Power DTE Mid-Span Cabling Implementation

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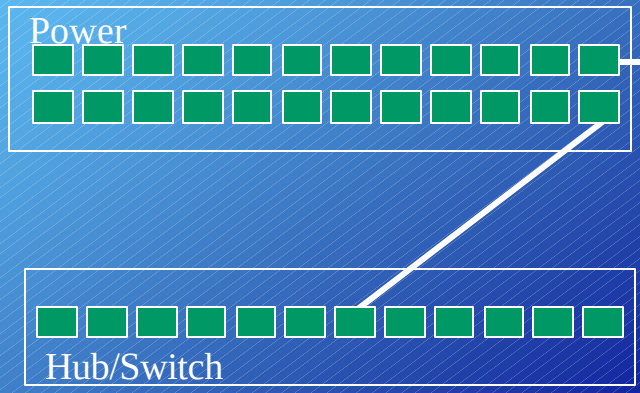
Agenda

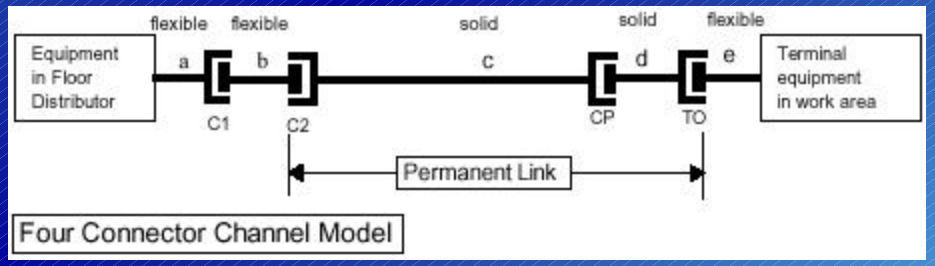
- Problems with present implementation
- Y patch cord proposal
- Power implementation on unused pairs (45,78)
- Power implementation on signal pairs (12,36)
- Effect of the transformer on the Return loss
- Conclusions and recommendations

