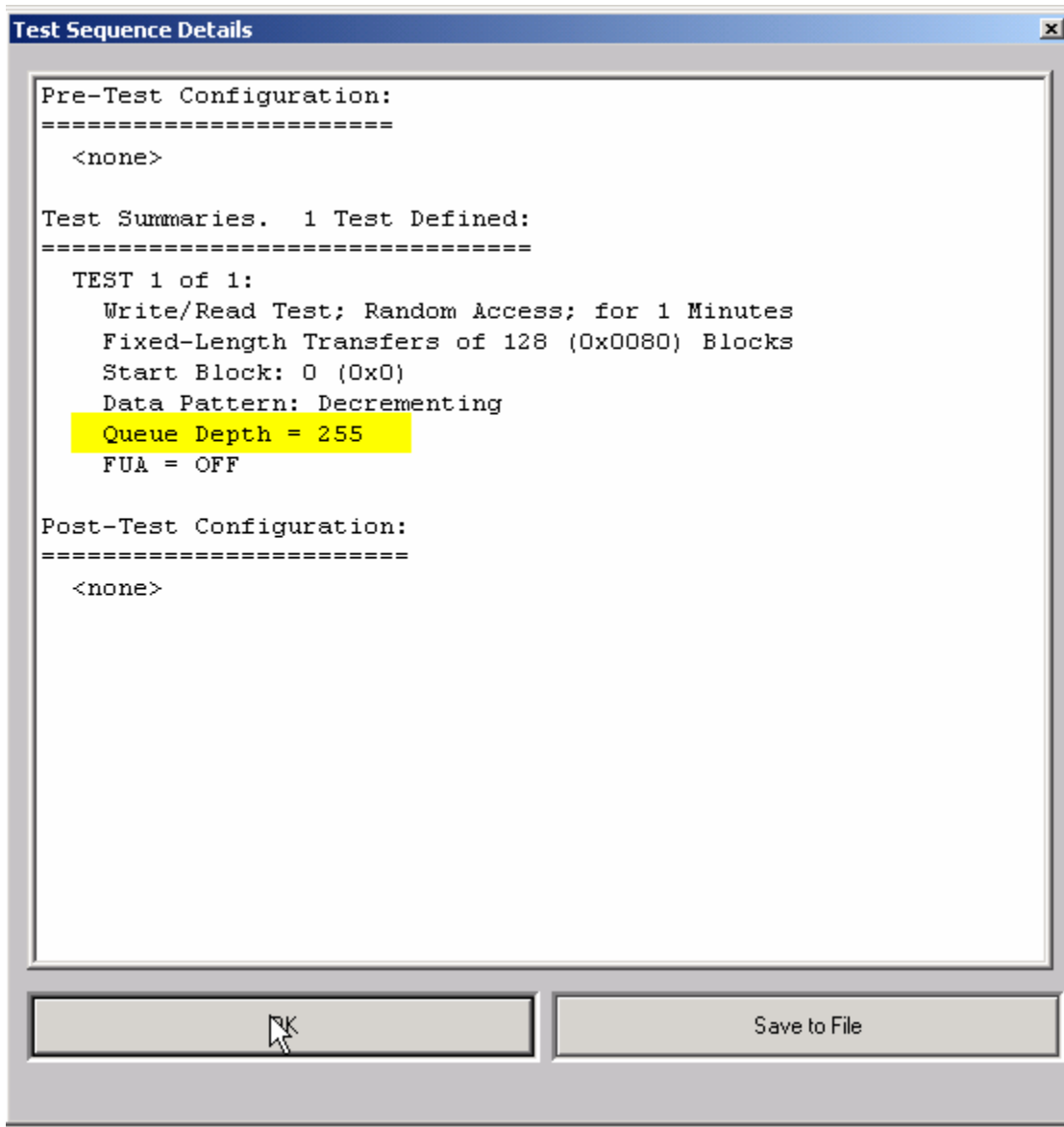
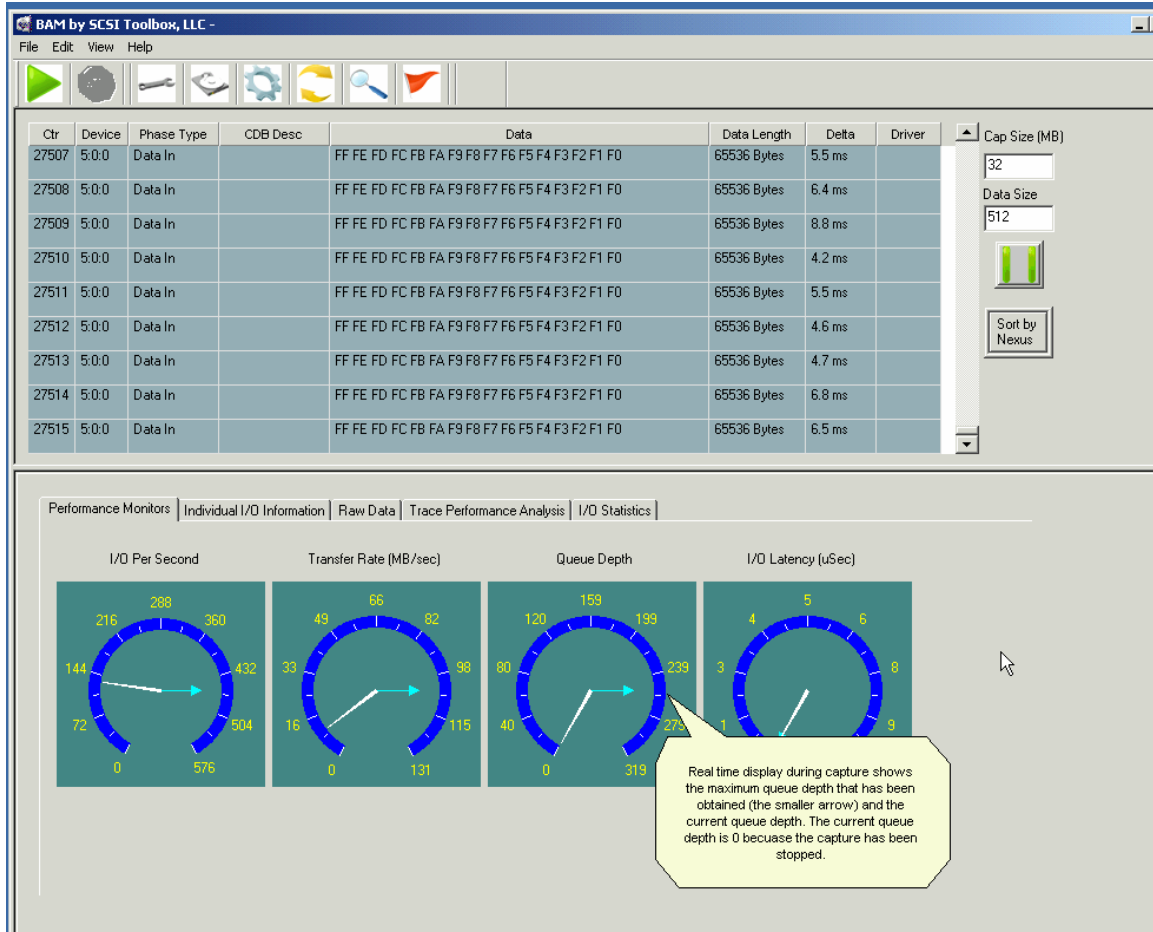


