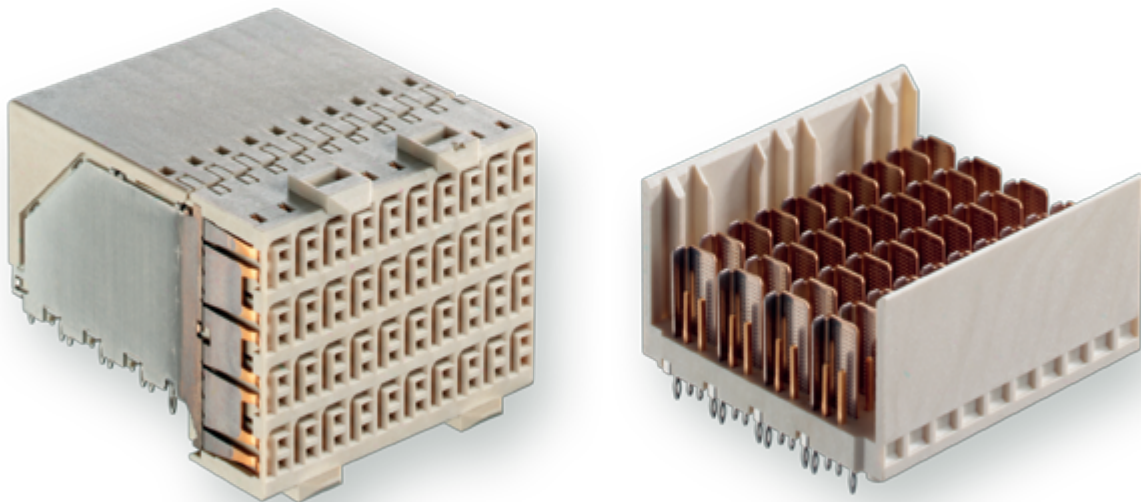


ERmet ZDpro[®]

Application Note

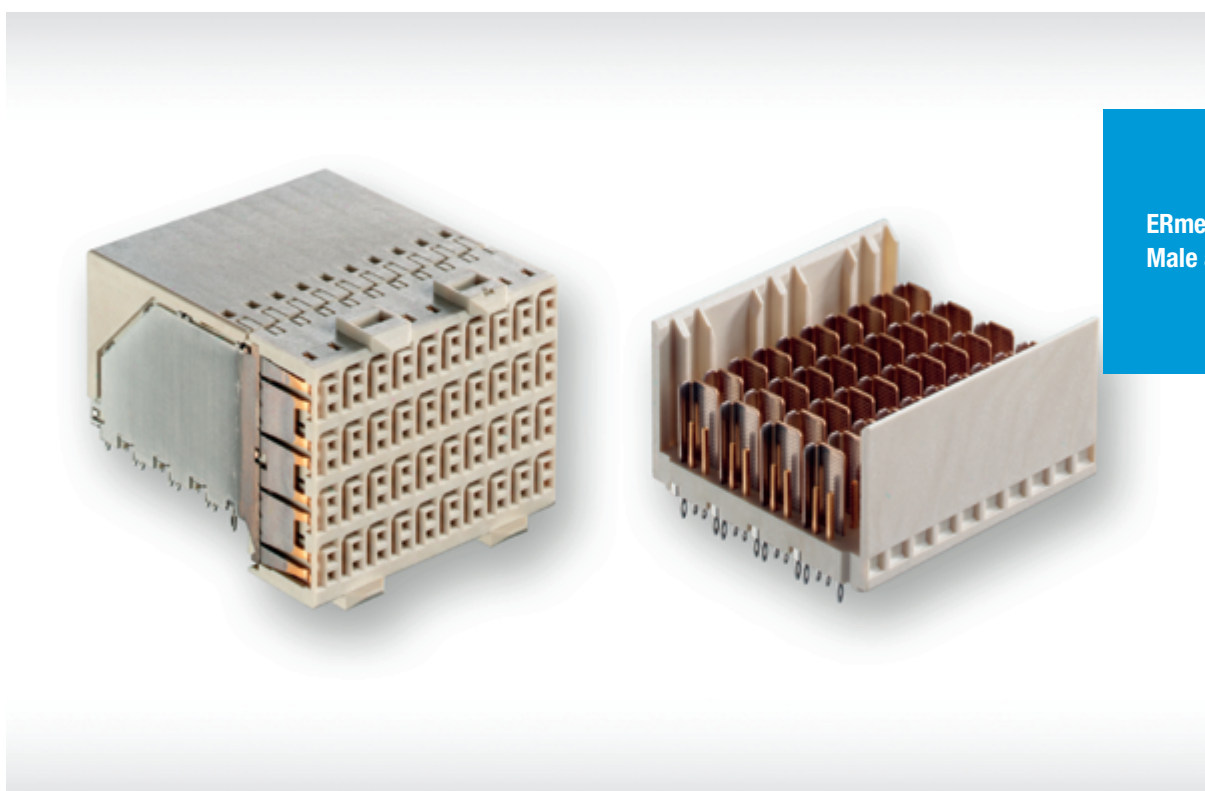


ERmet ZDpro - Application Note

OVERVIEW —



GENERAL



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.

