
SCSI SPI Working Group Study of First Pulse and Attenuation Using Various Industry Backplanes and Cables

Huntington Beach, CA

September 12, 2000

Seagate - Bruce Manildi

T10/00-348

Summary

■ Lab Setup

- Actual Silicon Driver - Precursor to Fast-160 Driver
- With crosstalk (all signal being driven- random on DBs)
- With noise (fully loaded backplanes)
- With silicon imperfections

■ Subsystems

- Received from vendors
- Actually have been shipped, are shipping, will ship

What we found

- Twist and Flat cables are used inside cabinets
- Round cables are used between cabinets
- Expanders are used in remote cabinets
- The longest TnF cable in a cabinet was 40"
- The longest round cable was 10 Meters
- No first pulses were $<80\%$ now attenuation $>20\%$ when short cables were used (most of the cases)
- No first pulses were $<70\%$ now attenuation $>30\%$ in all cases (including some cases not shipping)

SCSI SPI Working Group 6 Slot Backplane 'A' w/ Vendor supplied cable (longest)

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SCSI SPI Working Group Backplane 'B'- 6 Slot

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SCSI SPI Working Group Backplane C - 10 Slot

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SCSI SPI Working Group Backplane 'D' - 4 Slot

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5 Slot Backplane 'E' w/ various cables

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15 Slot Backplane 'F' w/ various cables

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SCSI SPI Working Group 15 Slot Backplane 'G' w/ various cables

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Invitational Challenge

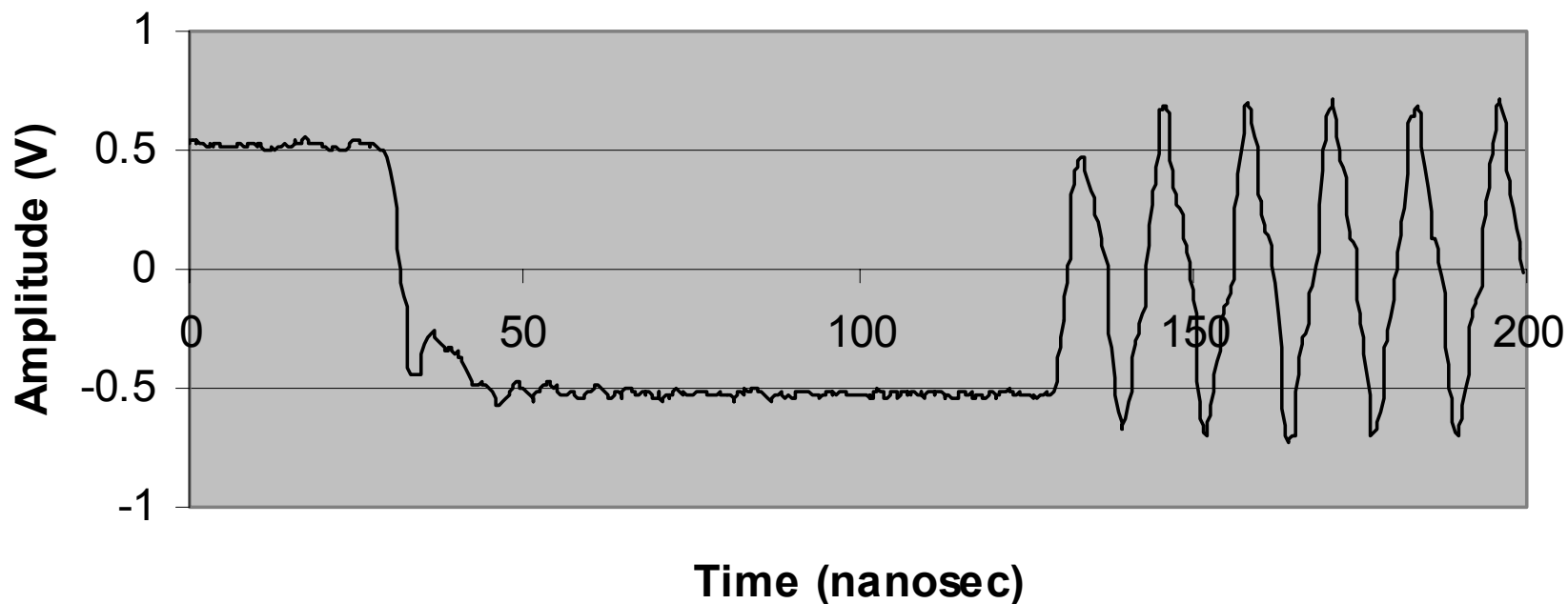
- We set up our lab to facilitate these kind of measurements - and partially automated the collection of data and its presentation
 - First Pulse
 - Frequency attenuation
 - Cable measurements
- We invite you to use our lab
 - Send us you materials and we will measure
 - Come with your materials and we can measure together
 - (If Quantum - we'll set it up in the park next door)

SCSI SPI Working Group 6 Slot Backplane 'A' w/ Vendor supplied cable (longest)

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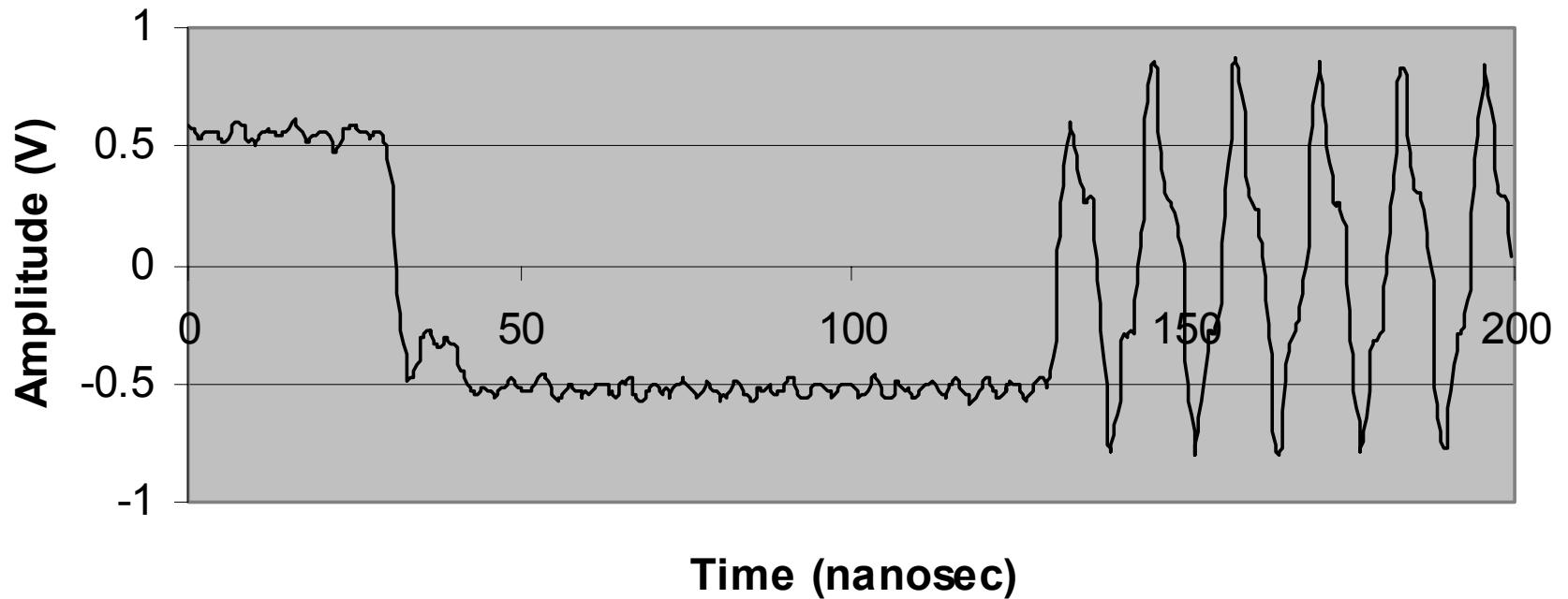
DB0 @ Slot 0 Backplane 'A' Test Chip Driving

DB0 @ Slot 0 BackPlane 'A' w/ vendor cable -
Test Chip



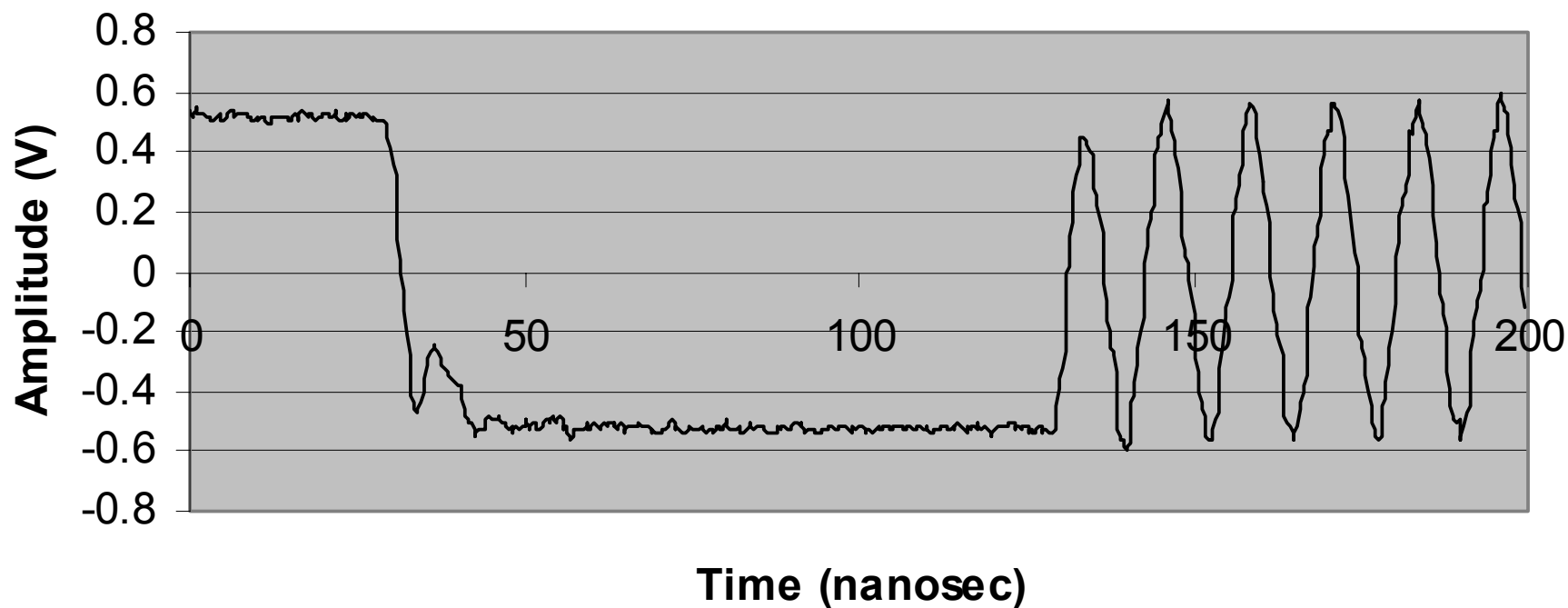
DB9 @ Slot 0 Backplane 'A' Test Chip Driving

DB9 @ Slot 0 BackPlane 'A' w/ vendor cable -
Test Chip



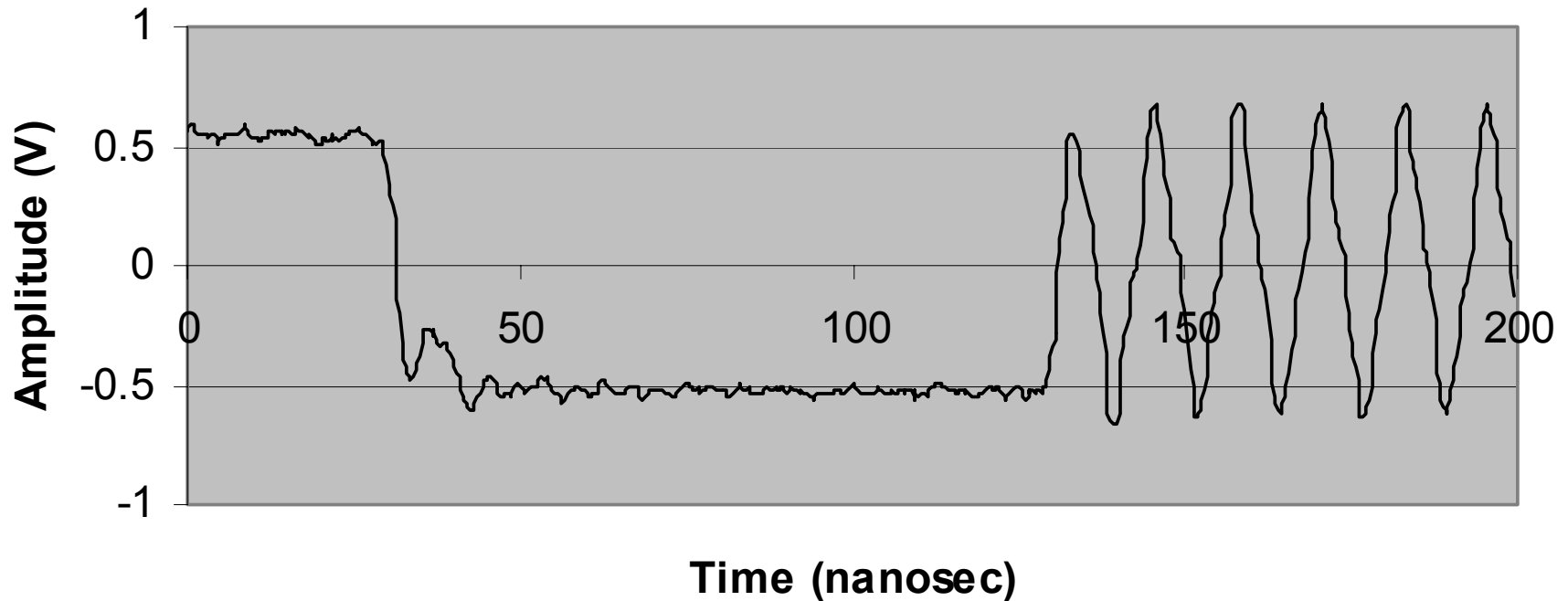
DB0 @ Slot 1 Backplane 'A' Test Chip Driving

DB0 @ Slot 1 BackPlane 'A' w/ vendor cable -
Test Chip



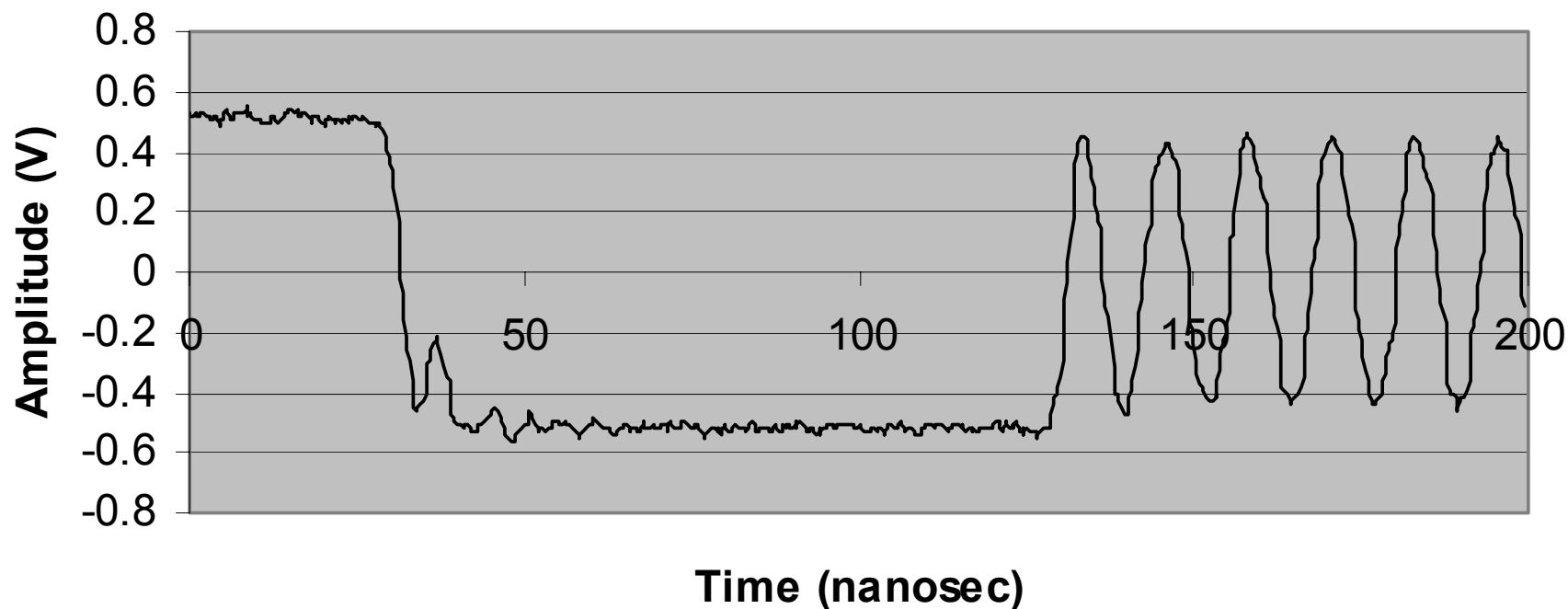
DB9 @ Slot 1 Backplane 'A' Test Chip Driving

DB9 @ Slot 1 BackPlane 'A' w/ vendor cable -
Test Chip



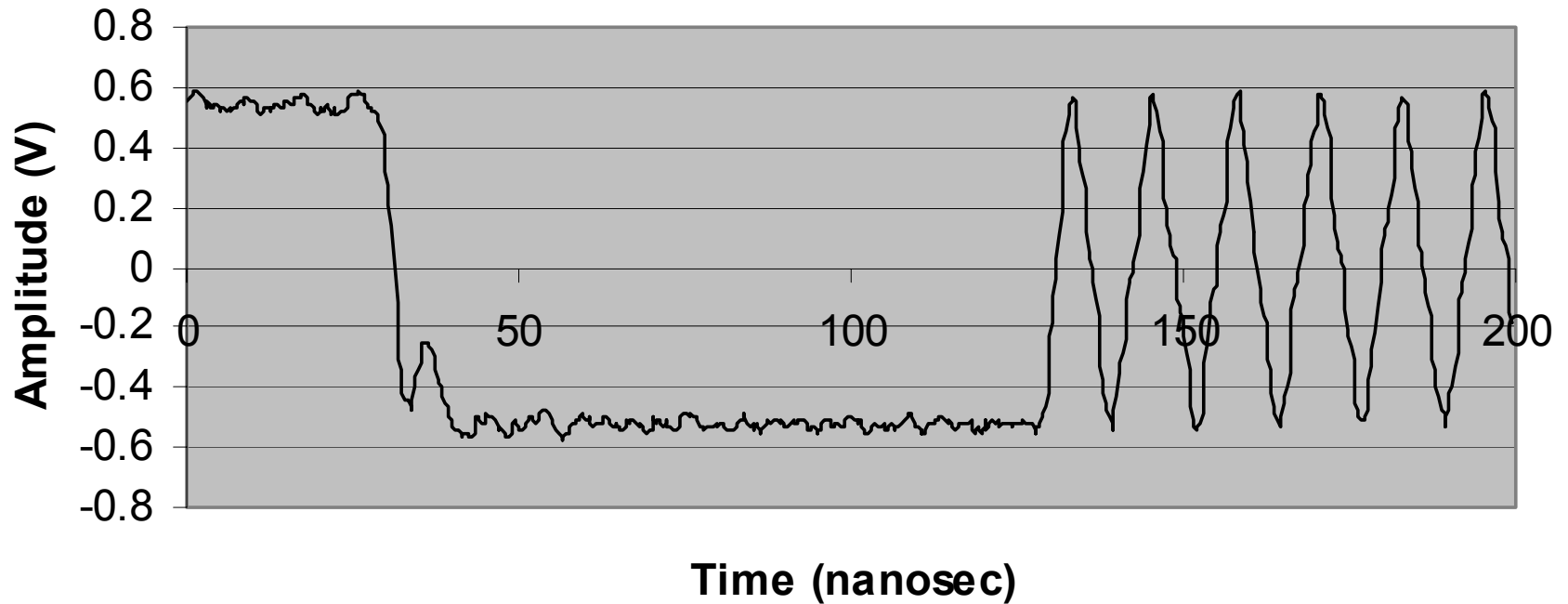
DB0 @ Slot 2 Backplane 'A' Test Chip Driving

DB0 @ Slot 2 BackPlane 'A' w/ vendor cable -
Test Chip



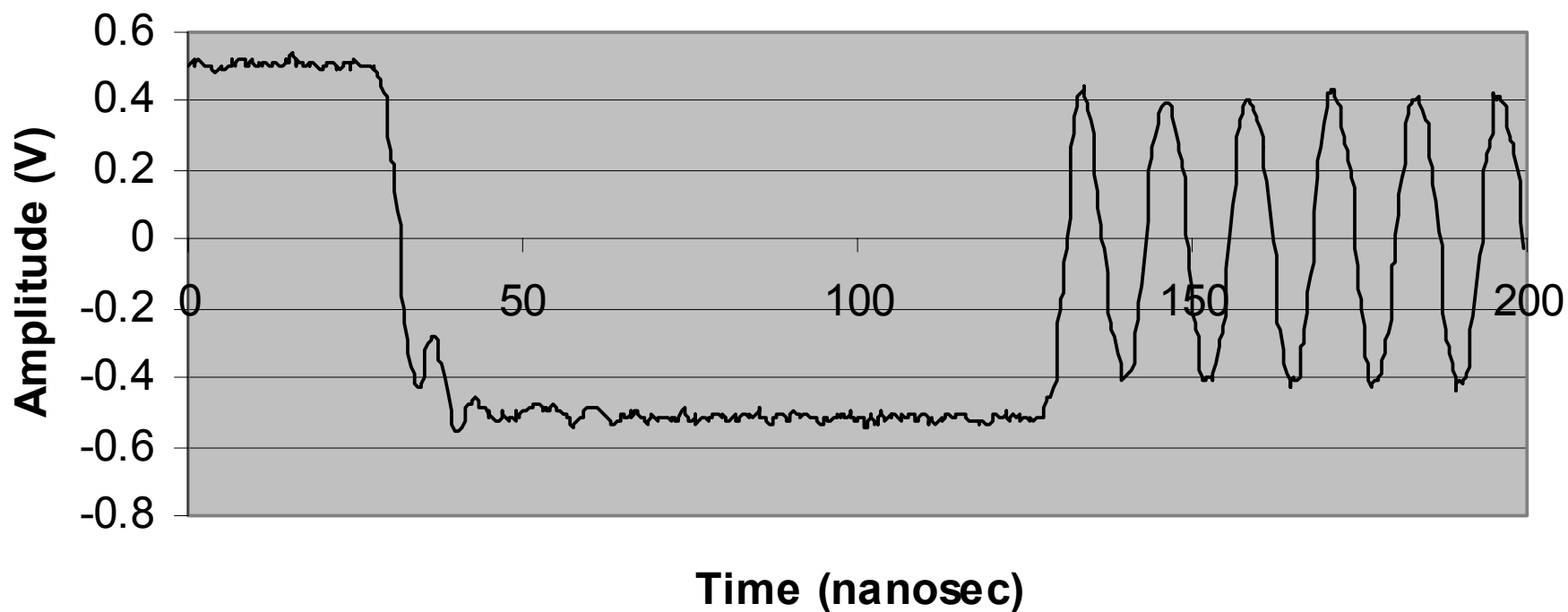
DB9 @ Slot 2 Backplane 'A' Test Chip Driving

DB9 @ Slot 2 BackPlane 'A' w/ vendor cable -
Test Chip



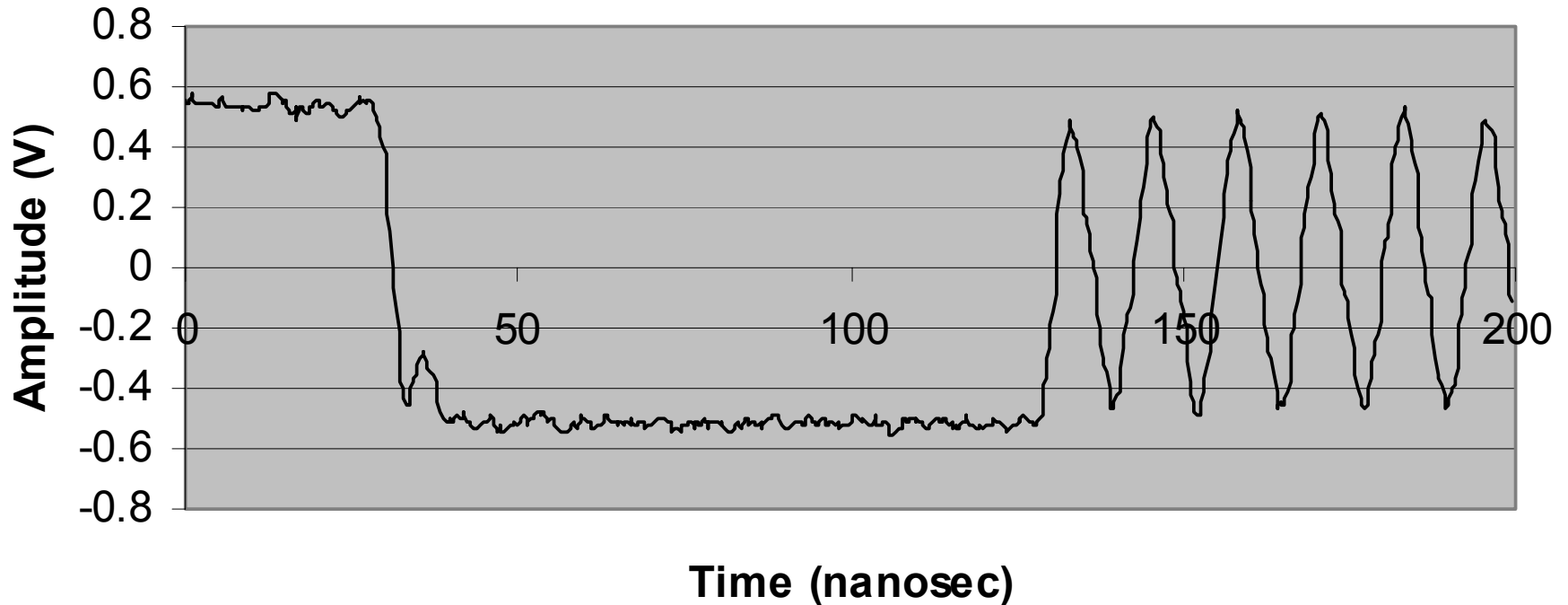
DB0 @ Slot 3 Backplane 'A' Test Chip Driving

DB0 @ Slot 3 BackPlane 'A' w/ vendor cable -
Test Chip



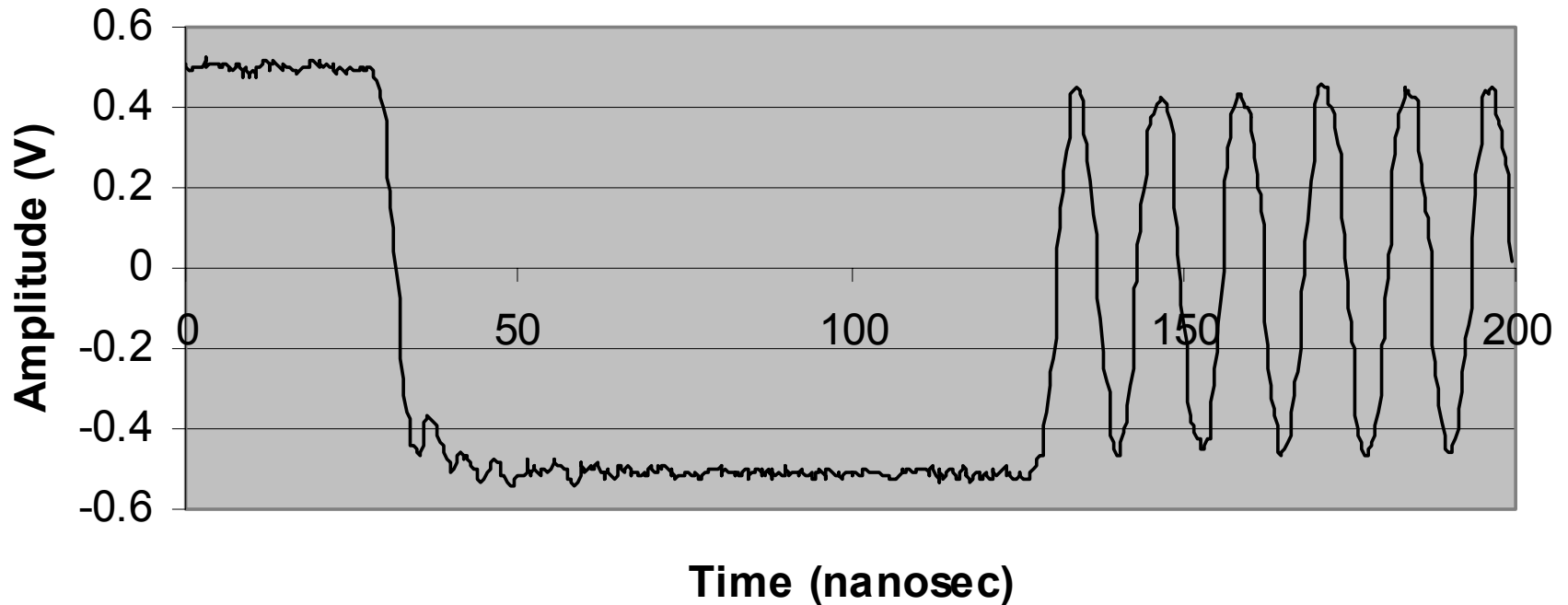
DB9 @ Slot 3 Backplane 'A' Test Chip Driving

DB9 @ Slot 3 BackPlane 'A' w/ vendor cable -
Test Chip



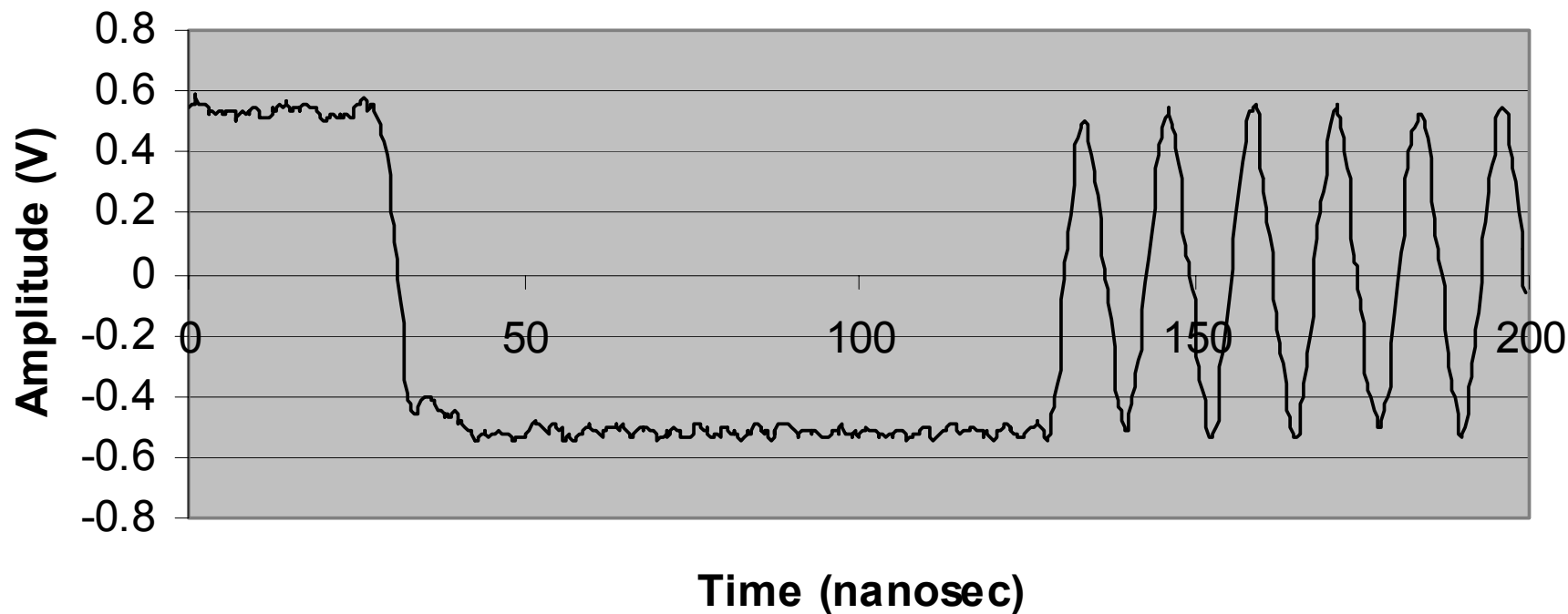
DB0 @ Slot 4 Backplane 'A' Test Chip Driving

DB0 @ Slot 4 BackPlane 'A' w/ vendor cable -
Test Chip



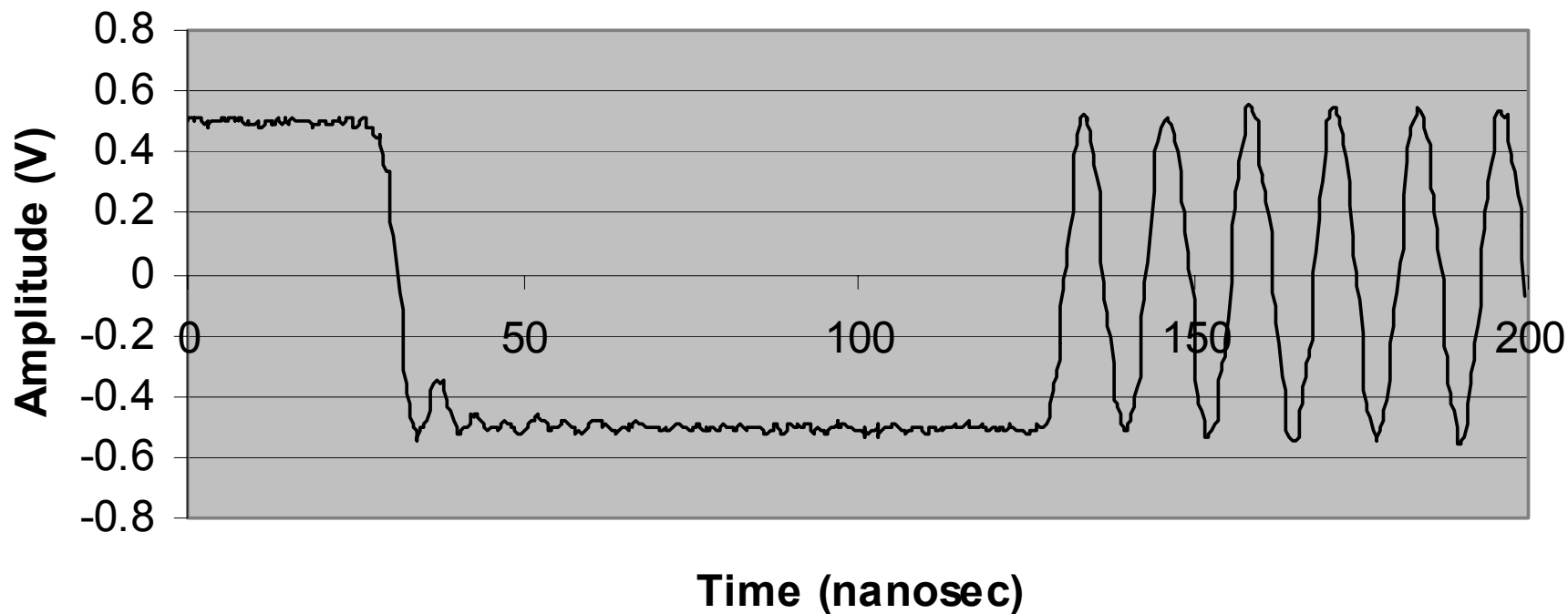
DB9 @ Slot 4 Backplane 'A' Test Chip Driving

