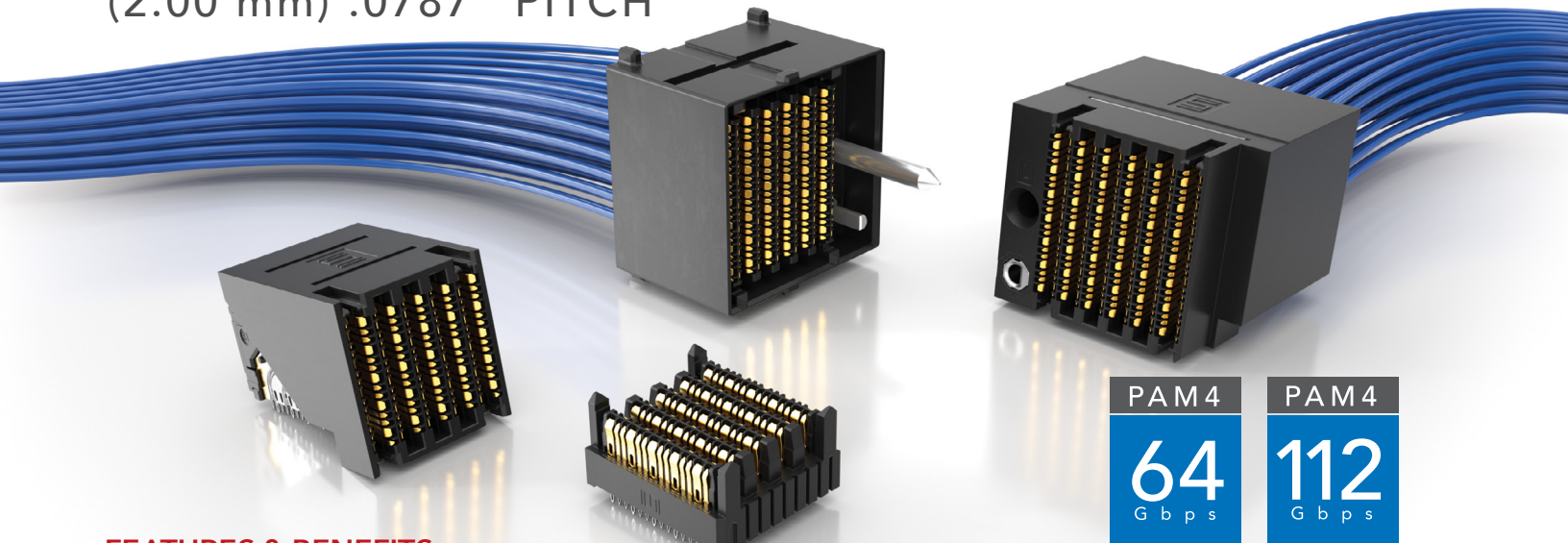


# ExaMAX<sup>®</sup>

## HIGH-SPEED BACKPLANE CONNECTOR & CABLE SYSTEMS

(2.00 mm) .0787" PITCH



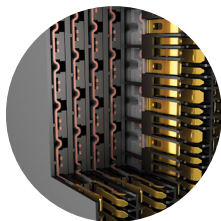
### FEATURES & BENEFITS

#### ExaMAX<sup>®</sup> High-Speed Backplane System

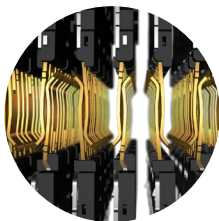
- Meets a variety of industry specifications
- Exceeds OIF CEI-28G-LR specification for 28 Gbps standards
- 24 - 72 pair designs (4 and 6 pairs; 6, 8, 10 and 12 columns)
- Wafer design includes one sideband signal per column
- Press-fit tails provide a reliable electrical connection
- PCIe<sup>®</sup> 6.0/CXL<sup>®</sup> 3.2 capable

#### ExaMAX<sup>®</sup> High-Speed Backplane Cable Assemblies

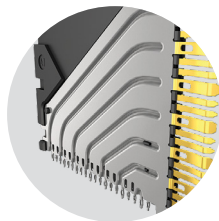
- 30 & 34 AWG Eye Speed<sup>®</sup> Ultra Low Skew Twinax Cable offers improved signal integrity, increased flexibility and routability
- Highly customizable with modular flexibility
- Reduce costs due to lower layer counts
- PCIe<sup>®</sup> 6.0/CXL<sup>®</sup> 3.2 capable
- Eye Speed<sup>®</sup> Thinax<sup>™</sup> ultra performance twinax cable version in development