ERmet ZDpro - Application Note

FEATURES

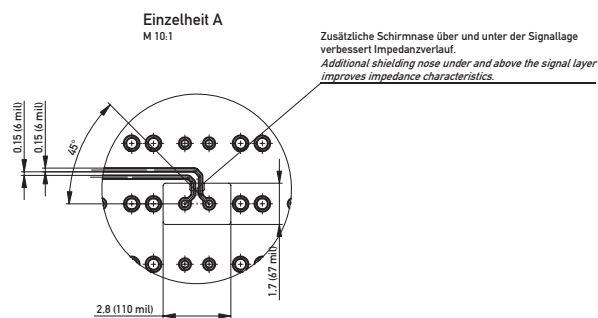
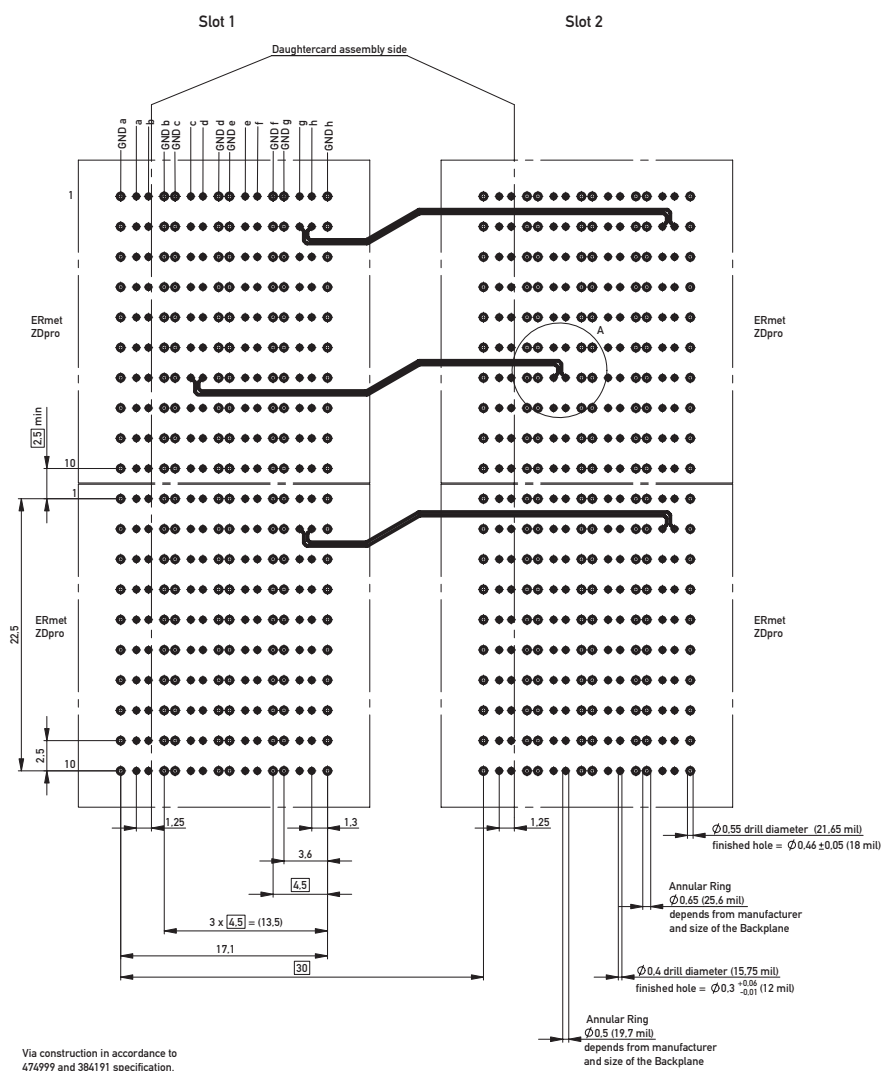
TECHNICAL FEATURES