DB9 @ Slot 4 BackPlane 'A' w/ vendor cable -
Test Chip



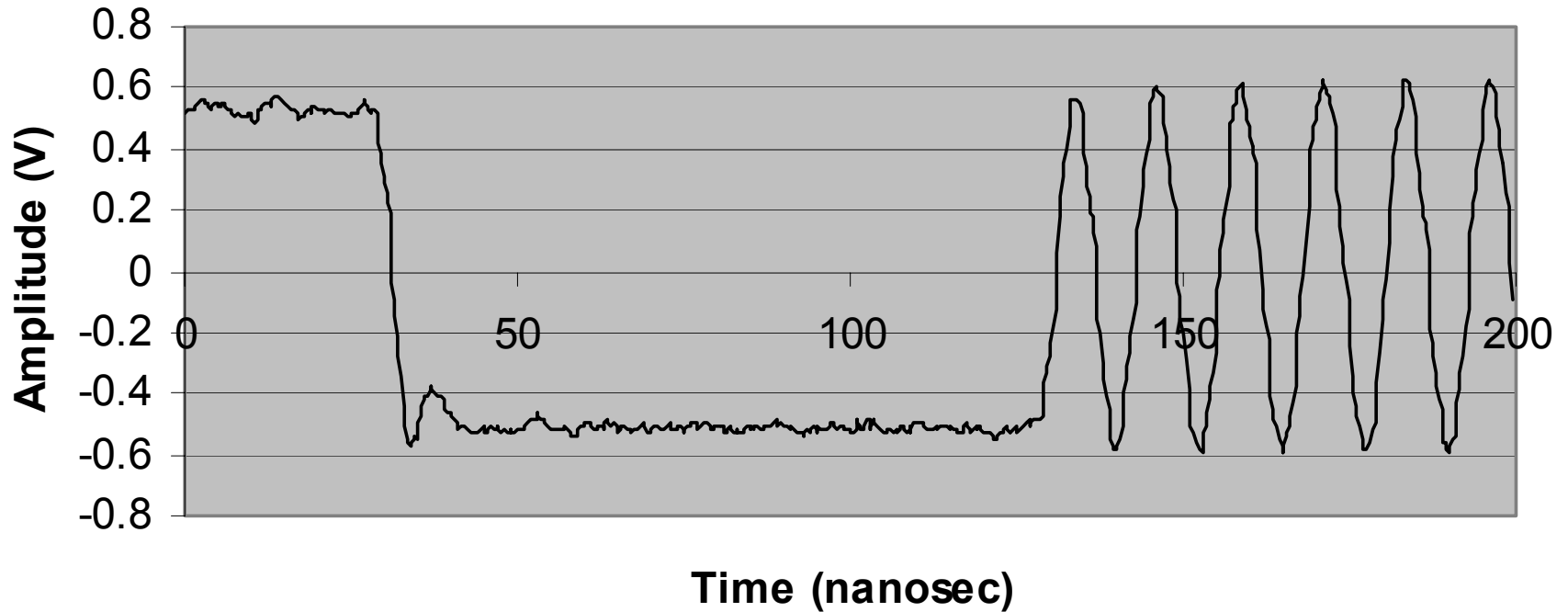
DB0 @ Slot 5 Backplane 'A' Test Chip Driving

DB0 @ Slot 5 BackPlane 'A' w/ vendor cable -
Test Chip



DB9 @ Slot 5 Backplane 'A' Test Chip Driving

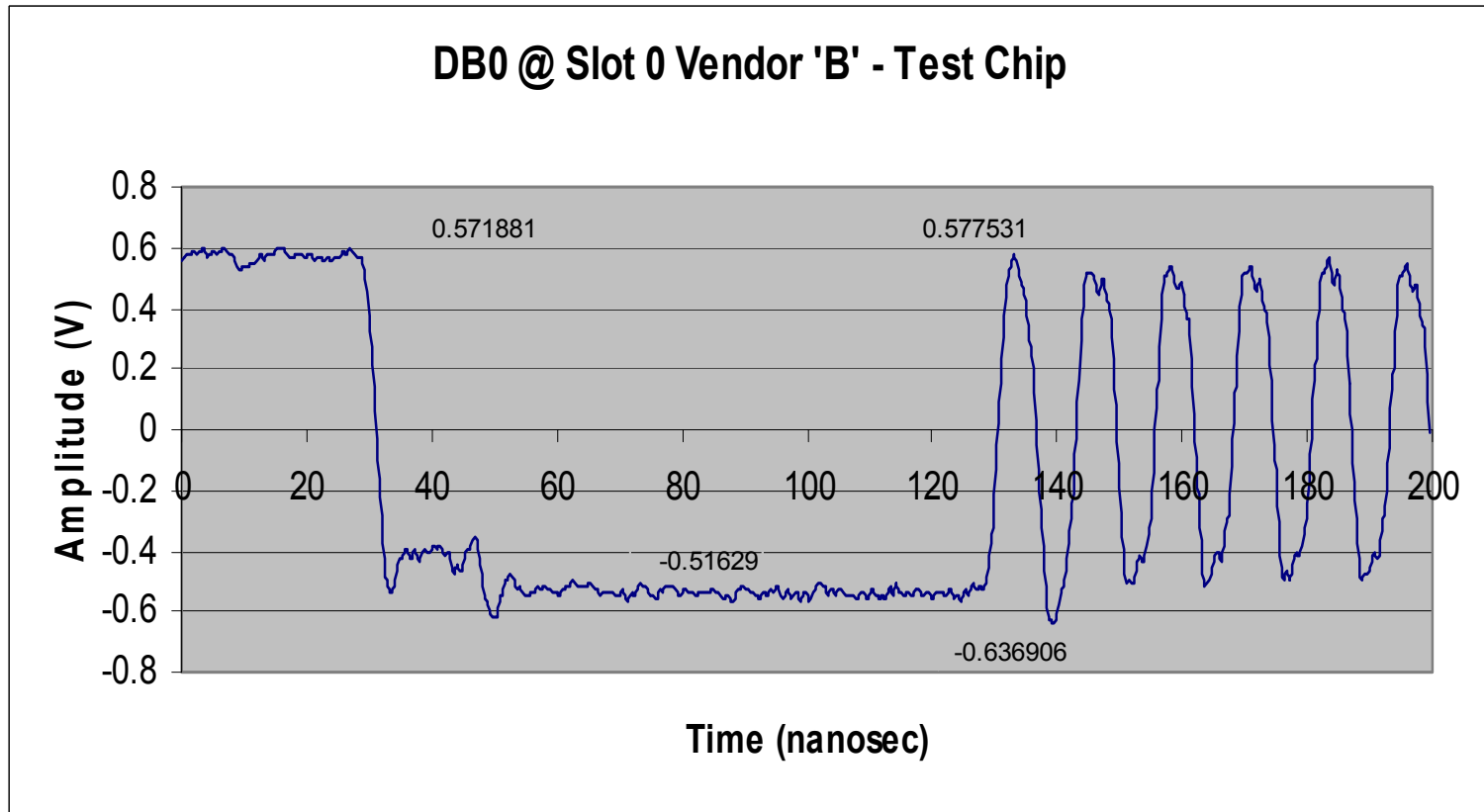
DB9 @ Slot 5 BackPlane 'A' w/ vendor cable -
Test Chip



SCSI SPI Working Group Backplane 'B'

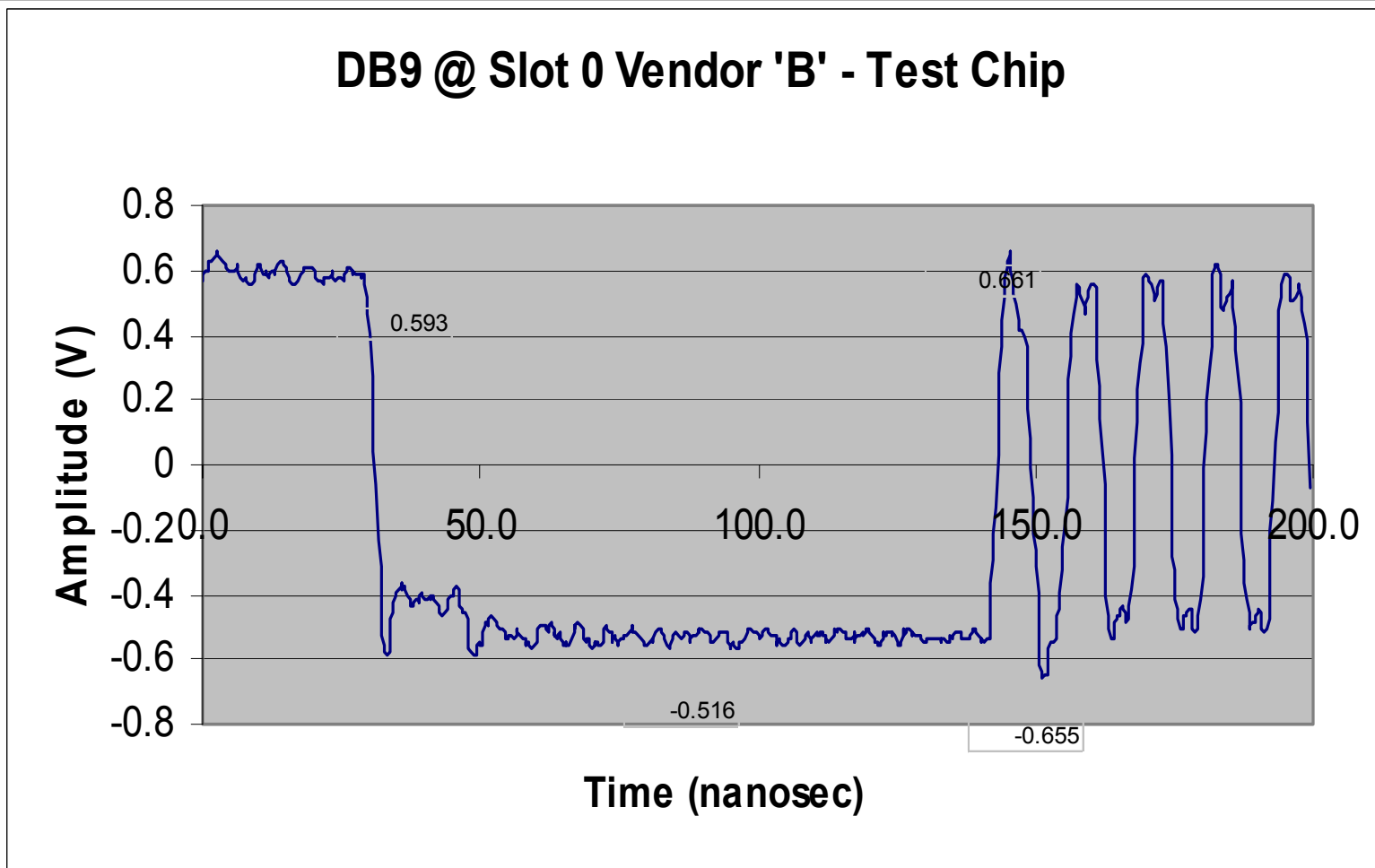
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DB0 @ Slot 0 Vendor 'B' Test Chip Driving



Cable length = 40 in. (max. supported by vendor)

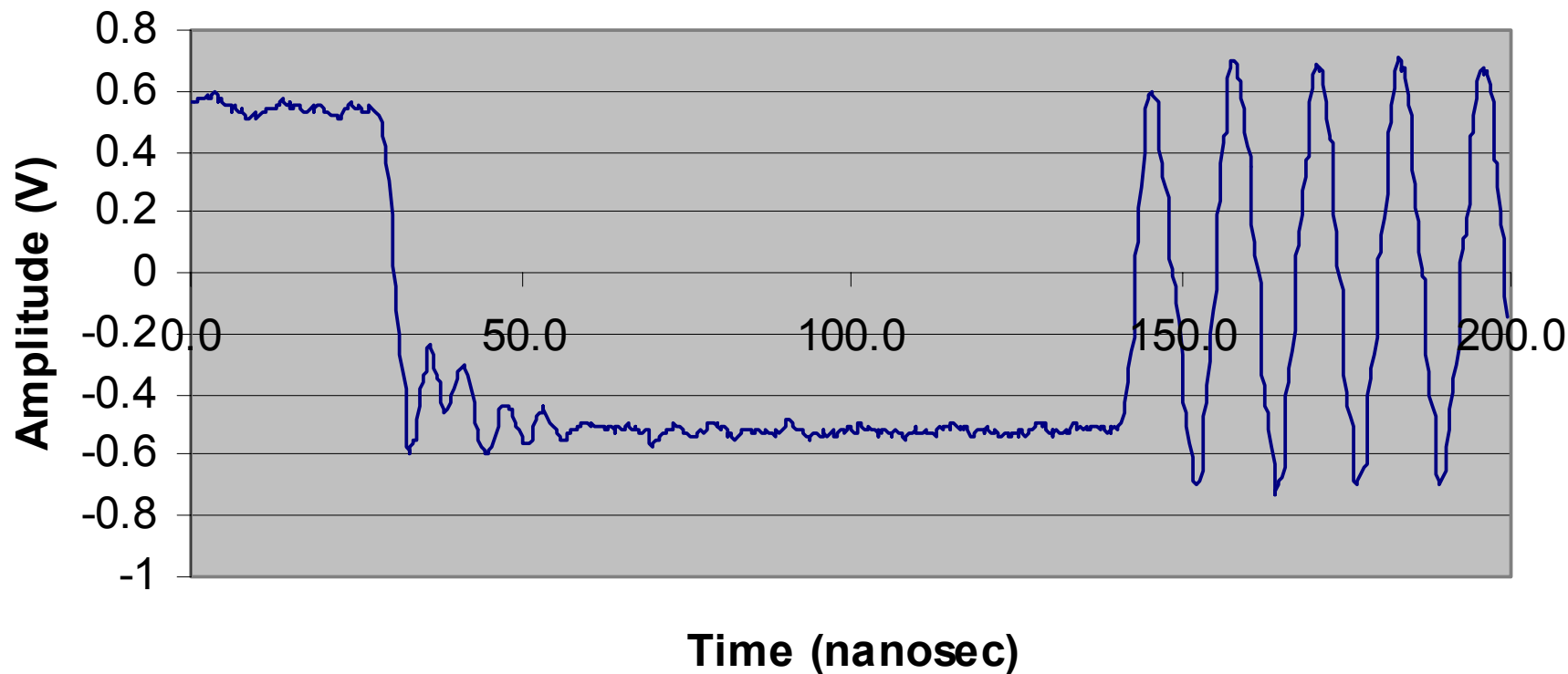
DB9 @ Slot 0 Vendor 'B' - Test Chip Driving



Cable length = 40 in. (max. supported by vendor)

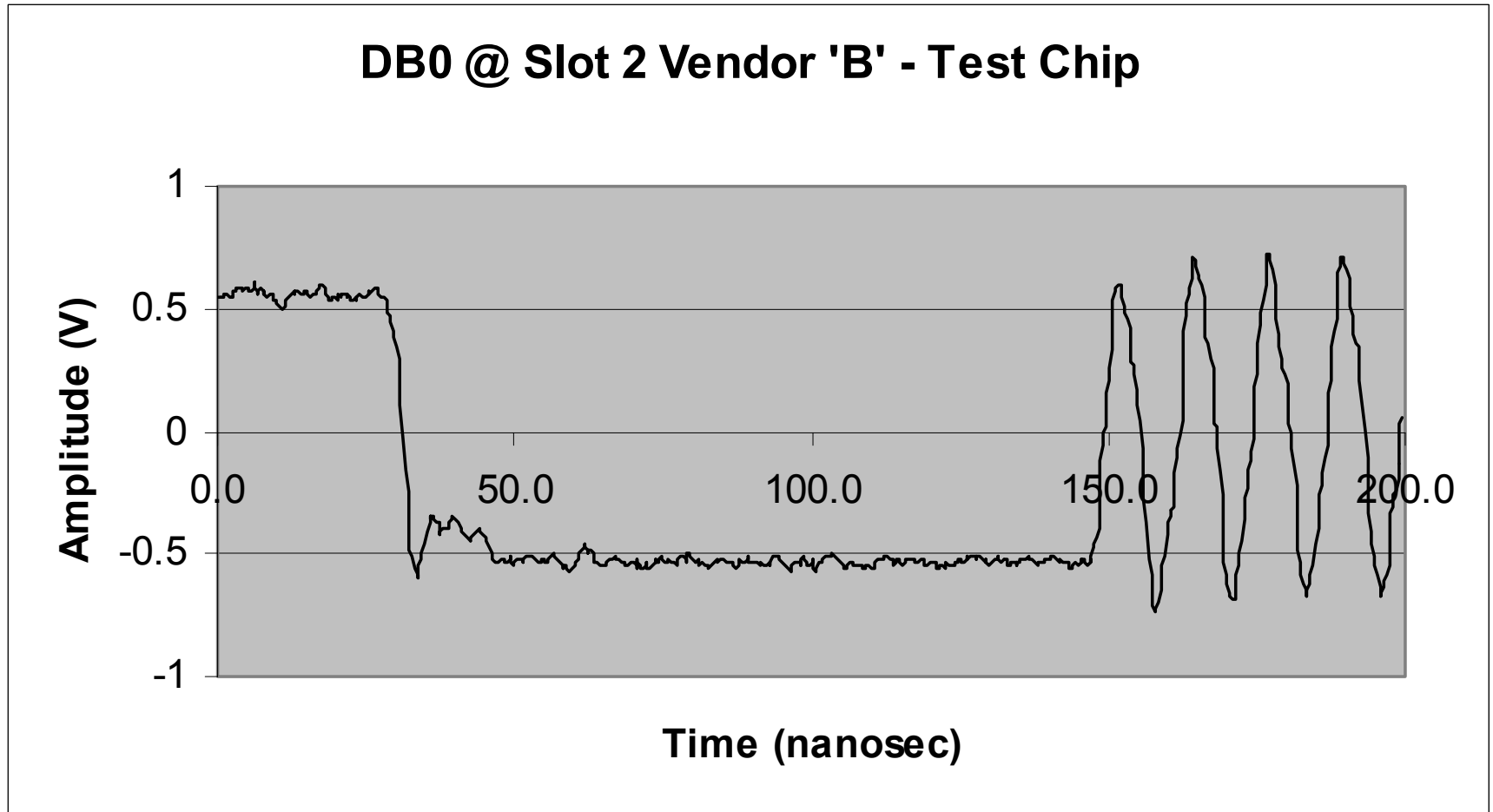
DB0 @ Slot 1 Vendor 'B' Test Chip Driving

DB0 @ Slot 1 Vendor 'B' - Test Chip



Cable length = 40 in. (max. supported by vendor)

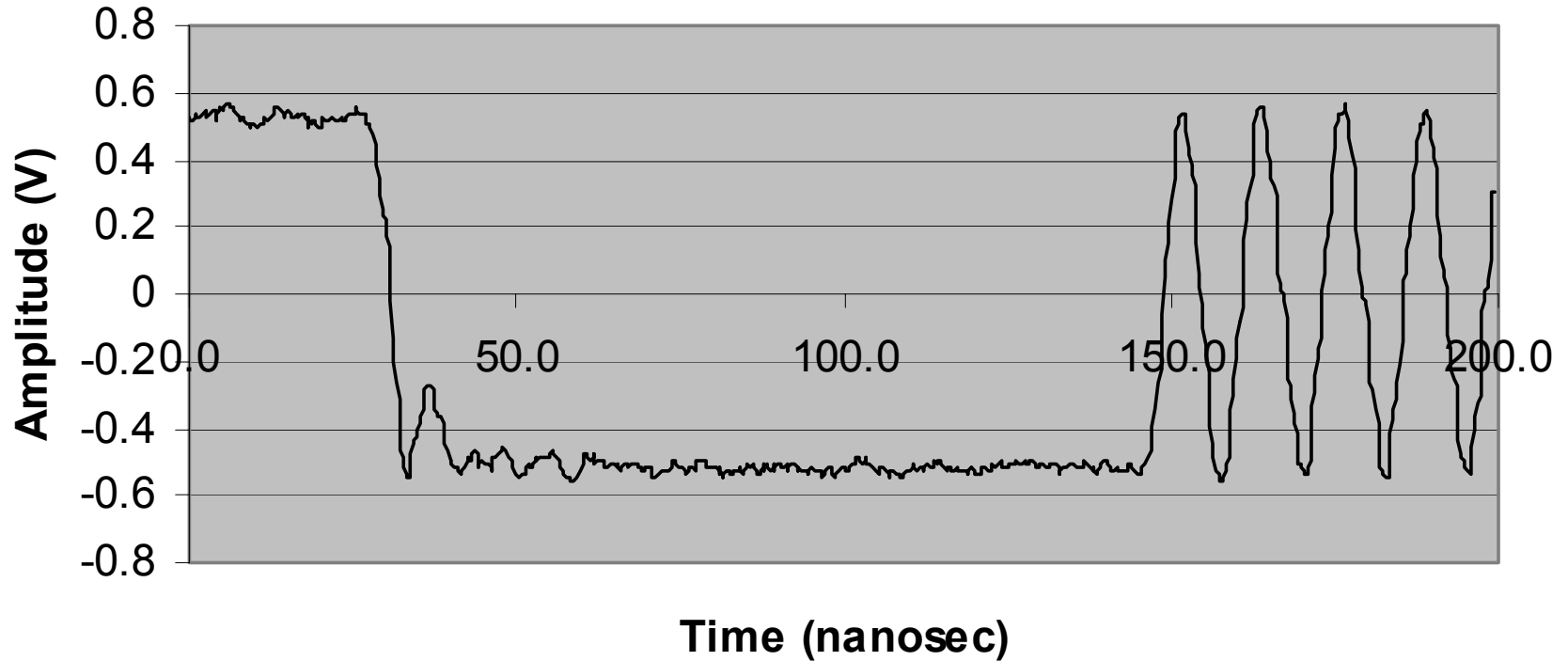
DB0 @ Slot 2 Vendor 'B' Test Chip Driving



Cable length = 40 in. (max. supported by vendor)

DB0 @ Slot 3 Vendor 'B' Test Chip Driving

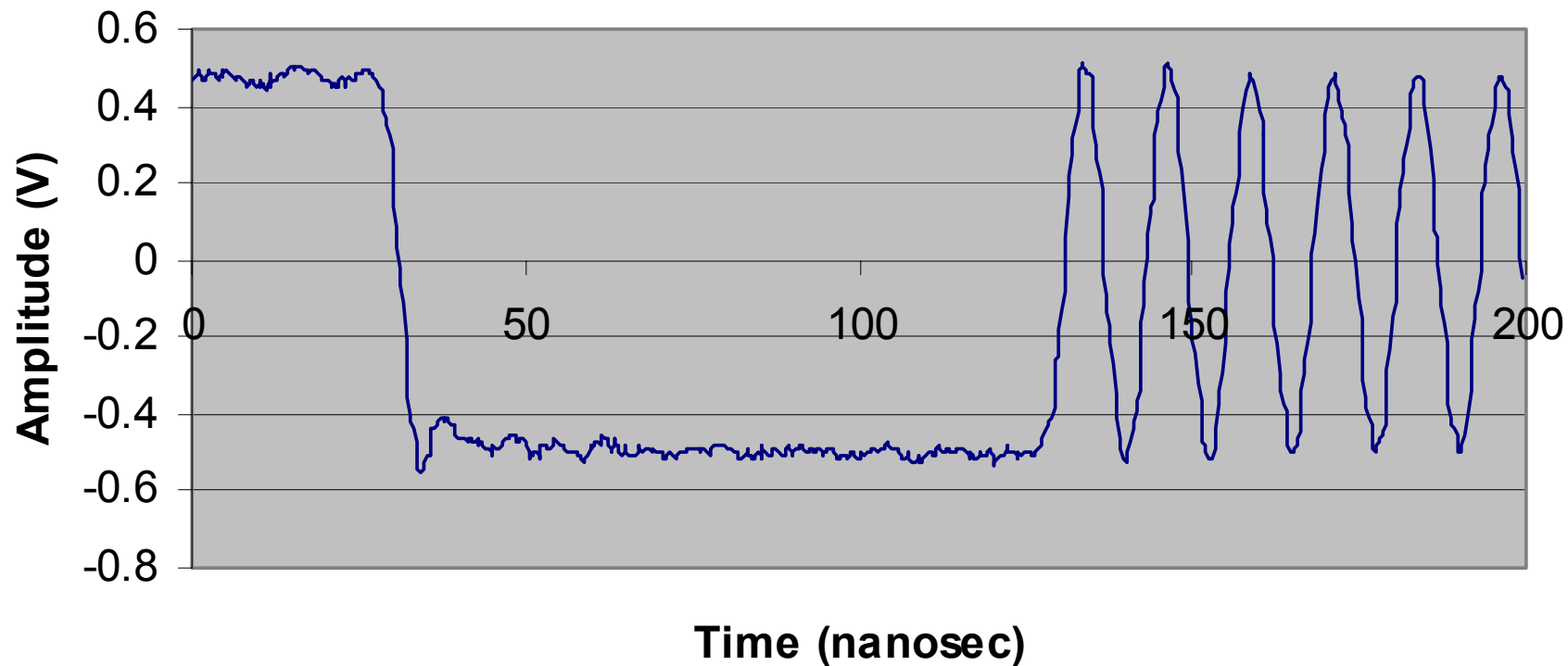
DB0 @ Slot 3 Vendor 'B' - Test Chip



Cable length = 40 in. (max. supported by vendor)

DB0 @ Slot 4 Vendor 'B' Test Chip Driving

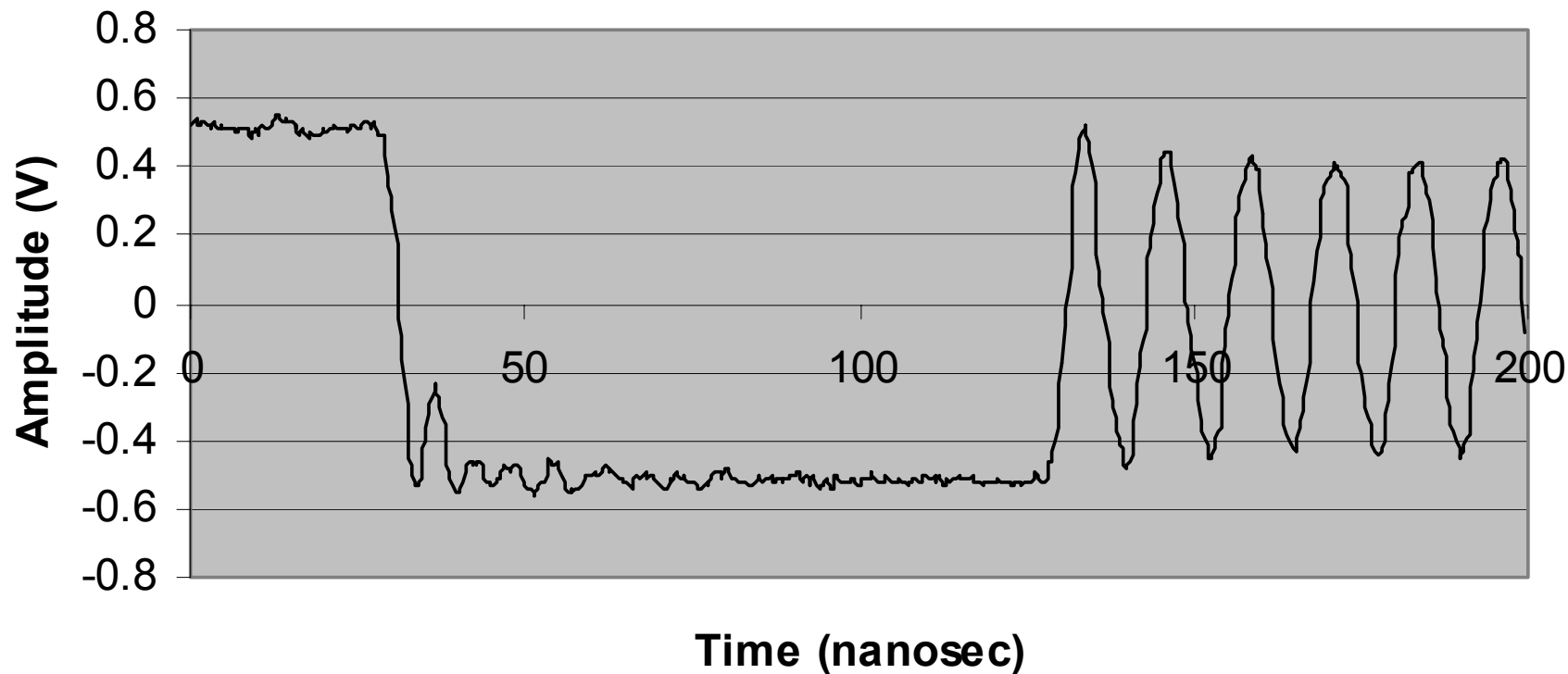
DB0 @ Slot 4 Vendor 'B' - Test Chip



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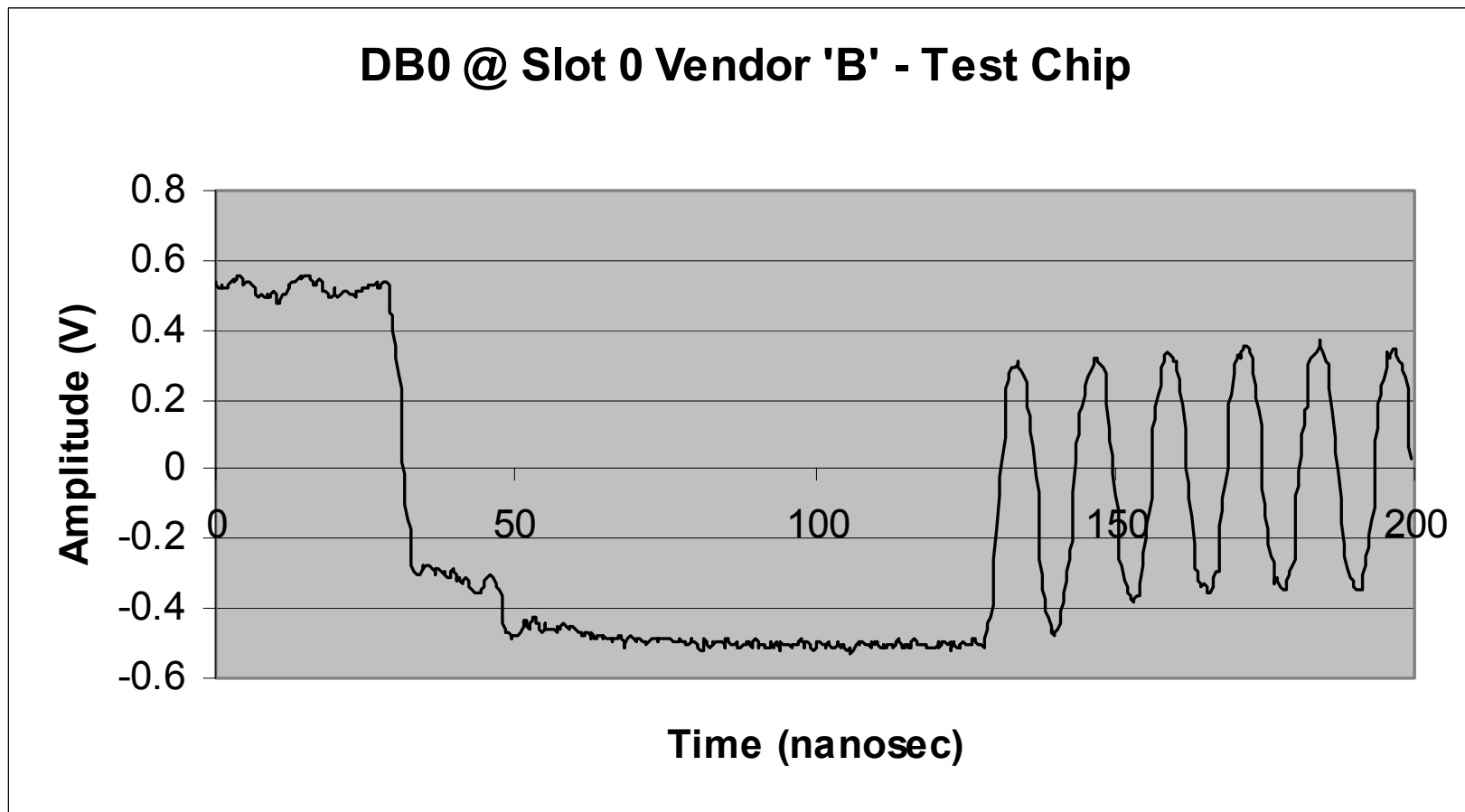
DB0 @ Slot 5 Vendor 'B' Test Chip Driving

DB0 @ Slot 5 Vendor 'B' - Test Chip



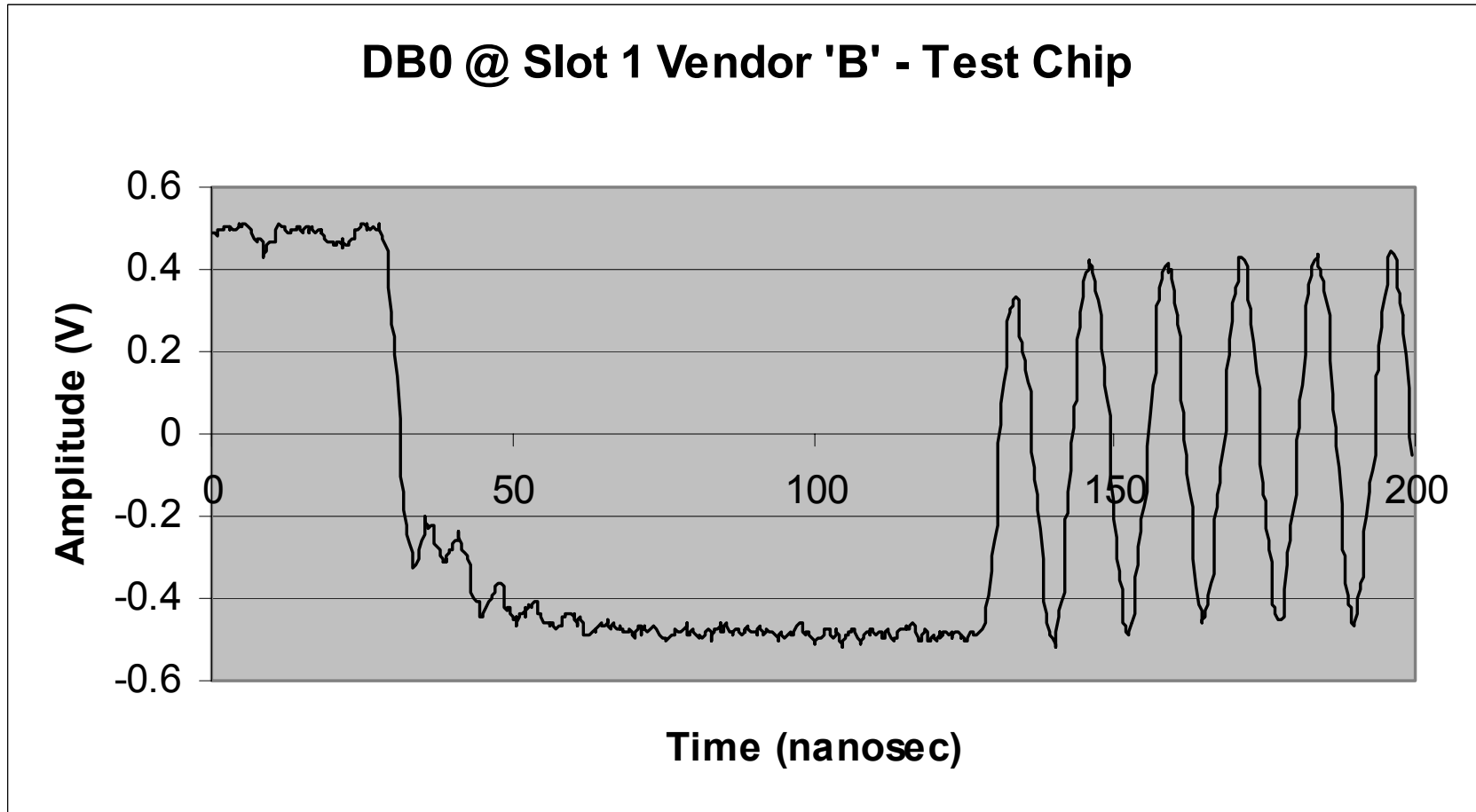
Cable length = 40 in. (max. supported by vendor)