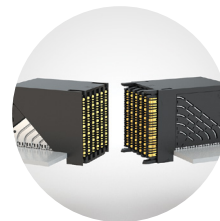
Staggered  
Differential  
Pair Design



Two Reliable Points  
of Contact with  
a 2.4 mm Wipe



Shielded  
Wafer Design  
Reduces Crosstalk



Traditional, Coplanar  
and Direct Mate  
Orthogonal

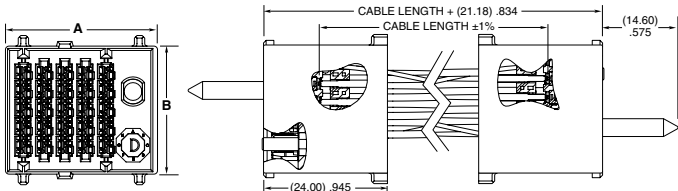


In Development:  
8 Pairs for Greater  
Design Flexibility

### KEY SPECIFICATIONS

| SERIES         | INSULATOR MATERIAL             | CONTACT MATERIAL | PLATING                          | OPERATING TEMP RANGE | CURRENT RATING | VOLTAGE RATING  | LEAD-FREE SOLDERABLE |
|----------------|--------------------------------|------------------|----------------------------------|----------------------|----------------|-----------------|----------------------|
| EBTM/EBTF/EBDM | Liquid Crystal Polymer         | Copper Alloy     | Sn or Au over 50 µ" (1.27 µm) Ni | -55 °C to +105 °C    | 4 A per pin    | 150 VAC/212 VDC | Yes                  |
| EPTT/EPTS      | High Temperature Thermoplastic | Copper Alloy     | Sn or Au over 50 µ" (1.27 µm) Ni | -55 °C to +105 °C    | 14.1 A per pin | 150 VAC/212 VDC | Yes                  |
| EBCM/EBCF      | Liquid Crystal Polymer         | Copper Alloy     | Au over 50 µ" (1.27 µm) Ni       | -40 °C to +105 °C    | 3.6 A per pin  | 125 VAC/177 VDC | N/A                  |

PCI-SIG<sup>®</sup>, PCI Express<sup>®</sup> and the PCIe<sup>®</sup> design marks are registered trademarks and/or service marks of PCI-SIG.

