320 MB Eye Pattern Data with 15-25-33% Precomp and Crosstalk

Controller Development Engineering
Scotts Valley
Revisions

- r0 - First Revision
- r1 - Corrected most pictures with improved-correlation cases. Resolved test fixture issue to better correlate with actual SCSI Initiator silicon. Added 1m twisted-flat cable data and 6m round cable data cases.
Comments

- It was noted in the presentation last month that some cases did not correlate well to the real world when using the generator-driver test setup.
  - Generator-driver typically showed poorer results.
  - Doubt as to data validity when some results correlate and others do not is an issue.
- Test fixture issue was identified and all affected cases retaken and presented here.
  - Conclusions do not change.
  - Generator results still not as good as real SCSI Initiator, but correlate very consistently and predict performance with precompensation.
## Index of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>201</td>
<td>Generator Driver, Example @ 33% Cutback (pg. 7)</td>
</tr>
<tr>
<td>204</td>
<td>Generator Driver without Cutback (pg. 8)</td>
</tr>
<tr>
<td>205</td>
<td>Generator Driver with Cutback (pg. 9)</td>
</tr>
<tr>
<td>206</td>
<td>Point-to-Point 18'' Twisted-Flat, 15% Cutback with &amp; w/o Crosstalk (pg 10)</td>
</tr>
<tr>
<td>207</td>
<td>Point-to-Point 18'' Twisted-Flat, 25% Cutback with &amp; w/o Crosstalk (pg. 11)</td>
</tr>
<tr>
<td>208</td>
<td>Point-to-Point 18'' Twisted-Flat, 33% Cutback with &amp; w/o Crosstalk (pg. 12)</td>
</tr>
<tr>
<td>234</td>
<td>Point-to-Point 1m Twisted-Flat, 15% Cutback with Crosstalk (pg 13)</td>
</tr>
<tr>
<td>235</td>
<td>Point-to-Point 1m Twisted-Flat, 25% Cutback with Crosstalk (pg. 14)</td>
</tr>
<tr>
<td>236</td>
<td>Point-to-Point 1m Twisted-Flat, 33% Cutback with Crosstalk (pg 15)</td>
</tr>
<tr>
<td>212</td>
<td>Point-to-Point 12m Twisted-Flat, 15% Cutback with &amp; w/o Crosstalk (pg 16)</td>
</tr>
<tr>
<td>213</td>
<td>Point-to-Point 12m Twisted-Flat, 25% Cutback with &amp; w/o Crosstalk (pg. 17)</td>
</tr>
<tr>
<td>214</td>
<td>Point-to-Point 12m Twisted-Flat, 33% Cutback with &amp; w/o Crosstalk (pg 18)</td>
</tr>
</tbody>
</table>
# Index of Figures

<table>
<thead>
<tr>
<th>Figure 240</th>
<th>Point-to-Point 12m Round, 15% Cutback with Crosstalk. (pg 19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 241</td>
<td>Point-to-Point 12m Round, 25% Cutback with Crosstalk. (pg 20)</td>
</tr>
<tr>
<td>Figure 242</td>
<td>Point-to-Point 12m Round, 33% Cutback with Crosstalk. (pg 21)</td>
</tr>
<tr>
<td>Figure 215</td>
<td>Point-to-Point 25m Round, 15% Cutback with Crosstalk. (pg 22)</td>
</tr>
<tr>
<td>Figure 216</td>
<td>Point-to-Point 25m Round, 25% Cutback with Crosstalk. (pg 23)</td>
</tr>
<tr>
<td>Figure 217</td>
<td>Point-to-Point 25m Round, 33% Cutback with Crosstalk. (pg 24)</td>
</tr>
<tr>
<td>Figure 218</td>
<td>Seagate U2 Backplane, 12m Round, 15% Cutback with Crosstalk. (pg 25)</td>
</tr>
<tr>
<td>Figure 219</td>
<td>Seagate U2 Backplane, 12m Round, 25% Cutback with Crosstalk. (pg 26)</td>
</tr>
<tr>
<td>Figure 220</td>
<td>Seagate U2 Backplane, 12m Round, 33% Cutback with Crosstalk. (pg 27)</td>
</tr>
</tbody>
</table>
Index of Figures