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

ERmet ZDpro - Application Note

RECOMMENDED PCB LAYOUT

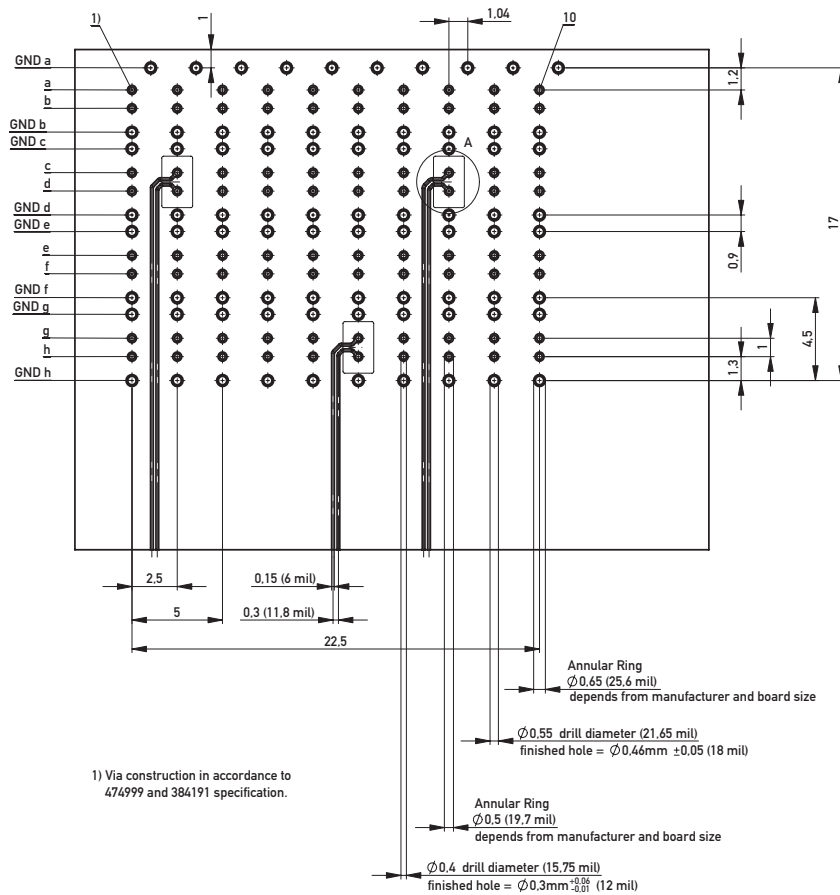
BACKPLANE LAYOUT 4 PAIR MALE CONNECTOR



ERmet ZDpro - Application Note

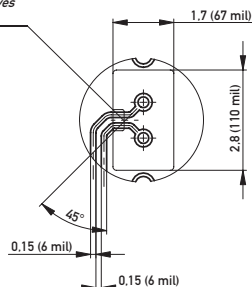
RECOMMENDED PCB LAYOUT

DAUGHTERCARD LAYOUT 4 PAIR FEMALE CONNECTOR



Einzelheit A
M 10:1

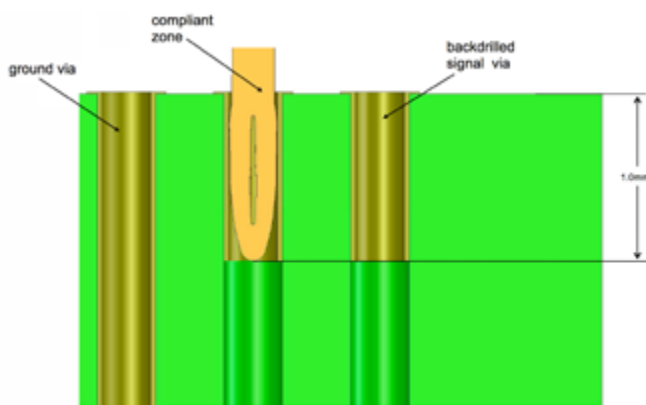
Zusätzliche Schirmnase über und unter der Signallage verbessert den Impedanzverlauf.
Additional shielding nose under and above of the signal layer improves impedance characteristics



ERmet ZDpro - Application Note

PLATED-THROUGH HOLE —

PLATED-THROUGH HOLES FOR PRESSFIT TERMINALS



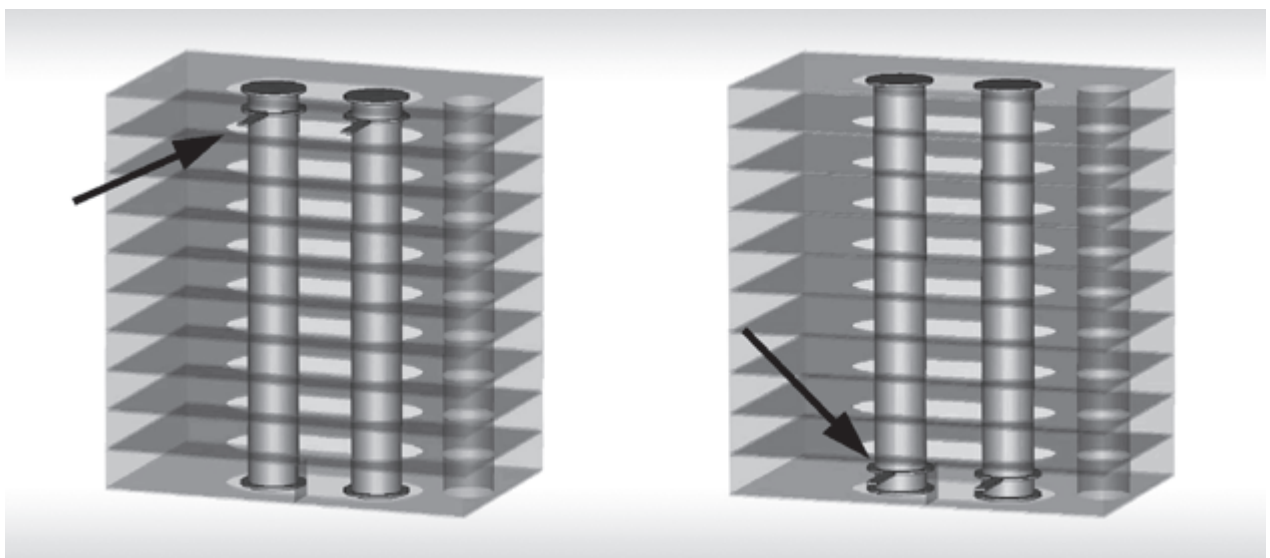
Two press fit terminals are required for ERmet ZDpro modules.

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.

STUBBING EFFECT

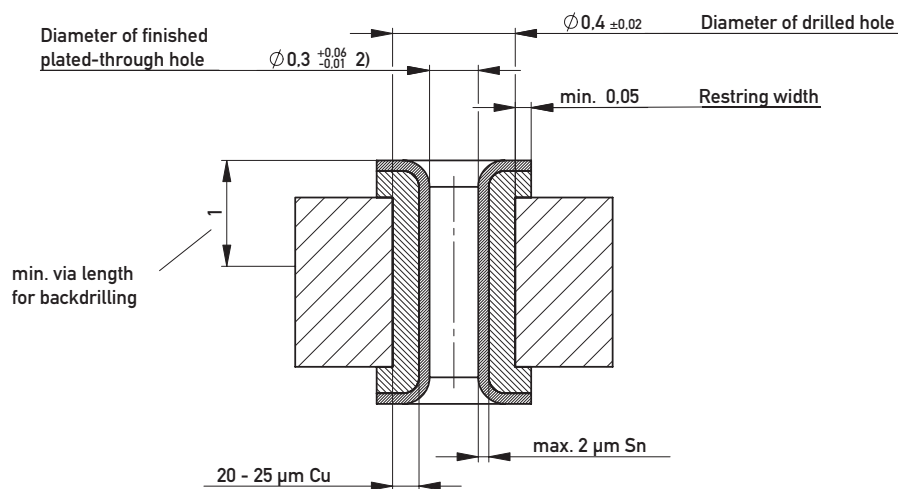
The bottom connection (right) is preferable, due to less reflection.