DB0 @ Slot 0 Vendor 'B' Test Chip Driving



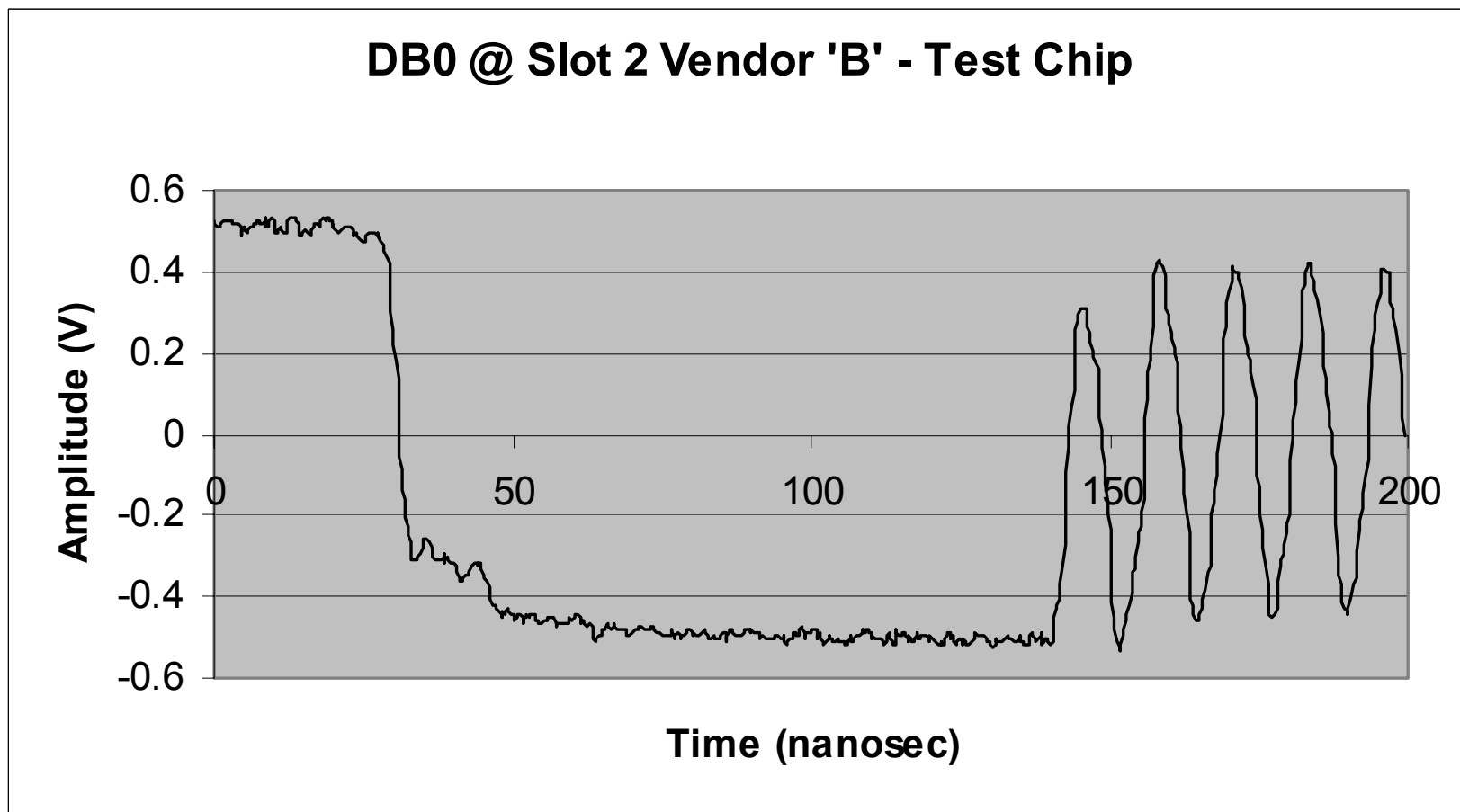
12 Meter Madison Round Cable

DB0 @ Slot 1 Vendor 'B' Test Chip Driving



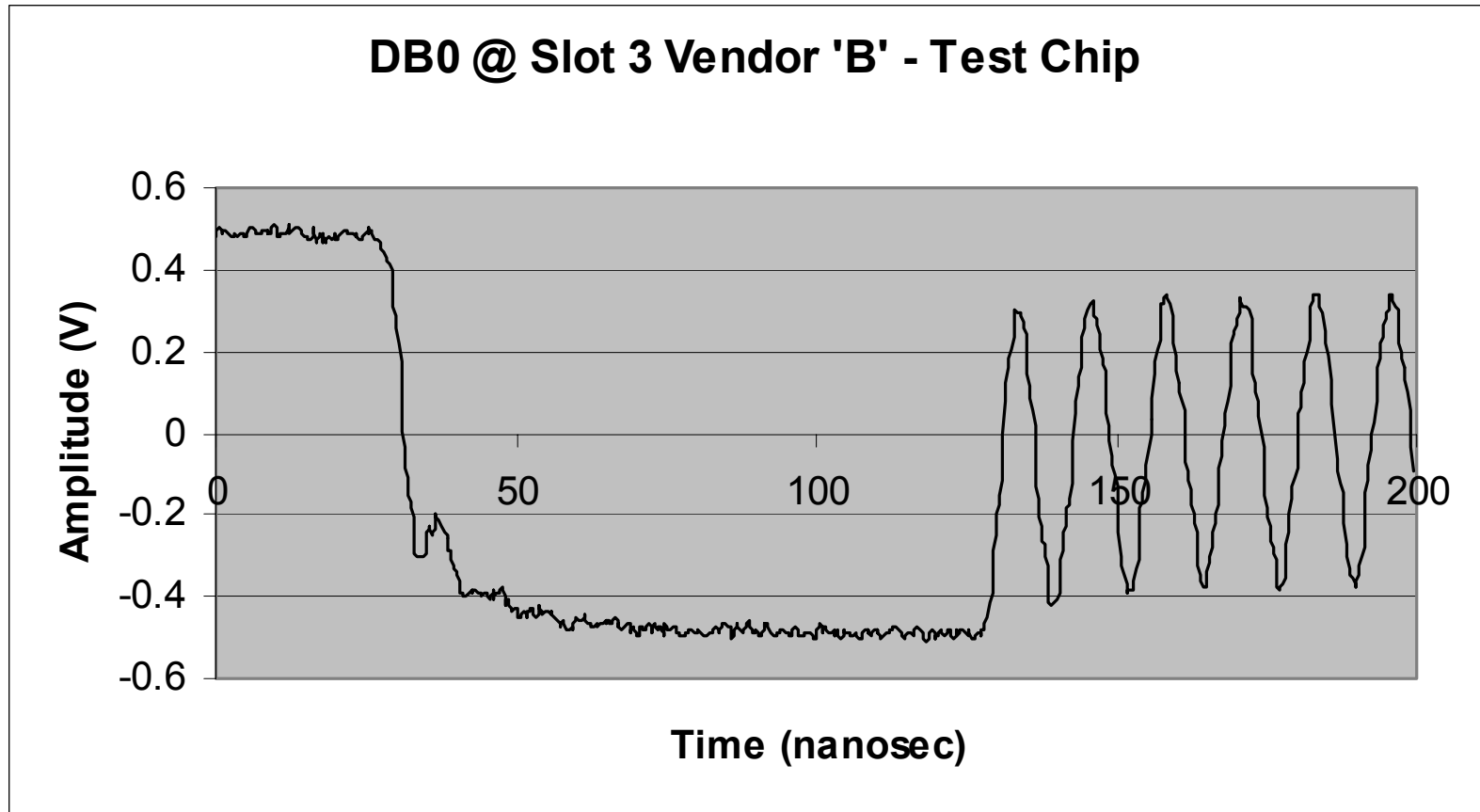
12 Meter Madison Round Cable

DB0 @ Slot 2 Vendor 'B' Test Chip Driving



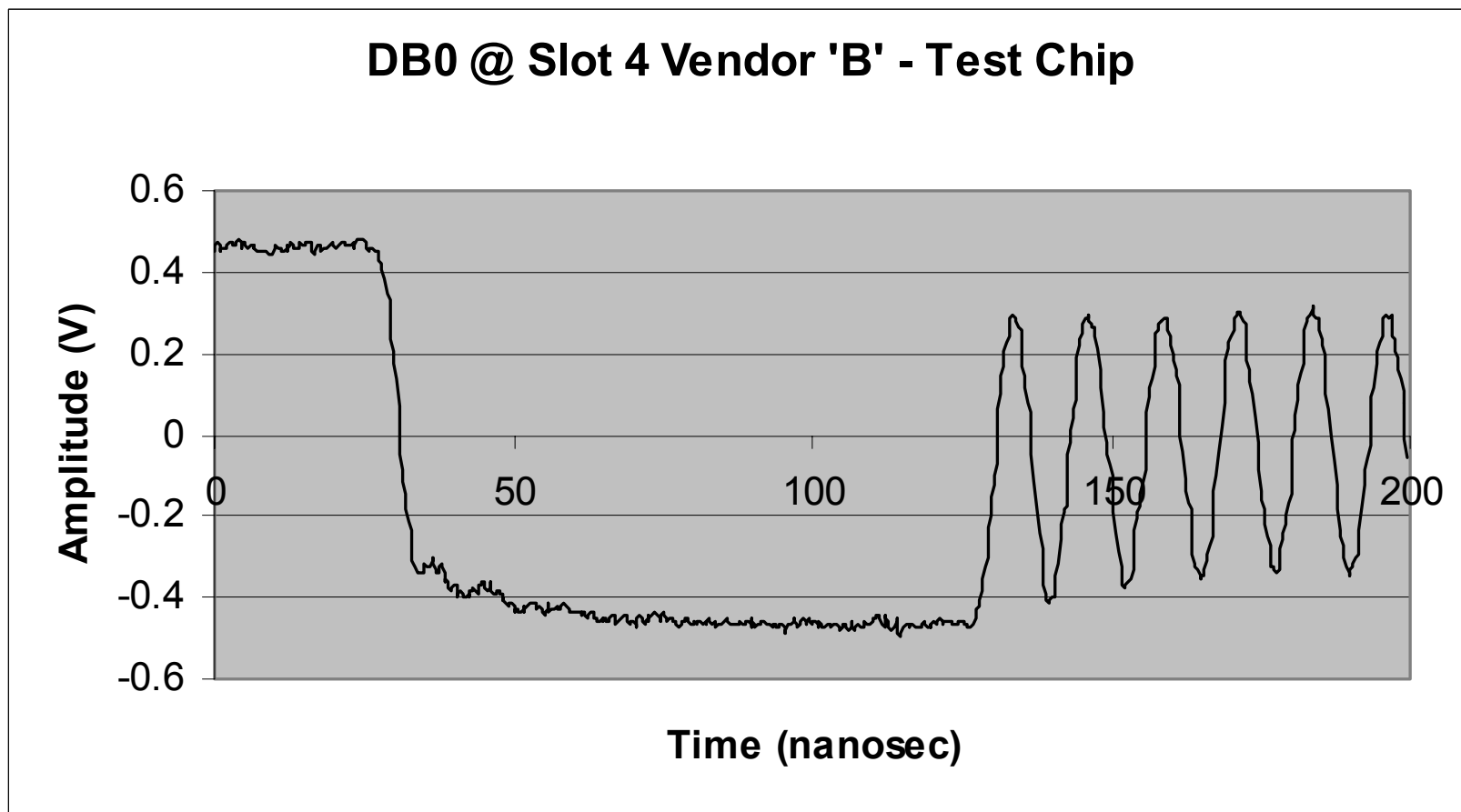
12 Meter Madison Round Cable

DB0 @ Slot 3 Vendor 'B' Test Chip Driving



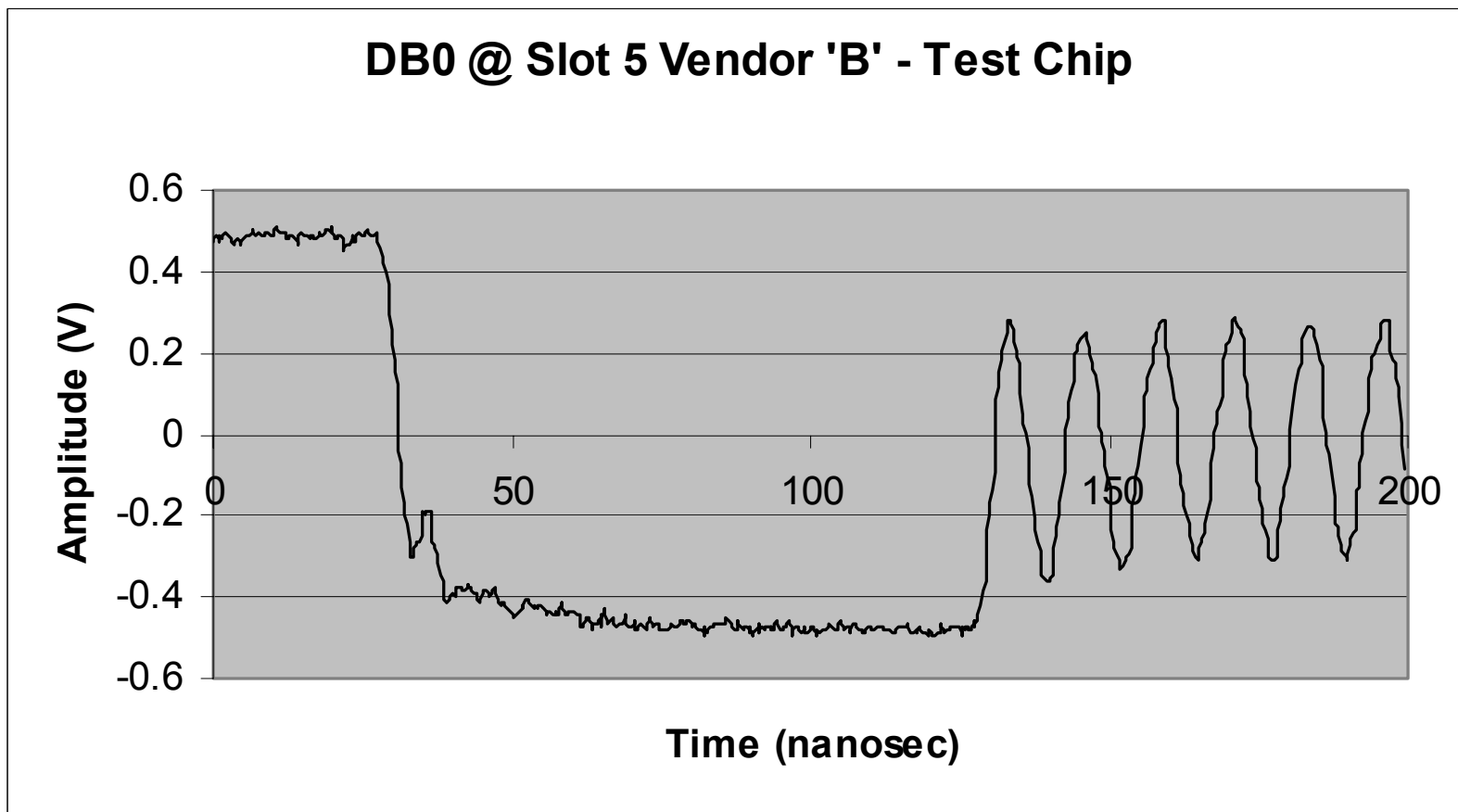
12 Meter Madison Round Cable

DB0 @ Slot 4 Vendor 'B' Test Chip Driving



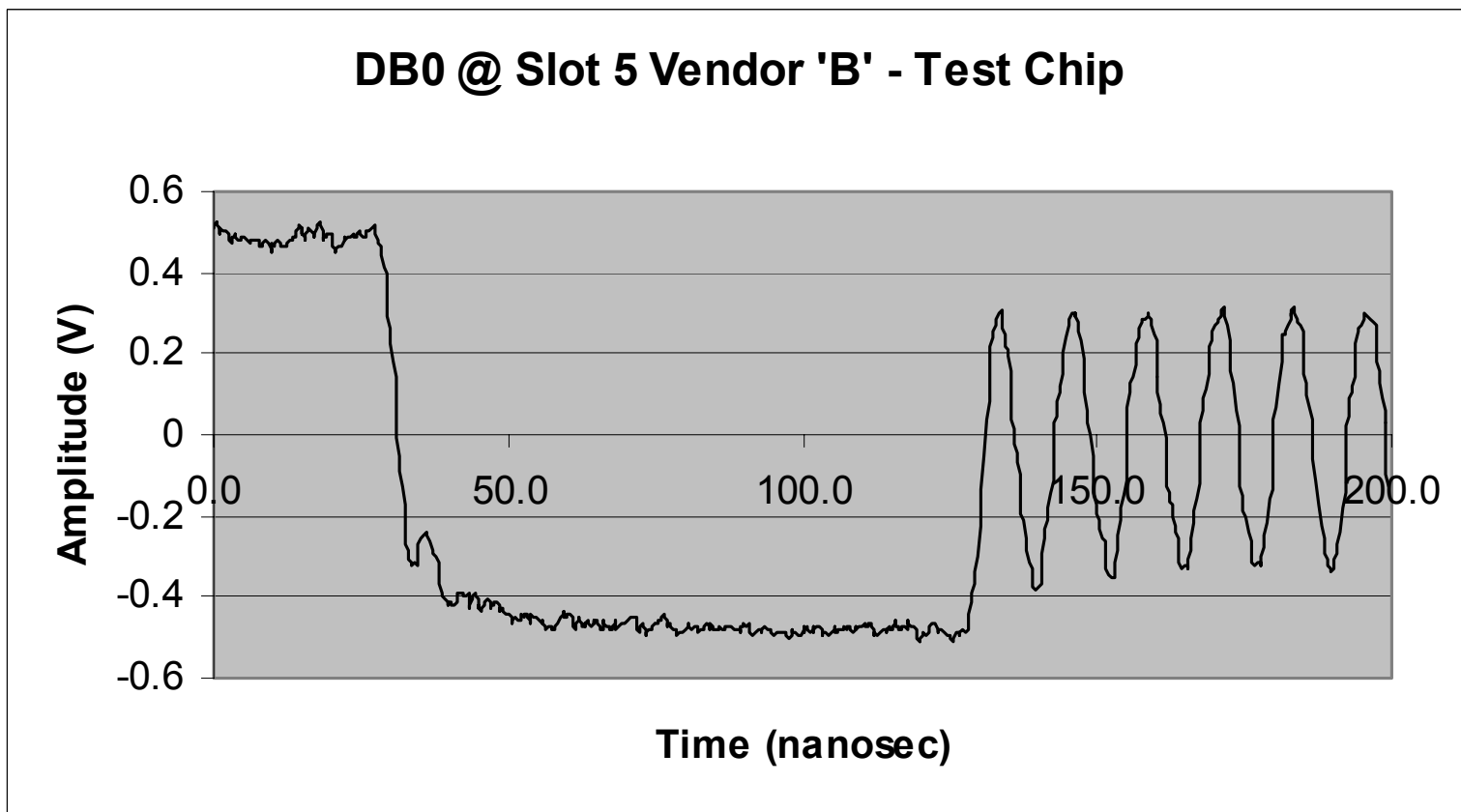
12 Meter Madison Round Cable

DB0 @ Slot 5 Vendor 'B' Test Chip Driving



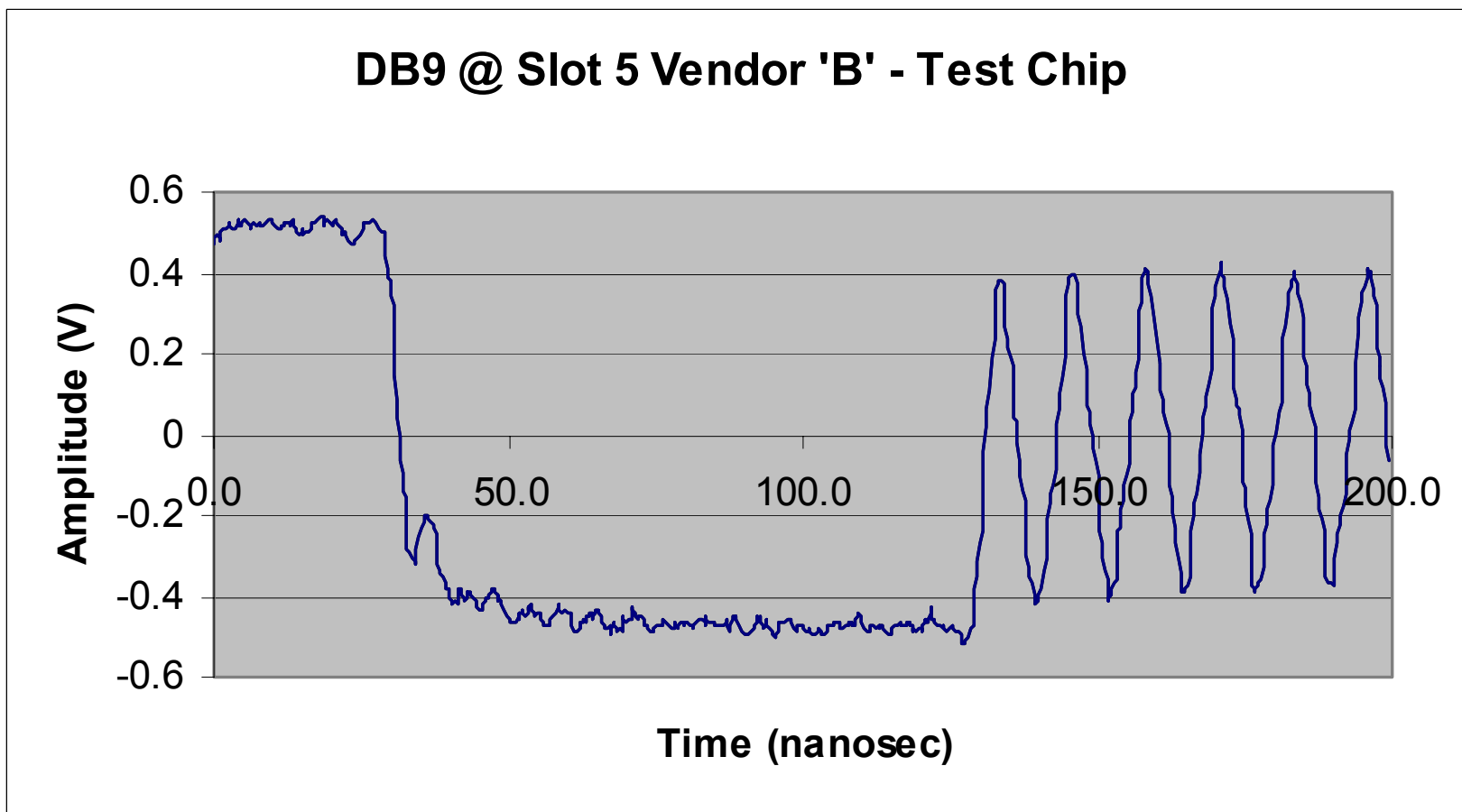
12 Meter Madison Round Cable

DB0 @ Slot 5 Vendor 'B' Test Chip Driving



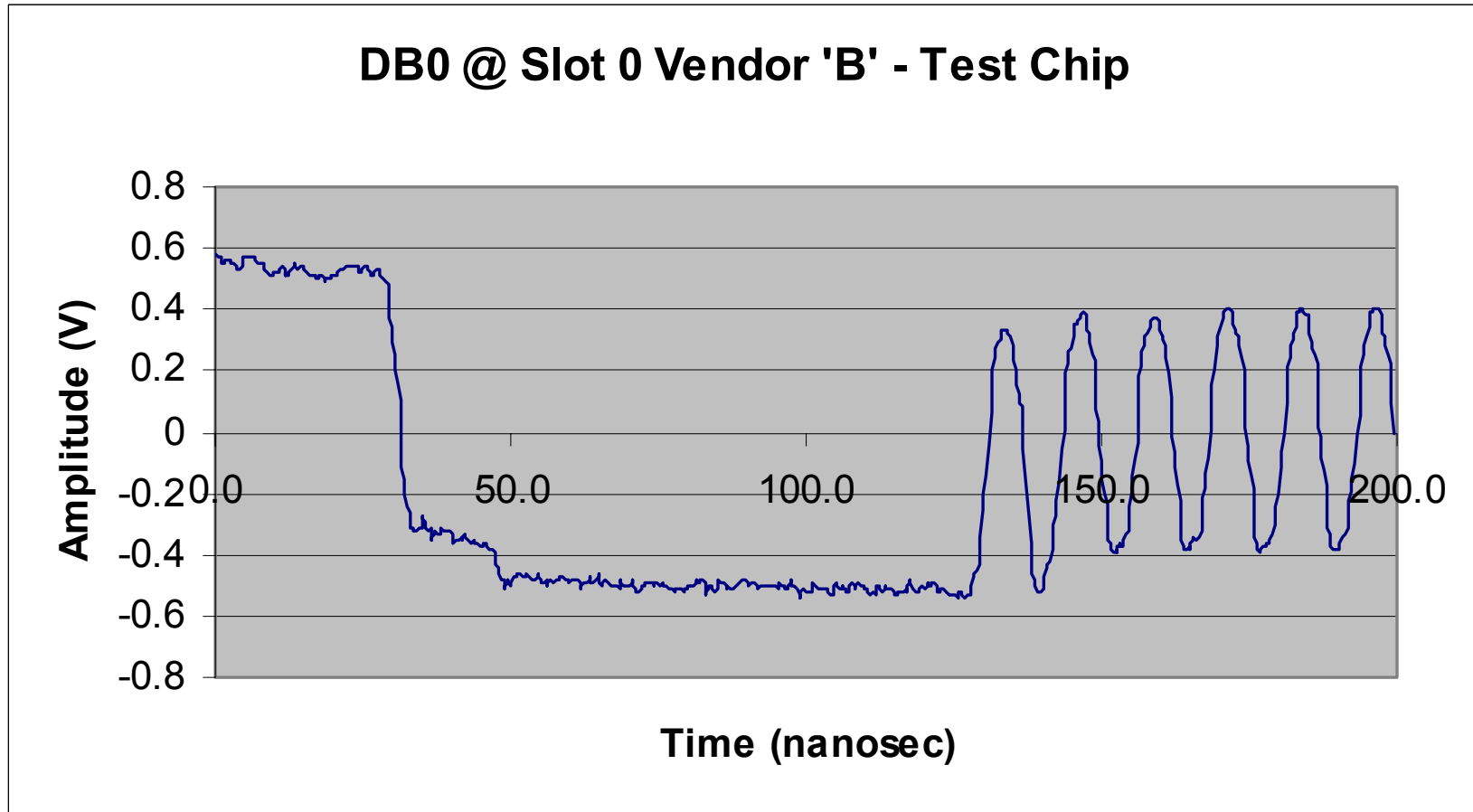
10 Meter Amphenol T'N'F

DB9 @ Slot 5 Vendor 'B' Test Chip Driving



10 Meter Amphenol T'N'F

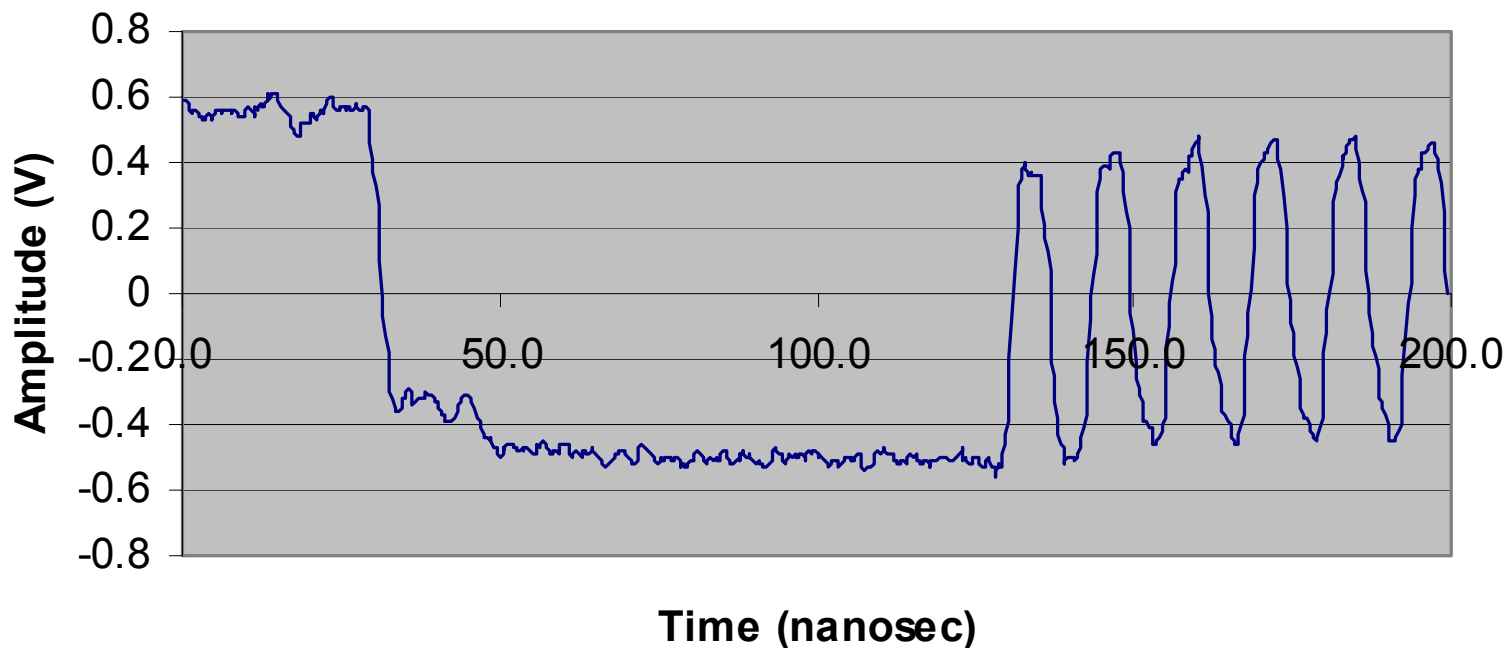
DB0 @ Slot 0 Vendor 'B' Test Chip Driving



10 Meter Amphenol T'N'F

DB9 @ Slot 0 Vendor 'B' Test Chip Driving

DB9 @ Slot 0 Vendor 'B' - Test Chip

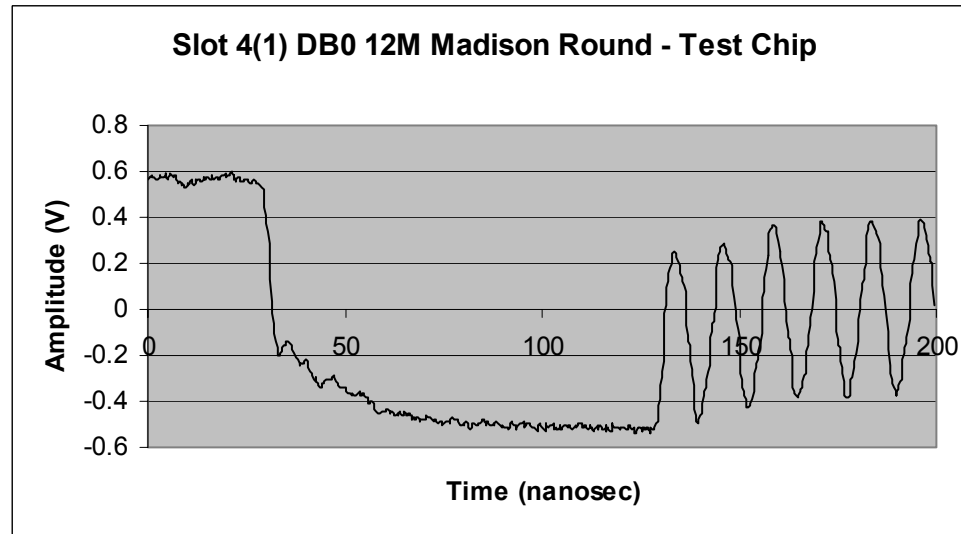


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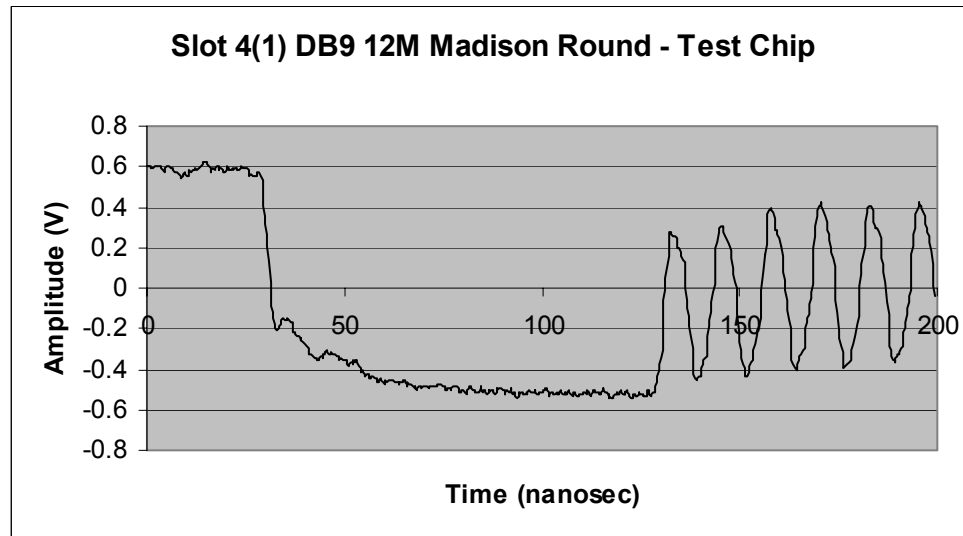
SCSI SPI Working Group Backplane C

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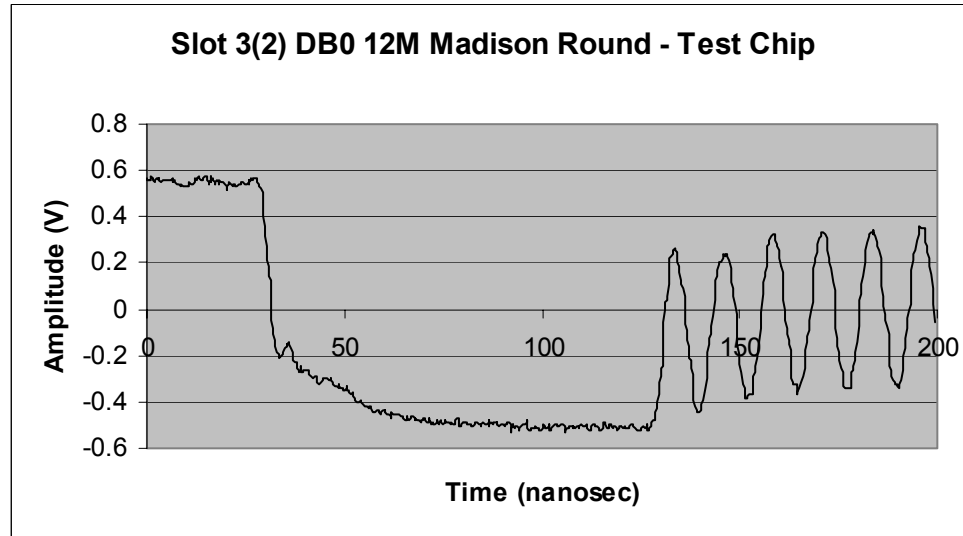
Vendor C - 10 slot backplane w/12 M Madison (round)



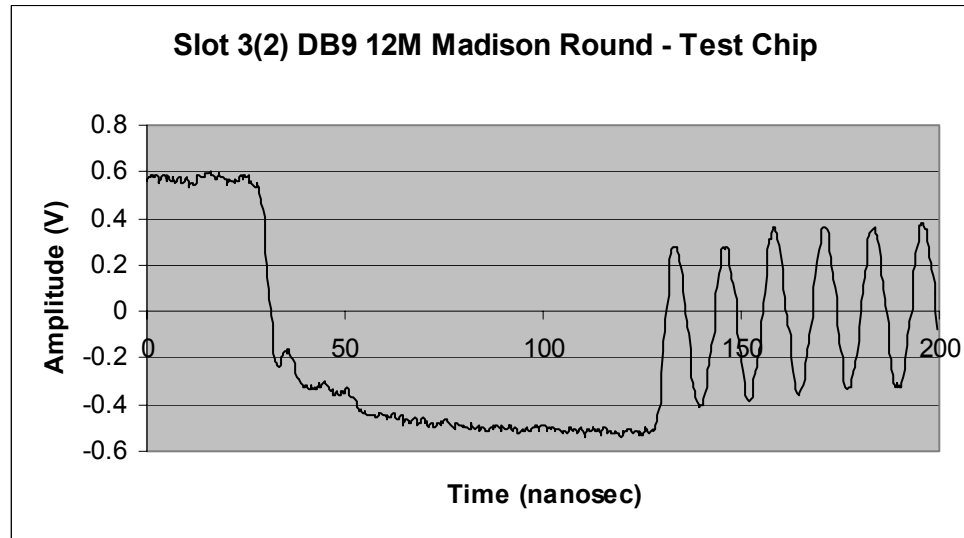
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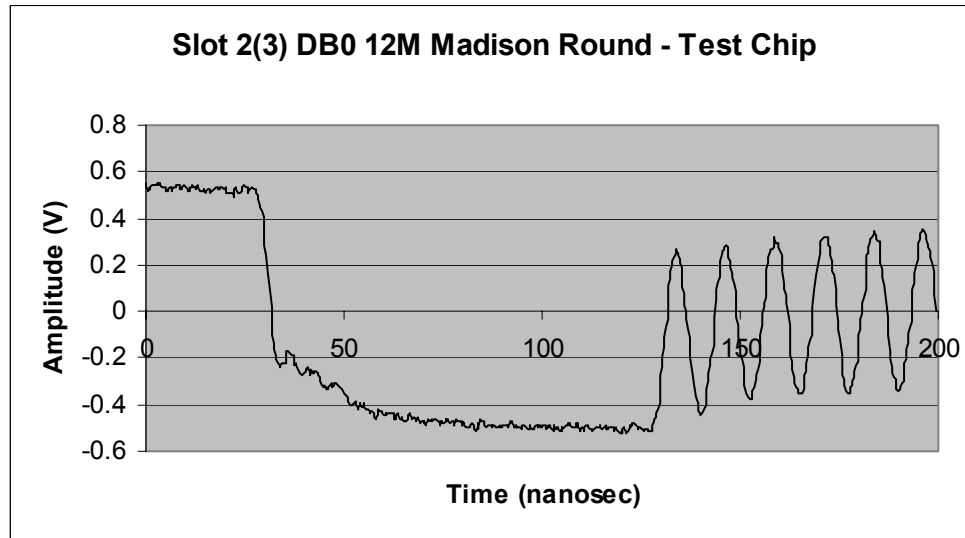
Vendor C - 10 slot backplane w/12 M Madison (round)