Figure 221  Seagate U2 Backplane, 18” Twisted-Flat, 15% Cutback with & w/o Crosstalk (pg 28)
Figure 222  Seagate U2 Backplane, 18” Twisted-Flat, 25% Cutback with & w/o Crosstalk (pg 29)
Figure 223  Seagate U2 Backplane, 18” Twisted-Flat, 33% Cutback with & w/o Crosstalk (pg 30)

Figure 237  Seagate U2 Backplane, 1m Twisted-Flat, 15% Cutback with Crosstalk. (pg 31)
Figure 238  Seagate U2 Backplane, 1m Twisted-Flat, 25% Cutback with Crosstalk. (pg 32)
Figure 239  Seagate U2 Backplane, 1m Twisted-Flat, 33% Cutback with Crosstalk (pg 33)

Figure 224  Seagate U2 Backplane, 12m Twisted-Flat, 15% Cutback with Crosstalk. (pg 34)
Figure 225  Seagate U2 Backplane, 12m Twisted-Flat, 25% Cutback with Crosstalk. (pg 35)
Figure 226  Seagate U2 Backplane, 12m Twisted-Flat, 33% Cutback with Crosstalk. (pg 36)

Figure 230  Seagate 320BM Backplane, 18” Twisted-Flat, 25% Cutback with Crosstalk (pg 37)
Figure 233  Seagate 320BM Backplane, 1m Twisted-Flat, 25% Cutback with Crosstalk (pg 38)
Figure 231  Seagate 320BM Backplane, 12m Twisted-Flat, 25% Cutback with Crosstalk (pg 39)
Figure 232  Seagate 320BM Backplane, 12m Round, 25% Cutback with Crosstalk (pg 40)
Generator Driver, Example @ 33% Cutback

Seagate Backplane (older 16 slot) 3-22-00 HP81110 tests \m Amphenol twisted-flat - 15 loads

\textbf{T}KeK STOP 5.00 GS/s 281 Acqs

\[ \Delta: 476\, \text{mV} \]
\[ @: 476\, \text{mV} \]

\[ 476\, \text{mV} \]
\[ \sim 310\, \text{mV} \]

\textbf{Fig 201}

T10 SCSI - 4/4/26/00
320 precomp rev j.ppt - - 7
Generator Driver with No Precomp

Seagate Backplane (older 16 slot)\3-22-00 HP81110 tests\12m Madison round - 15 loads

Tek Run: 5.00GS/s  Sample

Δ: 4.00ns
@: 13.12ns

Fig 204
Generator Driver with Precomp

Seagate Backplane (older 16 slot) 3-22-00 HP81110 tests 12m Madison round - 15 loads

Fig 205

T10 SCSI - 4/4/26/00
320 precomp rev j.ppt - 9
Point-to-Point - 18” TnF, 15% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, HP81110 tests - 15% cutback \Amph TnF - 1 loads, Data taken on DB9

Fig 206

Disk 24 file 27

No Precomp
No xtalk

Disk 24 file 28 with Noise

Disk 24 file 25

15% Precomp

Disk 24 file 26 with noise
Point-to-Point - 18” TnF, 25% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, \HP81110 tests - 25% cutback \Amph TnF - 1 loads, Data taken on DB9
Point-to-Point - 18" TnF, 33% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, \ HP81110 tests - 33% cutback \ Amph TnF - 1 loads, Data taken on DB9

No Precomp No xtalk

Disk 24 file 27

Disk 24 file 28 with Noise

No Precomp with xtalk

Disk 24 file 31

Disk 24 file 33 with noise

33% Precomp

Fig 208

T10 SCSI - 4/4/26/00
320 precomp rev j.ppt - - 12
Point-to-Point - 1m TnF, 15% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, \HP81110 tests - 15% cutback \Amph TnF - 1 loads, Data taken on DB9

No Precomp

15% Precomp

Fig 234
Point-to-Point - 1m TnF, 25% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, HP81110 tests - 25% cutback \Amph TnF - 1 loads, Data taken on DB9