| EBCM                                                                                  | GAUGE/<br>SIG. MAP                                                                                                                                                                     | PAIRS PER<br>COLUMN                                  | COLUMNS                                                                                                                                                                                                                                                                                                                                                                  | END 1<br>PIN            | END 1<br>GUIDE                                                          | END 1<br>KEY                                                                                             | CABLE<br>LENGTH                                                                                                               | END 2<br>PIN            | END 2                                                                                                                                                                                                                                                                                                                                                         | END 2<br>KEY                                                                                                                                         |     |               |     |               |     |               |     |               |     |               |                                                                                                                                                    |  |                     |   |    |              |    |               |  |  |  |  |  |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---------------|-----|---------------|-----|---------------|-----|---------------|-----|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------|---|----|--------------|----|---------------|--|--|--|--|--|
| Cable<br>Header                                                                       | <b>-1</b><br>= 34 AWG/Tx<br>to Rx Sig. Map<br><br><b>-2</b><br>= 30 AWG/Tx<br>to Rx Sig. Map<br><br><b>-3</b><br>= 34 AWG/1:1<br>Sig. Map<br><br><b>-4</b><br>= 30 AWG/1:1<br>Sig. Map | <b>-4</b><br>= 4 Pairs<br><br><b>-6</b><br>= 6 Pairs | <b>-04, -06, -08, -10, -12, -14, -16</b>                                                                                                                                                                                                                                                                                                                                 | <b>-1</b><br>= Standard | <b>-L</b><br>= Left<br>Guidance<br><br><b>-R</b><br>= Right<br>Guidance | <b>-A<br/>thru<br/>-H</b><br>= Position<br>of Flat<br>on Key<br>(See Table)<br><br><b>-N</b><br>= No Key | <b>-"XX"</b><br>= Length in<br>Inches<br>4 Pairs:<br>06"<br>(152.4 mm)<br>minimum<br>6 Pairs:<br>08"<br>(203.2 mm)<br>minimum | <b>-1</b><br>= Standard | <b>-L</b><br>= Male, Left<br>Guidance<br><br><b>-R</b><br>= Male, Right<br>Guidance<br><br><b>-FL</b><br>= Female,<br>Right-angle<br>Left Guidance<br>(-3 & -4 Signal<br>Map only)<br><br><b>-FR</b><br>= Female,<br>Right-angle<br>Right Guidance<br>(-3 & -4 Signal<br>Map only)<br><br><b>-FV</b><br>= Female,<br>Vertical<br>(-3 & -4 Signal<br>Map only) | (Leave<br>Blank<br>for -FV<br>End 2)<br><br><b>-A<br/>thru<br/>-H</b><br>= Position<br>of Flat<br>on Key<br>(See Table)<br><br><b>-N</b><br>= No Key |     |               |     |               |     |               |     |               |     |               |                                                                                                                                                    |  |                     |   |    |              |    |               |  |  |  |  |  |
|                                                                                       |                                                                                                                                                                                        |                                                      | <table><tr><th>NO. OF<br/>COLUMNS</th><th>A</th></tr><tr><td>-04</td><td>(17.45) .687</td></tr><tr><td>-06</td><td>(21.45) .845</td></tr><tr><td>-08</td><td>(25.45) 1.002</td></tr><tr><td>-10</td><td>(29.45) 1.159</td></tr><tr><td>-12</td><td>(33.45) 1.317</td></tr><tr><td>-14</td><td>(37.45) 1.474</td></tr><tr><td>-16</td><td>(41.45) 1.632</td></tr></table> |                         | NO. OF<br>COLUMNS                                                       | A                                                                                                        | -04                                                                                                                           | (17.45) .687            | -06                                                                                                                                                                                                                                                                                                                                                           | (21.45) .845                                                                                                                                         | -08 | (25.45) 1.002 | -10 | (29.45) 1.159 | -12 | (33.45) 1.317 | -14 | (37.45) 1.474 | -16 | (41.45) 1.632 | <table><tr><th>PAIRS PER<br/>COLUMN</th><th>B</th></tr><tr><td>-4</td><td>(24.80) .976</td></tr><tr><td>-6</td><td>(32.00) 1.260</td></tr></table> |  | PAIRS PER<br>COLUMN | B | -4 | (24.80) .976 | -6 | (32.00) 1.260 |  |  |  |  |  |
| NO. OF<br>COLUMNS                                                                     | A                                                                                                                                                                                      |                                                      |                                                                                                                                                                                                                                                                                                                                                                          |                         |                                                                         |                                                                                                          |                                                                                                                               |                         |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                      |     |               |     |               |     |               |     |               |     |               |                                                                                                                                                    |  |                     |   |    |              |    |               |  |  |  |  |  |
| -04                                                                                   | (17.45) .687                                                                                                                                                                           |                                                      |                                                                                                                                                                                                                                                                                                                                                                          |                         |                                                                         |                                                                                                          |                                                                                                                               |                         |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                      |     |               |     |               |     |               |     |               |     |               |                                                                                                                                                    |  |                     |   |    |              |    |               |  |  |  |  |  |
| -06                                                                                   | (21.45) .845                                                                                                                                                                           |                                                      |                                                                                                                                                                                                                                                                                                                                                                          |                         |                                                                         |                                                                                                          |                                                                                                                               |                         |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                      |     |               |     |               |     |               |     |               |     |               |                                                                                                                                                    |  |                     |   |    |              |    |               |  |  |  |  |  |
| -08                                                                                   | (25.45) 1.002                                                                                                                                                                          |                                                      |                                                                                                                                                                                                                                                                                                                                                                          |                         |                                                                         |                                                                                                          |                                                                                                                               |                         |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                      |     |               |     |               |     |               |     |               |     |               |                                                                                                                                                    |  |                     |   |    |              |    |               |  |  |  |  |  |
| -10                                                                                   | (29.45) 1.159                                                                                                                                                                          |                                                      |                                                                                                                                                                                                                                                                                                                                                                          |                         |                                                                         |                                                                                                          |                                                                                                                               |                         |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                      |     |               |     |               |     |               |     |               |     |               |                                                                                                                                                    |  |                     |   |    |              |    |               |  |  |  |  |  |