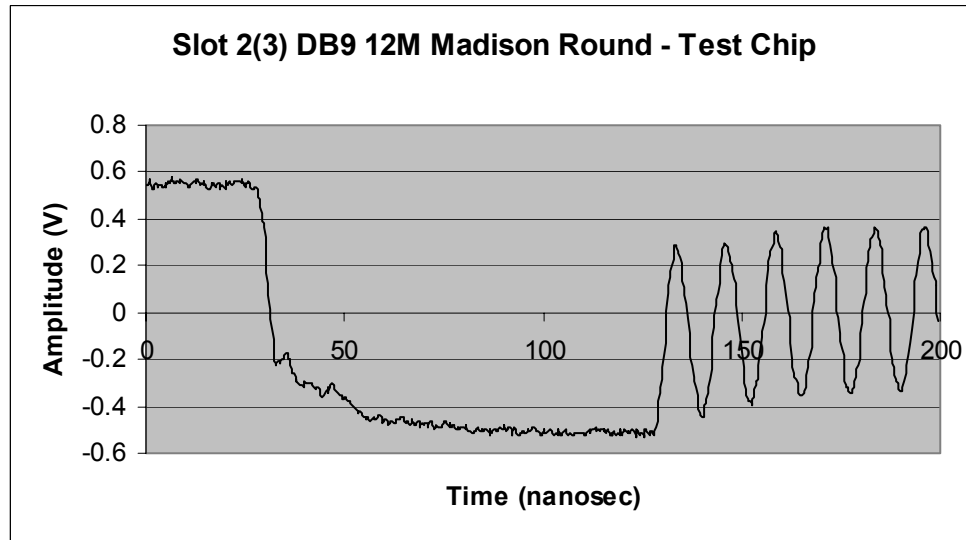
Vendor C - 10 slot backplane w/12 M Madison (round)



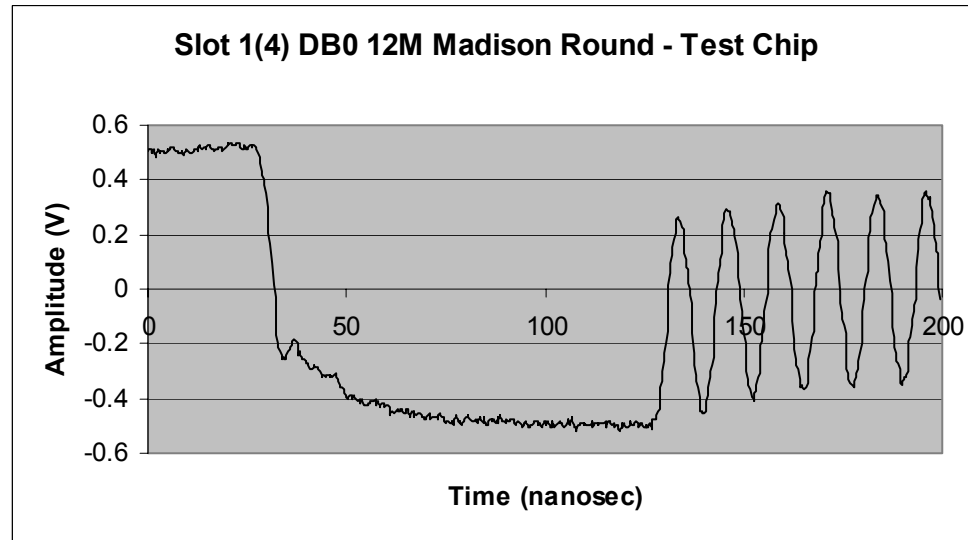
Vendor C - 10 slot backplane w/12 M Madison (round)



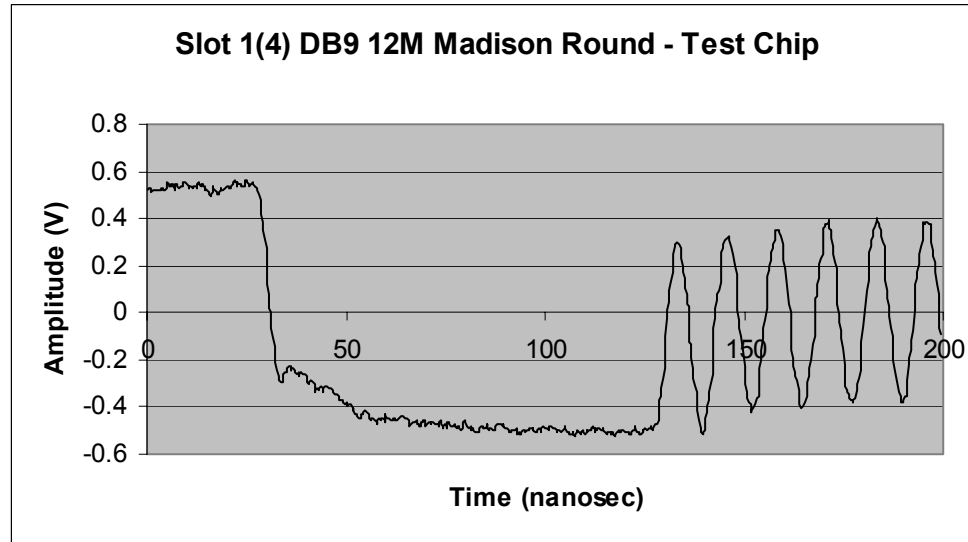
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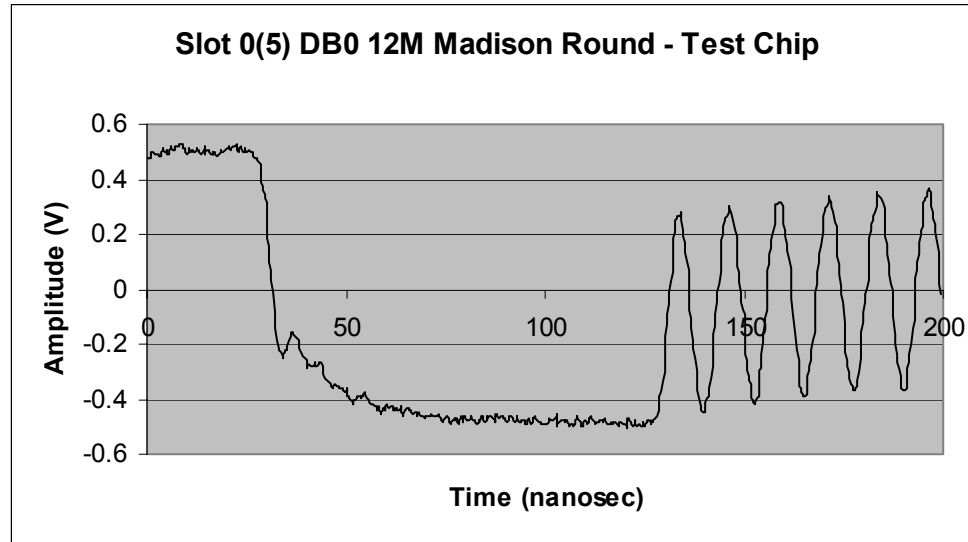
Vendor C - 10 slot backplane w/12 M Madison (round)



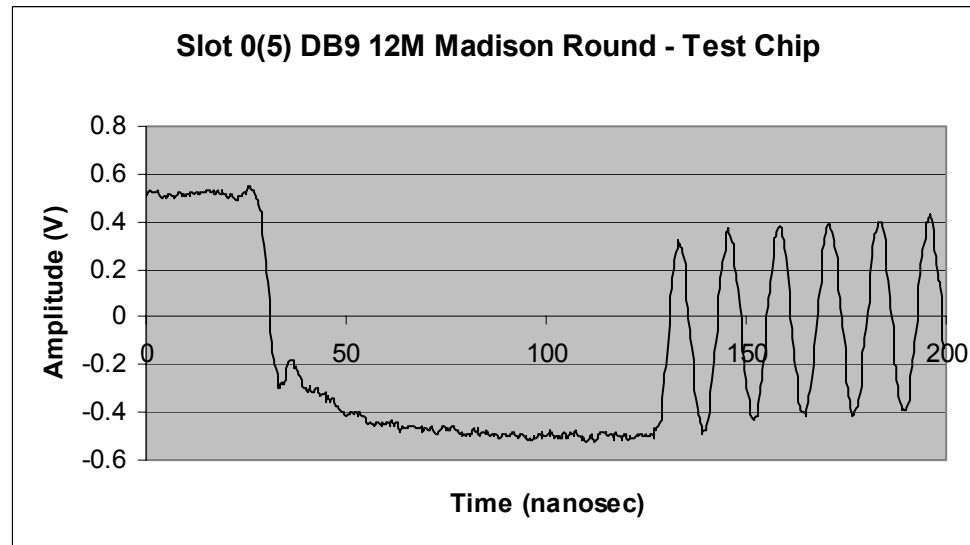
Vendor C - 10 slot backplane w/12 M Madison (round)



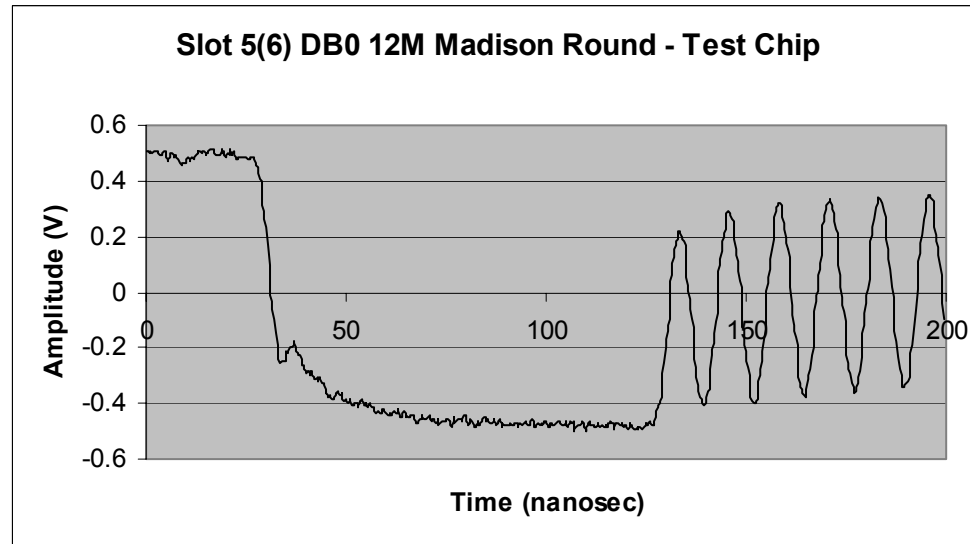
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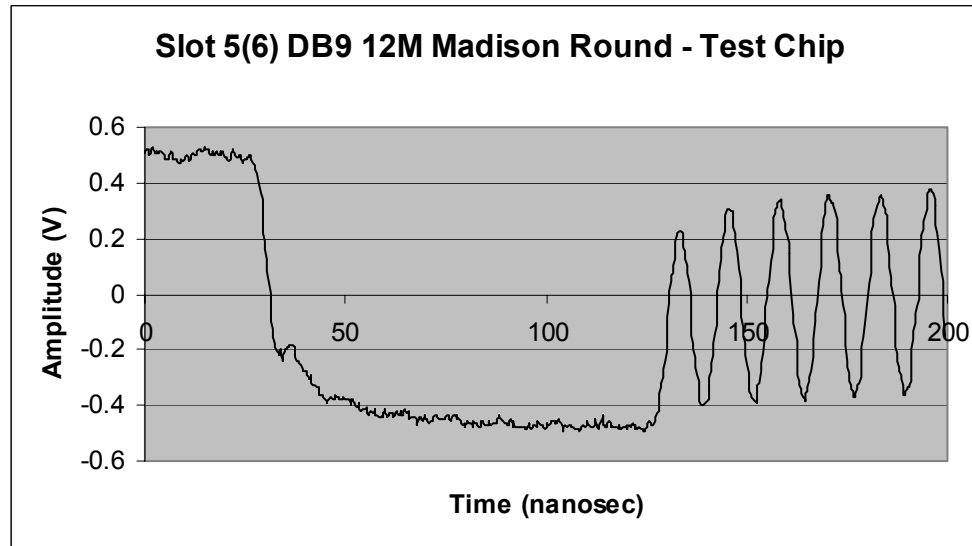
Vendor C - 10 slot backplane w/12 M Madison (round)



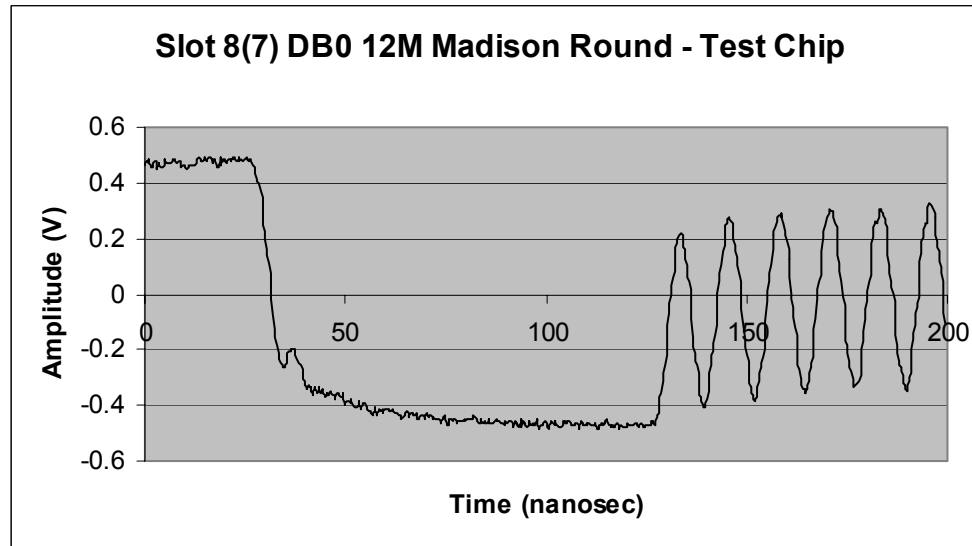
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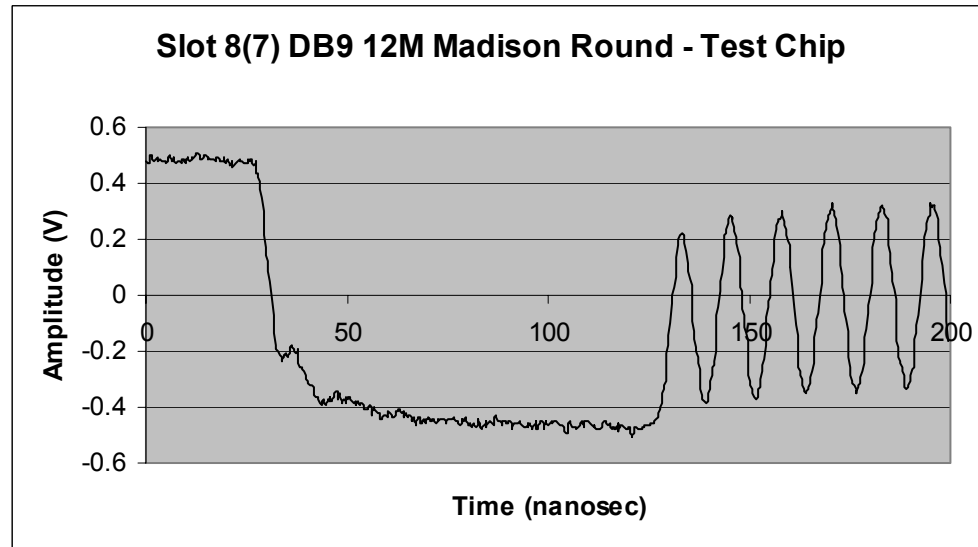
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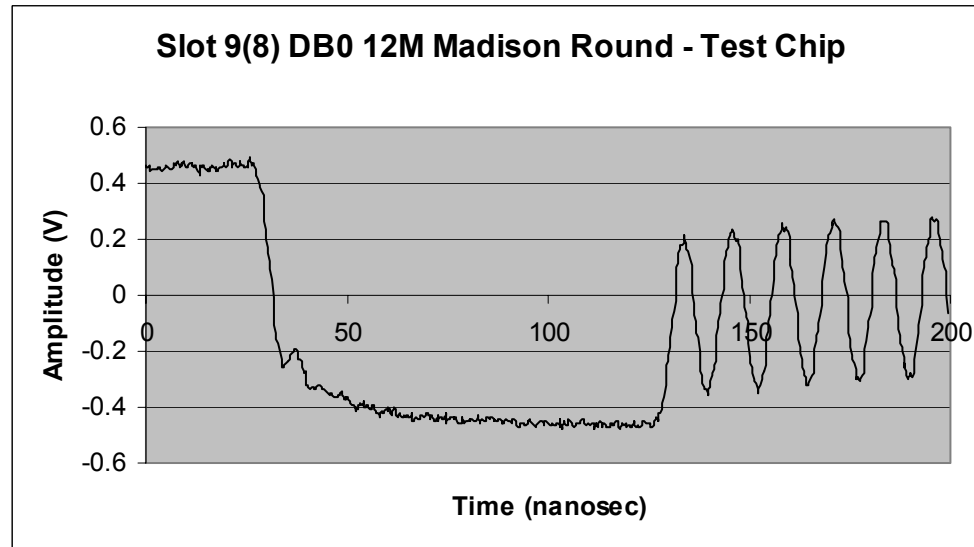
Vendor C - 10 slot backplane w/12 M Madison (round)



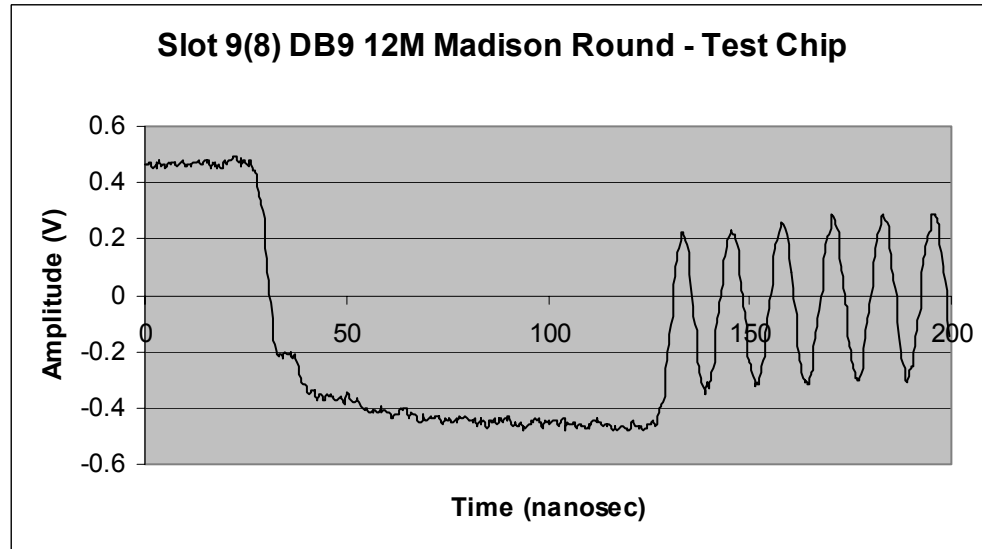
Vendor C - 10 slot backplane w/12 M Madison (round)



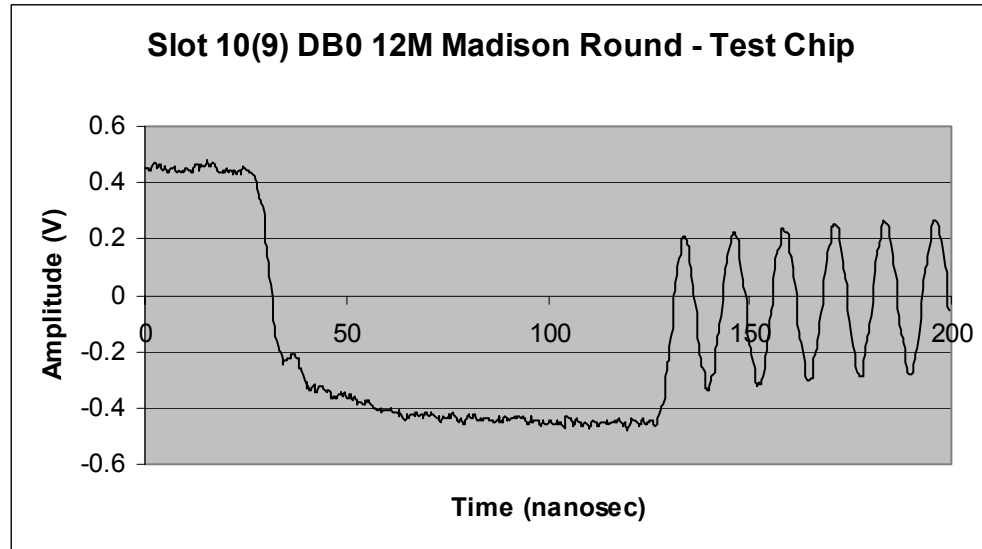
Vendor C - 10 slot backplane w/12 M Madison (round)



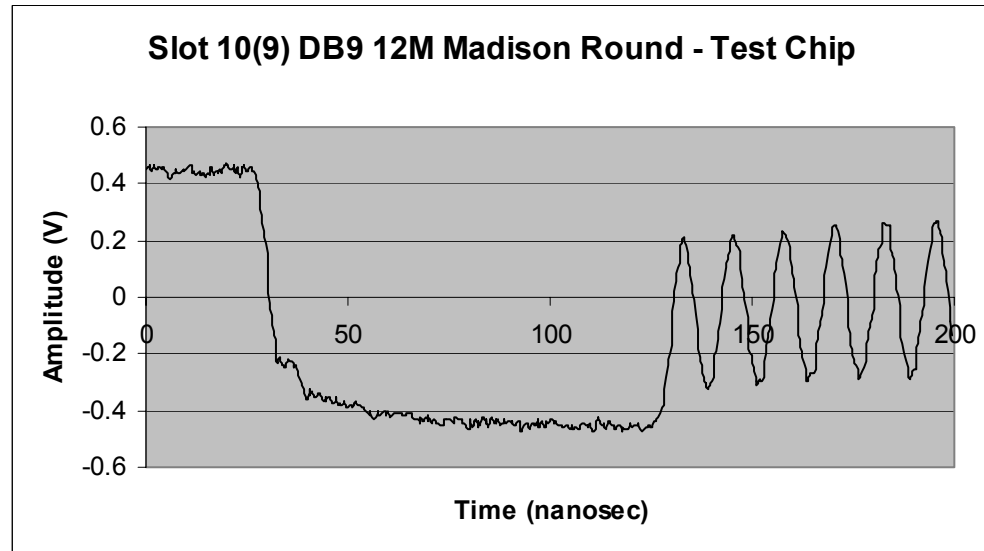
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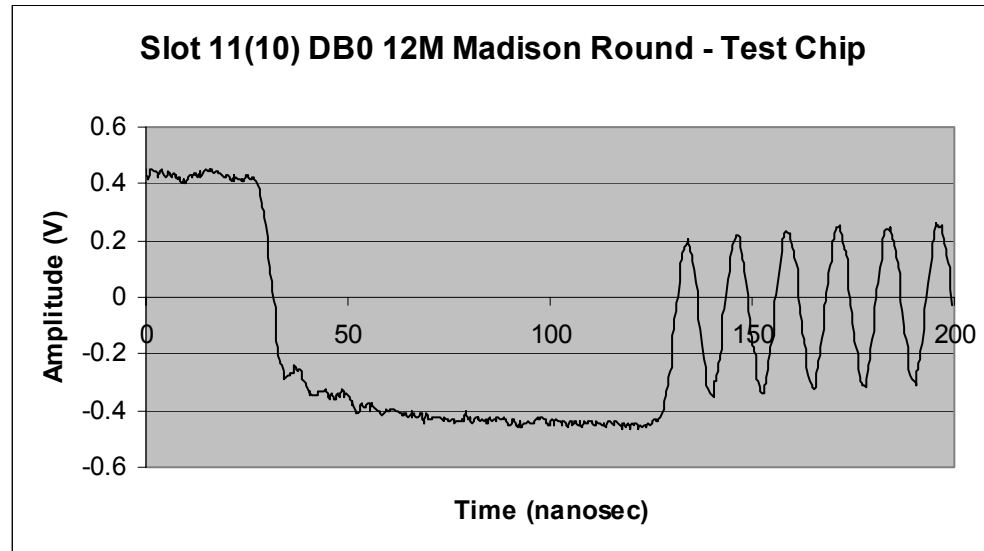
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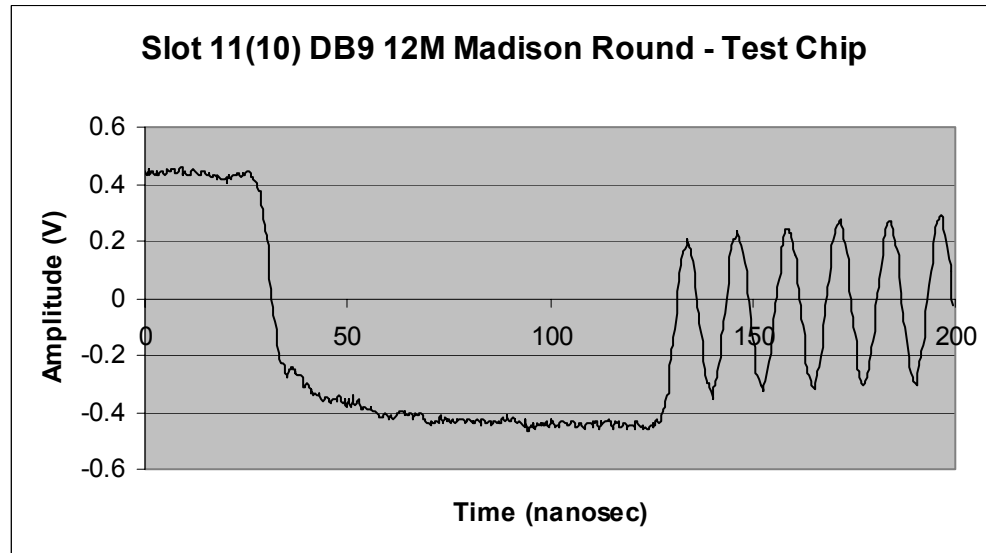
Vendor C - 10 slot backplane w/12 M Madison (round)



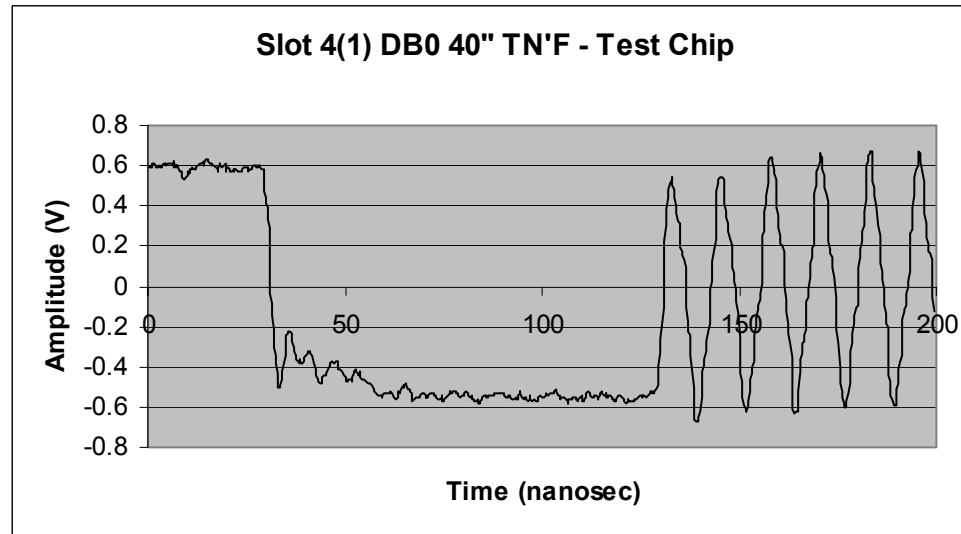
Vendor C - 10 slot backplane w/12 M Madison (round)



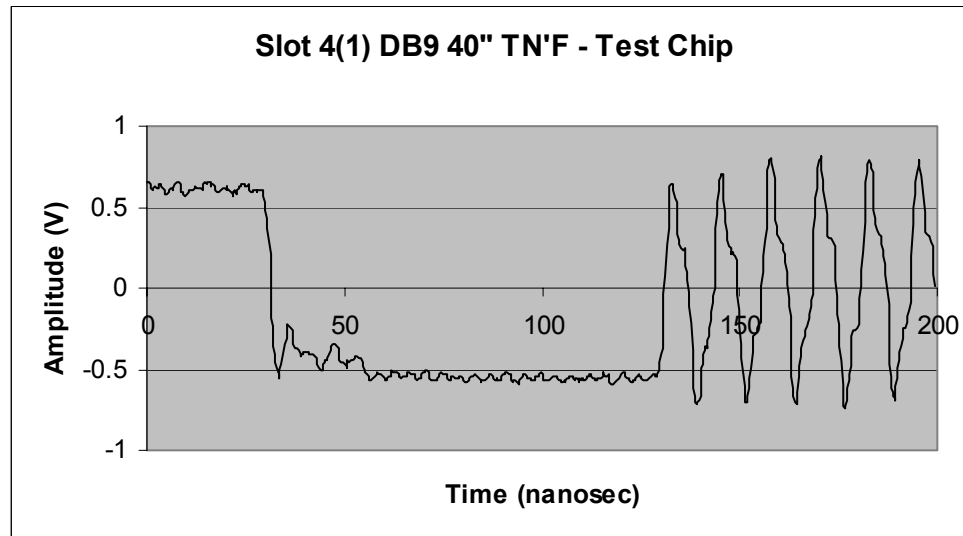
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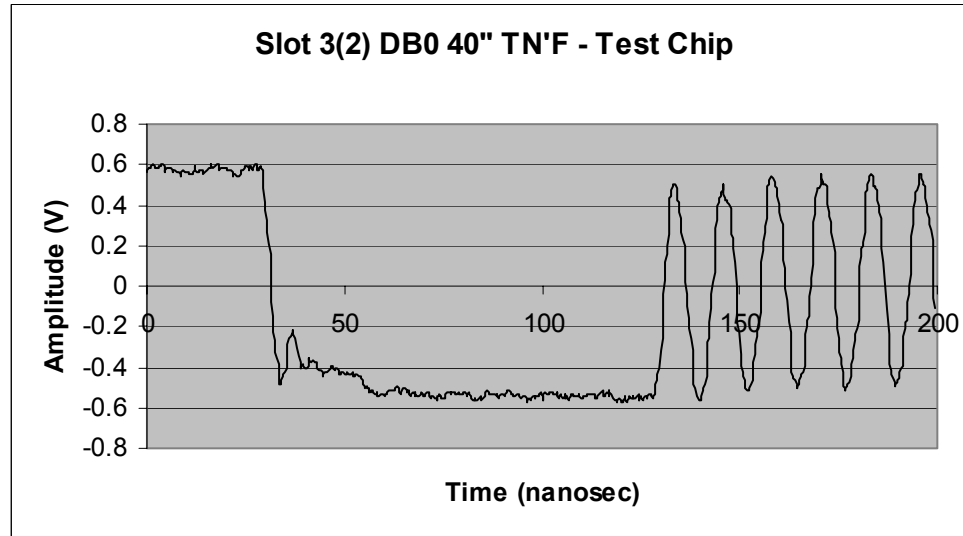
Vendor C - 10 slot backplane w/40" TN'F (longest)



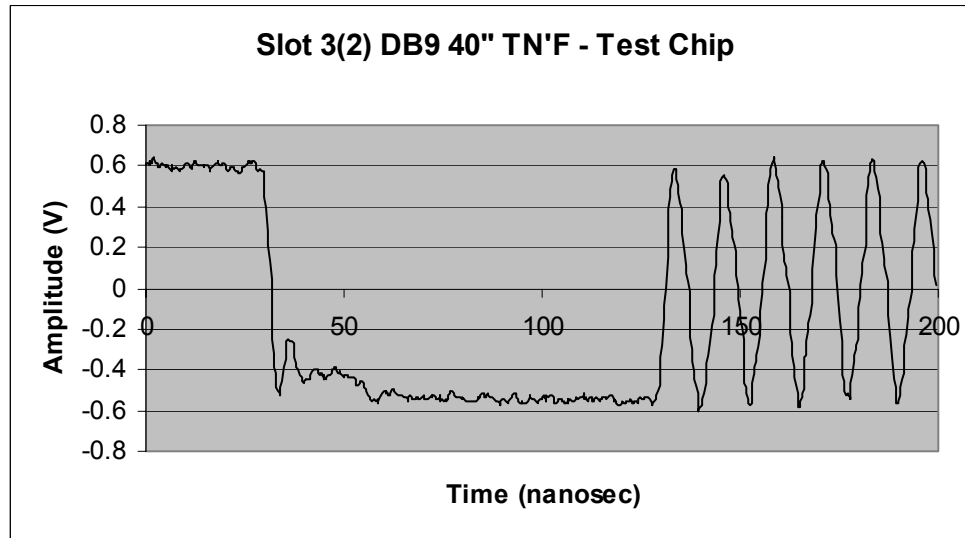
Vendor C - 10 slot backplane w/40" TN'F (longest)



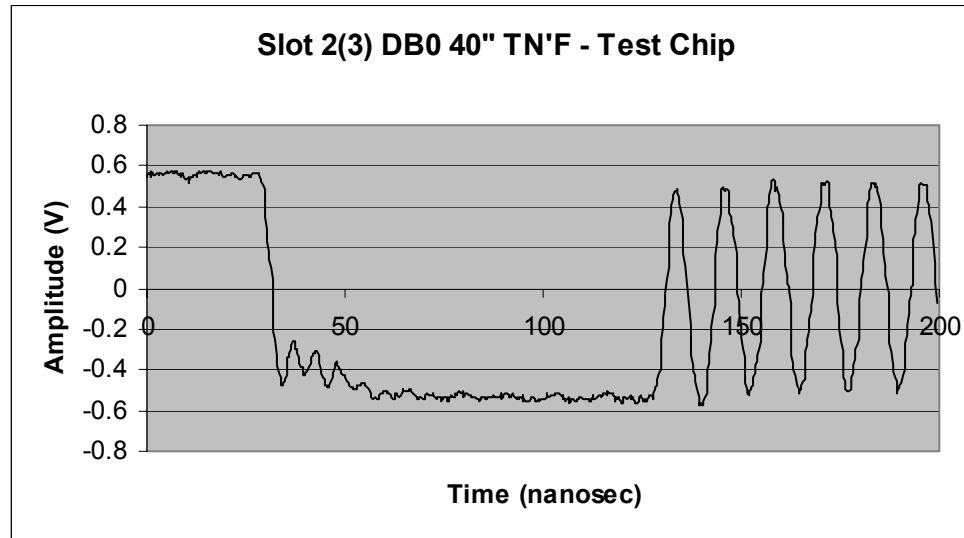
Vendor C - 10 slot backplane w/40" TN'F (longest)