ERmet ZDpro - Application Note

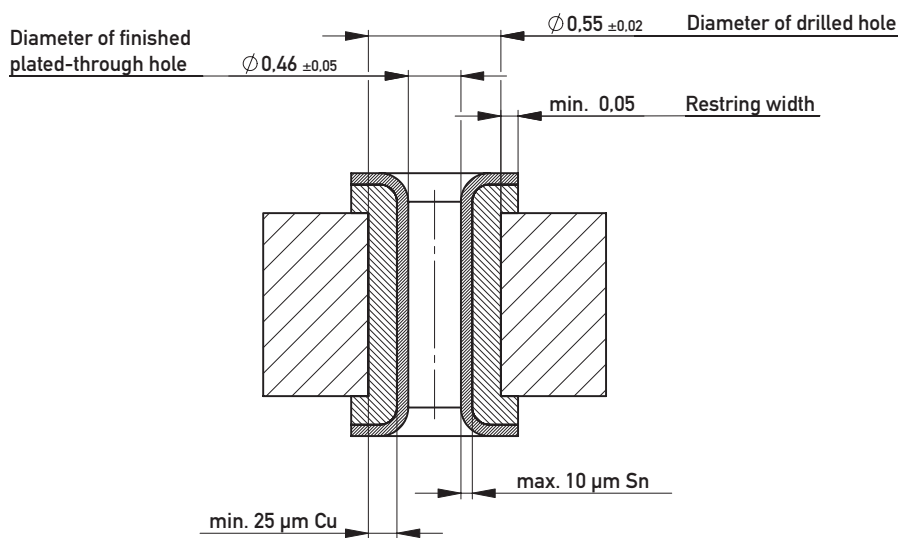
PLATED-THROUGH HOLE

SIGNAL PIN



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

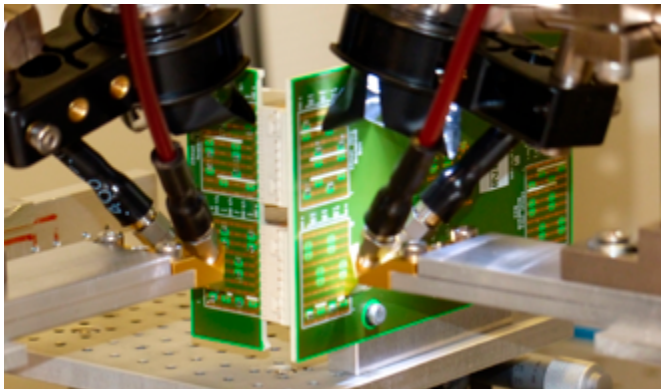
SHIELDING PIN



ERmet ZDpro - Application Note

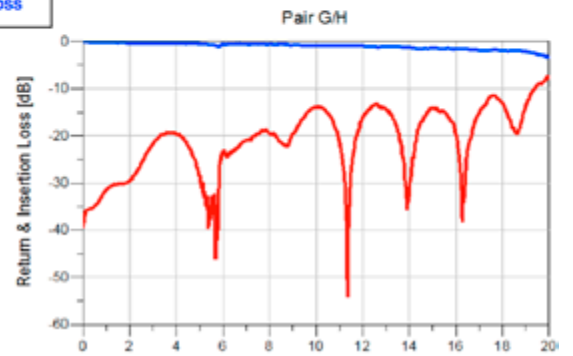
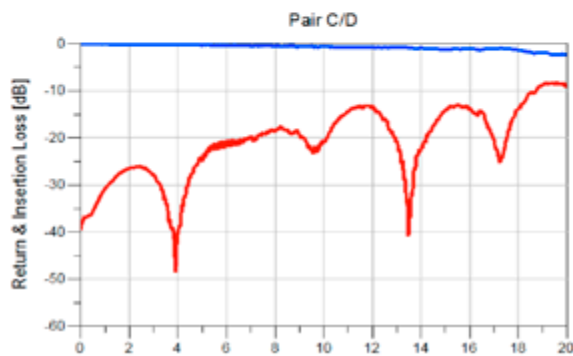
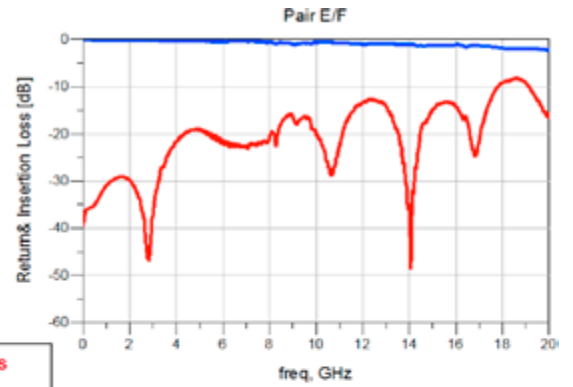
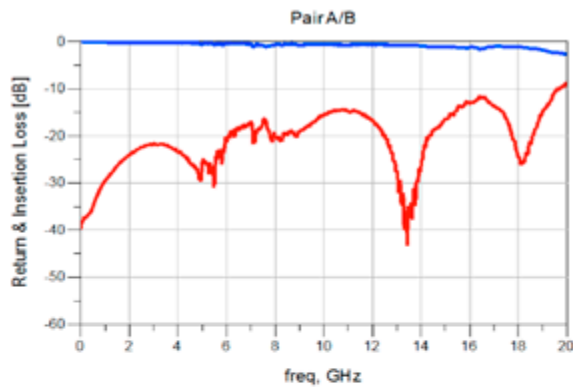
MEASUREMENT RESULTS