Present Implementation



RJ45 direct to
Patch Panel

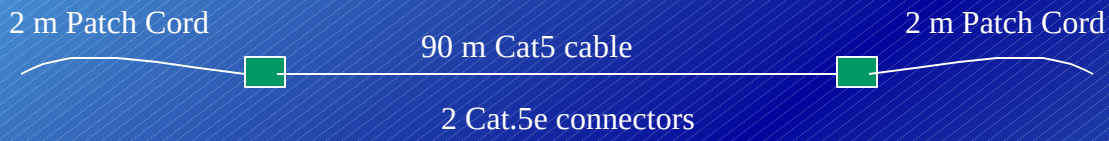
Power in 45-78
Signal in 12-36

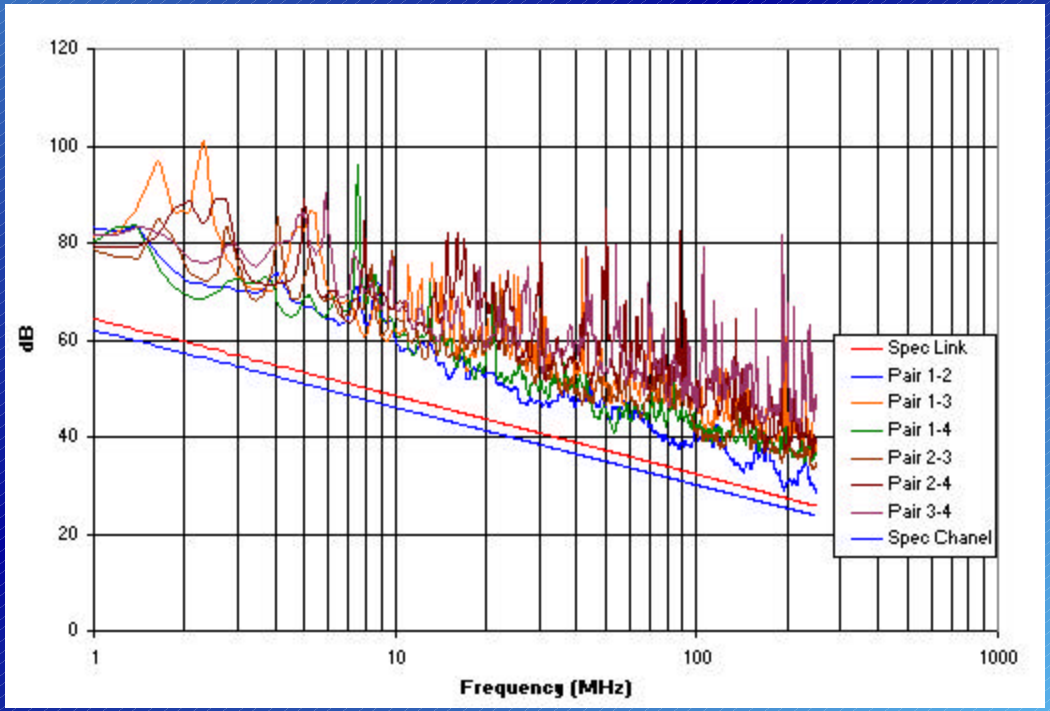


- Implementation issues
  - Violate EIA/TIA rules of maximum number of connectors
    - Cause NEXT and Return-Loss Failures
  - Power modules requires two RJ45 Jacks per port well tuned for cat 5e performances
  - Requires two patch cord per ports

Present Implementation NEXT Results

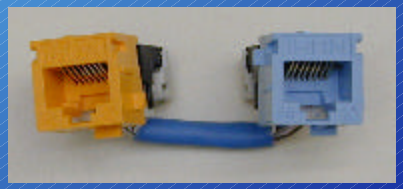
- Typical Cat 5e Basic Link (2 connectors)

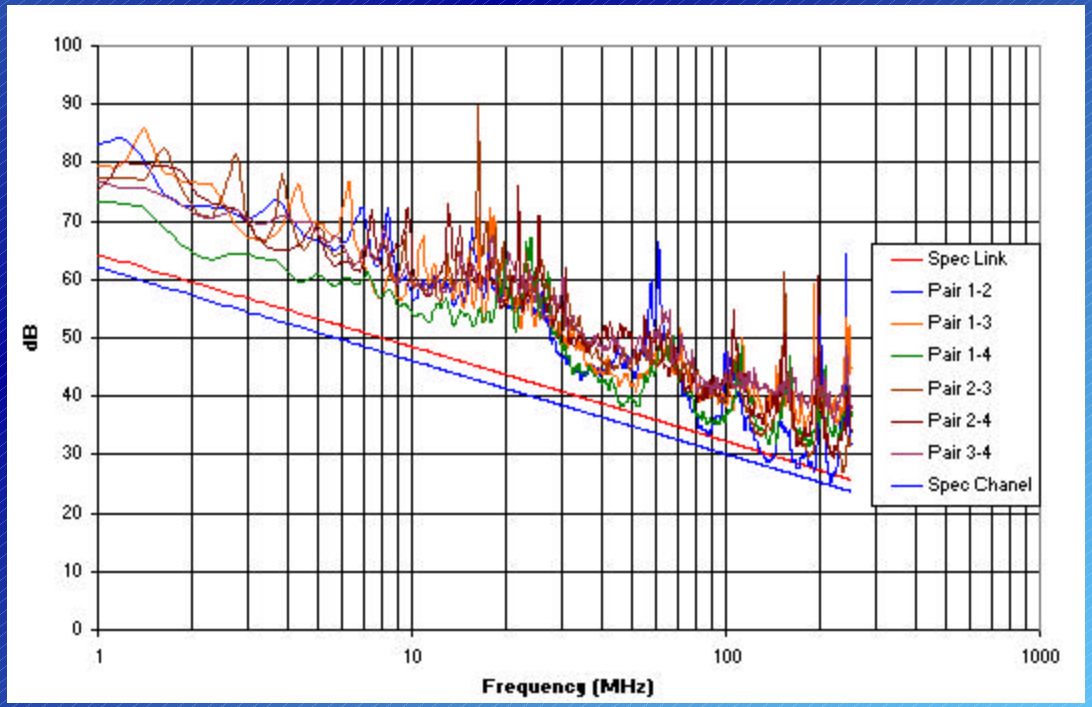




Present Implementation NEXT Results

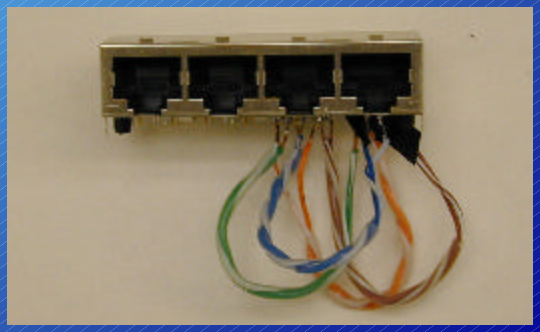
- Power Module simulation with Cat 5e connectors