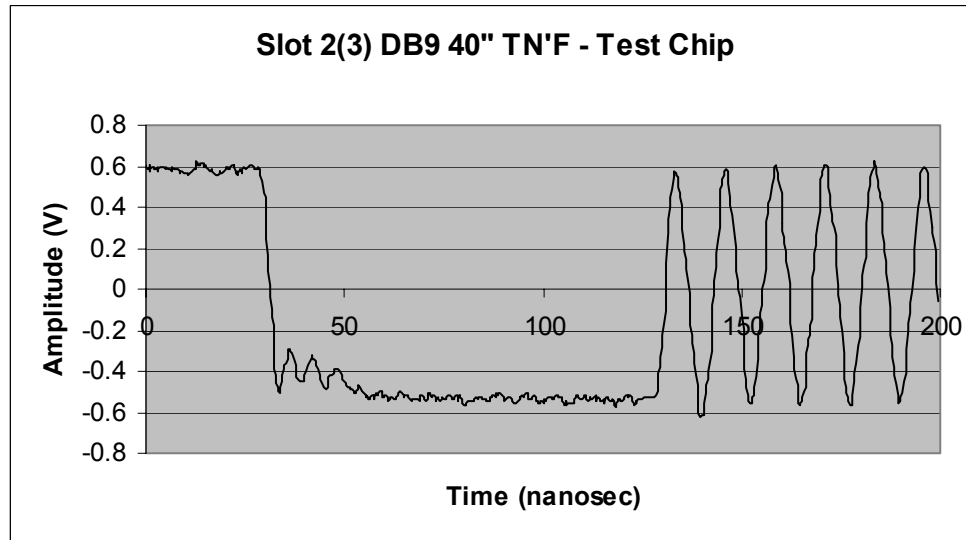
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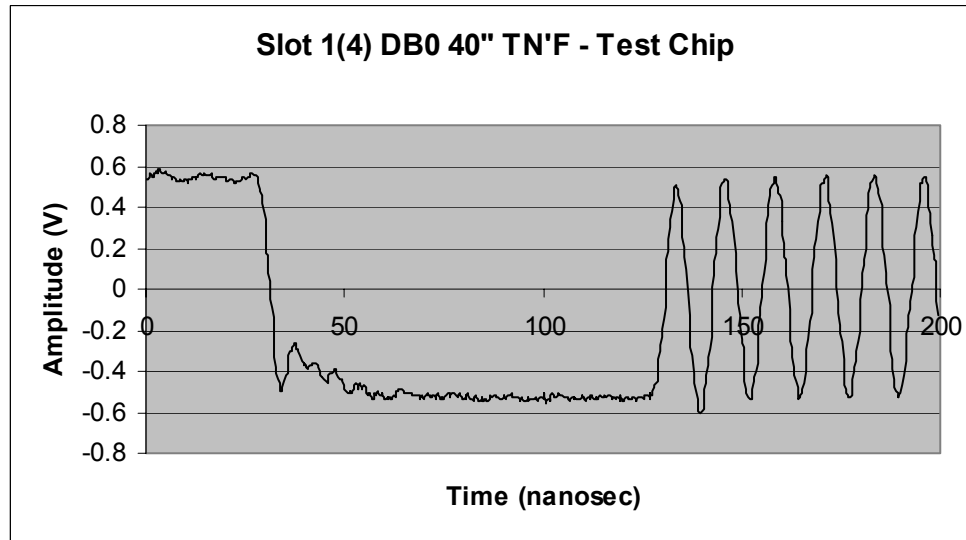
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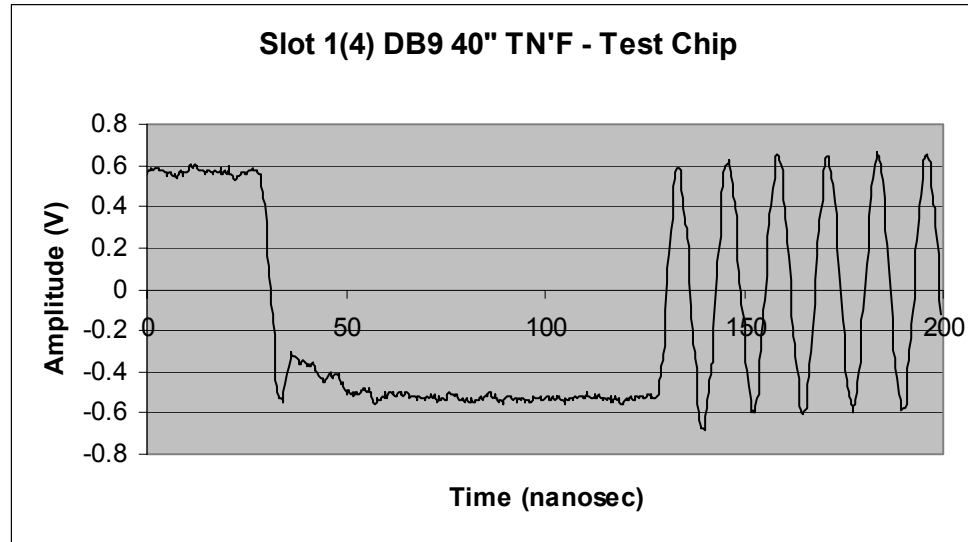
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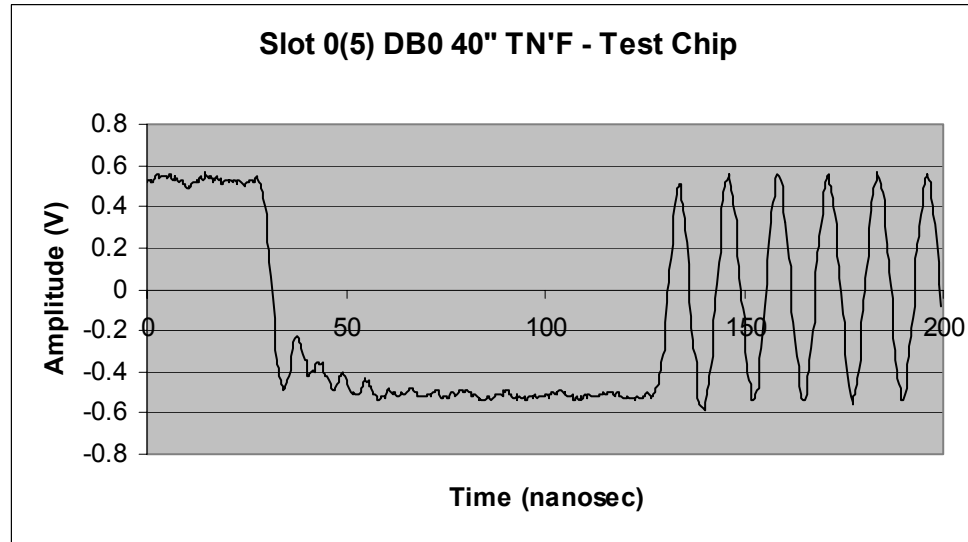
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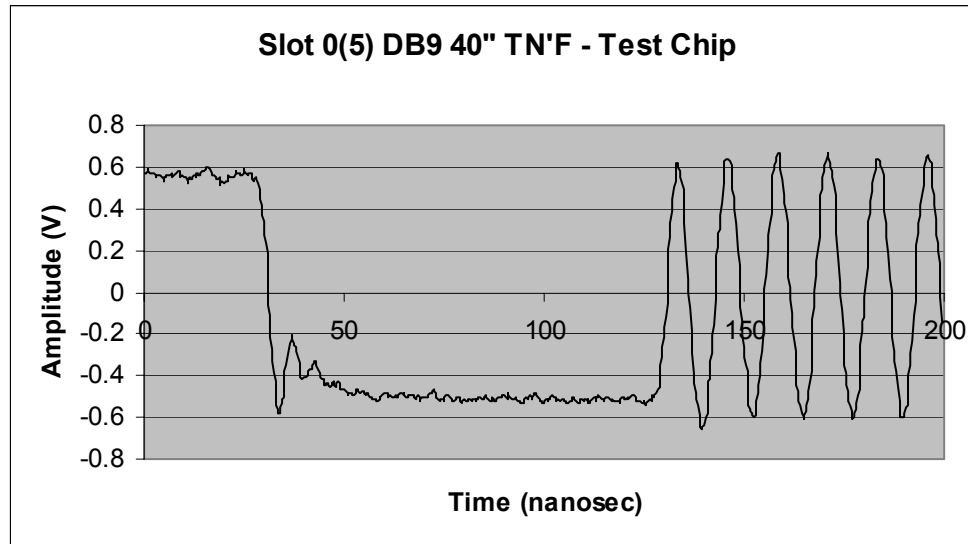
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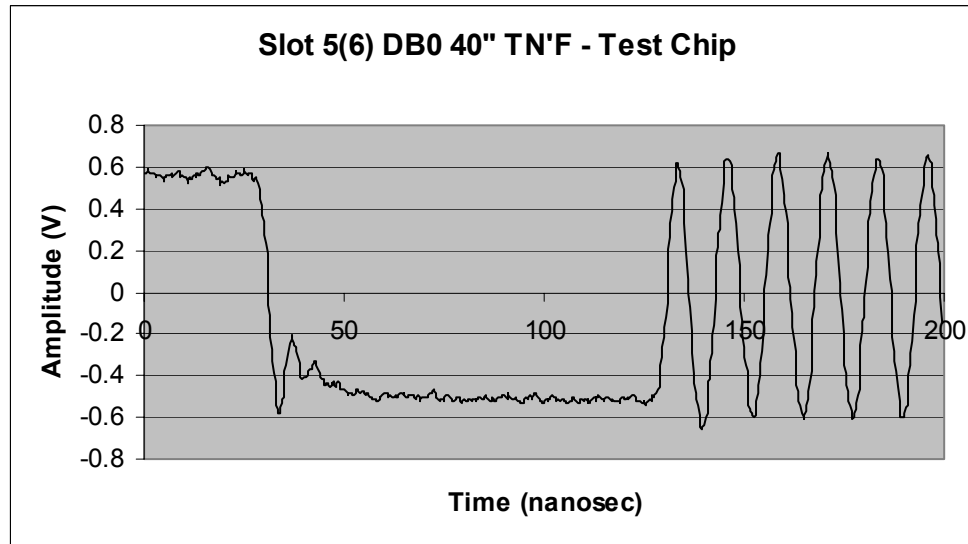
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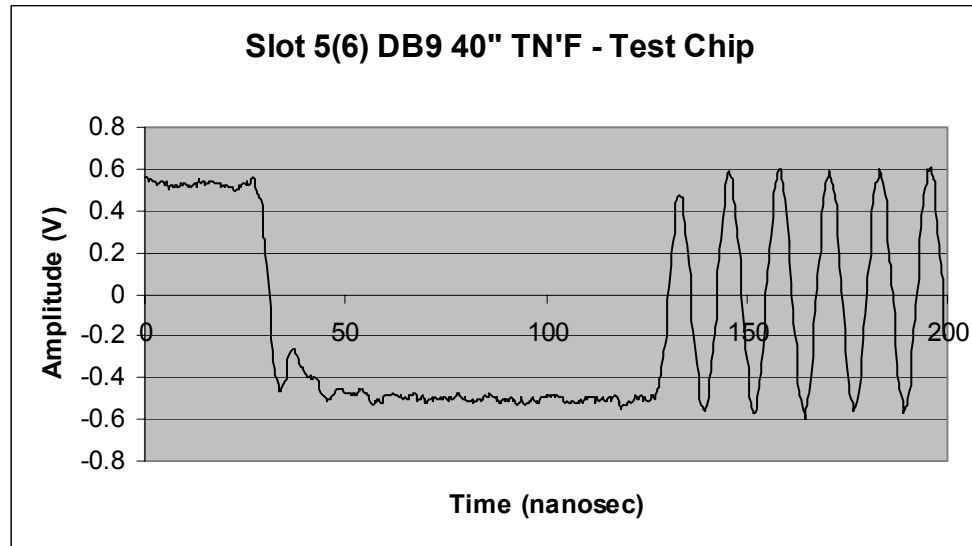
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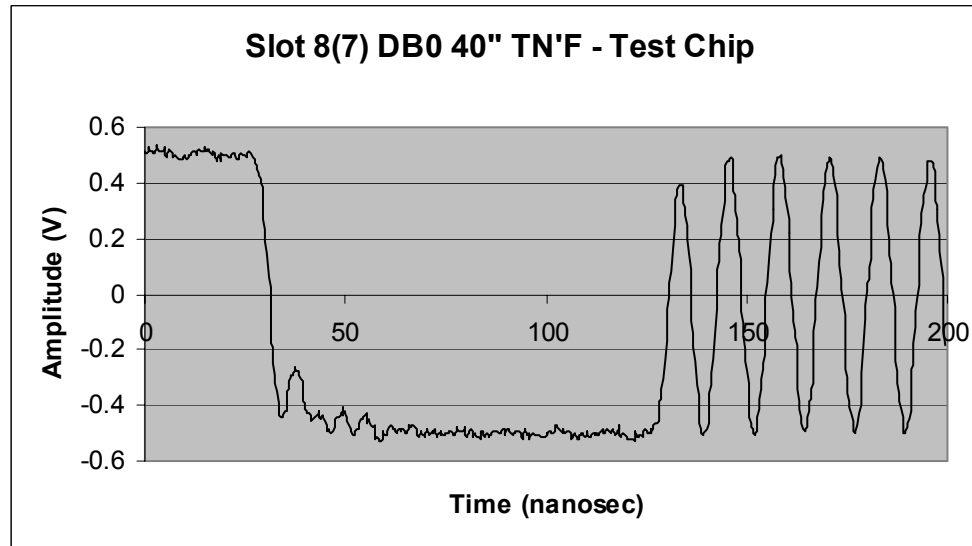
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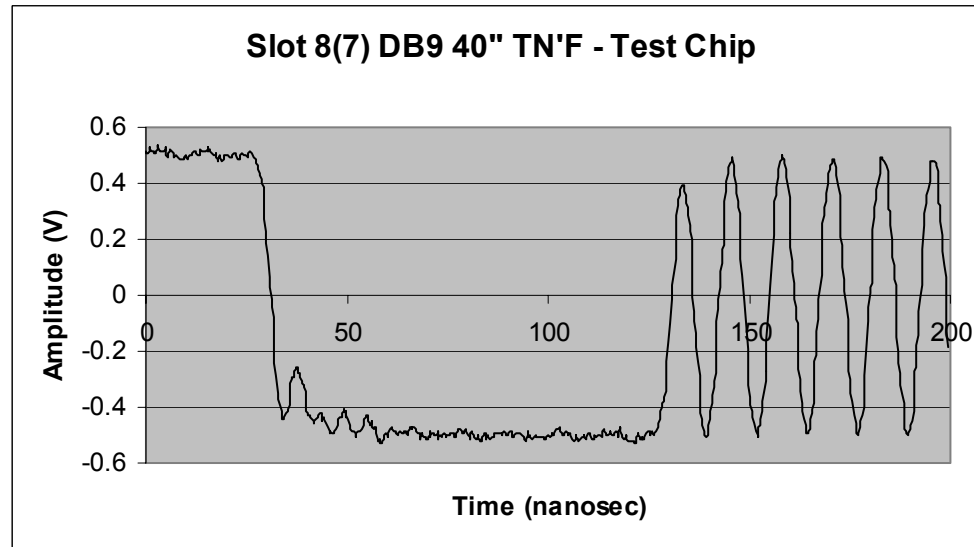
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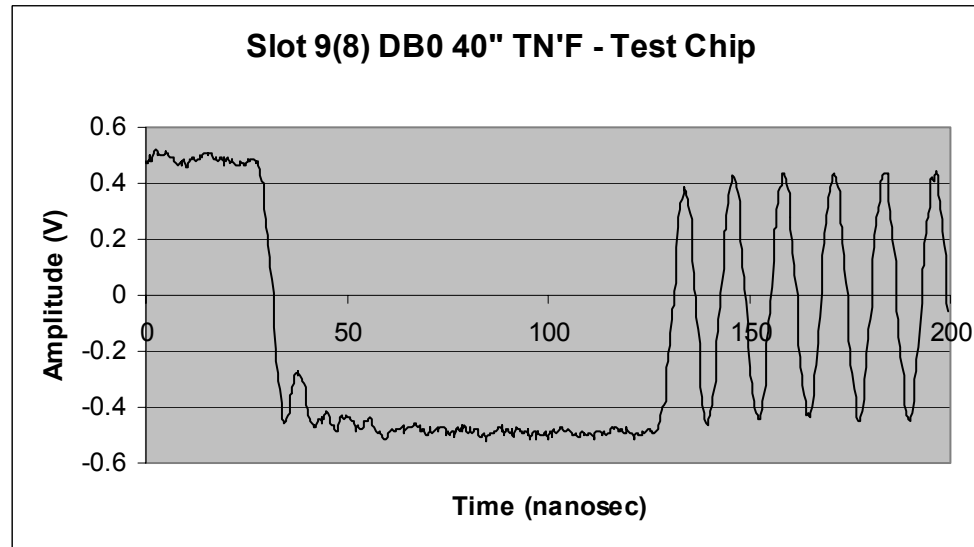
Vendor C - 10 slot backplane w/40" TN'F (longest)



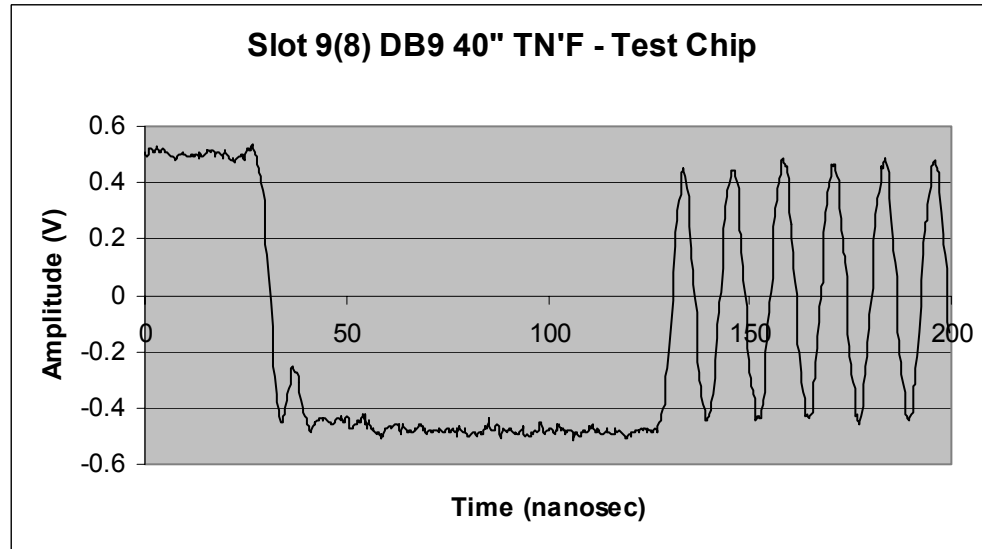
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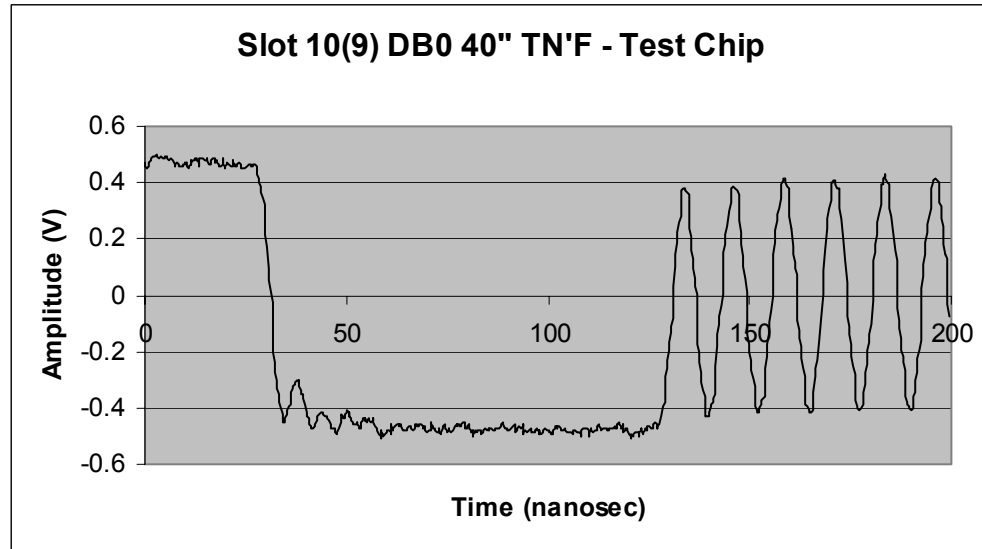
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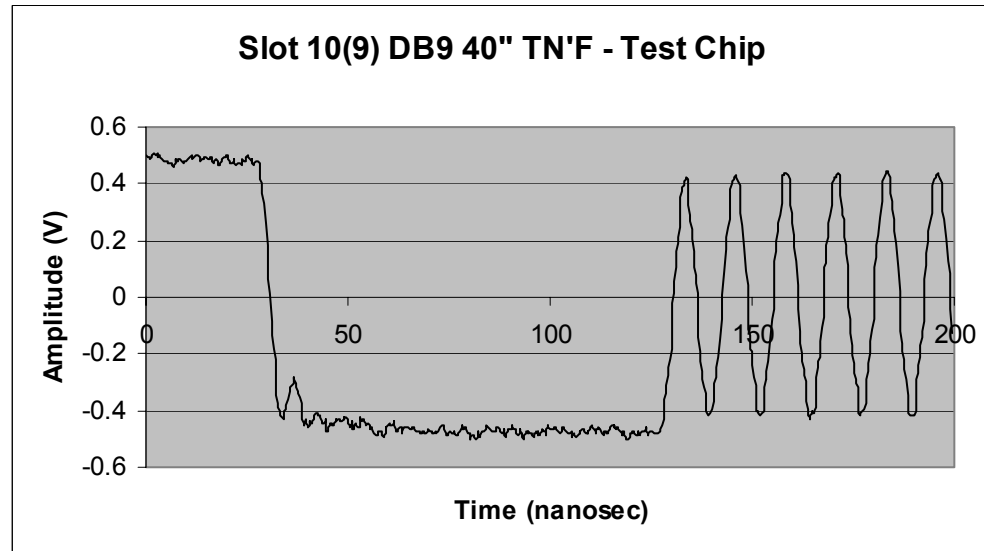
Vendor C - 10 slot backplane w/40" TN'F (longest)



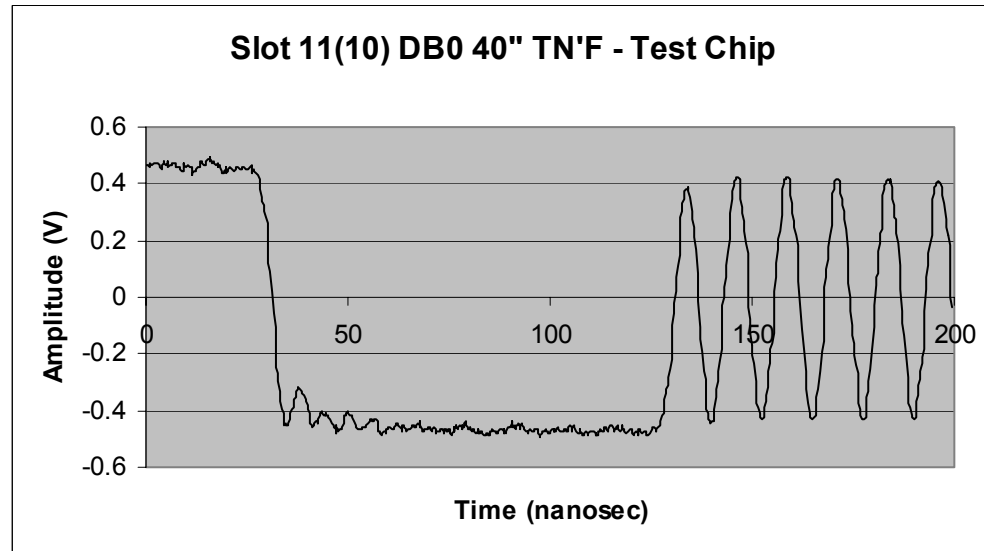
Vendor C - 10 slot backplane w/40" TN'F (longest)



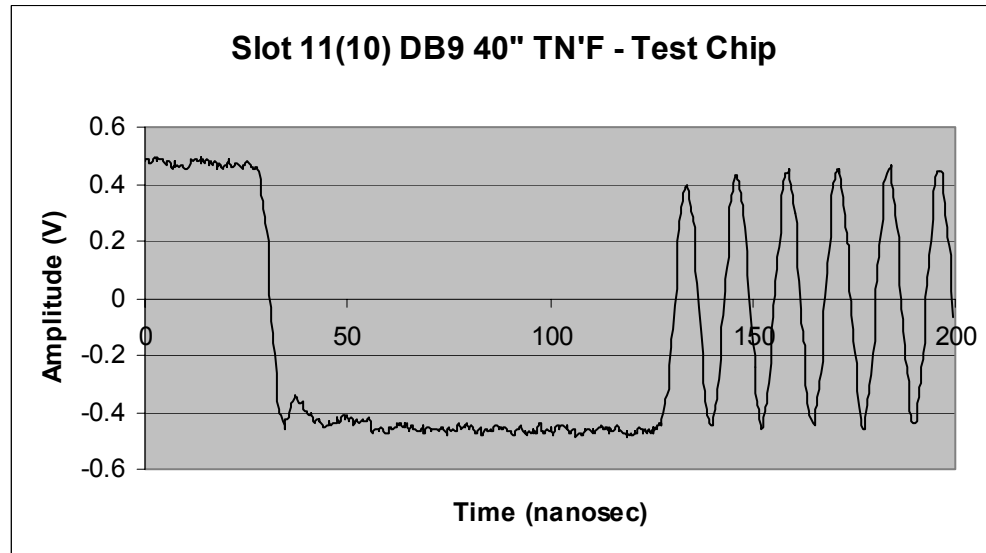
Vendor C - 10 slot backplane w/40" TN'F (longest)



Vendor C - 10 slot backplane w/40" TN'F (longest)

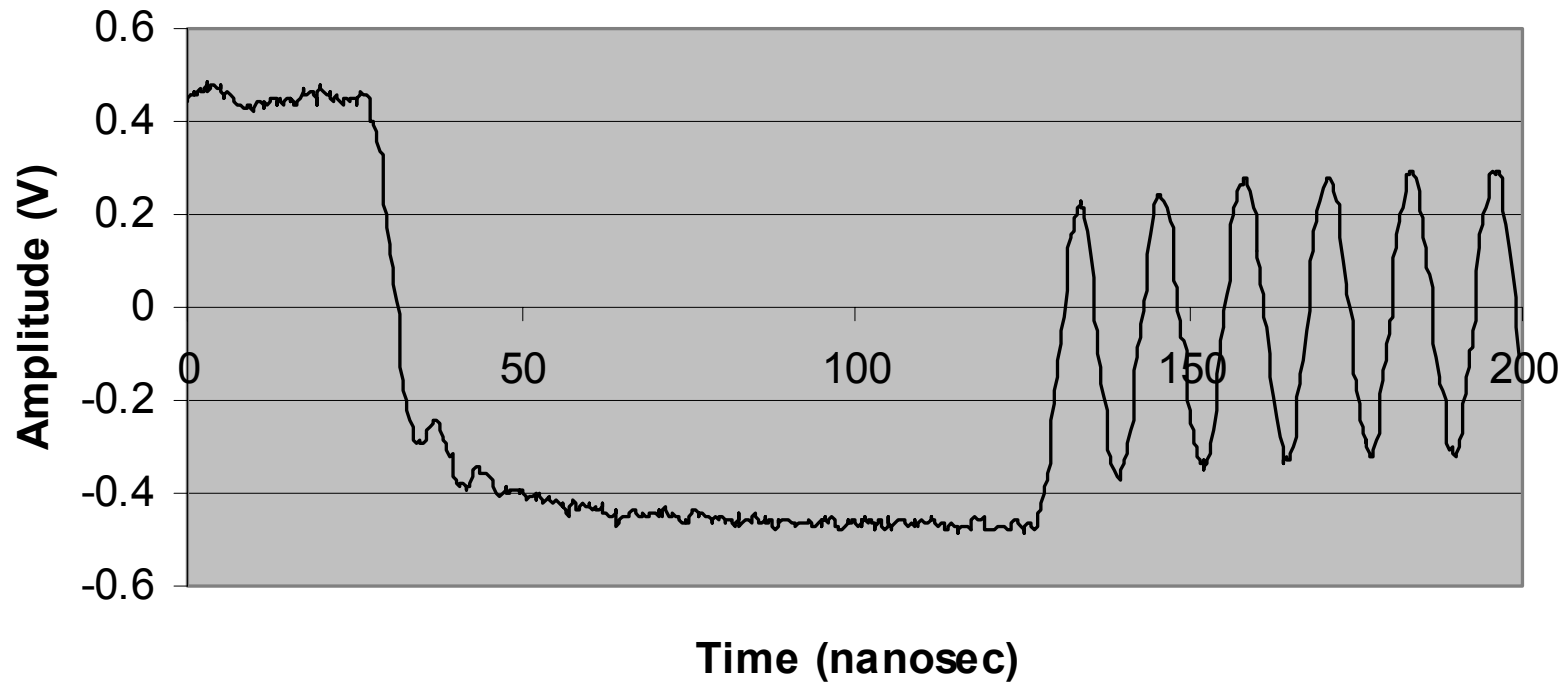


Vendor C - 10 slot backplane w/40" TN'F (longest)



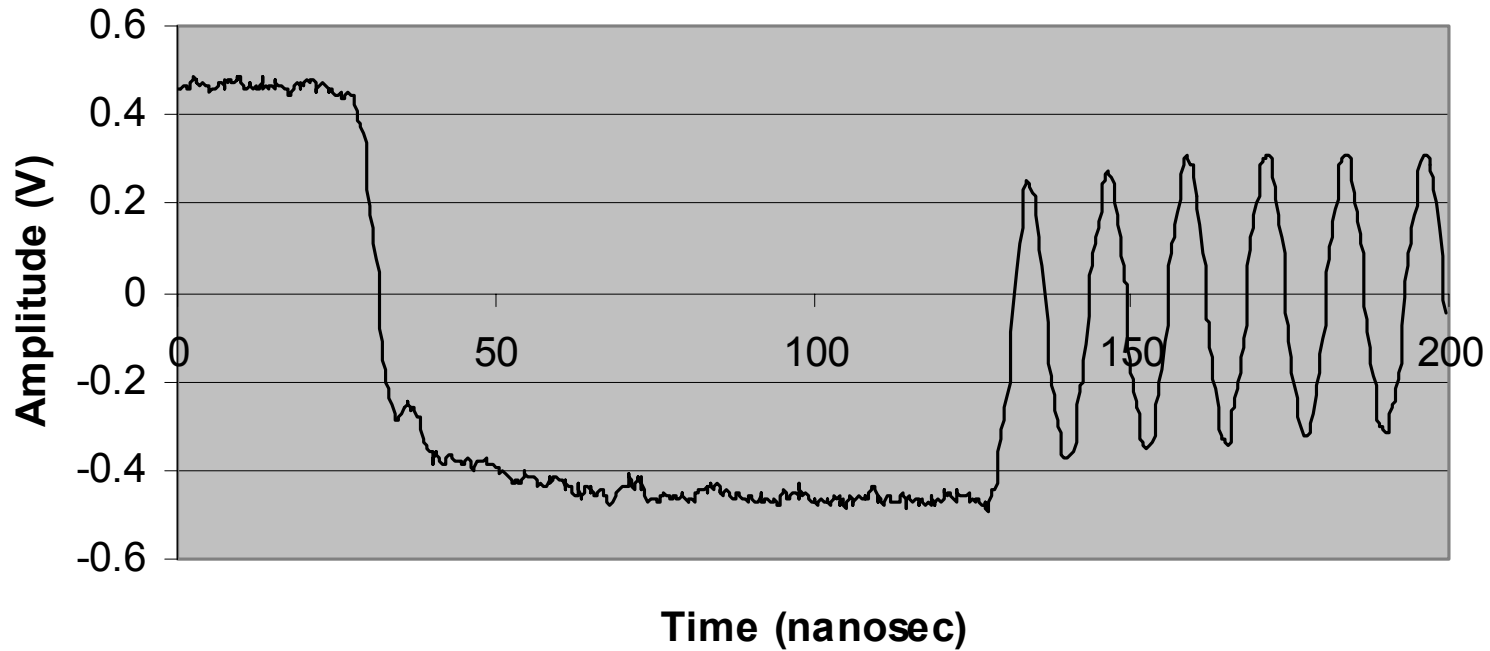
Vendor C - 10 slot backplane w/10 M Laminated

Slot 10(9) DB0 10 M Lam - Test Chip



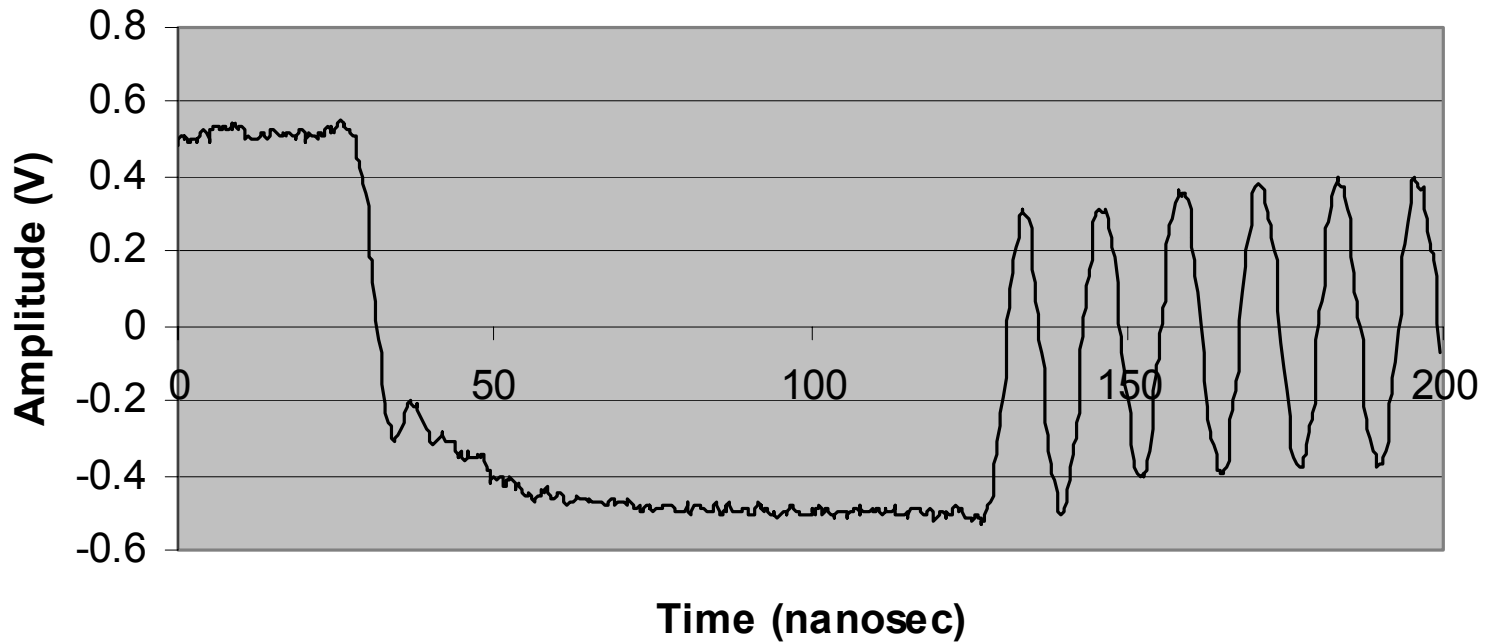
Vendor C - 10 slot backplane w/10 M Laminated