| -12                                                                                   | (33.45) 1.317                                                                                                                                                                          |                                                      |                                                                                                                                                                                                                                                                                                                                                                          |                         |                                                                         |                                                                                                          |                                                                                                                               |                         |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                      |     |               |     |               |     |               |     |               |     |               |                                                                                                                                                    |  |                     |   |    |              |    |               |  |  |  |  |  |
| -14                                                                                   | (37.45) 1.474                                                                                                                                                                          |                                                      |                                                                                                                                                                                                                                                                                                                                                                          |                         |                                                                         |                                                                                                          |                                                                                                                               |                         |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                      |     |               |     |               |     |               |     |               |     |               |                                                                                                                                                    |  |                     |   |    |              |    |               |  |  |  |  |  |
| -16                                                                                   | (41.45) 1.632                                                                                                                                                                          |                                                      |                                                                                                                                                                                                                                                                                                                                                                          |                         |                                                                         |                                                                                                          |                                                                                                                               |                         |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                      |     |               |     |               |     |               |     |               |     |               |                                                                                                                                                    |  |                     |   |    |              |    |               |  |  |  |  |  |
| PAIRS PER<br>COLUMN                                                                   | B                                                                                                                                                                                      |                                                      |                                                                                                                                                                                                                                                                                                                                                                          |                         |                                                                         |                                                                                                          |                                                                                                                               |                         |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                      |     |               |     |               |     |               |     |               |     |               |                                                                                                                                                    |  |                     |   |    |              |    |               |  |  |  |  |  |
| -4                                                                                    | (24.80) .976                                                                                                                                                                           |                                                      |                                                                                                                                                                                                                                                                                                                                                                          |                         |                                                                         |                                                                                                          |                                                                                                                               |                         |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                      |     |               |     |               |     |               |     |               |     |               |                                                                                                                                                    |  |                     |   |    |              |    |               |  |  |  |  |  |
| -6                                                                                    | (32.00) 1.260                                                                                                                                                                          |                                                      |                                                                                                                                                                                                                                                                                                                                                                          |                         |                                                                         |                                                                                                          |                                                                                                                               |                         |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                      |     |               |     |               |     |               |     |               |     |               |                                                                                                                                                    |  |                     |   |    |              |    |               |  |  |  |  |  |
|      |                                                                                                                                                                                        |                                                      |                                                                                                                                                                                                                                                                                       |                         |                                                                         |                                                                                                          |                                                                                                                               |                         |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                      |     |               |     |               |     |               |     |               |     |               |                                                                                                                                                    |  |                     |   |    |              |    |               |  |  |  |  |  |
|                                                                                       |                                                                                                                                                                                        |                                                      | END 1: -L-G SHOWN      END 2                                                                                                                                                                                                                                                                                                                                             |                         |                                                                         |                                                                                                          |                                                                                                                               |                         |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                      |     |               |     |               |     |               |     |               |     |               |                                                                                                                                                    |  |                     |   |    |              |    |               |  |  |  |  |  |
| View complete specifications at: <a href="http://samtec.com?EBCM">samtec.com?EBCM</a> |                                                                                                                                                                                        |                                                      |                                                                                                                                                                                                                                                                                                                                                                          |                         |                                                                         |                                                                                                          |                                                                                                                               |                         |                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                      |     |               |     |               |     |               |     |               |     |               |                                                                                                                                                    |  |                     |   |    |              |    |               |  |  |  |  |  |