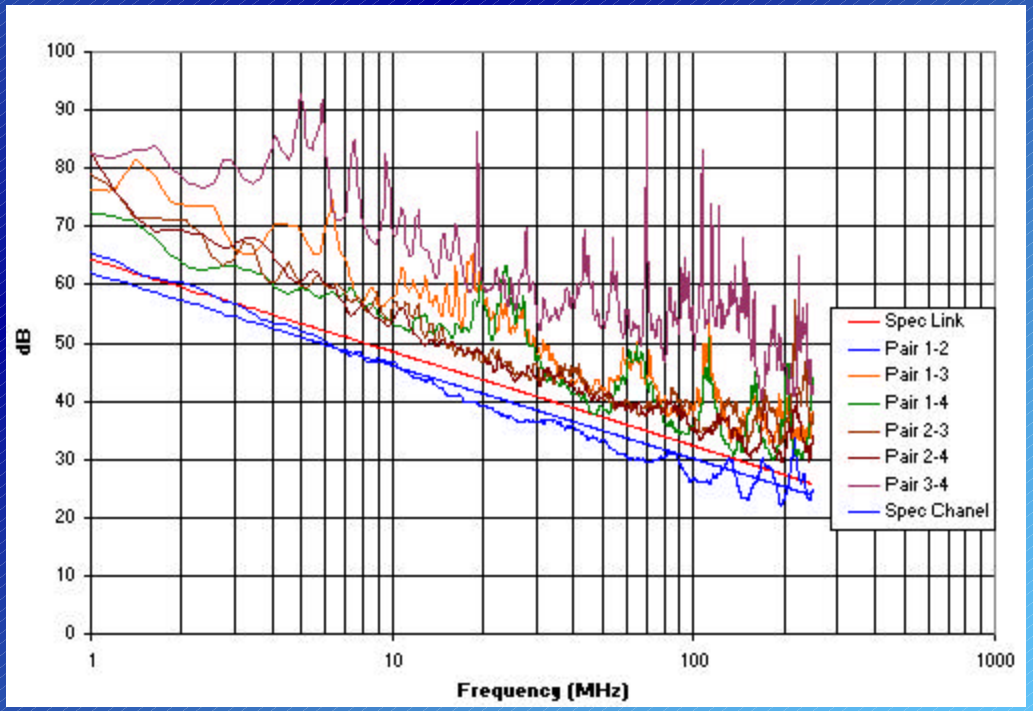




Present Implementation NEXT Results

- Power Module simulation with PCB mount Cat 5 connectors

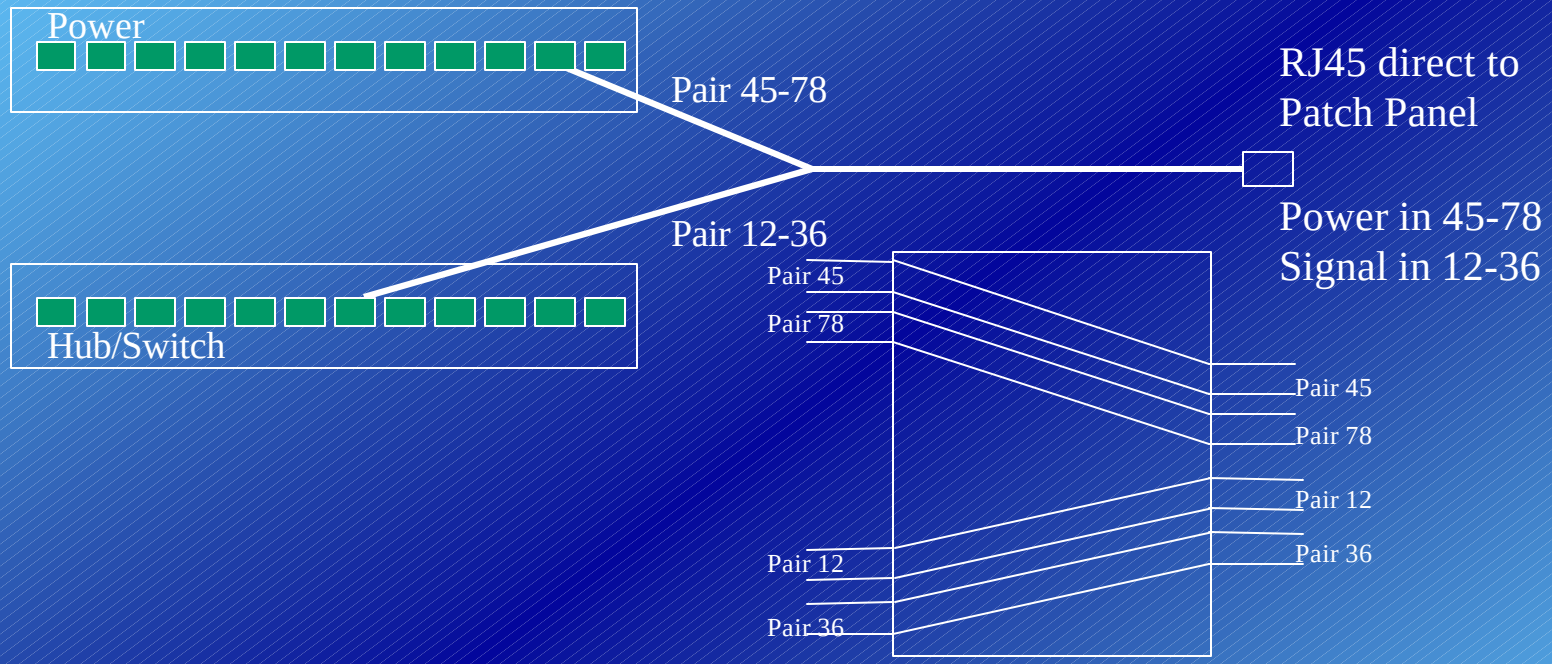




Other Alternatives

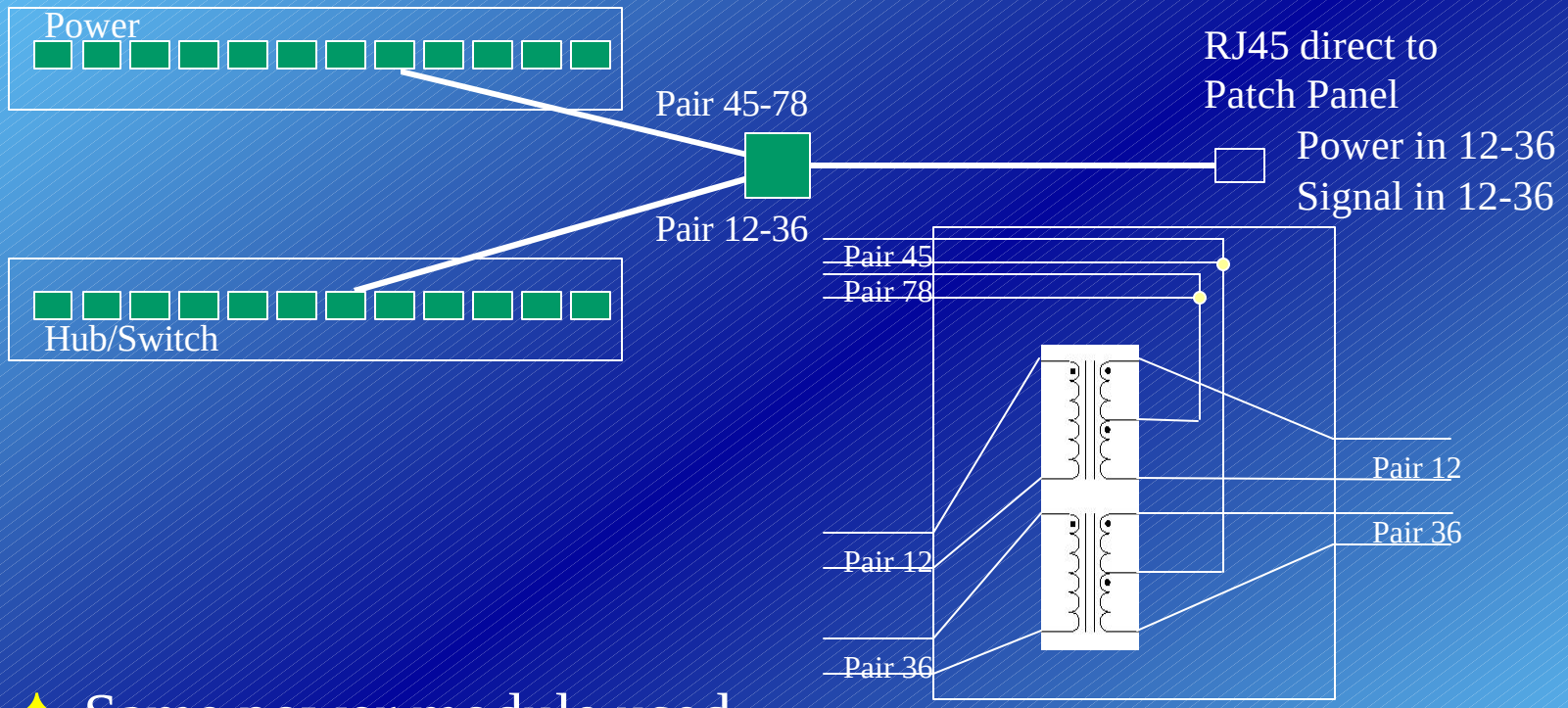
- Replace the existing patch panel with the mid-span power module
  - Not desirable
  - The power module will require and IDC connector for cable termination
- Use of a Y patch cord
  - No need to touch the patch panel / horizontal cable
  - No infringement on cabling standard
  - Reduces (by half) the number of port per power module
  - Same power module may support 4 pair and 2 pair implementation
  - Replaces two standard patch cord