Slot 10(9) DB9 10 M Lam - Test Chip

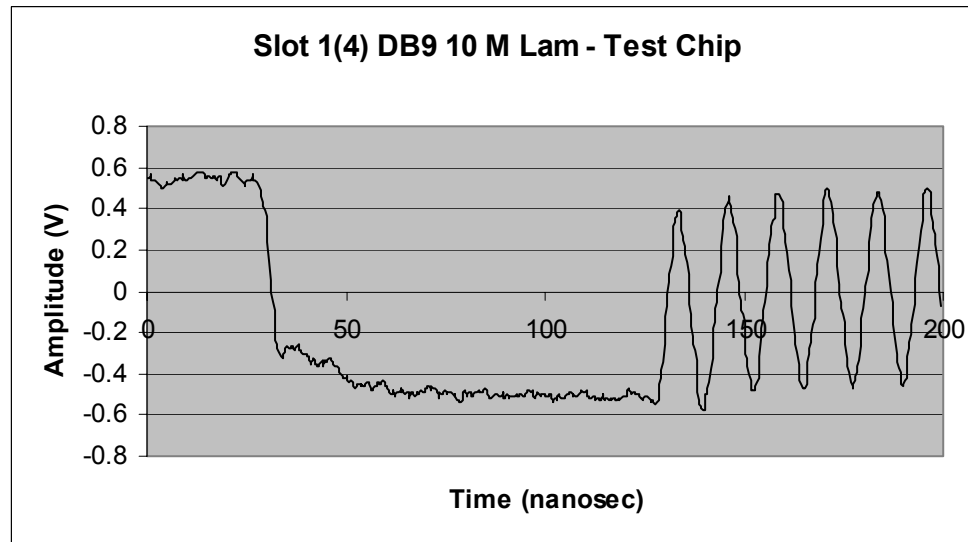


Vendor C - 10 slot backplane w/10 M Laminated

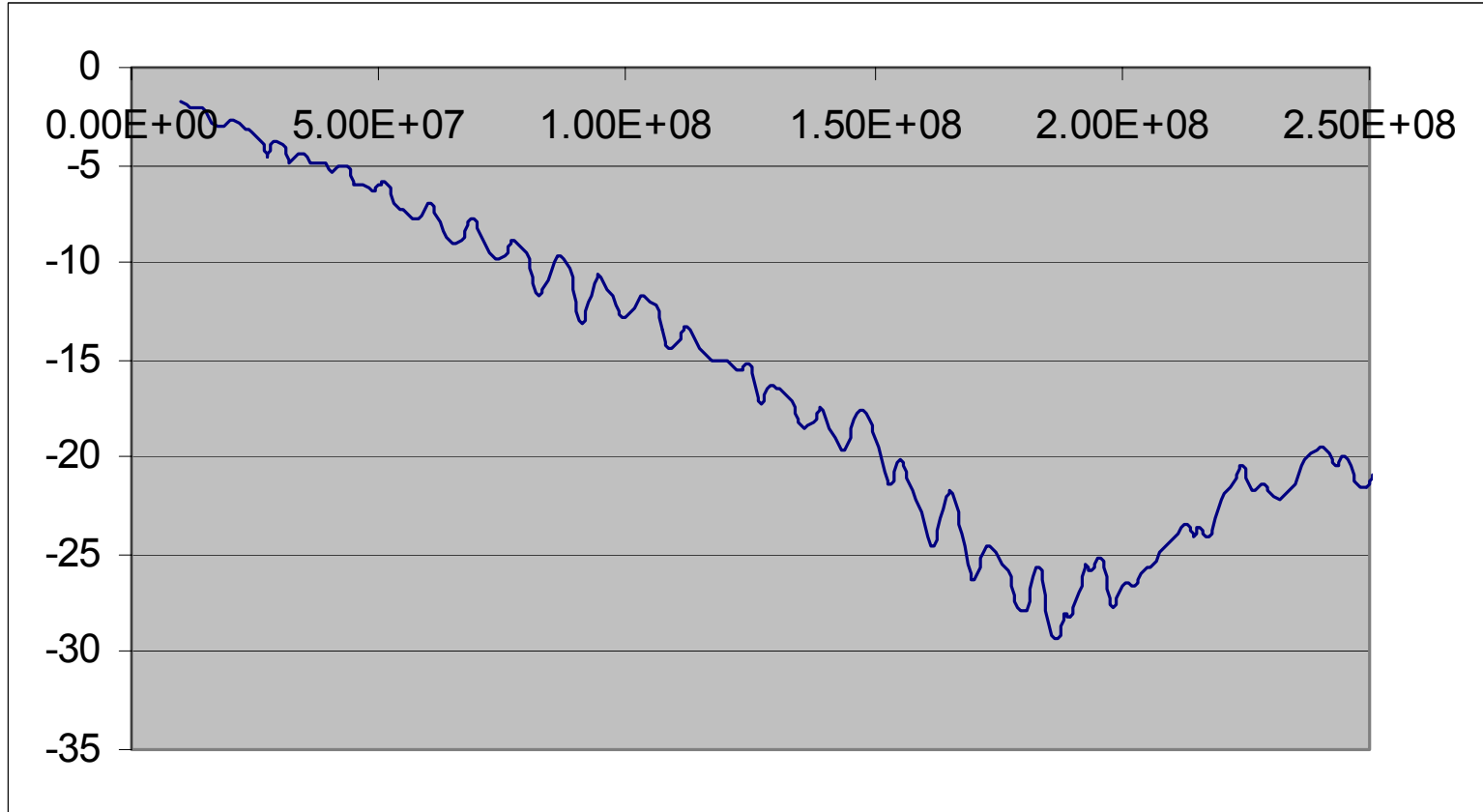
Slot 1(4) DB0 10 M Lam - Test Chip



Vendor C - 10 slot backplane w/10 M Laminated



10 M Brand X cable loss Vs. Frequency

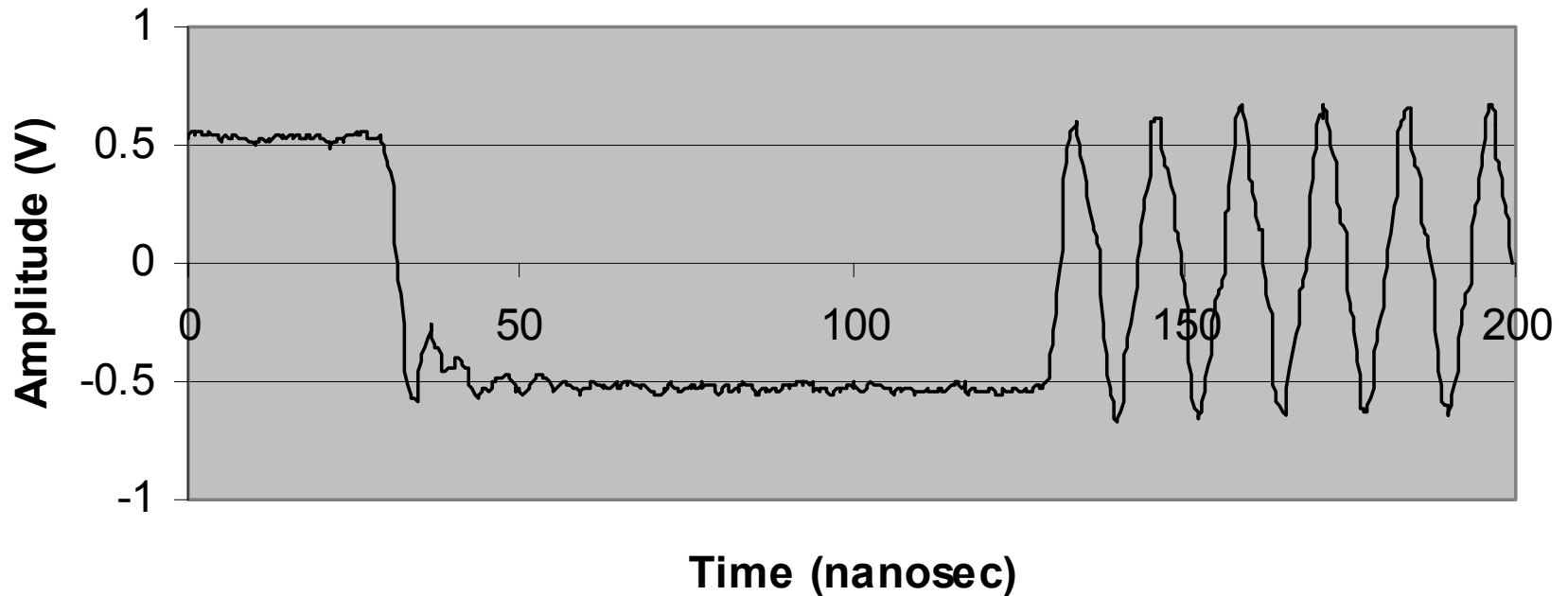


SCSI SPI Working Group Backplane 'D' - 4 Slot

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September 12, 2000

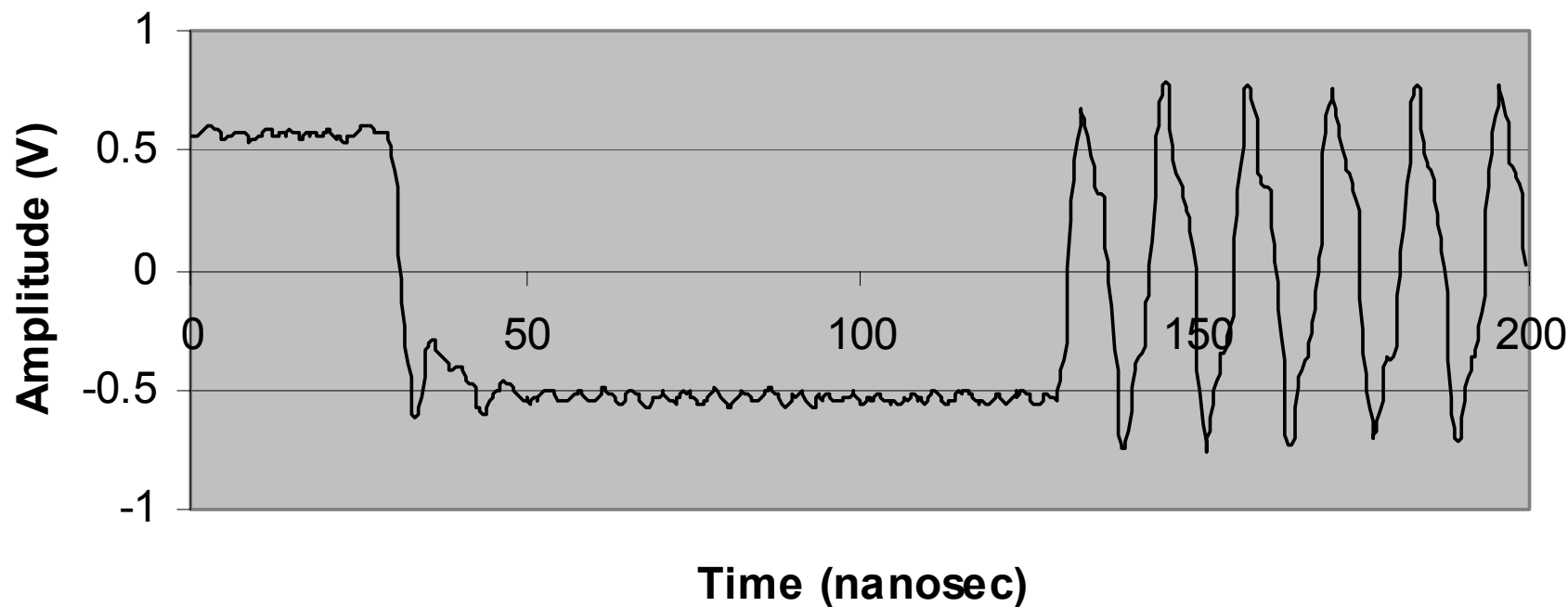
DB0 @ Slot 0 Backplane 'D' - 4 Slot

DB0 @ Slot 0 BackPlane 'D' w/ 40" TN'F -
Test Chip



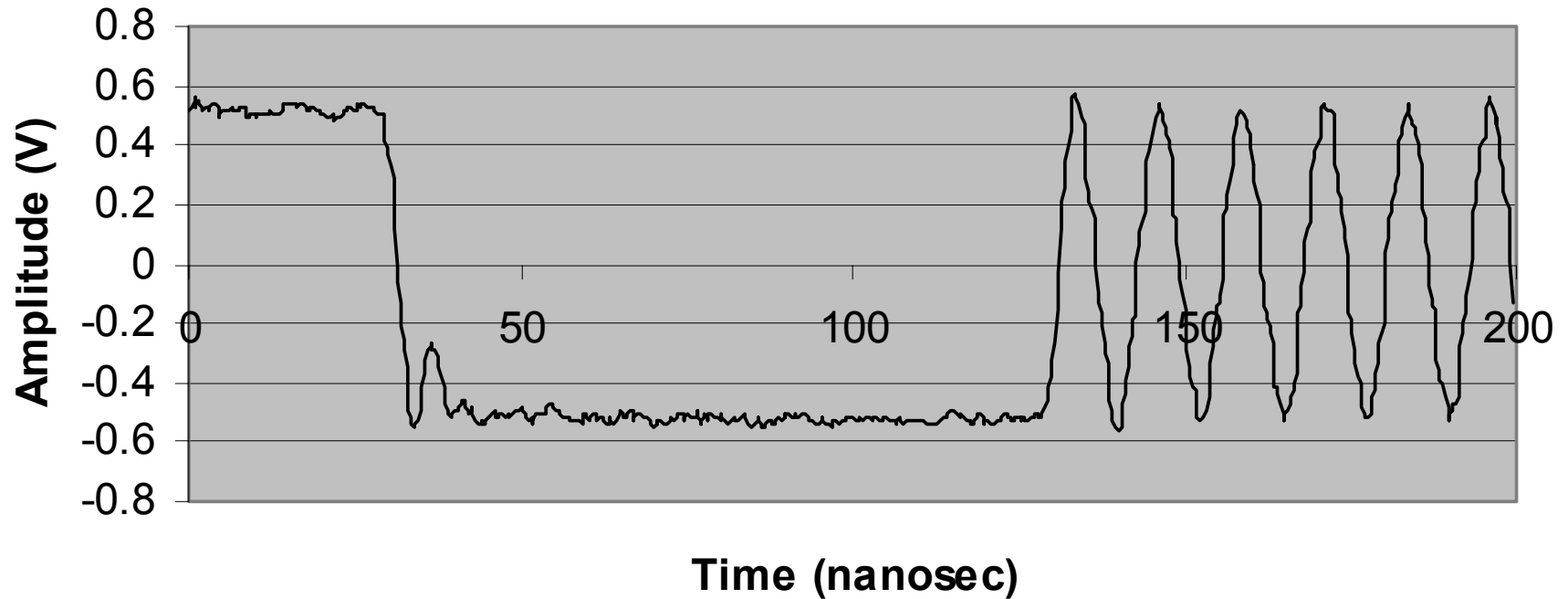
DB9 @ Slot 0 Backplane 'D' - 4 Slot

DB9 @ Slot 0 BackPlane 'D' w/ 40" TN'F cable - Test Chip



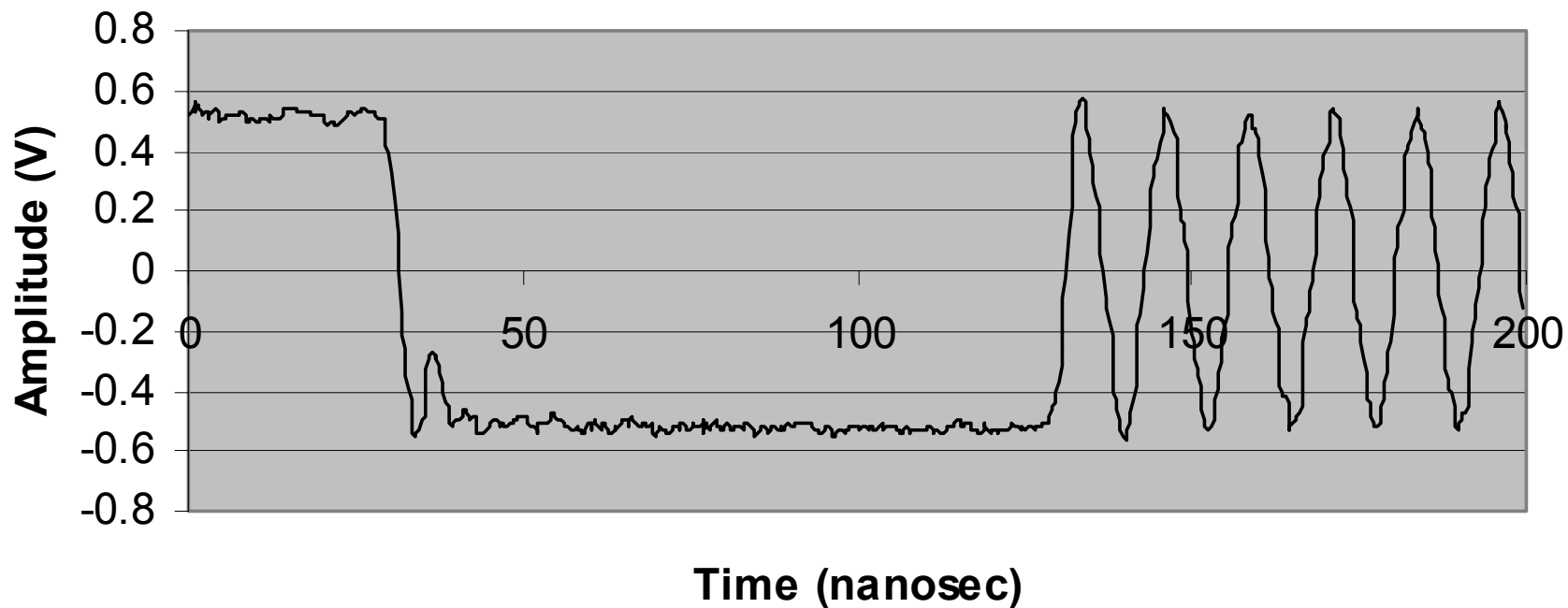
DB0 @ Slot 1 Backplane 'D' - 4 Slot

DB0 @ Slot 1 BackPlane 'D' w/ 40" TN'F cable - Test Chip



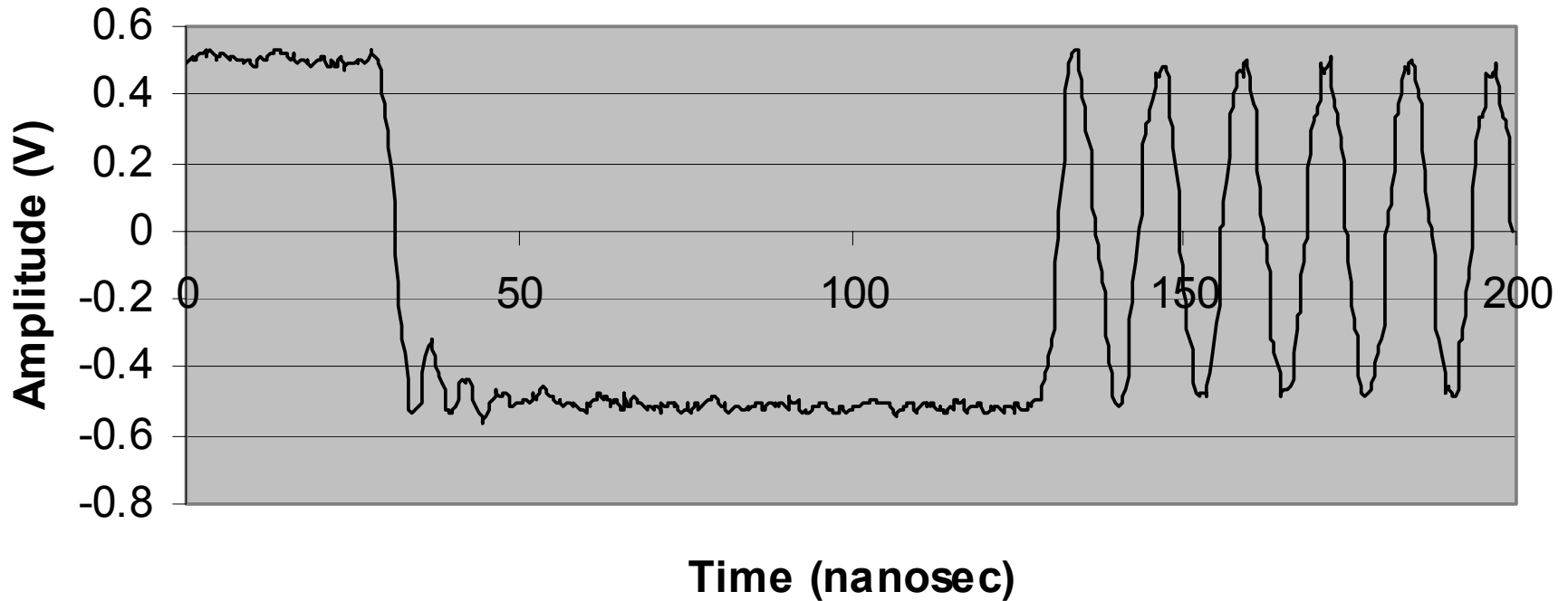
DB9 @ Slot 1 Backplane 'D' - 4 Slot

DB9 @ Slot 1 BackPlane 'D' w/ 40" TN'F cable - Test Chip



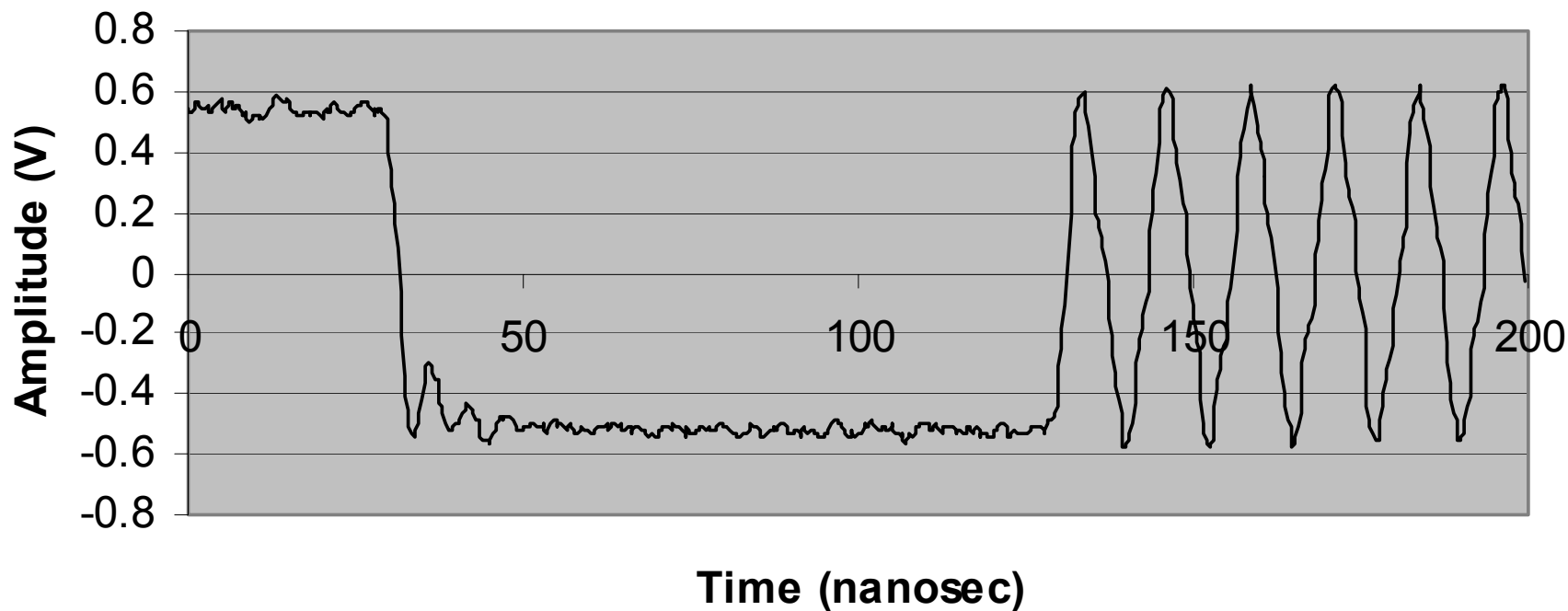
DB0 @ Slot 2 Backplane 'D' - 4 Slot

DB0 @ Slot 2 BackPlane 'D' w/ 40" TN'F cable - Test Chip



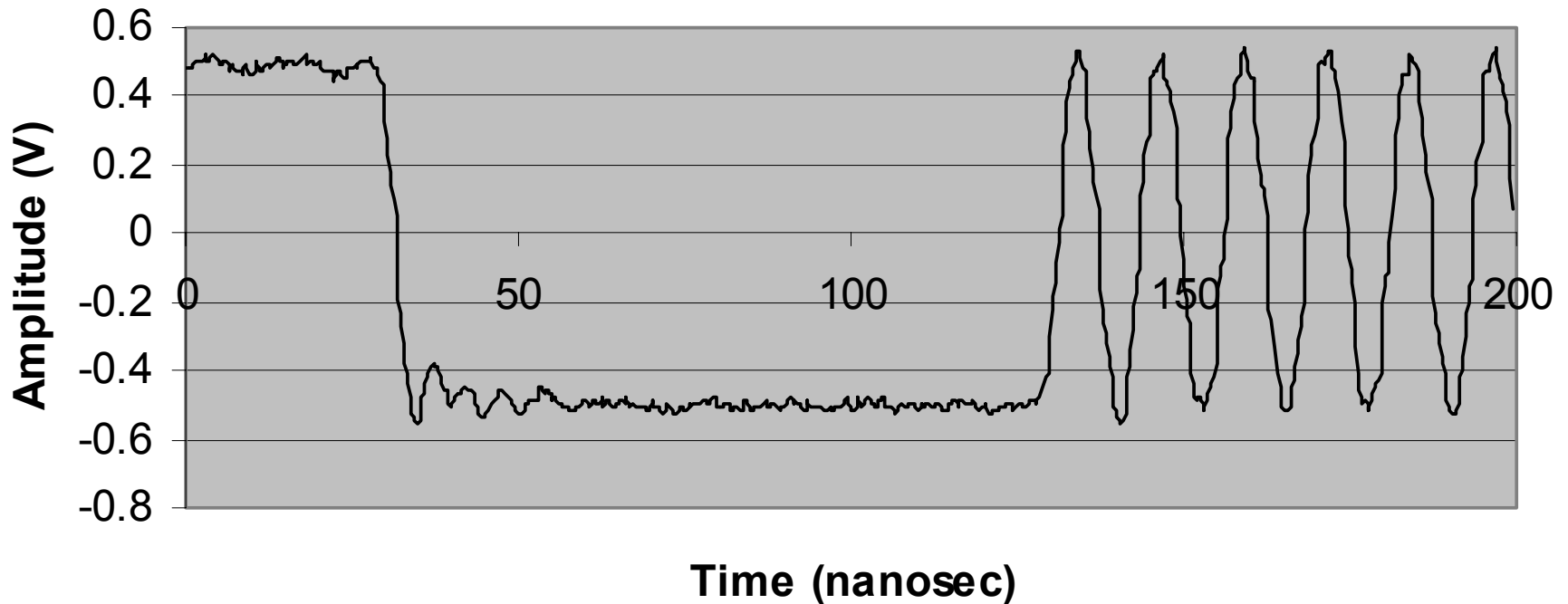
DB9 @ Slot 2 Backplane 'D' - 4 Slot

DB9 @ Slot 2 BackPlane 'D' w/ 40" TN'F cable - Test Chip



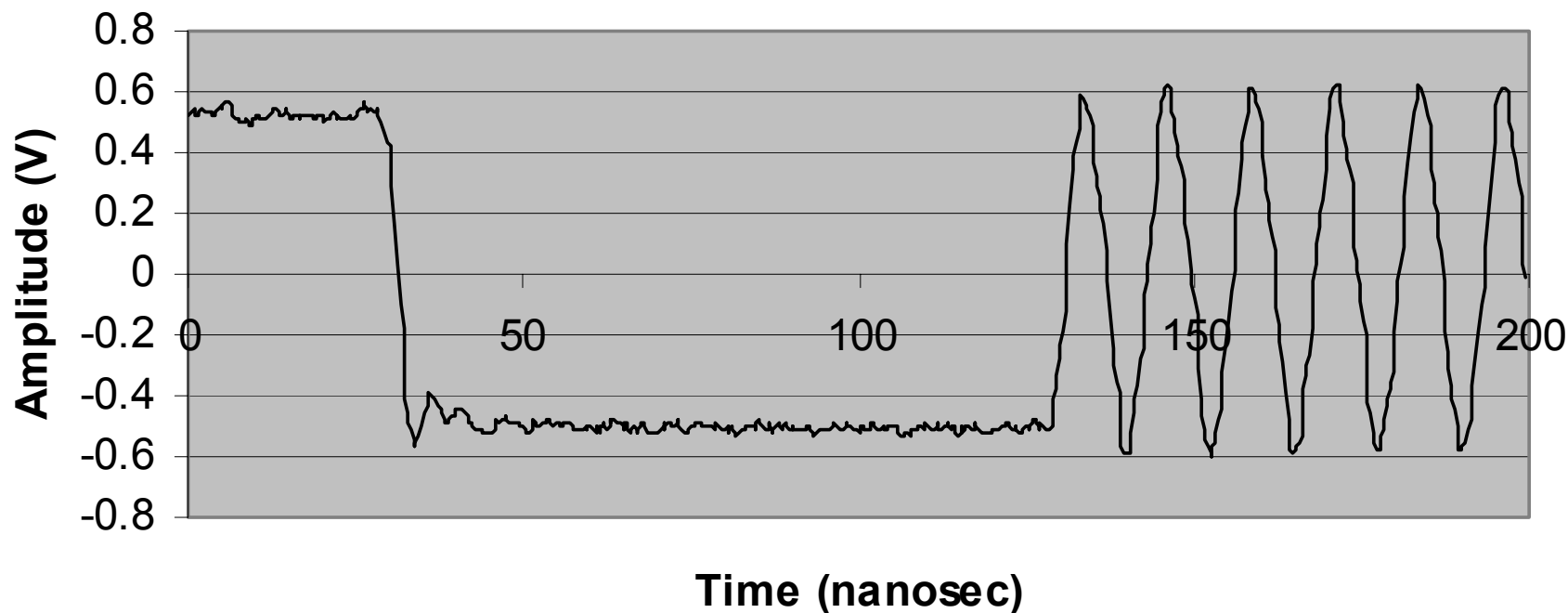
DB0 @ Slot 3 Backplane 'D' - 4 Slot

DB0 @ Slot 3 BackPlane 'D' w/ 40" TN'F cable - Test Chip



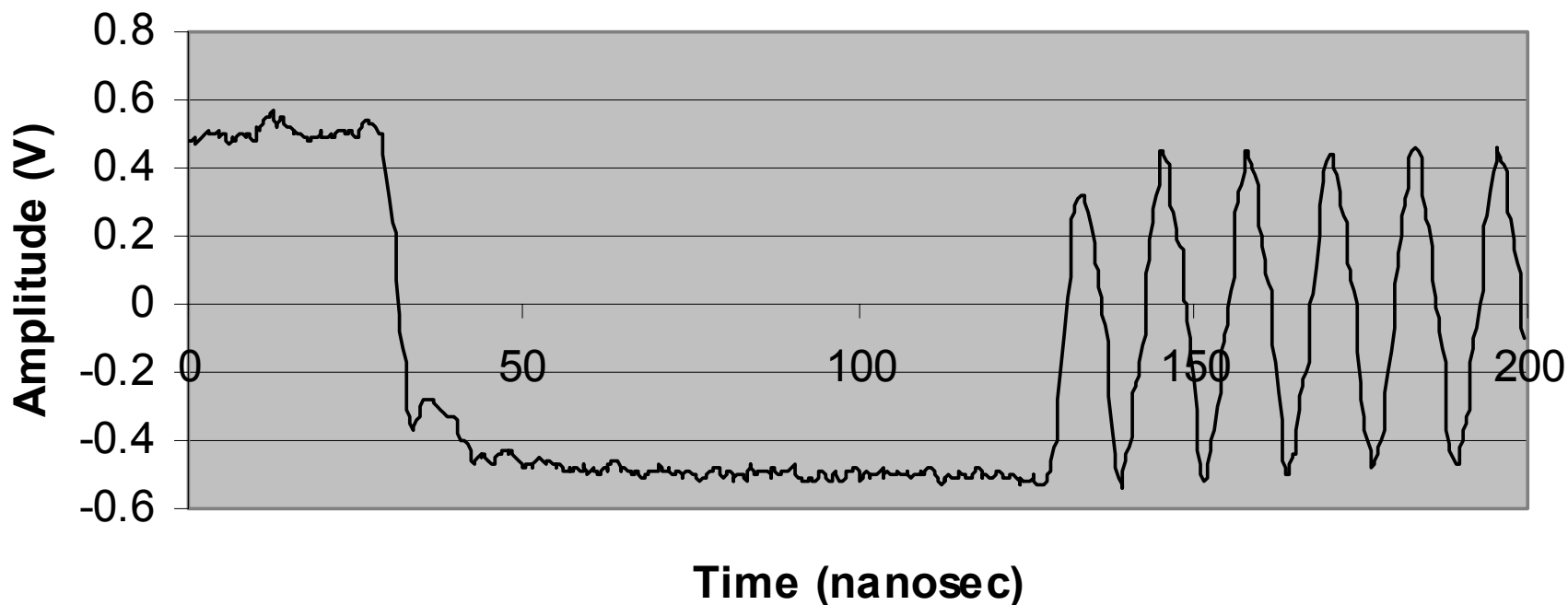
DB9 @ Slot 3 Backplane 'D' - 4 Slot

DB9 @ Slot 3 BackPlane 'D' w/ 40" TN'F cable - Test Chip



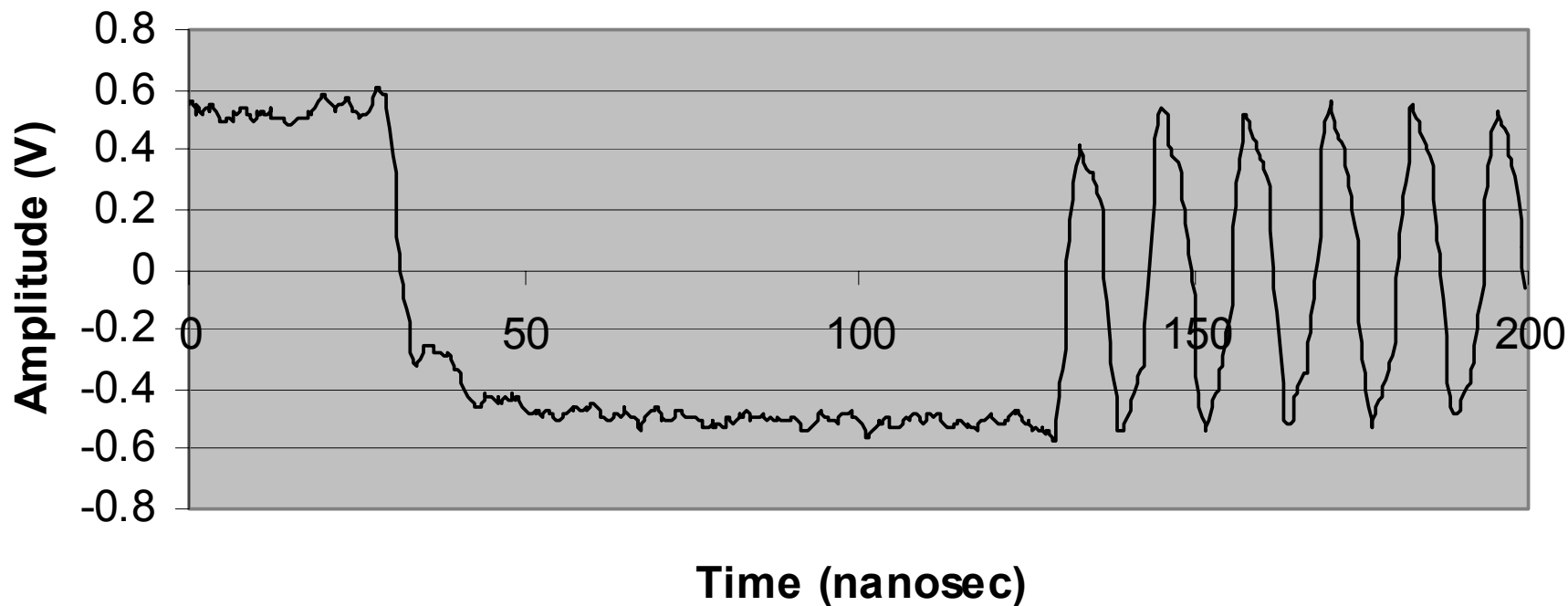
DB0 @ Slot 0 Backplane 'D' - 4 Slot

DB0 @ Slot 0 BackPlane 'D' w/ 10 M TN'F -
Test Chip



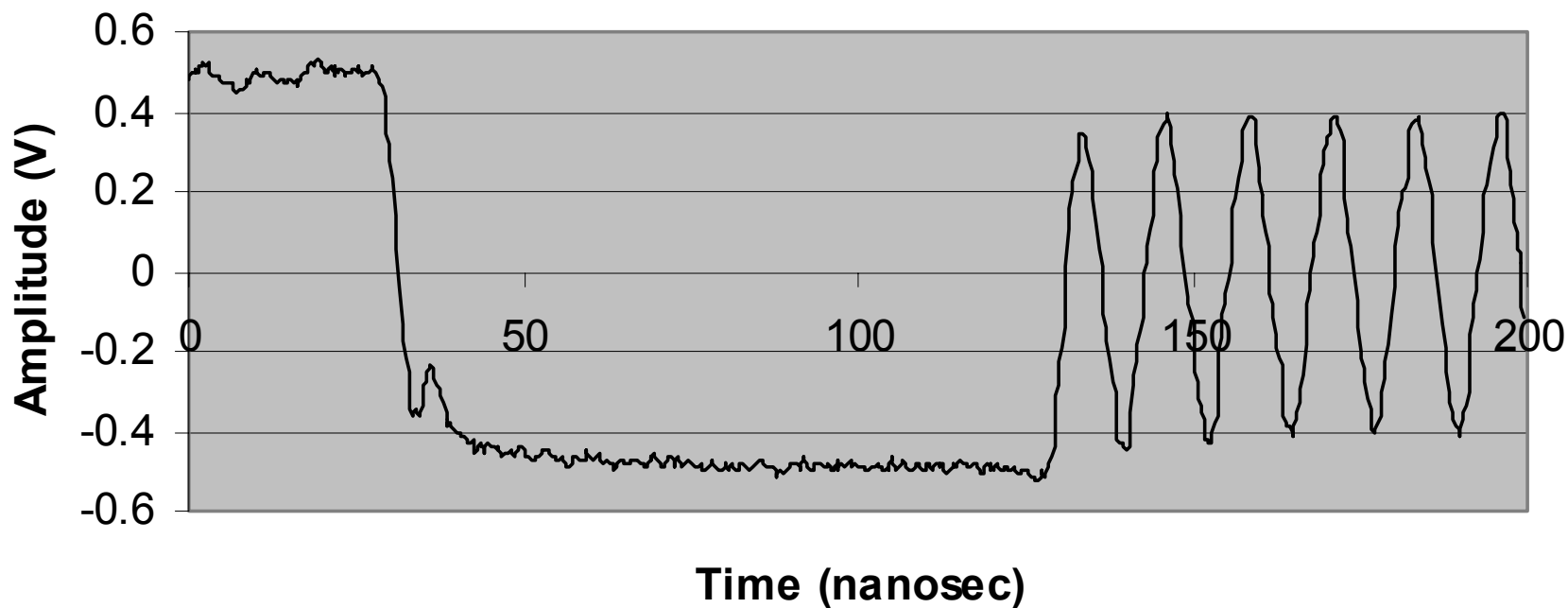
DB9 @ Slot 0 Backplane 'D' - 4 Slot

