The ERmet ZD is specifically designed for high speed differential signaling in telecom applications at data rates of up to 25 Gbits/second. This robust, high performance, modular connector system is also designed to be used in conjunction with the 2 mm Hard Metric (IEC 61076-4-101) family of connectors. It shares the chassis and board design features along with common layout references. The connector meets the electrical performance requirements of high speed, low voltage differential signaling. The ERmet ZD connector family is available in pressfit versions. The backplane module is a male pin header that has two mating levels. The ground shield and signal pins mate sequentially at 1.5 mm intervals.

The robust mechanical design and excellent signal integrity are a result of the internal differential shielding scheme and the “L” shaped male shield blades. The inherently rigid male shields stand higher than the signal pins and surround each pair. An improved guidance feature completes the rugged mechanical design. Optimized grid design to improve the RF characteristics. Easy and economical trace routing achieved by in line-design of signal and ground pins. Simulation models available upon request.
## FEATURES

### TECHNICAL FEATURES

<table>
<thead>
<tr>
<th>Modules</th>
<th>4 pair versions available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mating</td>
<td>Compatible to ERmet ZD and ZDplus connectors</td>
</tr>
<tr>
<td>Design</td>
<td>Wafers with individually fully shielded pairs of contacts</td>
</tr>
<tr>
<td>Contacts</td>
<td>Low noise, dual beam contacts, one ground blade for every pair of signals</td>
</tr>
<tr>
<td>Multiline crosstalk</td>
<td>&lt; 3% at 100ps rise time, 250 mV swing</td>
</tr>
<tr>
<td>Differential crosstalk</td>
<td>100 Ω ±5%</td>
</tr>
<tr>
<td>Skew compensation</td>
<td>max. 3 ps differential skew</td>
</tr>
<tr>
<td>Data rate</td>
<td>per differential pair 25+ Gbit/s</td>
</tr>
<tr>
<td>Alignment features</td>
<td>Pre-alignment guide with polarizing feature</td>
</tr>
<tr>
<td>Standards</td>
<td>Meets the requirements of 100G ATCA technology and 100 Gbit/s Ethernet (IEEE802.3bj)</td>
</tr>
<tr>
<td>Mating cycles</td>
<td>&gt; 250</td>
</tr>
</tbody>
</table>
| Material and plating | Plastic parts: LCP  
  Contact Material: Cu alloy  
  Mating area: PdNi with gold flash  
  Termination are: Sn |
**RECOMMENDED PCB LAYOUT**

**BACKPLANE LAYOUT 4 PAIR MALE CONNECTOR**

Via construction in accordance to 474999 and 384191 specification.

Einzelheit A

M 10:1 Zusätzliche Schirmnase über und unter der Signalage verbessert Impedanzverlauf.

Additional shielding nose under and above the signal layer improves impedance characteristics.
1) Via construction in accordance to 67499 and 36091 specification.

Annular Ring
\[ \Phi = 0.45 \text{ (18 mil)} \]
finished hole = \[ \Phi = 0.3 \text{ (11.8 mil)} \]
depends from manufacturer and board size
Annular Ring
\[ \Phi = 0.3 \text{ (11.8 mil)} \]
depends from manufacturer and board size

0.4 drill diameter (15.7 mil)
finished hole = \[ \Phi = 0.3 \text{ (11.8 mil)} \]

Zusätzliche Schirmnase über und unter der Signallage verbessert den Impedanzverlauf.
Additional shielding nose under and above of the signal layer improves impedance characteristics.
Two press fit terminals are required for ERmet ZDpro modules. These press fit terminals have been used successfully with plated tin, immersion tin, organic coatings over bare copper and immersion gold hole plating process. The hole recommendations and press in force information shown in this catalog are for plated tin-lead. The usage of backdrilling is recommended.

The bottom connection (right) is preferable, due to less reflection.
ERmet ZDpro - Application Note

PLATED-THROUGH HOLE

---

SIGNAL PIN

![Diagram of SIGNAL PIN]

Diameter of drilled hole: \( \phi 0.4 \pm 0.02 \)

Diameter of finished plated-through hole: \( \phi 0.3 \pm 0.02 \) min. via length

Restring width: min. 0.05

20 - 25 \( \mu \)m Cu

max. 2 \( \mu \)m Sn

Accuracy of the finished diameter, is only in the min. via length for backdrilling required.