Y Patch Cord - Implementation



- Power is provided on the unused pair (45-78)
- Y patch cord combines the signal and the power on the same connector

Y Patch Cord - Implementation



- Same power module used
- Y patch cord combine power and signal on pair 12 and 36

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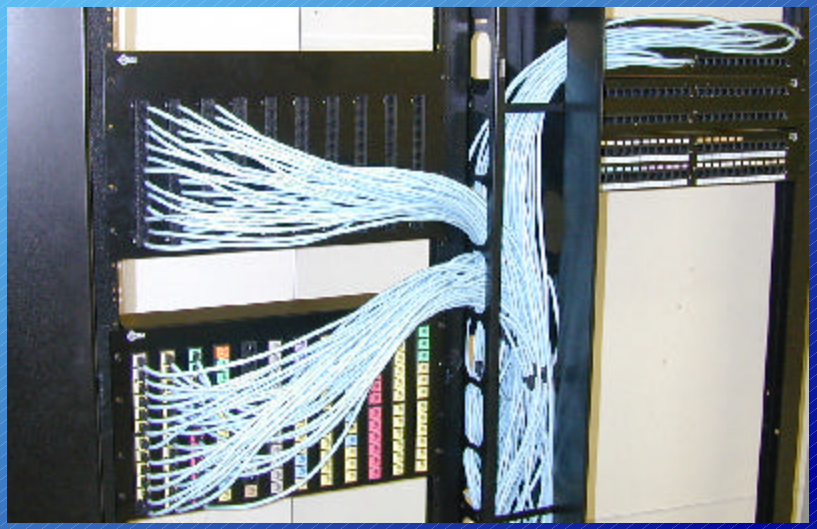
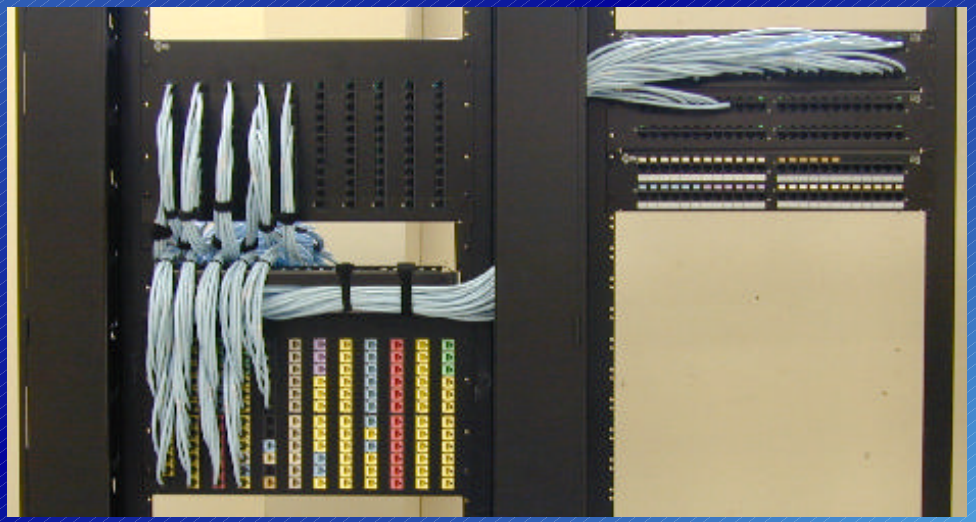
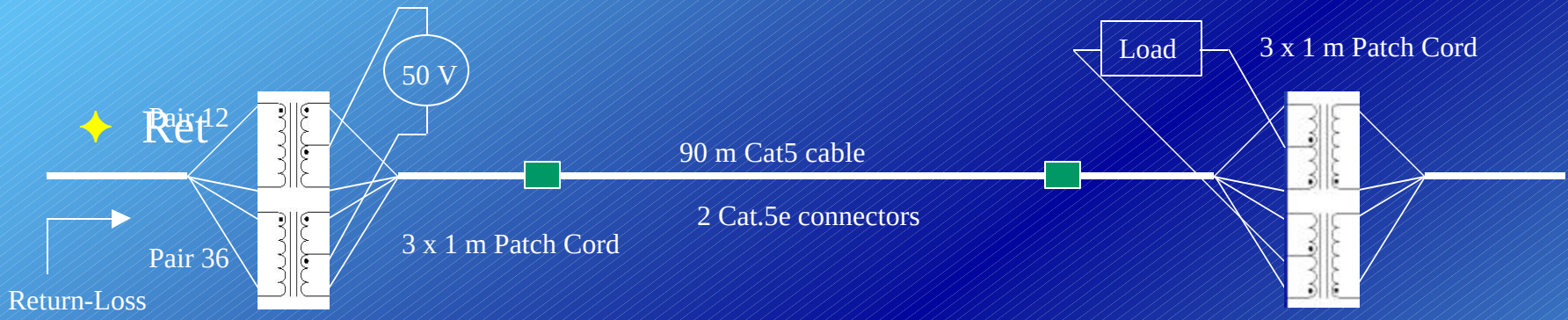
Y Patch Cord Cabling Management