DB9 @ Slot 0 BackPlane 'D' w/10 M TN'F cable -
Test Chip



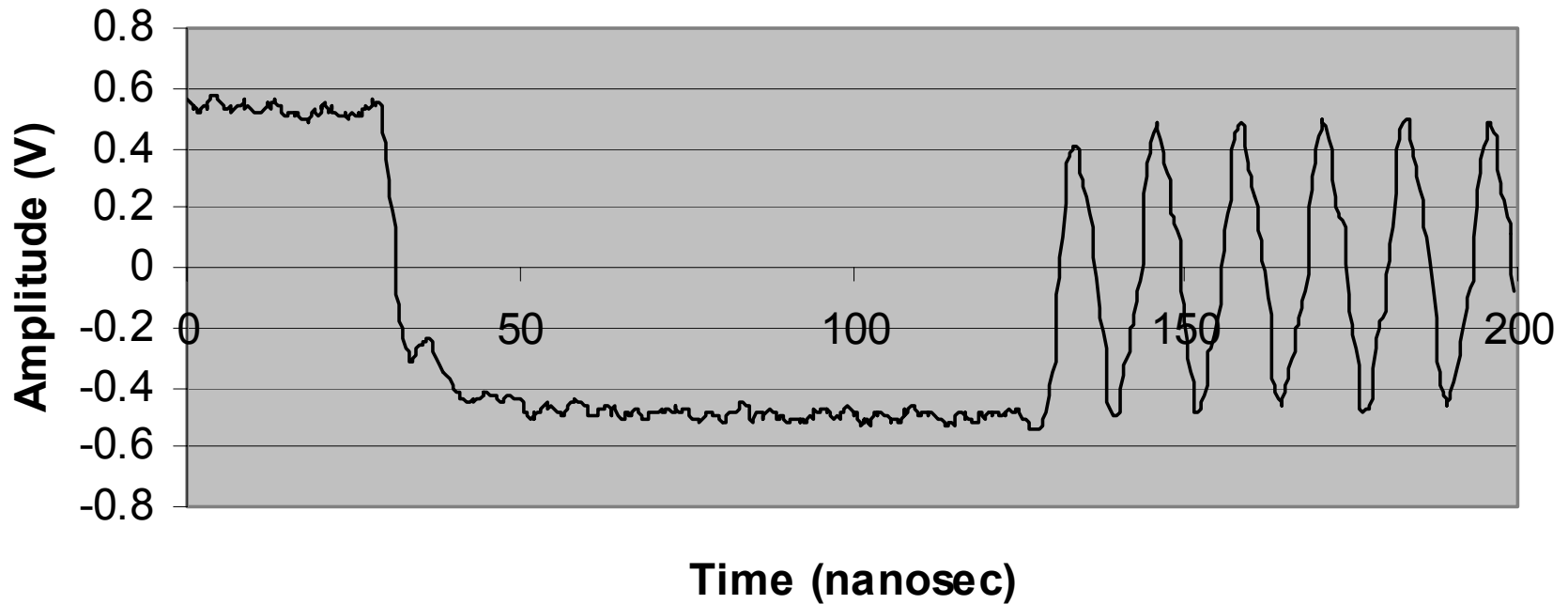
DB0 @ Slot 1 Backplane 'D' - 4 Slot

DB0 @ Slot 1 BackPlane 'D' w/ 10 M TN'F cable -
Test Chip



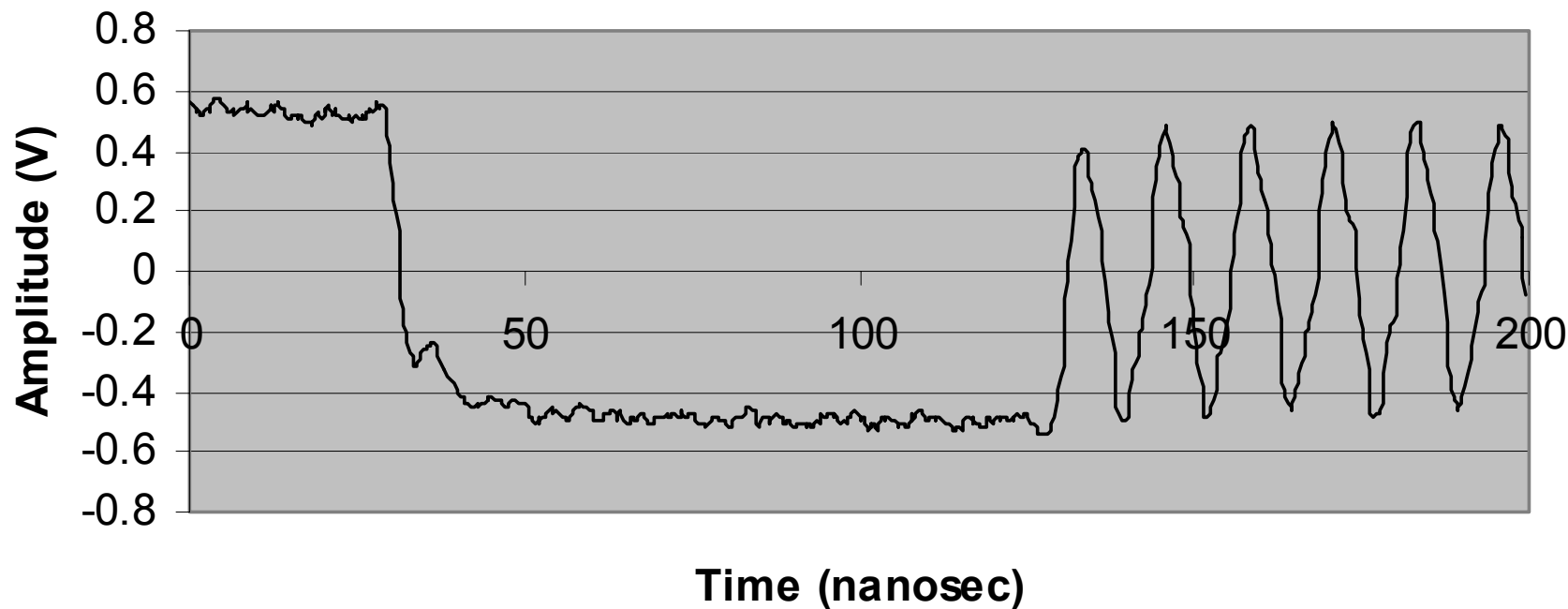
DB9 @ Slot 1 Backplane 'D' - 4 Slot

DB9 @ Slot 1 BackPlane 'D' w/ 10 M TN'F cable - Test Chip



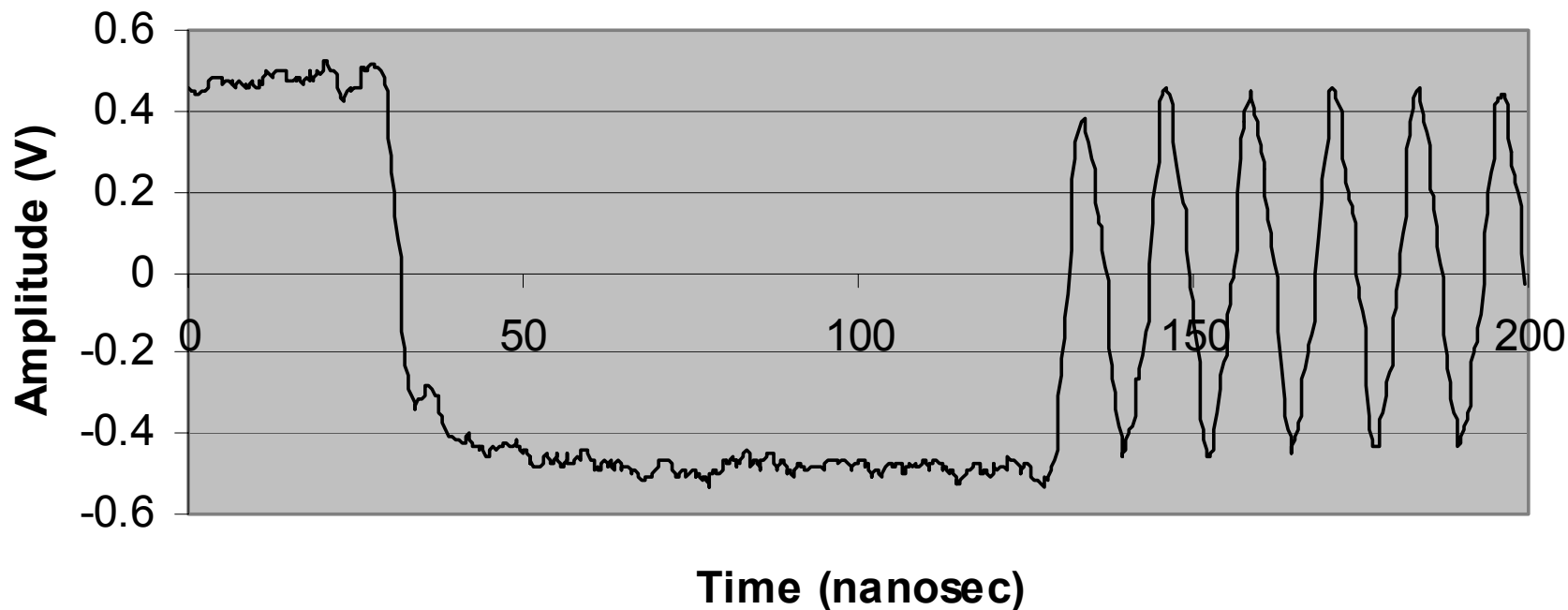
DB0 @ Slot 2 Backplane 'D' - 4 Slot

DB0 @ Slot 2 BackPlane 'D' w/ 10 M TN'F cable - Test Chip



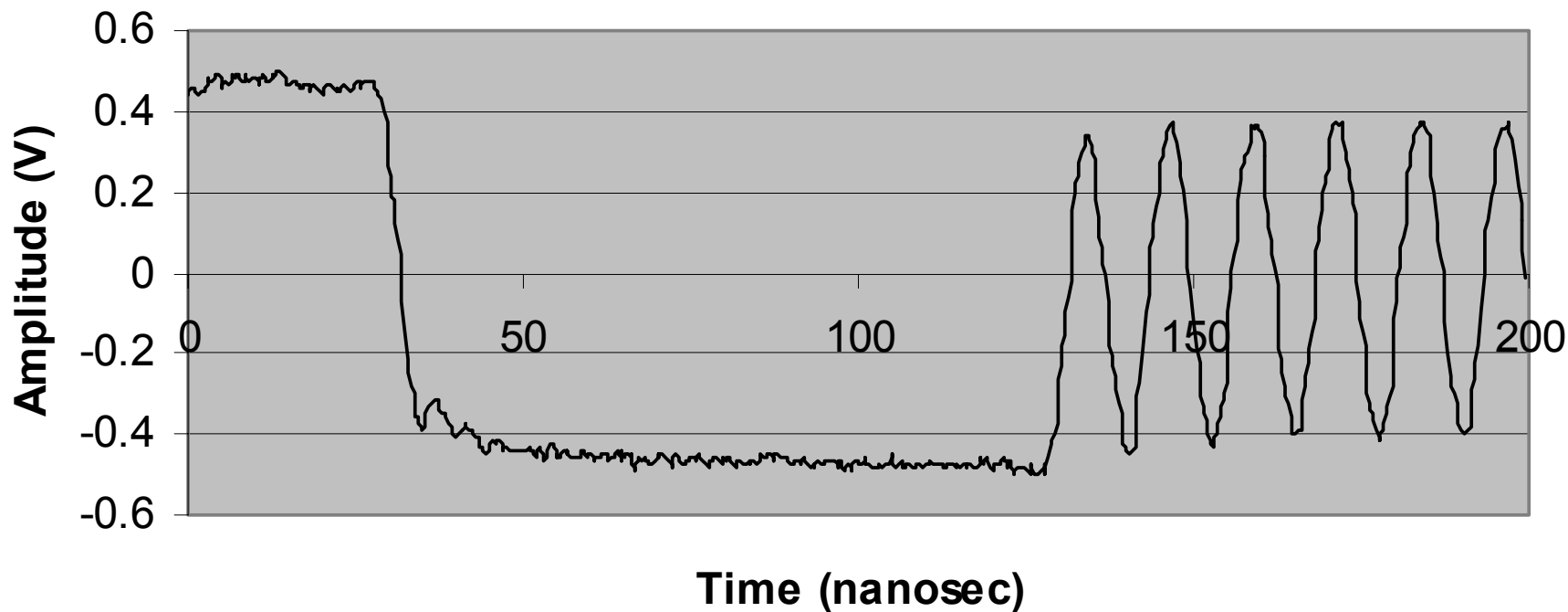
DB9 @ Slot 2 Backplane 'D' - 4 Slot

DB9 @ Slot 2 BackPlane 'D' w/ 10 M TN'F cable - Test Chip



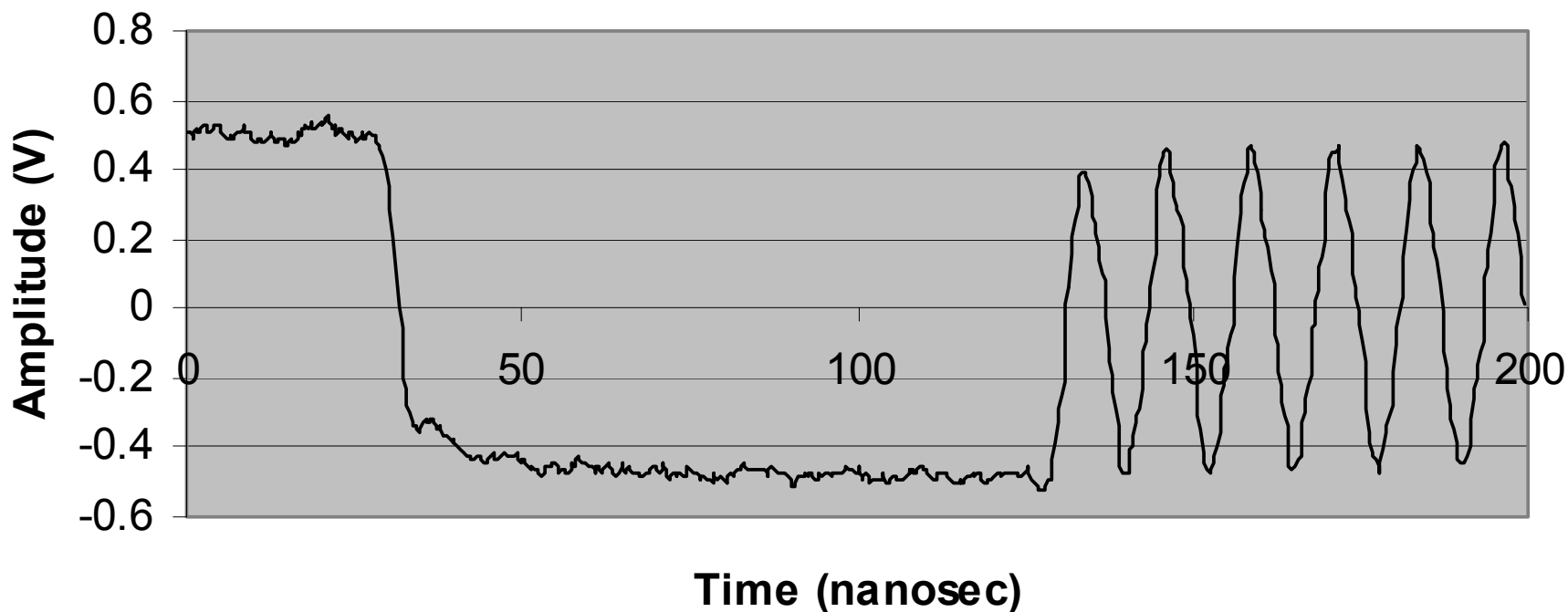
DB0 @ Slot 3 Backplane 'D' - 4 Slot

DB0 @ Slot 3 BackPlane 'D' w/ 10 M TN'F cable - Test Chip



DB9 @ Slot 3 Backplane 'D' - 4 Slot

DB9 @ Slot 3 BackPlane 'D' w/ 10 M TN'F cable - Test Chip

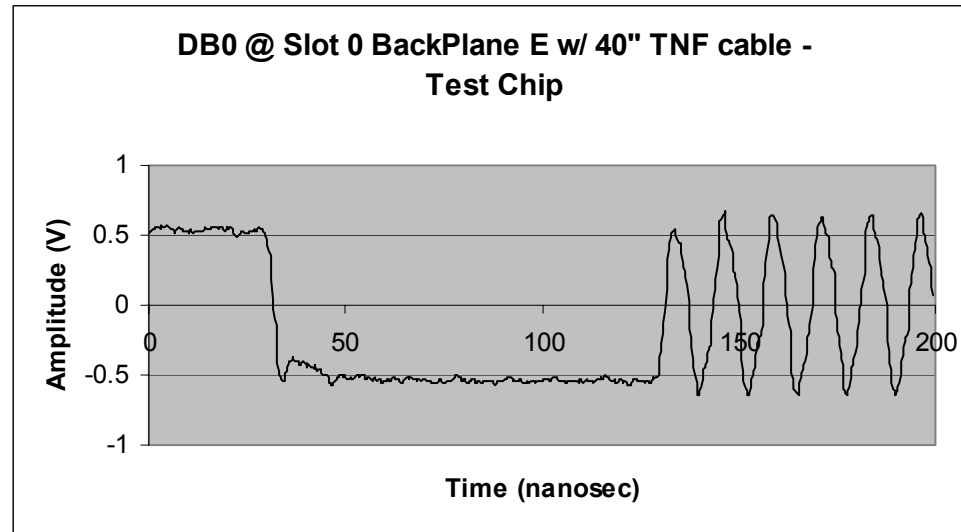


SCSI SPI Working Group

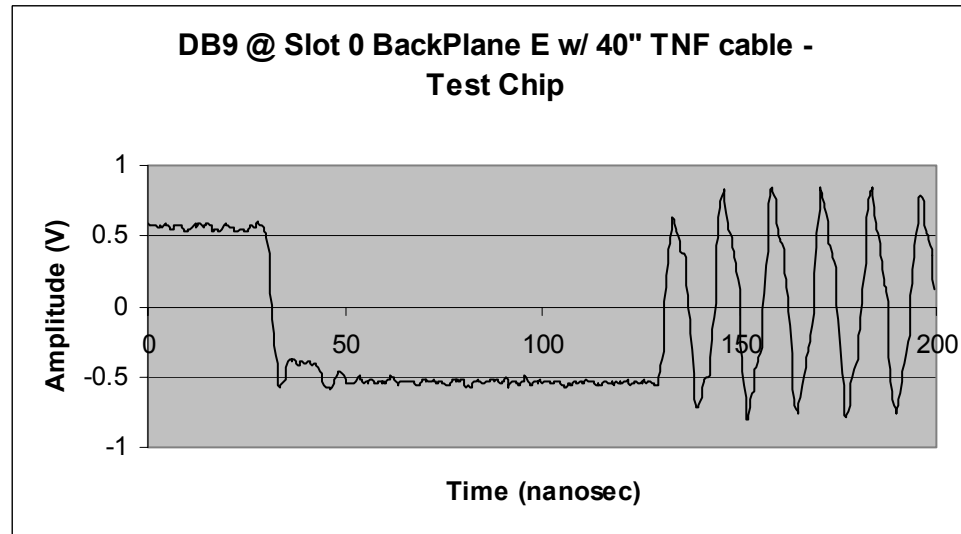
5 Slot Backplane 'E' w/ various cables

Huntington Beach, CA
September 12, 2000

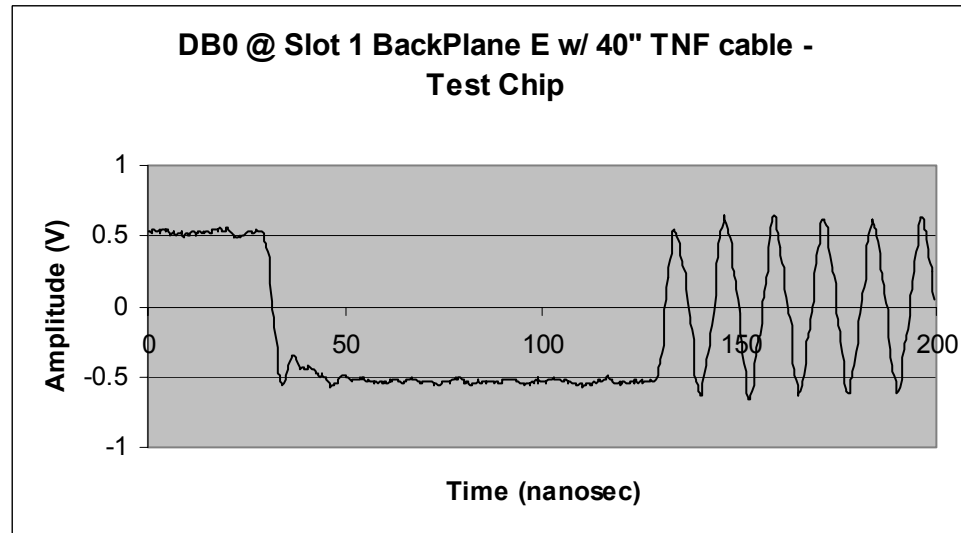
DB0 @ Slot 0 Backplane E Test Chip Driving



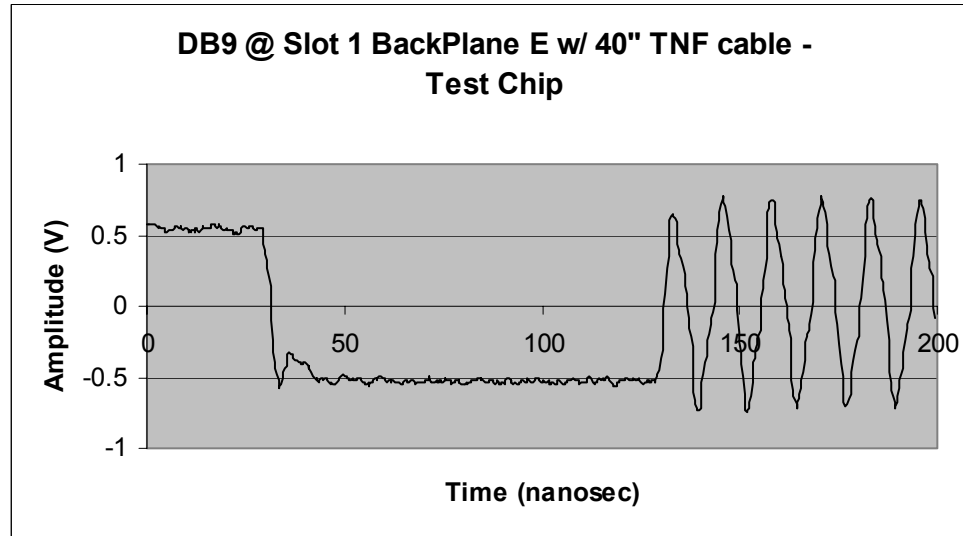
DB9 @ Slot 0 Backplane I Test Chip Driving



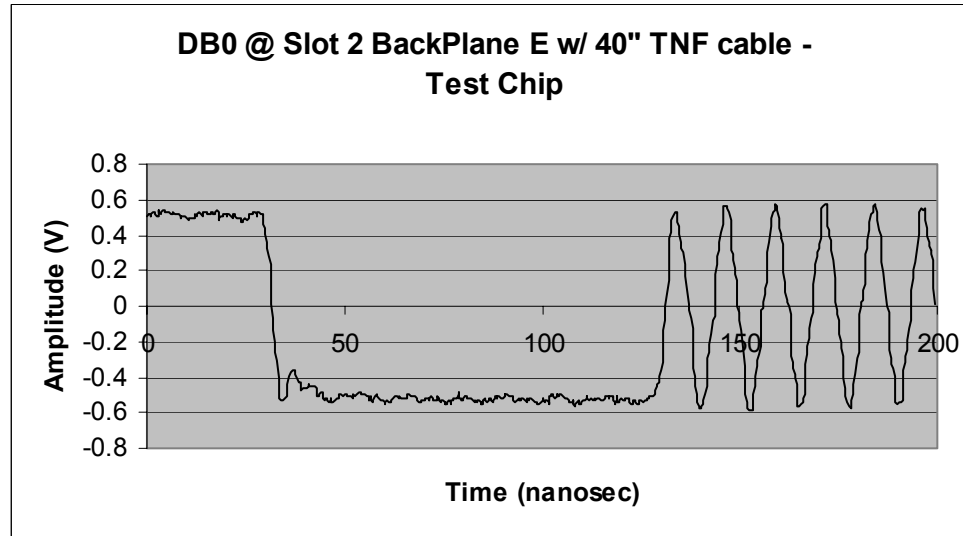
DB0 @ Slot 1 Backplane E Test Chip Driving



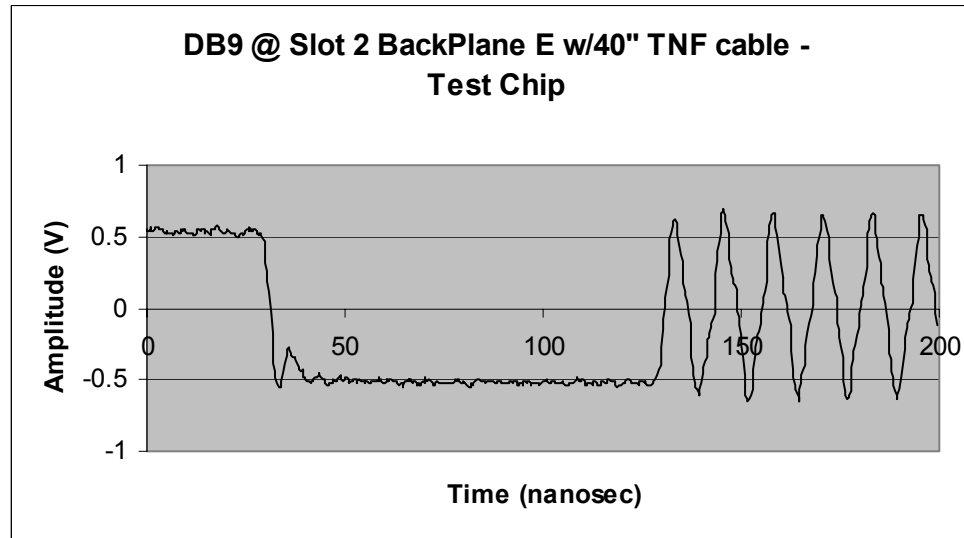
DB9 @ Slot 1 Backplane E Test Chip Driving



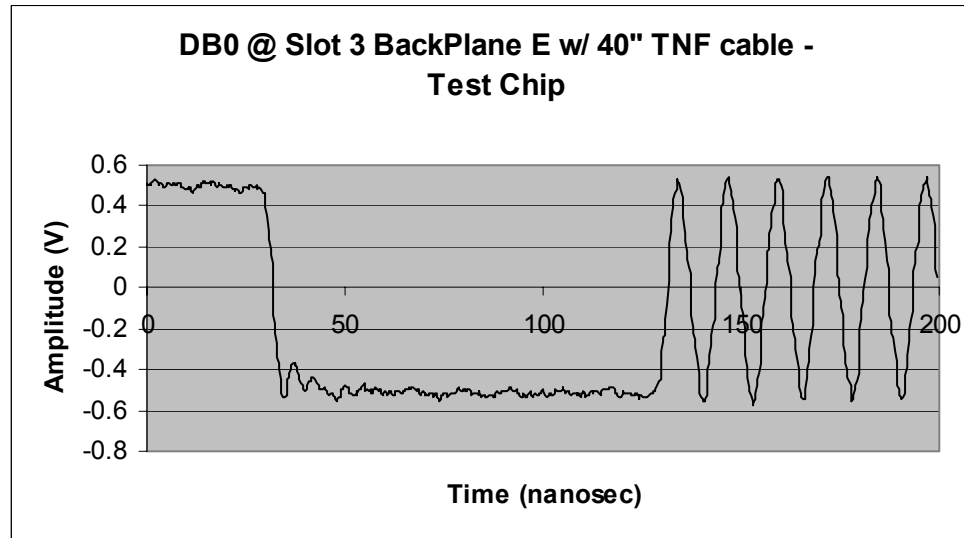
DB0 @ Slot 2 Backplane E Test Chip Driving



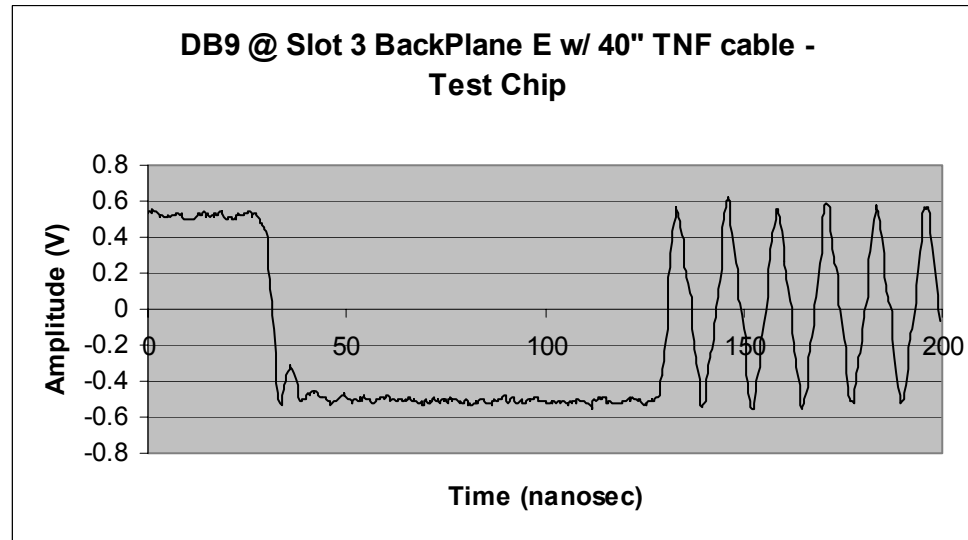
DB9 @ Slot 2 Backplane E Test Chip Driving



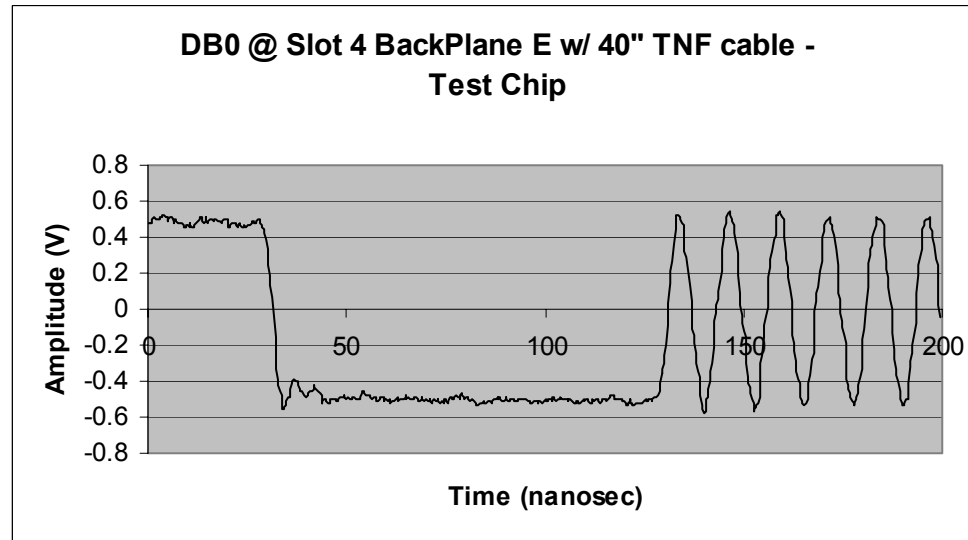
DB0 @ Slot 3 Backplane E Test Chip Driving



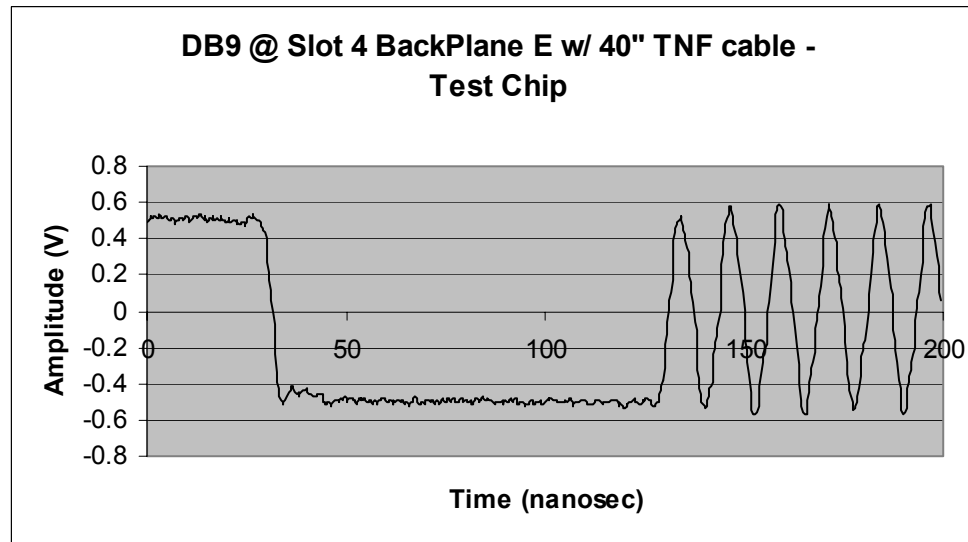
DB9 @ Slot 3 Backplane E Test Chip Driving



