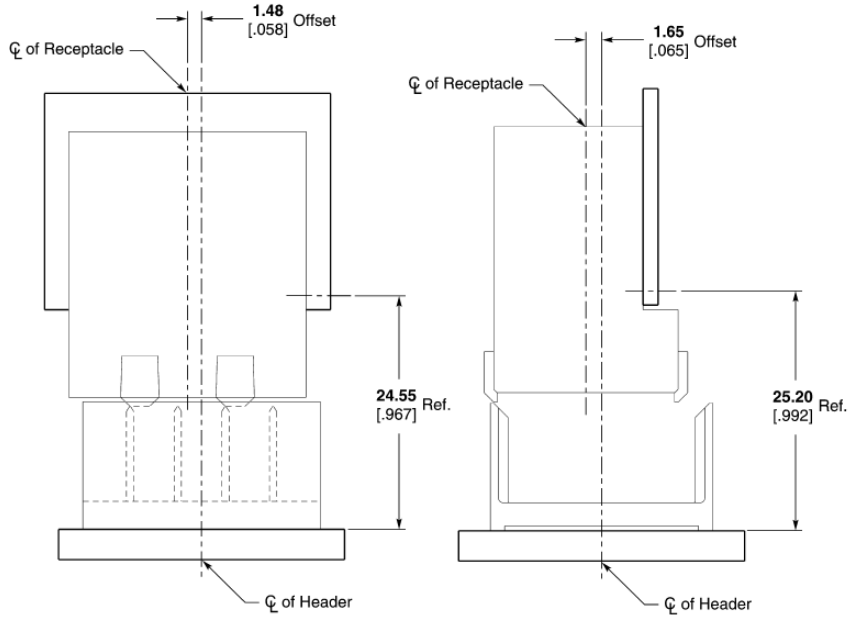
## Z-PACK HM-Zd Connector (Continued)

### Connector Housing Gathering Capabilities




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



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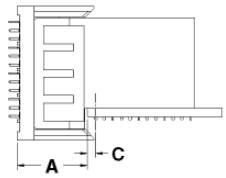
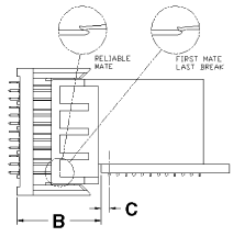
## Z-PACK HM-Zd Connector (Continued)

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




Fully Mated




Reliable Mate

| Product Family | Dim. C | Dim. A Fully Mated | Contact | Dim B. Reliable Mate | Dim B. First Mate Last Break | Fully Mated Wipe Length |
|---|---|---|---|---|---|---|
| **Z-PACK HM-Zd Product** | **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] |
| **Z-PACK 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 |
| Z-PACK TinMan Product | **1.50** .059 | **12.50** .492 | Ground Pins | **16.44** [.647] | **17.13** [.674] | **3.94** [.155] |
| | | | Signal Level 2 | **14.94** [.588] | **15.63** [.615] | **2.44** [.096] |
| | | | Signal Level 1 | N/A | N/A | N/A |
| Z-PACK 2mm HM Product | **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 Product | **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 Product | **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 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] |
| Z-PACK HS3 Product | **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. |





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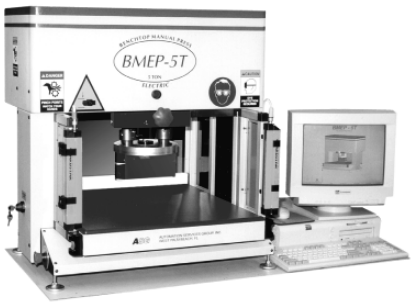
## Z-PACK HM-Zd Connector (Continued)

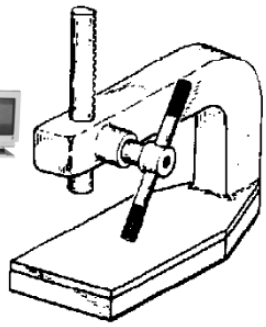
### Z-PACK HM-Zd Connector Application Tooling and Equipment


1585280-1 Model AP3



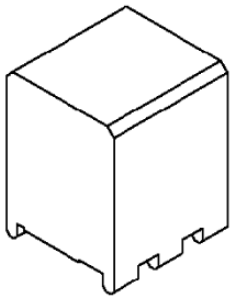

1585696-1 Model BMEP 5T


1585699-1 Model MEP 6T

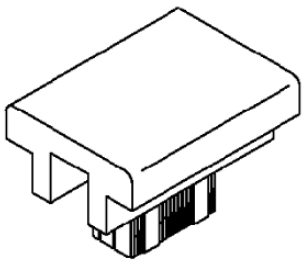


Typical Manual Arbor Frame Assembly (Commercially Available)

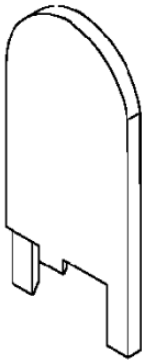
Typical PC Board Support (Customer Supplied)