- Simulation with 144 port panel
- Y patch cord installation could be a mess
- Use of organizer tray facilitates the installation by keeping the patch cord slack at the rear of the rack

Transformer Effect on Return-Loss



Return-Loss Measurements

- Without Transformer
- With transformer no Power Cable
- With power cable open
- With power supply off
- With 50 V no load
- With 50 V 45 mA load
- With 50 V 90 mA load
- With 50 V 140 mA load
- With 50 V 180 mA load
- With 50 V 210 mA load

- Test done on two different transformers

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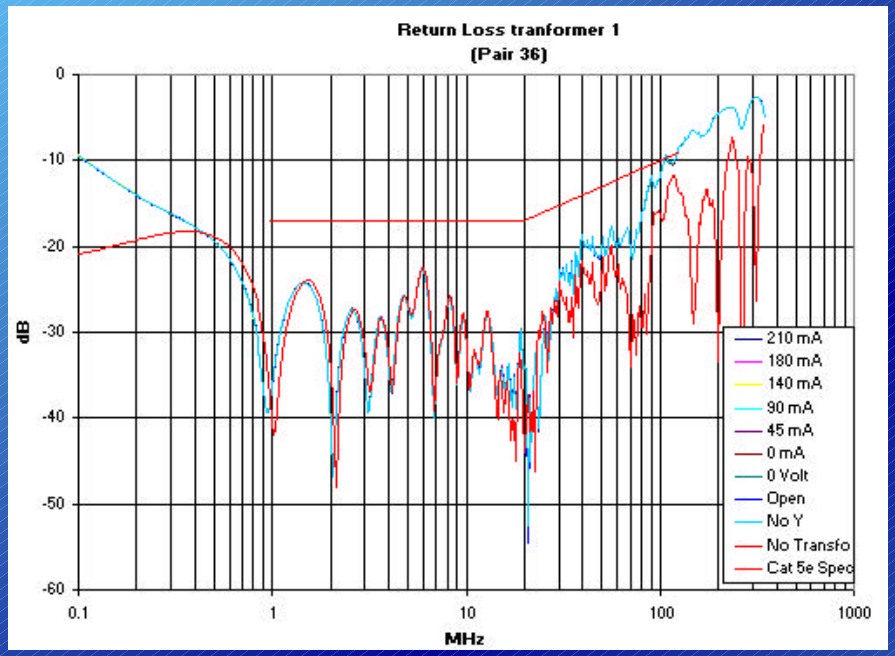
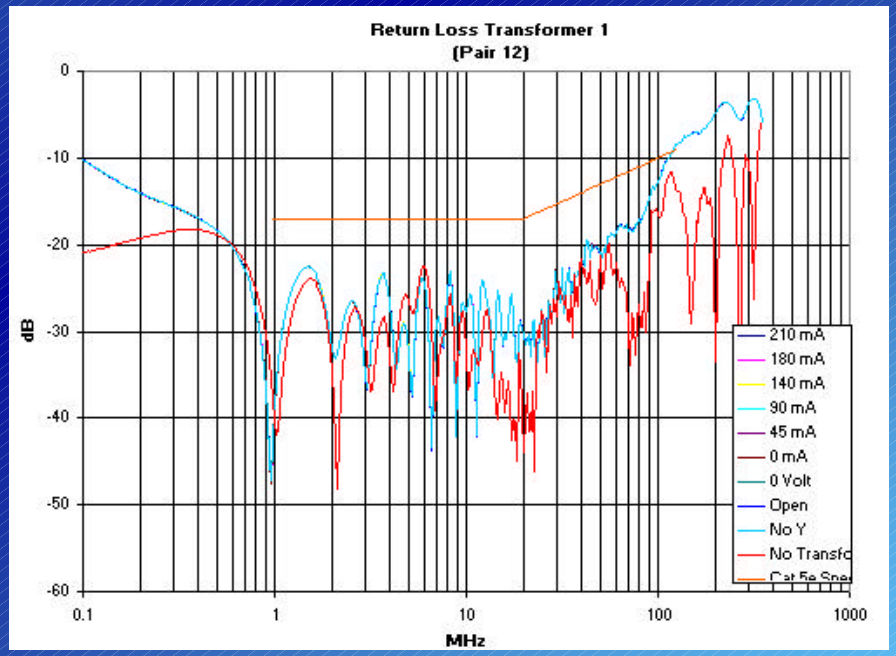
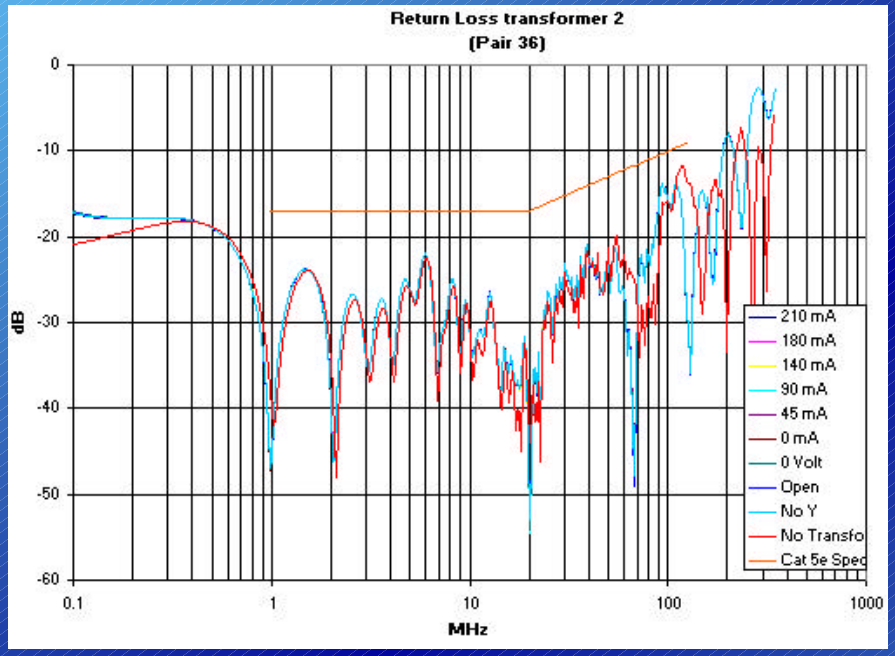
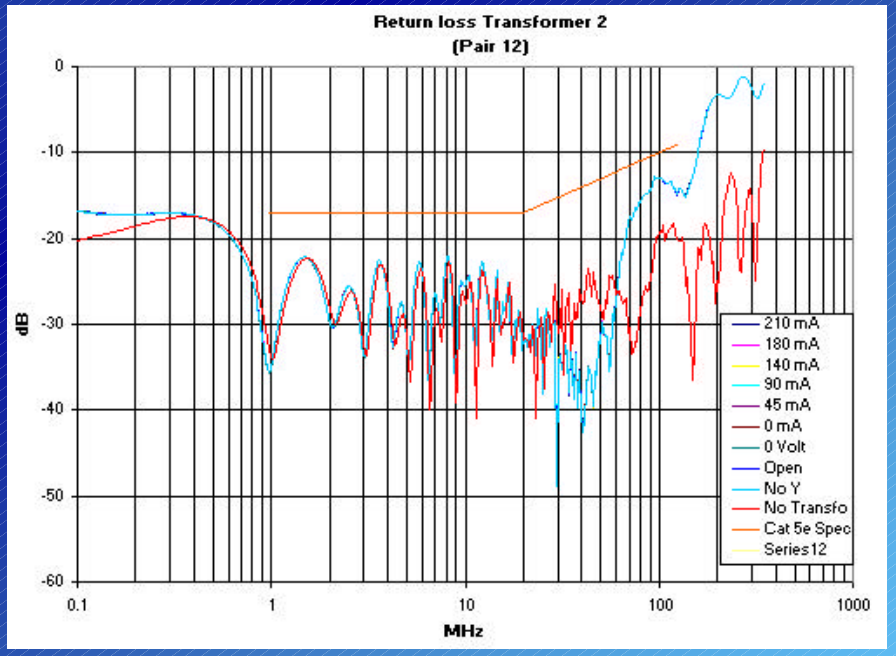
Return-Loss Measurements
Transformer 1