MEASUREMENT EQUIPMENT



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

INSERTION AND RETURN LOSS

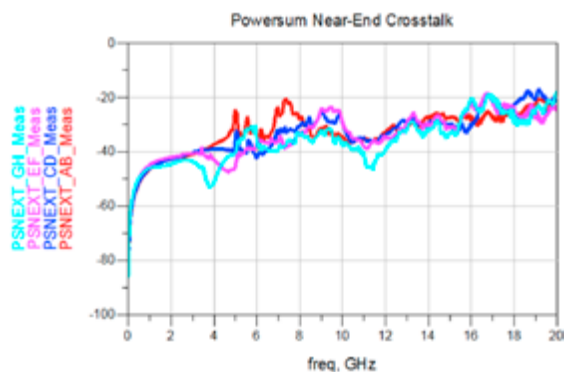


Return Loss
Insertion Loss

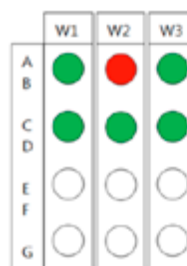
ERmet ZDpro - Application Note

MEASUREMENT RESULTS

NEAR-END CROSSTALK



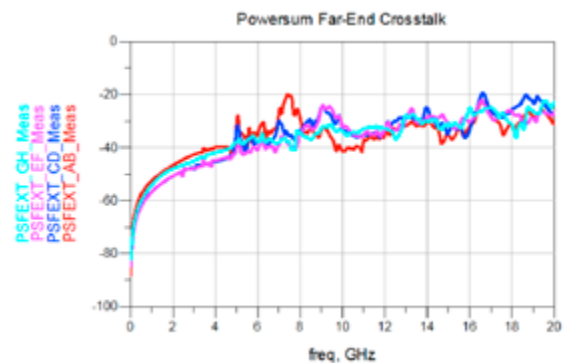
Victim:AB



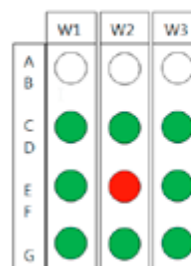
Victim:CD



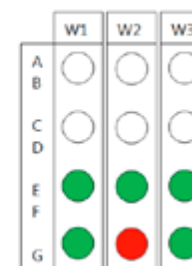
FAR-END CROSSTALK



Victim:EF



Victim:GH



SKREW

Pair	Frequency domain	Time domain
a-b	2,0 ps	0,9 ps
c-d	1,5 ps	1 ps
e-f	0,9 ps	0,5 ps
g-h	1,6 ps	1,2 ps

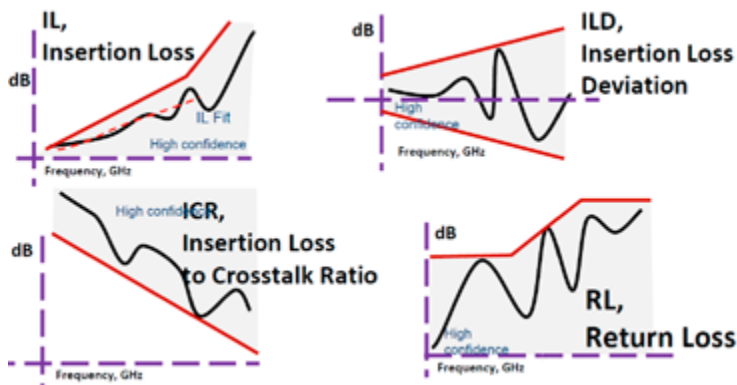
ERmet ZDpro - Application Note

COM - 100 GBIT/S ETHERNET

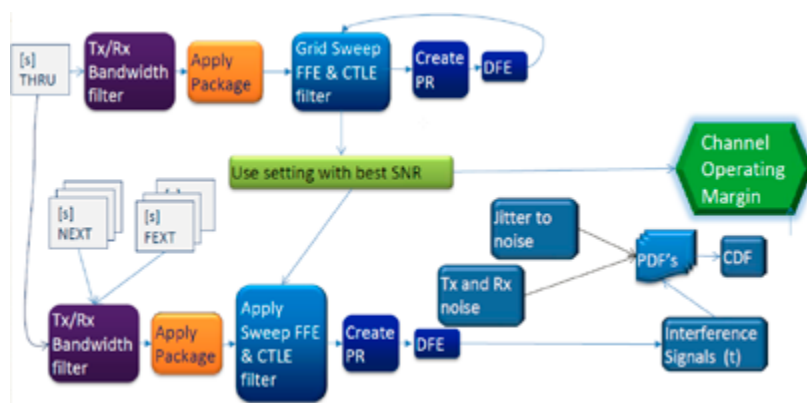
GENERAL

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 is substituting compliance diagrams that are frequency dependent.