| EBCF                                                          | GAUGE / SIG. MAP                                                                                                                                                               | PAIRS / COLUMN                                       | COLUMNS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | END 1                         | END 1 PIN               | CABLE LENGTH                                                                                             | END 2 OPTION                                                    | END 2 PIN               | END 2 GUIDE                                                                            | END 2 KEY                                                                                               |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------|----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|--------------|-----|--------------|--------------|--------------|-----|--------------|--------------|---------------|-----|--------------|---------------|---------------|-----|---------------|---------------|---------------|-----|---------------|---------------|---------------|-----|---------------|---------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------|---|---|----|--------------|--------------|----|---------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--------|--|--|--|--|--|--|--|--|----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--|--|--|--|--|--|--|--|--|
| Cable Socket                                                  | <b>-1</b><br>= 34 AWG / Tx to Rx Sig. Map<br><br><b>-2</b><br>= 30 AWG / Tx to Rx Sig. Map<br><br><b>-3</b><br>= 34 AWG/1:1 Sig. Map<br><br><b>-4</b><br>= 30 AWG/1:1 Sig. Map | <b>-4</b><br>= 4 Pairs<br><br><b>-6</b><br>= 6 Pairs | <b>-04, -06, -08, -10, -12, -14, -16</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>-V</b><br>= Vertical Latch | <b>-1</b><br>= Standard | <b>-"XX"</b><br>= Length in Inches<br>4 Pairs: 06" (152.4 mm) minimum<br>6 Pairs: 08" (203.2 mm) minimum | <b>-V</b><br>= Vertical Latch<br><br><b>-R</b><br>= Right-Angle | <b>-1</b><br>= Standard | (-R End Only)<br><br><b>-L</b><br>= Left Guidance<br><br><b>-R</b><br>= Right Guidance | (Leave Blank for no Key; -R End Only)<br><br><b>-A thru -H</b><br>= Position of Flat on Key (See Table) |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |
|                                                               |                                                                                                                                                                                |                                                      | <table><tr><th>NO. OF COLUMNS</th><th>A</th><th>C</th><th>E</th></tr><tr><td>-04</td><td>(10.60) .417</td><td>(14.85) .585</td><td>(19.15) .754</td></tr><tr><td>-06</td><td>(14.60) .575</td><td>(18.85) .742</td><td>(23.15) .911</td></tr><tr><td>-08</td><td>(18.60) .732</td><td>(22.85) .900</td><td>(27.15) 1.069</td></tr><tr><td>-10</td><td>(22.60) .890</td><td>(26.85) 1.057</td><td>(31.15) 1.226</td></tr><tr><td>-12</td><td>(26.60) 1.047</td><td>(30.85) 1.530</td><td>(35.15) 1.699</td></tr><tr><td>-14</td><td>(30.60) 1.205</td><td>(34.85) 1.372</td><td>(39.15) 1.541</td></tr><tr><td>-16</td><td>(34.60) 1.362</td><td>(38.85) 1.530</td><td>(43.15) 1.699</td></tr></table> | NO. OF COLUMNS                | A                       | C                                                                                                        | E                                                               | -04                     | (10.60) .417                                                                           | (14.85) .585                                                                                            | (19.15) .754 | -06 | (14.60) .575 | (18.85) .742 | (23.15) .911 | -08 | (18.60) .732 | (22.85) .900 | (27.15) 1.069 | -10 | (22.60) .890 | (26.85) 1.057 | (31.15) 1.226 | -12 | (26.60) 1.047 | (30.85) 1.530 | (35.15) 1.699 | -14 | (30.60) 1.205 | (34.85) 1.372 | (39.15) 1.541 | -16 | (34.60) 1.362 | (38.85) 1.530 | (43.15) 1.699 | <table><tr><th>PAIRS PER COLUMN</th><th>B</th><th>D</th></tr><tr><td>-4</td><td>(23.00) .906</td><td>(22.70) .894</td></tr><tr><td>-6</td><td>(30.20) 1.189</td><td>(29.90) 1.177</td></tr></table> |  | PAIRS PER COLUMN | B | D | -4 | (23.00) .906 | (22.70) .894 | -6 | (30.20) 1.189 | (29.90) 1.177 | <table><tr><th colspan="9">KEYING</th></tr><tr><td><b>-L / -R</b></td><td><b>-A</b></td><td><b>-B</b></td><td><b>-C</b></td><td><b>-D</b></td><td><b>-E</b></td><td><b>-F</b></td><td><b>-G</b></td><td><b>-H</b></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> |  |  |  |  | KEYING |  |  |  |  |  |  |  |  | <b>-L / -R</b> | <b>-A</b> | <b>-B</b> | <b>-C</b> | <b>-D</b> | <b>-E</b> | <b>-F</b> | <b>-G</b> | <b>-H</b> |  |  |  |  |  |  |  |  |  |
| NO. OF COLUMNS                                                | A                                                                                                                                                                              | C                                                    | E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                               |                         |                                                                                                          |                                                                 |                         |                                                                                        |                                                                                                         |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |
| -04                                                           | (10.60) .417                                                                                                                                                                   | (14.85) .585                                         | (19.15) .754                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                               |                         |                                                                                                          |                                                                 |                         |                                                                                        |                                                                                                         |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |
| -06                                                           | (14.60) .575                                                                                                                                                                   | (18.85) .742                                         | (23.15) .911                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                               |                         |                                                                                                          |                                                                 |                         |                                                                                        |                                                                                                         |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |
| -08                                                           | (18.60) .732                                                                                                                                                                   | (22.85) .900                                         | (27.15) 1.069                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |                         |                                                                                                          |                                                                 |                         |                                                                                        |                                                                                                         |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |
| -10                                                           | (22.60) .890                                                                                                                                                                   | (26.85) 1.057                                        | (31.15) 1.226                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |                         |                                                                                                          |                                                                 |                         |                                                                                        |                                                                                                         |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |
| -12                                                           | (26.60) 1.047                                                                                                                                                                  | (30.85) 1.530                                        | (35.15) 1.699                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |                         |                                                                                                          |                                                                 |                         |                                                                                        |                                                                                                         |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |
| -14                                                           | (30.60) 1.205                                                                                                                                                                  | (34.85) 1.372                                        | (39.15) 1.541                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |                         |                                                                                                          |                                                                 |                         |                                                                                        |                                                                                                         |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |
| -16                                                           | (34.60) 1.362                                                                                                                                                                  | (38.85) 1.530                                        | (43.15) 1.699                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |                         |                                                                                                          |                                                                 |                         |                                                                                        |                                                                                                         |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |
| PAIRS PER COLUMN                                              | B                                                                                                                                                                              | D                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |                         |                                                                                                          |                                                                 |                         |                                                                                        |                                                                                                         |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |
| -4                                                            | (23.00) .906                                                                                                                                                                   | (22.70) .894                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |                         |                                                                                                          |                                                                 |                         |                                                                                        |                                                                                                         |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |
| -6                                                            | (30.20) 1.189                                                                                                                                                                  | (29.90) 1.177                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |                         |                                                                                                          |                                                                 |                         |                                                                                        |                                                                                                         |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |
| KEYING                                                        |                                                                                                                                                                                |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |                         |                                                                                                          |                                                                 |                         |                                                                                        |                                                                                                         |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |
| <b>-L / -R</b>                                                | <b>-A</b>                                                                                                                                                                      | <b>-B</b>                                            | <b>-C</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>-D</b>                     | <b>-E</b>               | <b>-F</b>                                                                                                | <b>-G</b>                                                       | <b>-H</b>               |                                                                                        |                                                                                                         |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |
|                                                               |                                                                                                                                                                                |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |                         |                                                                                                          |                                                                 |                         |                                                                                        |                                                                                                         |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |
|                                                               |                                                                                                                                                                                |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |                         |                                                                                                          |                                                                 |                         |                                                                                        |                                                                                                         |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |
|                                                               |                                                                                                                                                                                |                                                      | <b>END 1: -V SHOWN</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                               |                         |                                                                                                          | <b>END 2: -L-G SHOWN</b>                                        |                         |                                                                                        |                                                                                                         |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |
| <p><b>Notes:</b><br/>Some lengths, styles and options are</p> |                                                                                                                                                                                |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |                         |                                                                                                          |                                                                 |                         |                                                                                        |                                                                                                         |              |     |              |              |              |     |              |              |               |     |              |               |               |     |               |               |               |     |               |               |               |     |               |               |               |                                                                                                                                                                                                     |  |                  |   |   |    |              |              |    |               |               |                                                                                                                                                                                                                                                                                                                               |  |  |  |  |        |  |  |  |  |  |  |  |  |                |           |           |           |           |           |           |           |           |  |  |  |  |  |  |  |  |  |

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**Notes:**  
Some lengths, styles and options are  
non-standard, non-returnable.

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