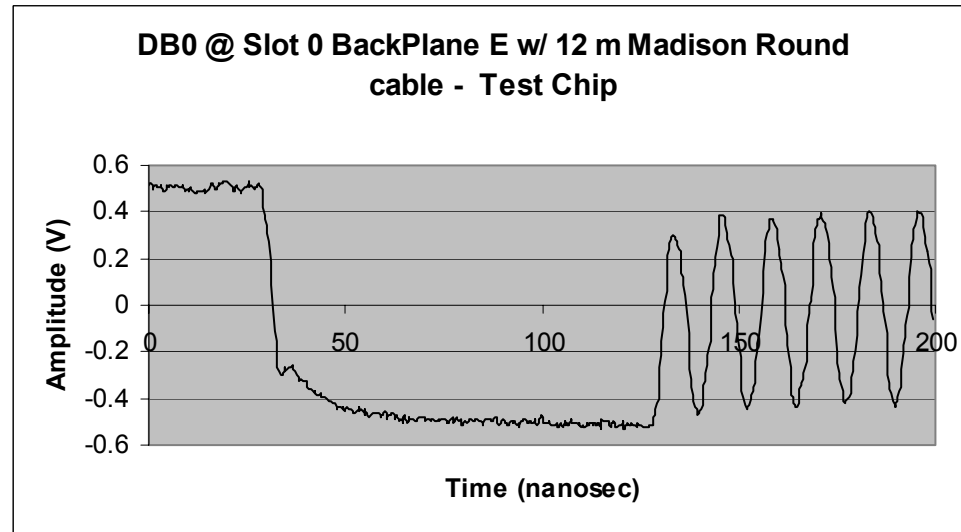
DB0 @ Slot 4 Backplane E Test Chip Driving



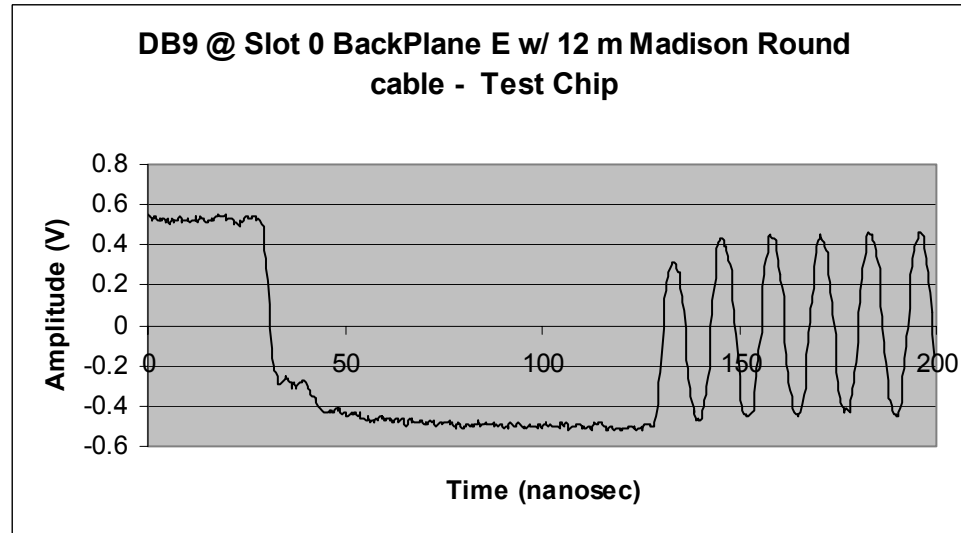
DB9 @ Slot 4 Backplane E Test Chip Driving



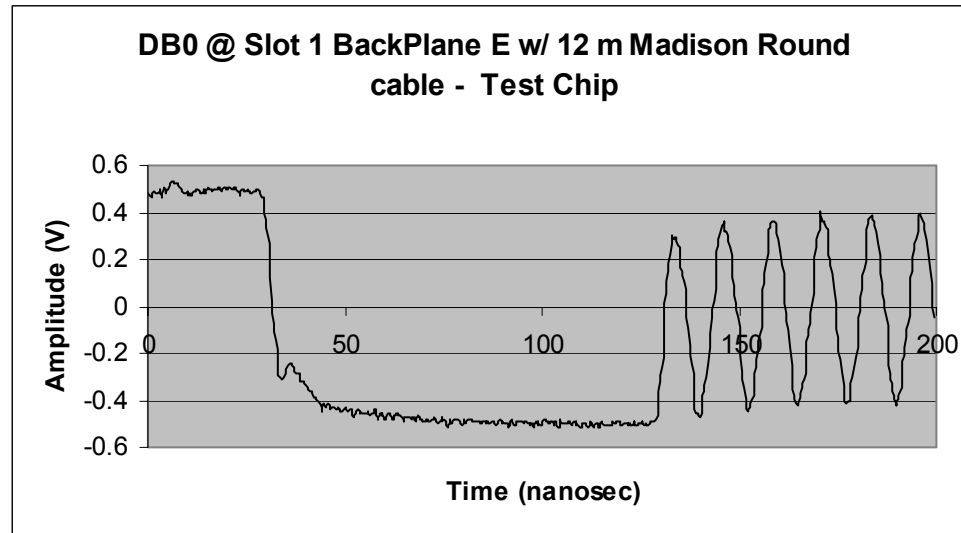
DB0 @ Slot 0 Backplane E Test Chip Driving



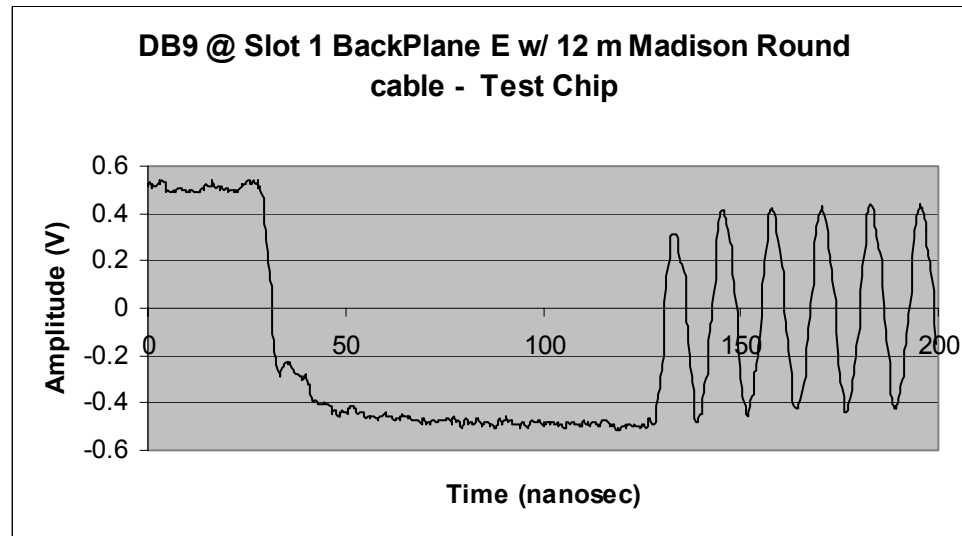
DB9 @ Slot 0 Backplane I Test Chip Driving



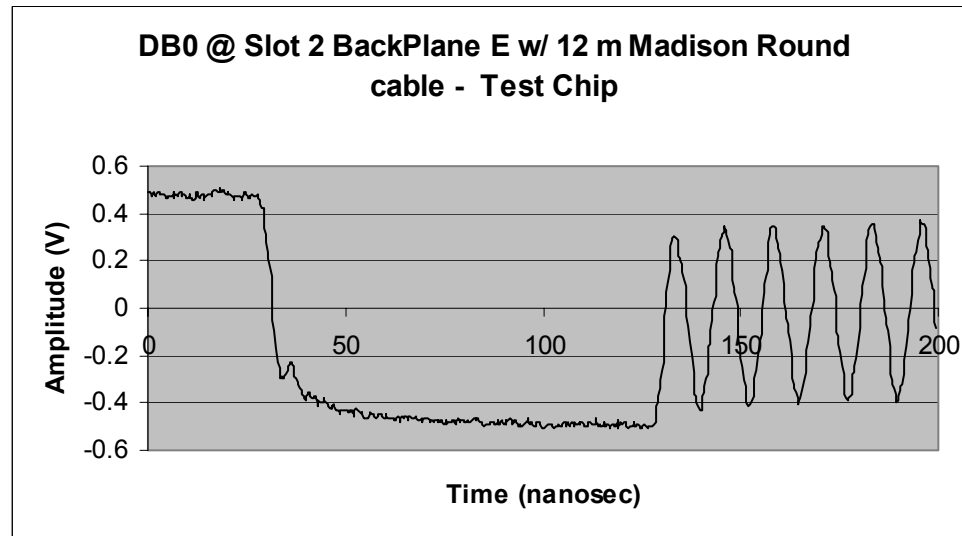
DB0 @ Slot 1 Backplane E Test Chip Driving



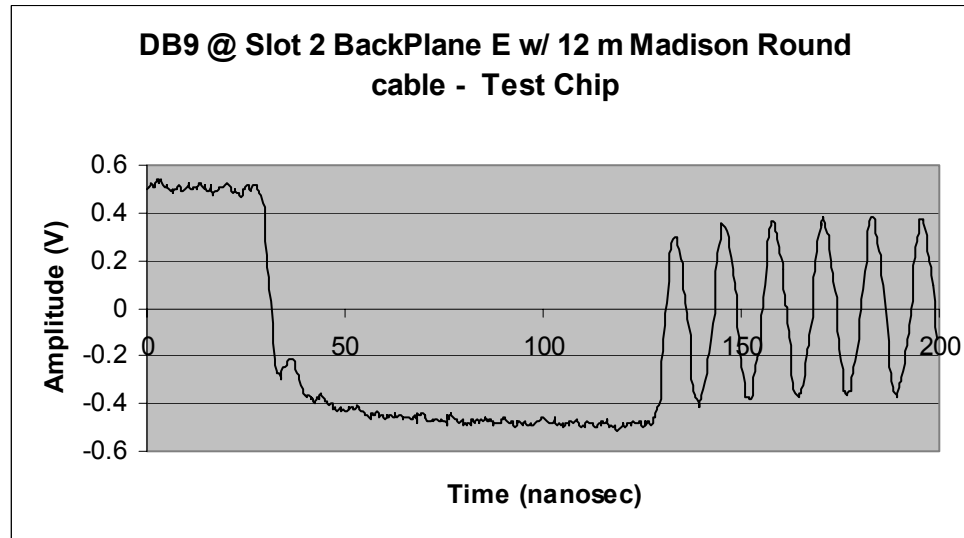
DB9 @ Slot 1 Backplane E Test Chip Driving



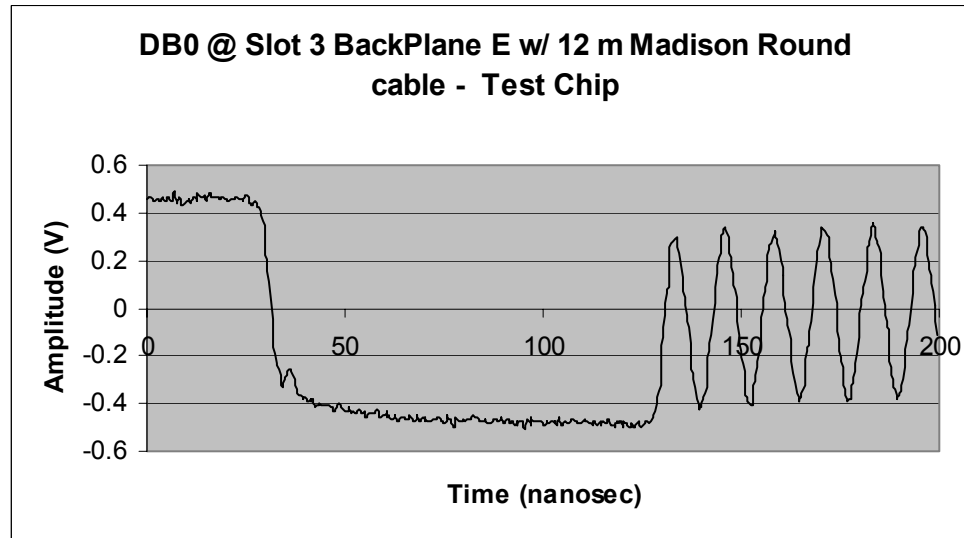
DB0 @ Slot 2 Backplane E Test Chip Driving



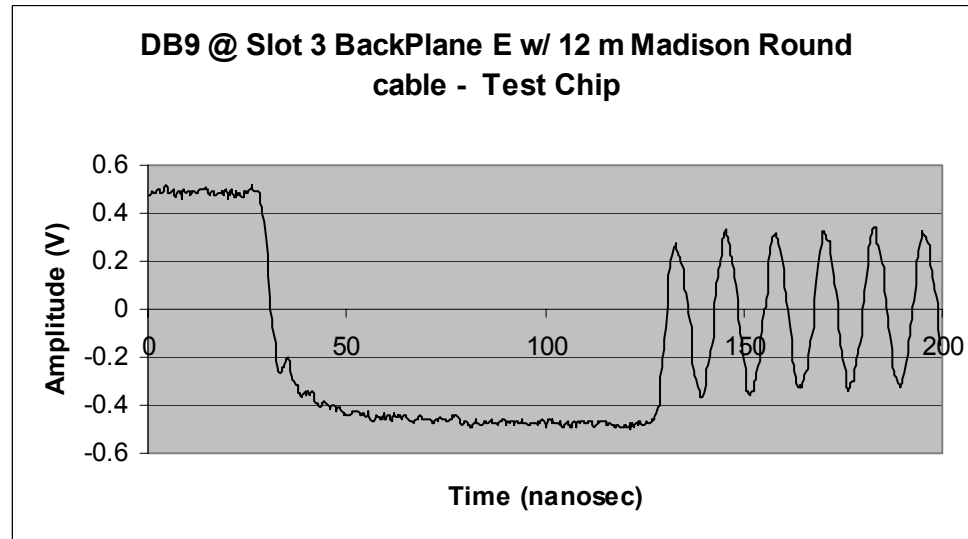
DB9 @ Slot 2 Backplane E Test Chip Driving



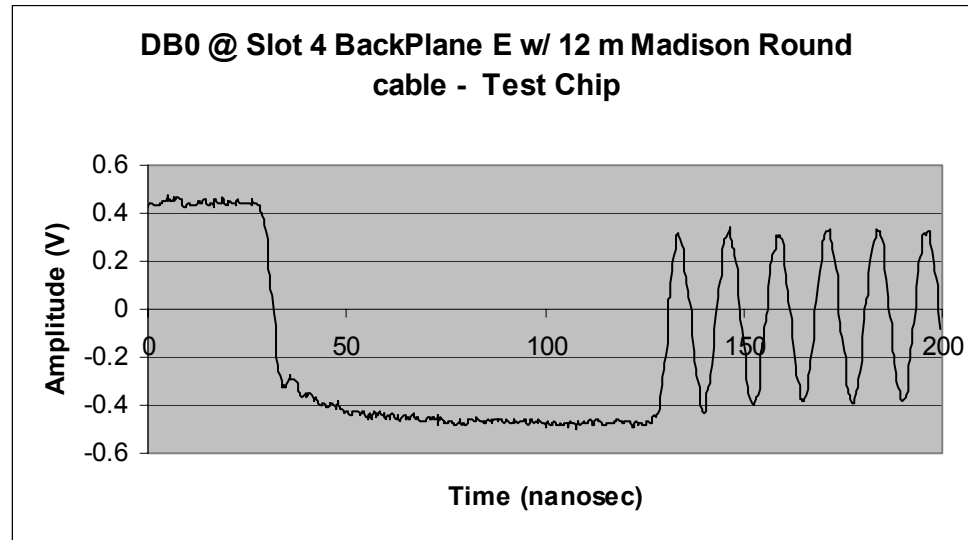
DB0 @ Slot 3 Backplane E Test Chip Driving



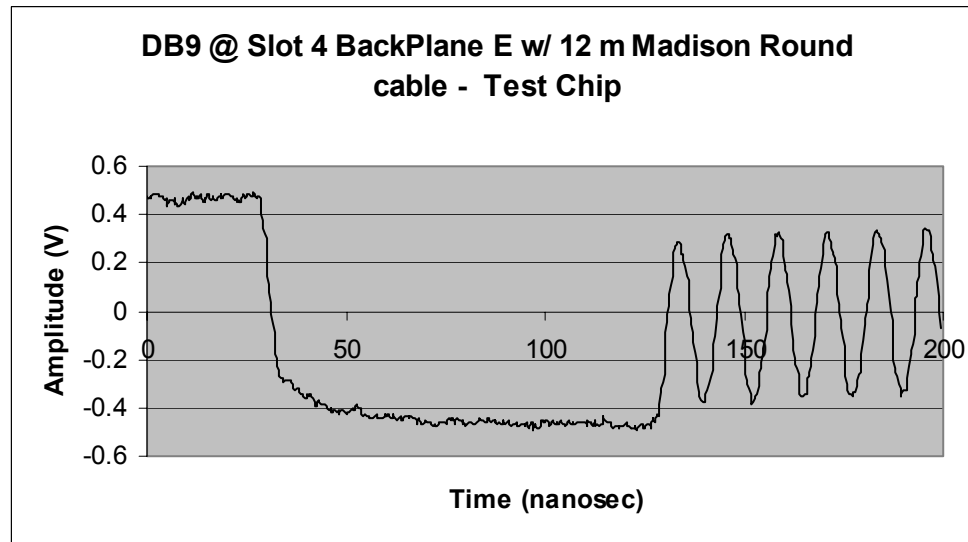
DB9 @ Slot 3 Backplane E Test Chip Driving



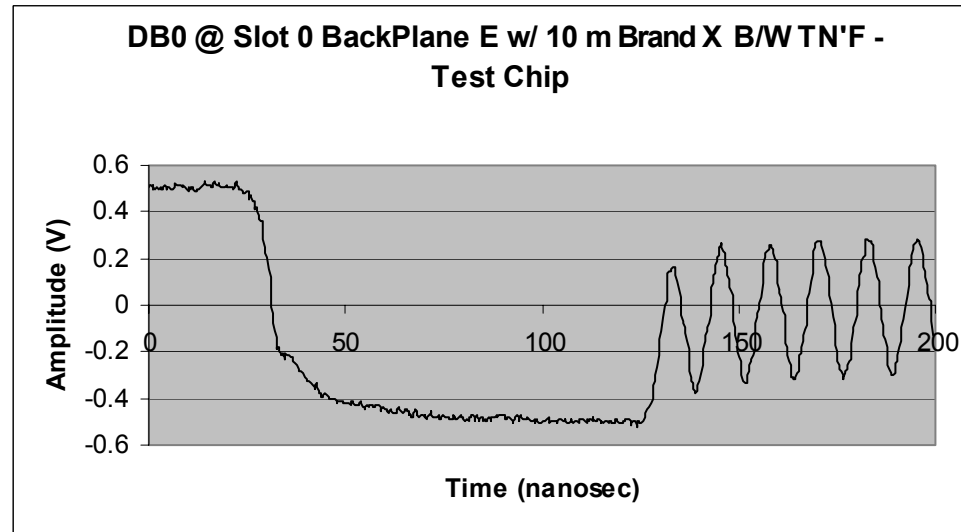
DB0 @ Slot 4 Backplane E Test Chip Driving



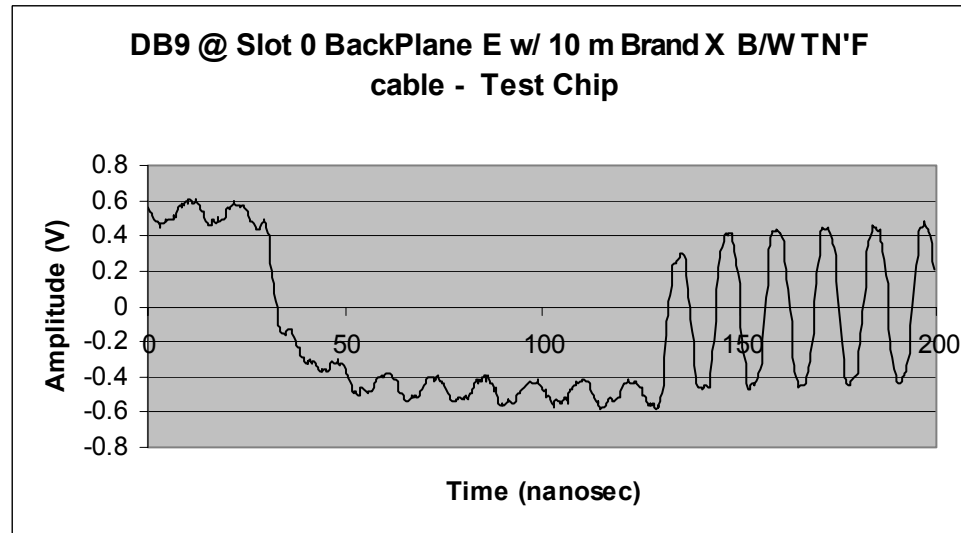
DB9 @ Slot 4 Backplane E Test Chip Driving



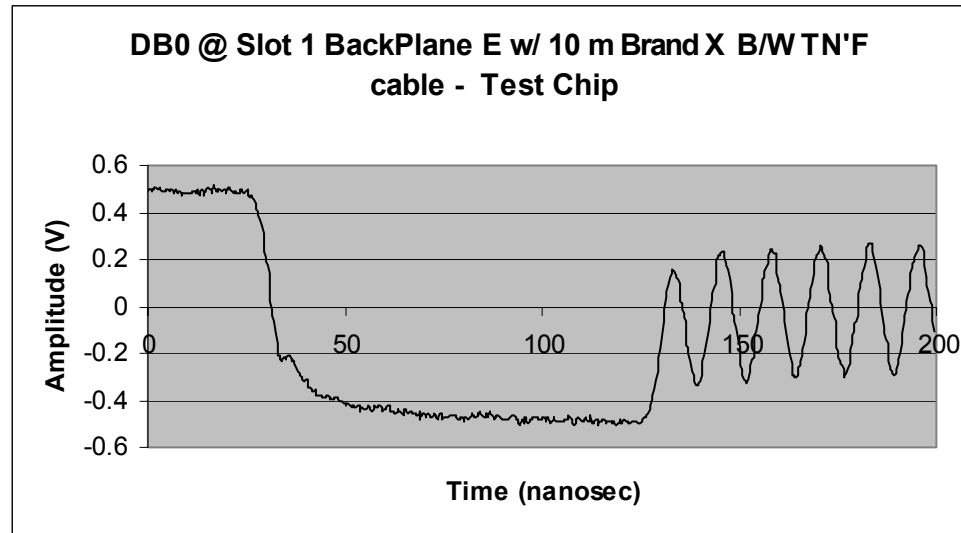
DB0 @ Slot 0 Backplane E Test Chip Driving



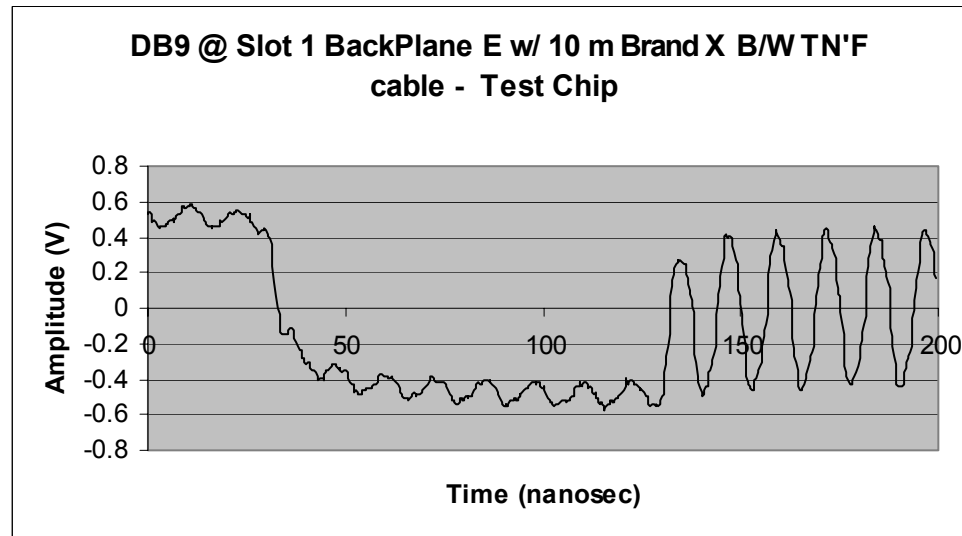
DB9 @ Slot 0 Backplane E Test Chip Driving



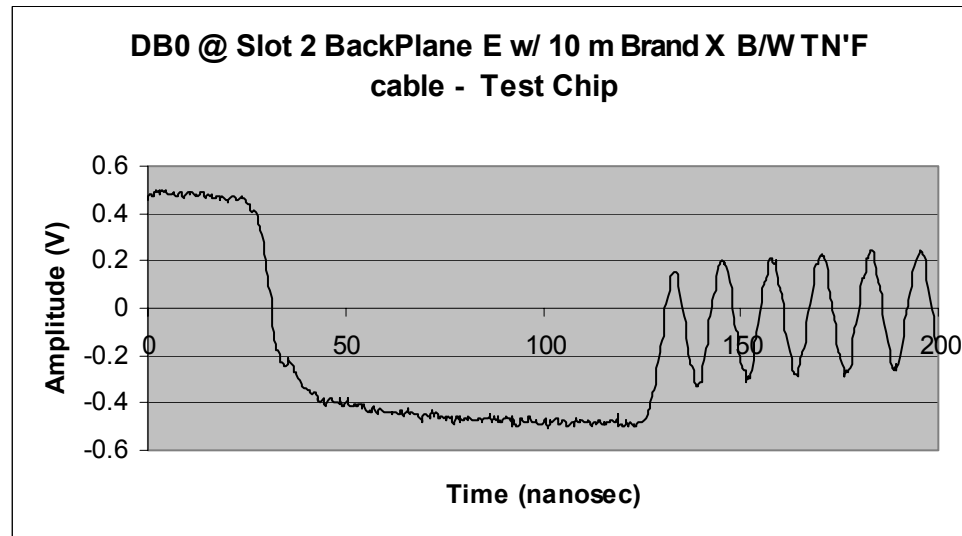
DB0 @ Slot 1 Backplane E Test Chip Driving



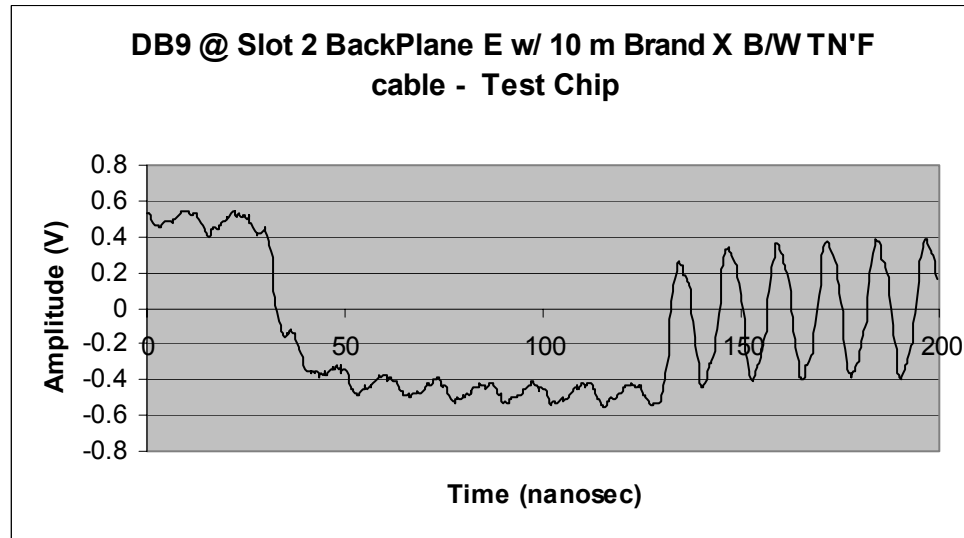
DB9 @ Slot 1 Backplane E Test Chip Driving



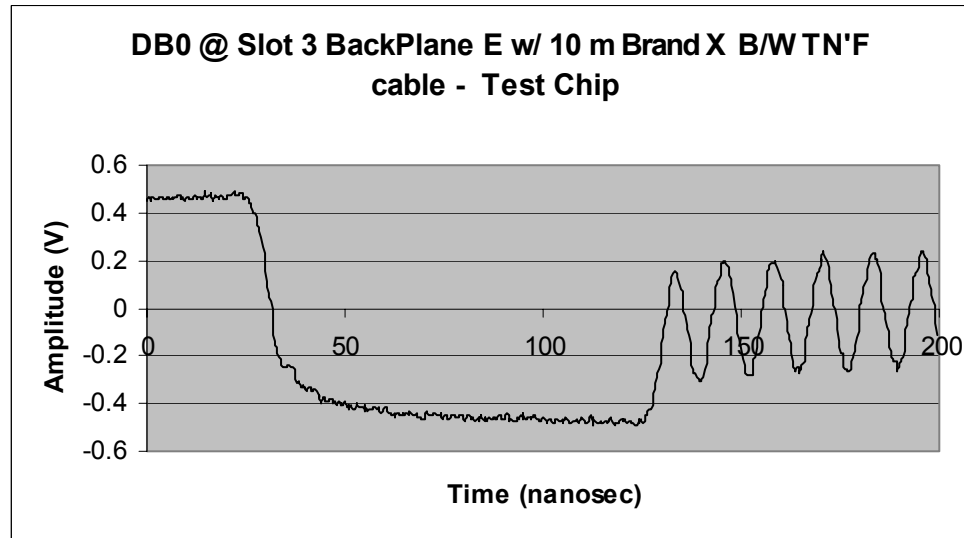
DB0 @ Slot 2 Backplane E Test Chip Driving



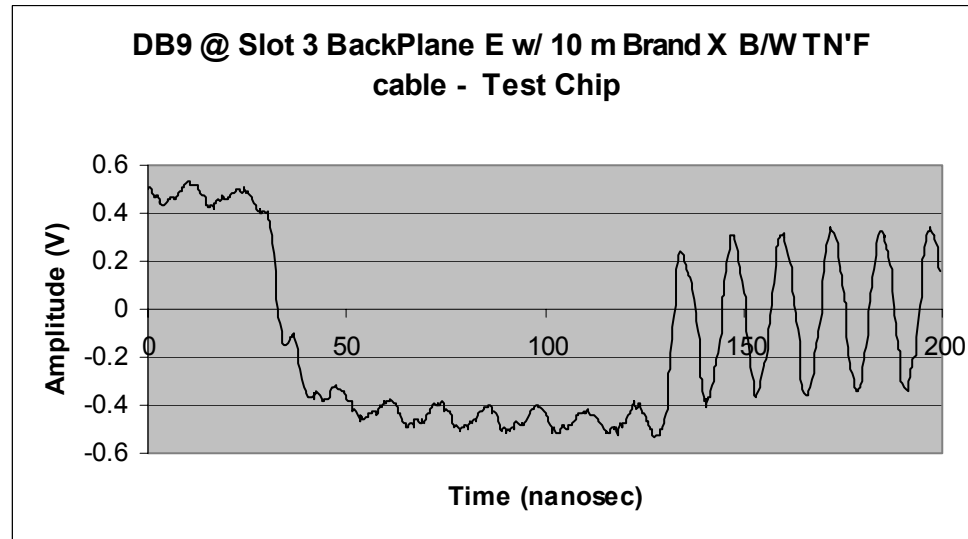
DB9 @ Slot 2 Backplane E Test Chip Driving



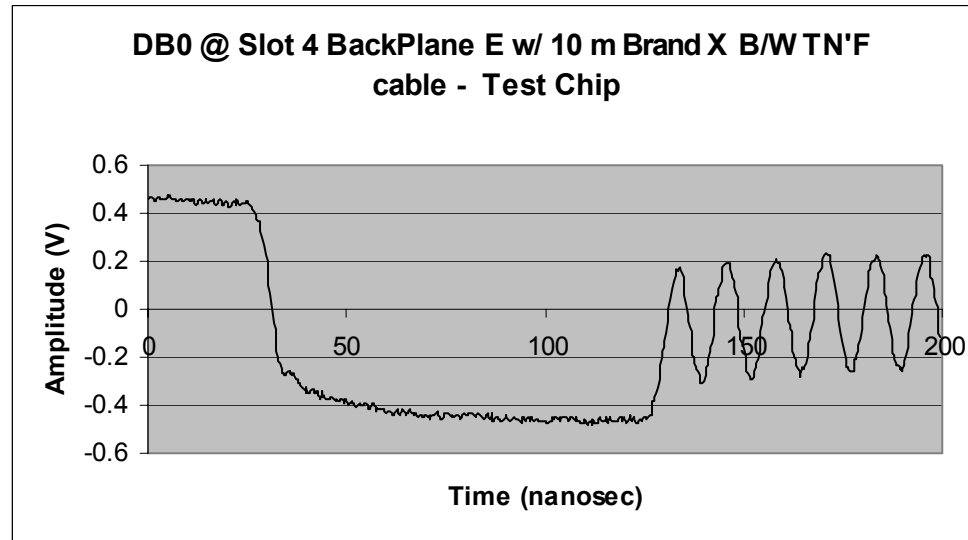
DB0 @ Slot 3 Backplane E Test Chip Driving



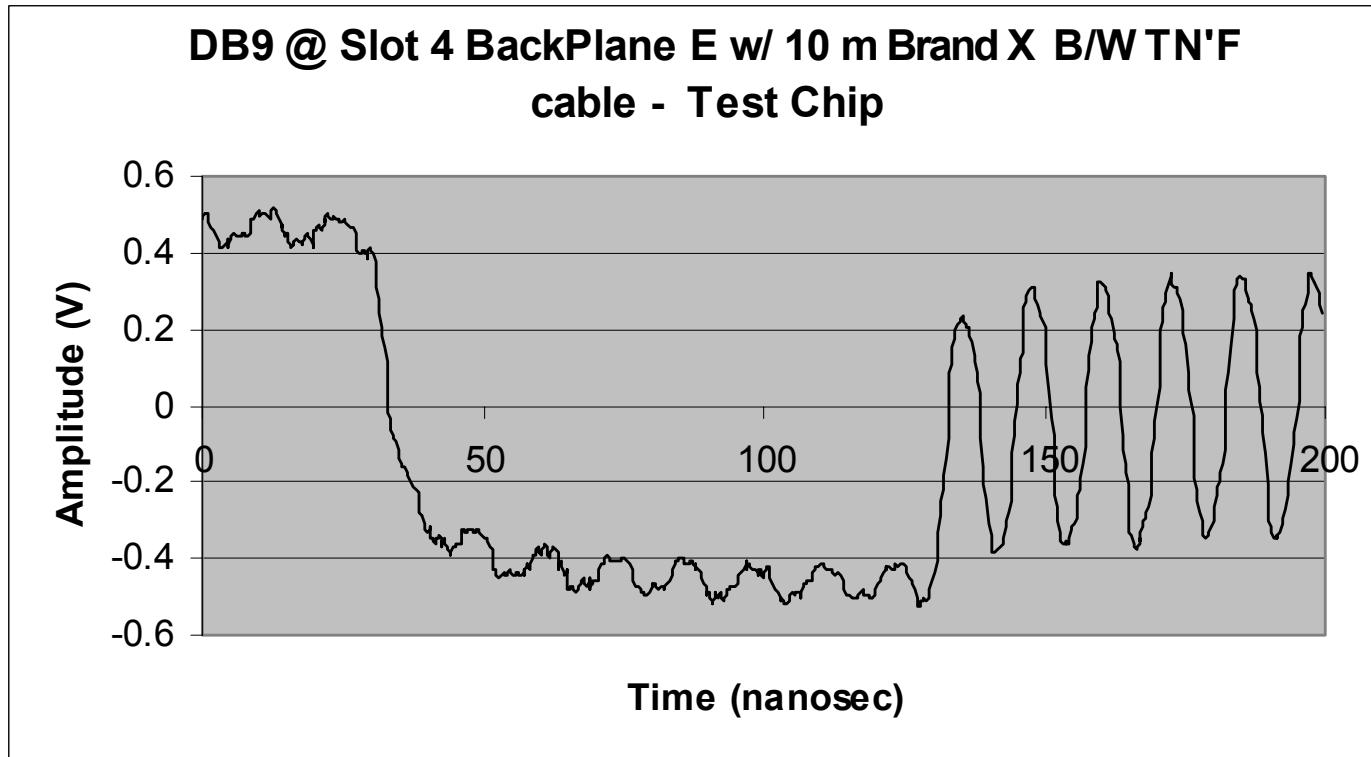
DB9 @ Slot 3 Backplane E Test Chip Driving



DB0 @ Slot 4 Backplane E Test Chip Driving



DB9 @ Slot 4 Backplane E Test Chip Driving



10 M Brand X cable loss vs. Frequency