FORMER COMPLIANCE DIAGRAMS



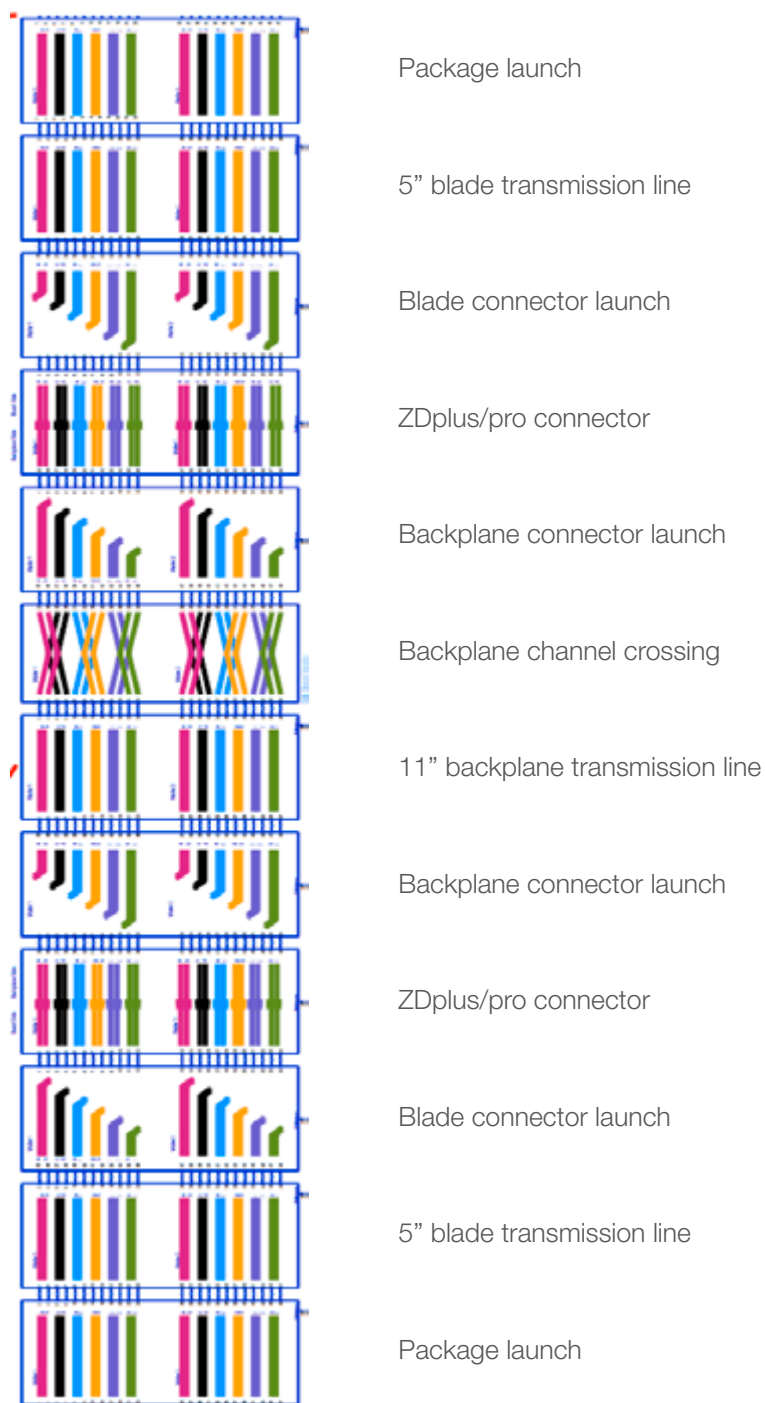
COM FLOW CHART



ERmet ZDpro - Application Note

COM - 100 GBIT/S ETHERNET

COM SIMULATION SETUP: ATCA „100GBASE-KR4“

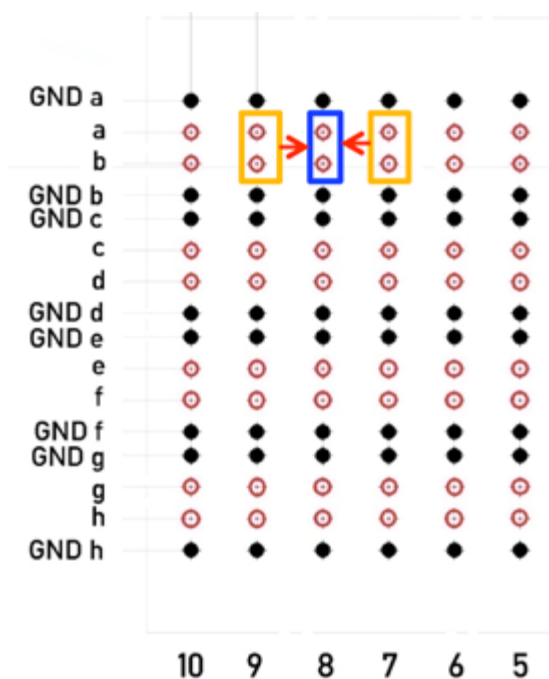


ERmet ZDpro - Application Note

COM - 100 GBIT/S ETHERNET

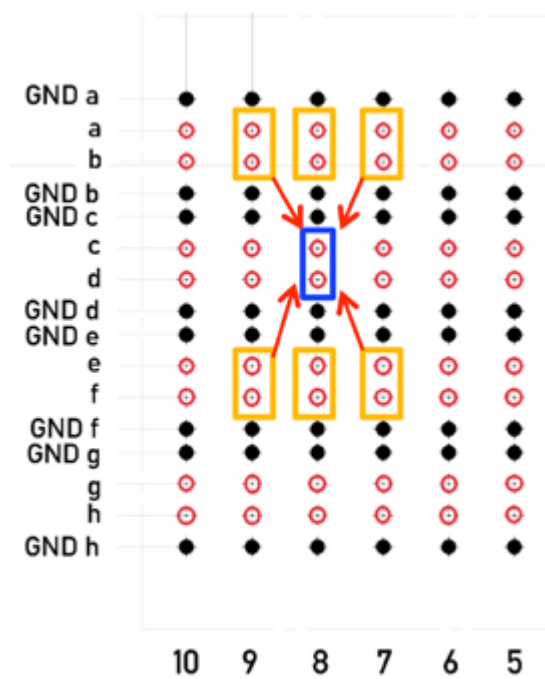
PIN CONFIGURATION (BASED ON ATCA LAYOUT)