---

SHIELDING PIN

![Diagram of SHIELDING PIN]

Diameter of drilled hole: \( \phi 0.55 \pm 0.02 \)

Diameter of finished plated-through hole: \( \phi 0.46 \pm 0.05 \) min. via length

Restring width: min. 0.05

min. 25 \( \mu \)m Cu

max. 10 \( \mu \)m Sn
ERmet ZDpro - Application Note

MEASUREMENT RESULTS

MEASUREMENT EQUIPMENT

Agilent ENA E5071C with Cascade Microtech Z-Probes (GSGSG)

INSERTION AND RETURN LOSS

[Graphs of Measurement Results]
**MEASUREMENT RESULTS**

### NEAR-END CROSSTALK

*Graph showing near-end crosstalk with frequency.*

### FAR-END CROSSTALK

*Graph showing far-end crosstalk with frequency.*

### SKEW

<table>
<thead>
<tr>
<th>Pair</th>
<th>Frequency domain</th>
<th>Time domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>a-b</td>
<td>2.0 ps</td>
<td>0.9 ps</td>
</tr>
<tr>
<td>c-d</td>
<td>1.5 ps</td>
<td>1.0 ps</td>
</tr>
<tr>
<td>e-f</td>
<td>0.8 ps</td>
<td>0.5 ps</td>
</tr>
<tr>
<td>g-h</td>
<td>1.6 ps</td>
<td>1.2 ps</td>
</tr>
</tbody>
</table>
Channel operating margin (COM) is a figure of merit for the physical electrical connection between a transmitter and a receiver block (channel). The result is determined from a minimum PHY architecture and the Channel s-parameters. COM ist substituting compliance diagrams that are frequency depending.
COM SIMULATION SETUP: ATCA „100GBASE-KR4“

- Package launch
- 5” blade transmission line
- Blade connector launch
- ZDplus/pro connector
- Backplane connector launch
- Backplane channel crossing
- 11” backplane transmission line
- Backplane connector launch
- ZDplus/pro connector
- Blade connector launch
- 5” blade transmission line
- Package launch
PIN CONFIGURATION (BASED ON ATCA LAYOUT)

Far-End Crosstalk

Near-End Crosstalk

- Victim Pair
- Aggressors

COM - 100 GBIT/S ETHERNET
ERmet ZDpro achieves more than 1 dB margin in ATCA applications compared to ZDplus.
**ERmet ZDpro - Application Note**

**ATCA SYSTEM MEASUREMENT**

---

**SETUP IN ACCORDANCE TO IEEE FOR 100 GBIT/S**

Test setup for Front Board S-parameter Tests

---

**Test Setup in accordance to PICMG 3.1 R2.0**

---

**Measuring Equipment**

<table>
<thead>
<tr>
<th>Test Equipment</th>
<th>Description</th>
<th>Notes/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agilent N5242A</td>
<td>4-Port Vector Network Analyzer</td>
<td>S-Parameter measurements</td>
</tr>
<tr>
<td></td>
<td>10 MHz to 26.5 GHz</td>
<td></td>
</tr>
</tbody>
</table>

---

**Test Equipments and Tools**

<table>
<thead>
<tr>
<th>Test Equipment</th>
<th>Description</th>
<th>Notes/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test-PICMG-BP Rev.2.0</td>
<td>PICMG Backplane Test Paddle Card with ZDpro Connector (ERNI 474960)</td>
<td>Test fixture for backplane validation</td>
</tr>
<tr>
<td>(8406811N61B_FAB_REV_A)</td>
<td>Low Loss Material: DF = 0.002 - 0.003</td>
<td></td>
</tr>
<tr>
<td>Test-PICMG-BP Rev.2.0</td>
<td>PICMG Front Board Test Card with ZDpro Connector (ERNI 474982)</td>
<td>Test fixture for adapter validation</td>
</tr>
<tr>
<td>(8406811N61B_FAB_REV_A)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**S-PARAMETER ANALYSIS**

**SHORT RANGE**

Backplane Measurement according IEEE P802.3bj/D3.2

Transmitter (blue), Receiver (green)

<table>
<thead>
<tr>
<th>Dataset</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top_BP_AXP4440_400_L01tL02</td>
<td>Jul 23, 2014</td>
</tr>
</tbody>
</table>

**Equation**

\[ T_{tdr} = 8.0 \text{ns} \]
LONG RANGE

Backplane Measurement according IEEE P802.3bj/D3.2

Transmitter (blue), Receiver (green)

Dataset | Date
---|---
Top_BP_AXP4440_400_L01tCL02 | Jul 23, 2014

Eqn $T_{tdr} = 8.0\text{ns}$