Typical Receptacle Seating Tool IS 408-8500

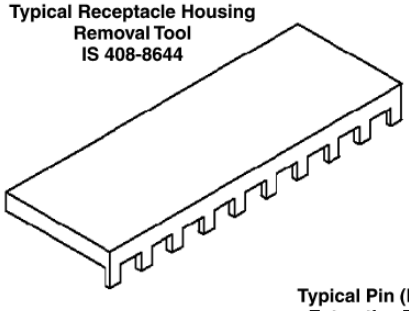


Typical Pin Header Seating Tool IS 408-8501

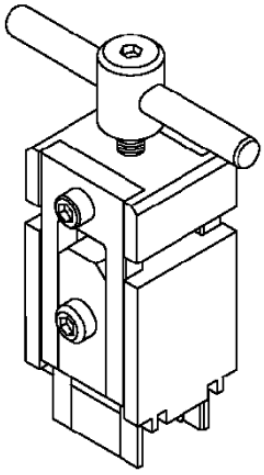


Typical Chiclet Removal Tool IS 408-8647

Typical Receptacle Housing Removal Tool IS 408-8644

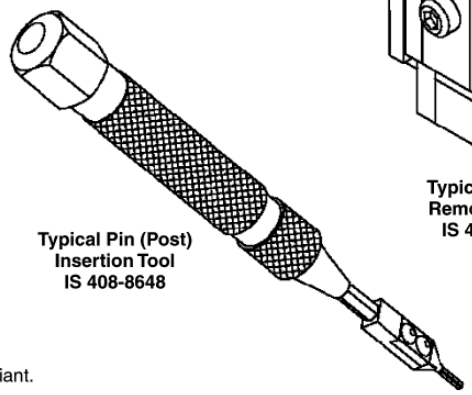


Typical Pin (Post) Extraction Tool IS 408-8646



Typical Header Removal Tools IS 408-8645

Typical Pin (Post) Insertion Tool IS 408-8648



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

**Note:** All part numbers are RoHS compliant.



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UK: 44-8706-080-208

## Z-PACK HM-Zd Connector (Continued)

### Z-PACK HM-Zd Connector Application Tooling and Equipment (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.

**Note:** All part numbers are RoHS compliant.





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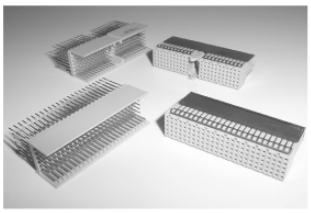
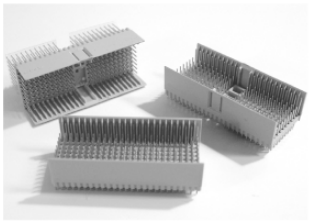
## Z-PACK HM-Zd Connector (Continued)

### Compatible 2mm HM Products



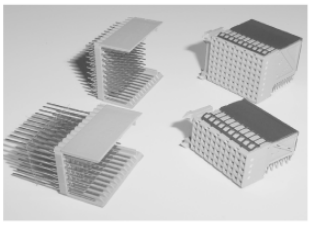
### Z-PACK 2mm HM Type A & B Connector Modules

- 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



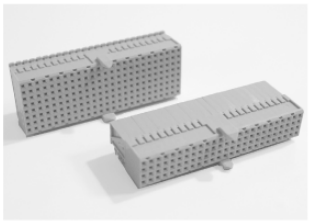
### Z-PACK 2mm HM Type D & E Connector Modules

- 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



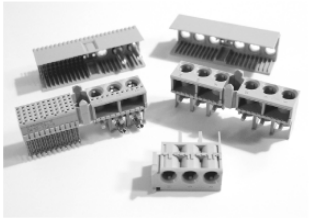
### Z-PACK 2mm HM Type F & C Connector Modules

- 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



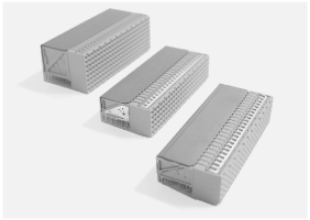
### Type AB/ DE Modules

- 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



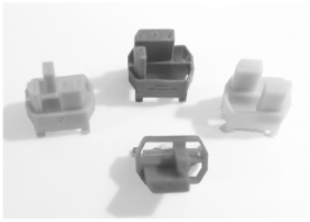
### Type L M & N Connectors

- 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



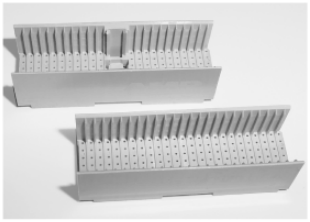
### Receptacles with Upper and Lower Ground Return Shields

- 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



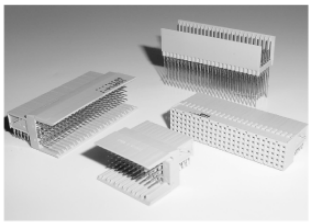
### Z-PACK 2mm HM Connector Coding Keys

- 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



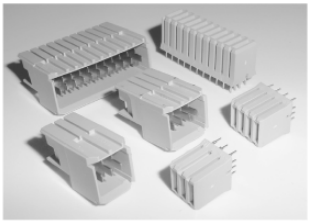
### Shrouds

- 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



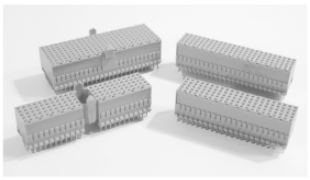
### Right Angle Male Offering

- 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



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