Far-End Crosstalk



- Victim Pair
- Aggressors

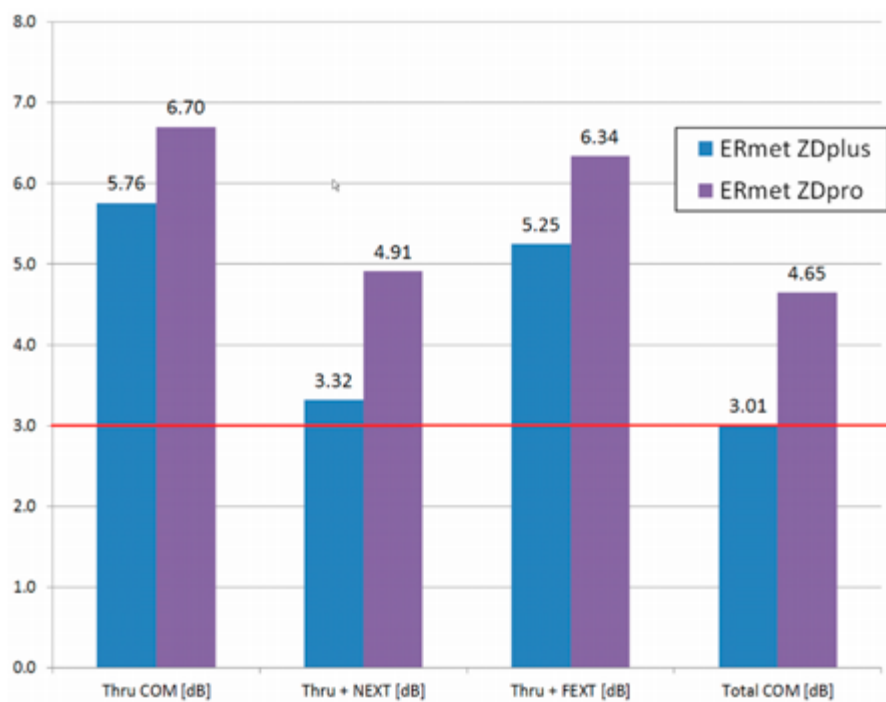
Near-End Crosstalk



ERmet ZDpro - Application Note

COM - 100 GBIT/S ETHERNET

COM SIMULATION RESULTS



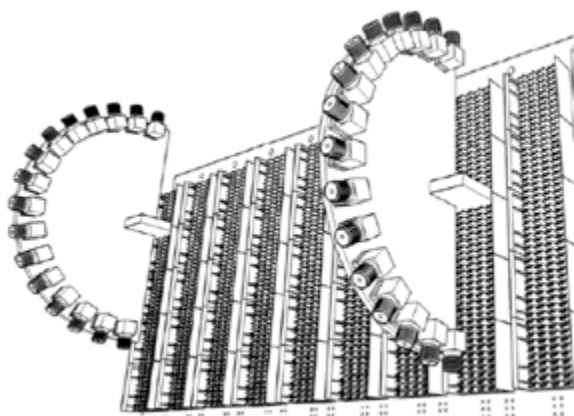
ERmet ZDpro achieves more than 1 dB margin in ATCA applications compared to ZDplus.

ERmet ZDpro - Application Note

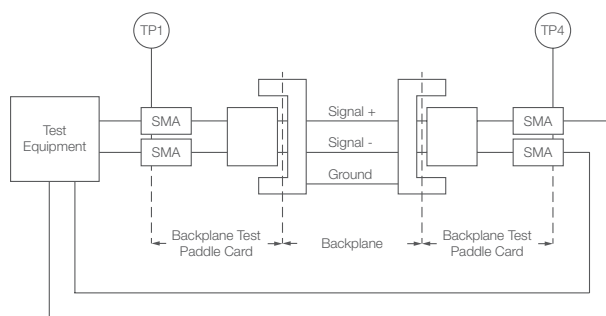
ATCA SYSTEM MEASUREMENT

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

Test Equipment	Description	Notes/Comments
Agilent N5242A	4-Port Vector Network Analyzer 10 MHz to 26.5 GHz	S-Parameter measurements

Test Equipments and Tools

Test Equipment	Description	Notes/Comments
Test-PICMG-BP Rev.2.0 (8406811N61B_FAB_REV_A)	PICMG Backplane Test Paddle Card with ZDpro Connector (ERNI 474960)	Test fixture for backplane validation Low Loss Material: DF = 0.002 - 0.003
Test-PICMG-FB Rev.2.0 (8406811N61B_FAB_REV_A)	PICMG Front Board Test Card with ZDpro Connector (ERNI 474982)	Test fixture for adapter validation