Fig 235

No Precomp

25% Precomp
Point-to-Point - 1m TnF, 33% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, HP81110 tests - 33% cutback \Amph TnF - 1 loads, Data taken on DB9

Fig 236

No Precomp

33% Precomp
Point-to-Point - 12m TnF, 15% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, \ HP81110 tests - 15% cutback \ Amph 12m TnF- 1 loads,
Data taken on DB9

Disk 24 file 38
No Precomp
No xtalk

Disk 43 file 8 with Noise
No Precomp
with xtalk

Fig 212

Disk 25 file 41
15% Precomp

Disk 43 file 9 with noise

Point-to-Point - 12m TnF, 25% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, \ HP81110 tests - 25% cutback \ Amph 12m Tnf - 1 loads,
Data taken on DB9

Disk 24 file 38

No Precomp
No xtalk

Disk 43 file 8 with Noise

No Precomp
with xtalk

Disk 25 file 39

Disk 43 file 10 with noise

25% Precomp
Point-to-Point - 12m TnF, 33% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, \ HP81110 tests - 33% cutback \ Amph 12m Tnf - 1 loads,
Data taken on DB9

Fig 214

No Precomp
No xtalk

Disk 24 file 38

No Precomp
with xtalk

Disk 43 file 8 with Noise

33% Precomp

Disk 43 file 11 with noise

Disk 24 file 35
Point-to-Point - 12m round, 15% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, HP81110 tests - 15% cutback 12m Round - 1 loads, Data taken on DB9

Fig 240

No Precomp 15% Precomp
Point-to-Point - 12m round, 25% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, HP81110 tests - 25% cutback 12m Round - 1 loads, Data taken on DB9

Fig 241

No Precomp with xtalk

25% Precomp
Point-to-Point - 12m round, 33% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, HP81110 tests - 33% cutback 12m Round - 1 loads, Data taken on DB9

No Precomp with xtalk

33% Precomp

Fig 242
Point-to-Point - 25m round, 15% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, HP81110 tests - 15% cutback \Hitachi 25m Round - 1 loads, Data taken on DB9

Fig 215

No Precomp

15% Precomp
Point-to-Point - 25m round, 25% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, \ HP81110 tests - 25% cutback \Hitachi 25m Round - 1 loads, Data taken on DB9

No Precomp with xtalk

25% Precomp

Fig 216
Point-to-Point - 25m round, 33% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, \HP81110 tests - 33% cutback \Hitachi 25m Round - 1 loads, Data taken on DB9

No Precomp with xtalk

33% Precomp
Seagate U2 Backplane - 12m round, 15% Precomp, Slot 1

Data bit Random Pattern, Xtalk worst case adjacent bits, Seagate Backplane (older 16 slot) \ HP81110 tests - 15% cutback \ Madison 12m Round - 15 loads, Data taken on DB9

Fig 218

Disk 45 file 16

15% Precomp

No Precomp with xtalk
Seagate U2 Backplane - 12m round, 25% Precomp, Slot 1

Data bit Random Pattern, Xtalk worst case adjacent bits, Seagate Backplane (older 16 slot) HP81110 tests - 25% cutback Madison 12m Round - 15 loads, Data taken on DB9

No Precomp with xtalk

25% Precomp

Fig 219
Seagate U2 Backplane - 12m round, 33% Precomp, Slot 1

Data bit Random Pattern, Xtalk worst case adjacent bits, Seagate Backplane (older 16 slot) HP81110 tests - 33% cutback Madison 12m Round - 15 loads, Data taken on DB9

No Precomp with xtalk

33% Precomp

Fig 220
Seagate U2 Backplane - 18” TnF, 15% Precomp, Slot 1

Data bit Random Pattern, Xtalk worst case adjacent bits, Seagate Backplane (older 16 slot)\ HP81110 tests - 15% cutback Amphenol 18” twisted-flat - 15 loads, Data taken on DB9

Fig 221

T10 SCSI - 4/4/26/00
320 precomp rev j.ppt - - 28
Seagate U2 Backplane - 18” TnF, 25% Precomp, Slot 1

Data bit Random Pattern, Xtalk worst case adjacent bits, Seagate Backplane (older 16 slot)\ HP81110 tests - 25% cutback Amphenol 18” twisted-flat - 15 loads, Data taken on DB9