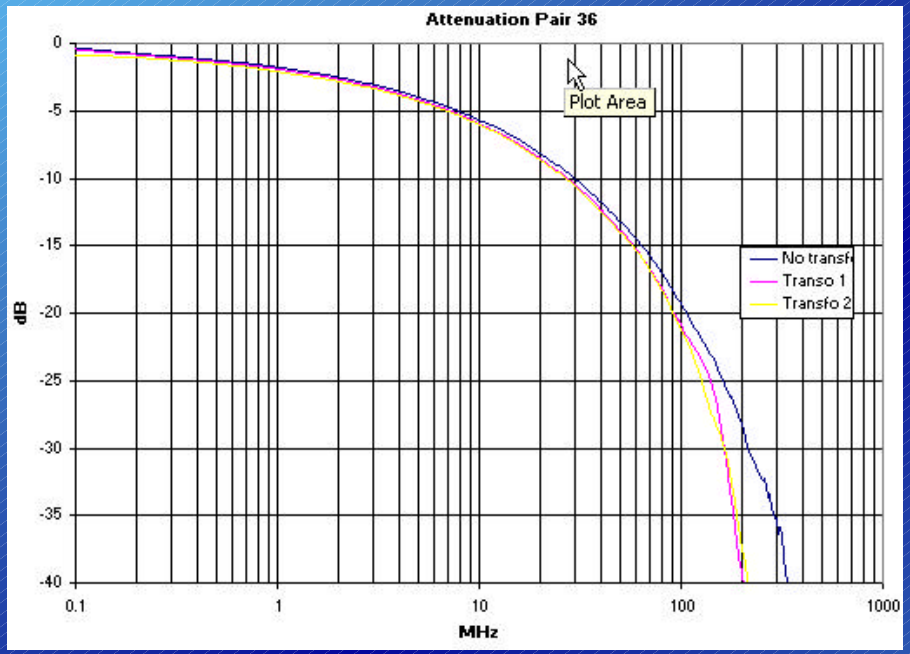


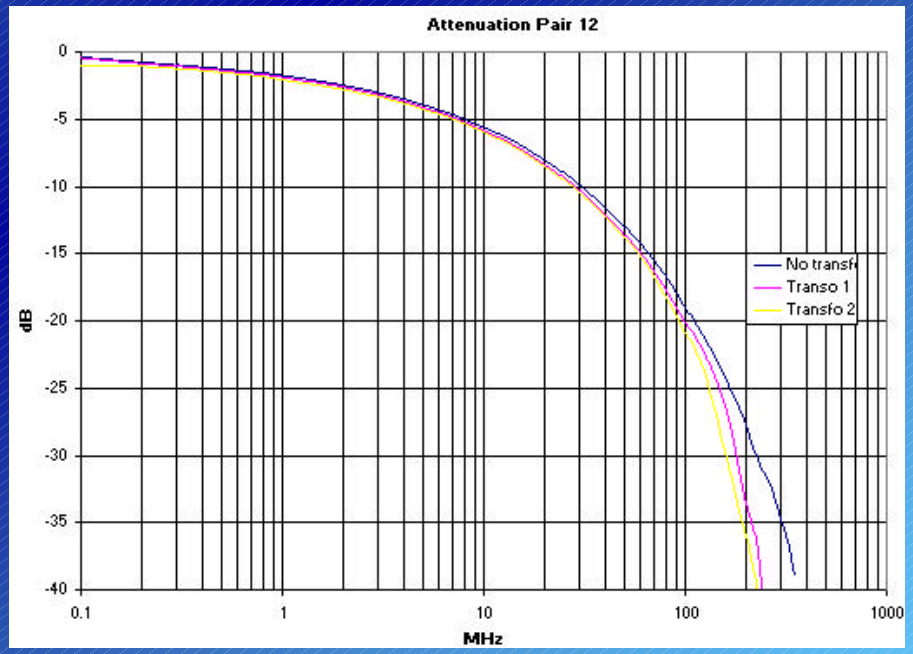
Return-Loss Measurements
Transformer 2





Transformer Effect on Attenuation





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Conclusions and Recommendations

- Use of transformers for two pair implementation have negligible effect on Return-Loss
- Adoption of the Y patch cord will allow:
  - reduction of the port density of mid-span power module
  - 2 pair and 4 pair implementation can be supported using the same mid-span power module
  - Comply with cabling standard
- DTE end device may use a combined interface (as presented by Howard Frazier, Dallas Jan 00) to allow powering from either pair combination (pair 45-78 or pair 12-36)