ERmet ZDpro - Application Note

S-PARAMETER ANALYSIS

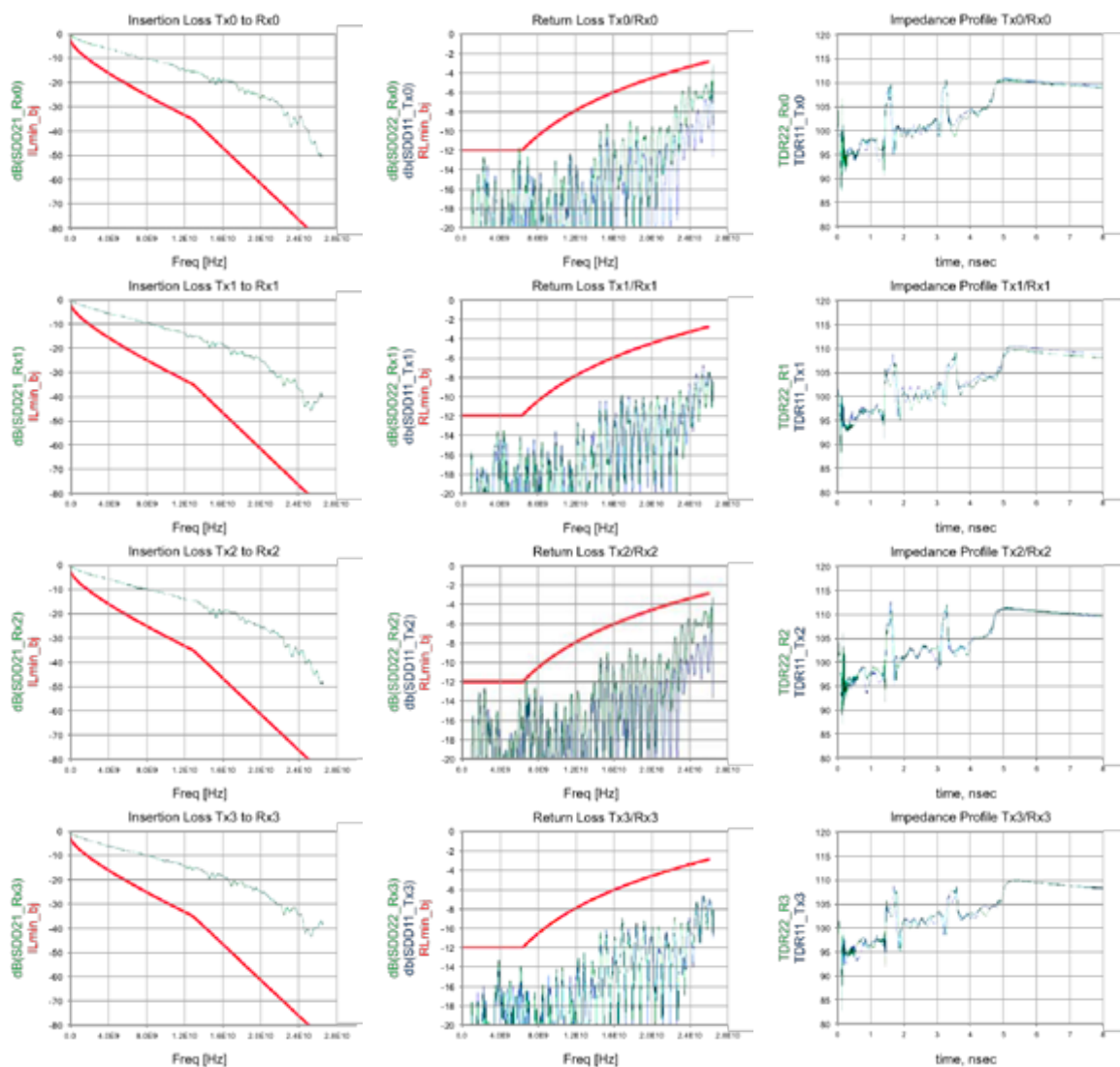
SHORT RANGE

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

Transmitter (blue), Receiver (green)

Eqn T_{tdr}=8.0ns

Dataset	Date
Top_BP_AXP4440_400_L01tcL02	Jul 23, 2014



ERmet ZDpro - Application Note

S-PARAMETER ANALYSIS

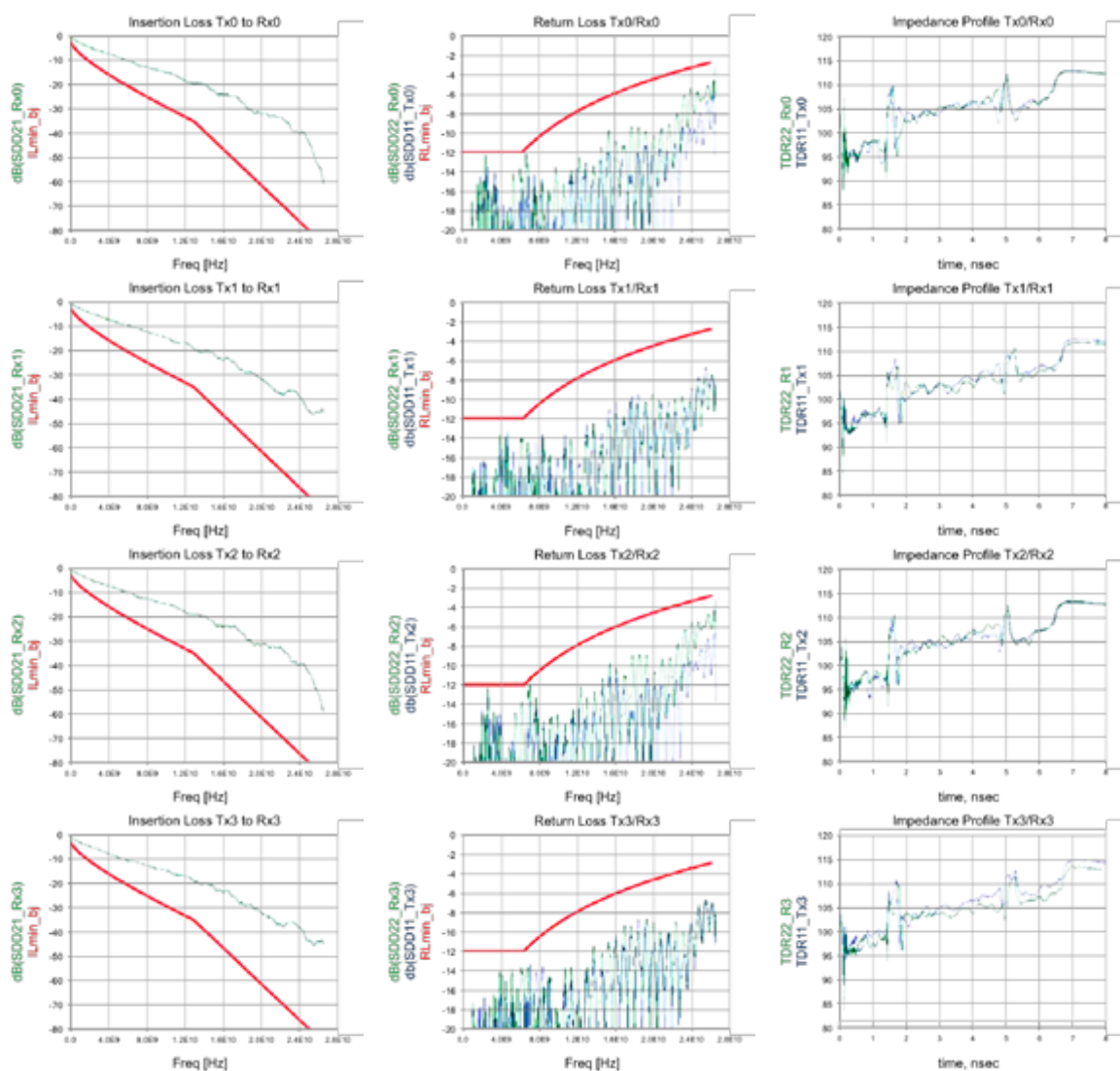
LONG RANGE

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

Transmitter (blue), Receiver (green)

Eqn T_{tdr}=8.0ns

Dataset	Date
Top_BP_AXP4440_400_L01tcL02	Jul 23, 2014



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