No Precomp
No xtalk

Disk 25 file 59

Disk 25 file 57

Disk 43 file 0 with Noise

Disk 43 file 2 with noise

25% Precomp

Fig 222
Seagate U2 Backplane - 18” TnF, 33% Precomp, Slot 1

Data bit Random Pattern, Xtalk worst case adjacent bits, Seagate Backplane (older 16 slot)\ HP81110 tests - 33% cutback Amphenol 18” twisted-flat - 15 loads, Data taken on DB9

No Precomp
No xtalk

No Precomp
with xtalk

33% Precomp

Fig 223
Seagate U2 Backplane - 1m TnF, 15% Precomp, Slot 1

Data bit Random Pattern, Xtalk worst case adjacent bits, Seagate Backplane (older 16 slot)\ HP81110 tests - 15% cutback \Amphenol 1m twisted-flat - 15 loads, Data taken on DB9

Fig 235

Disk 43 file 16

Disk 43 file 17
Seagate U2 Backplane - 1m TnF, 25% Precomp, Slot 1

Data bit Random Pattern, Xtalk worst case adjacent bits, Seagate Backplane (older 16 slot)\ HP81110 tests - 25% cutback \Amphenol 1m twisted-flat - 15 loads, Data taken on DB9

Disk 43  file 16

Disk 43  file 18

Fig 238
Seagate U2 Backplane - 1m TnF, 33% Precomp, Slot 1

Data bit Random Pattern, Xtalk worst case adjacent bits, Seagate Backplane (older 16 slot) \ HP81110 tests - 33% cutback \ Amphenol 1m twisted-flat - 15 loads, Data taken on DB9

Fig 239
Seagate U2 Backplane - 12m TnF, 15% Precomp, Slot 1

Data bit Random Pattern, Xtalk worst case adjacent bits, Seagate Backplane (older 16 slot)\ HP81110 tests - 15% cutback \Amphenol 12m twisted-flat - 15 loads, Data taken on DB9 at slot 1 (nearest cable)

Fig 224
Seagate U2 Backplane - 12m TnF, 25% Precomp, Slot 1

Data bit Random Pattern, Xtalk worst case adjacent bits, Seagate Backplane (older 16 slot)\ HP81110 tests - 25% cutback \Amphenol 12m twisted-flat - 15 loads, Data taken on DB9

No Precomp

25% Precomp

Fig 225
Seagate U2 Backplane - 12m, 33% Precomp, Slot 1

Data bit Random Pattern, Xtalk worst case adjacent bits, Seagate Backplane (older 16 slot)\ HP81110 tests - 33% cutback \Amphenol 12m twisted-flat - 15 loads, Data taken on DB9

![No Precomp](image1)

![33% Precomp](image2)

Fig 226
Seagate 320BM Backplane - 18” TnF, 25% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, Seagate 320BM Backplane (New design), HP81110 tests, 25% cutback \Amphenol 18” twisted-flat - 15 loads, Data taken on DB9, Slot 1( nearest cable)

Fig 230

No Precomp

25% Precomp

Disk 44 file 4

Disk 44 file 5
Seagate 320BM Backplane - 1m TnF, 25% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, Seagate 320BM Backplane (New design), HP81110 tests, 25% cutback \Amphenol 1m twisted-flat - 15 loads, Data taken on DB9, Slot 1 (nearest cable)

Fig 233

No Precomp

25% Precomp
Seagate 320BM Backplane - 12M TnF, 25% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, Seagate 320BM Backplane (New design), HP81110 tests, 25% cutback \Amphenol 12m twisted-flat - 15 loads, Data taken on DB9, Slot 1 (nearest cable)

Disk 44 file 2

No Precomp

Fig 231

25% Precomp
Seagate 320BM Backplane - 12M Round, 25% Precomp

Data bit Random Pattern, Xtalk worst case adjacent bits, Seagate 320BM Backplane (New design), HP81110 tests, 25% cutback \ 12m Round - 15 loads, Data taken on DB9, Slot 1 (nearest cable)

Fig 232

No Precomp

Disk 44 file 6

25% Precomp

Disk 44 file 7