How can you know if command tag queuing is occurring during disk testing? And if it is occurring how do you know what depth of queuing is being achieved? The answer, if you have SCSItoolbox Suite version 6 is **BAM!**

As an example, we will configure the Disk Manufacturing Module to run a write/read test and ask it to try to keep 255 commands outstanding. Here is the DMM test configuration that we will run – with the requested queue depth of 255 highlighted:



Using BAM we can monitor in real time what the highest queue depth achieved is, and also what the current queue depth is. In a good test environment the current queue depth should stay high throughout the test. Here is a picture of the BAM real time monitor “speedometers”, one of which shows Queue Depth information:



Please note that the current queue depth is 0 because this screenshot was taken after the test finished.

Post capture analysis using the Trace Performance Analysis tab also shows the highest queue depth attained during the capture:

The screenshot displays the 'BAM by SCSI Toolbox, LLC' application window. The top section shows a table of capture events with columns for Ctr, Device, Phase Type, CDB Desc, Data, Data Length, Delta, Driver, and Cap Size (MB). The table lists 10 events (Ctr 27507-27515) with a data length of 65536 Bytes and a delta between 4.2 ms and 8.8 ms.

The bottom section is the 'Trace Performance Analysis' tab, which contains a 'Summary Statistics' panel and a 'Graphs' panel. The 'Summary Statistics' panel shows the following data:

- Total CDBs: 13758
- W/R CDBs: 13750 R: 6875 W: 6875
- Data bytes (k): 880000 R: 440000 W: 440000
- Capture Time: 63.26 Sec
- I/Os per Sec: 217.49
- Bus Utilization %: 99.94
- Percentage of W/R CDBs: 99.94%
- Read Transfer Rate - Avg: 10.59 High: 47.59
- Read Transfer Size - avg: 65536.08
- Write Transfer Rate - Avg: 17.58 High: 190.84
- Write Transfer Size - avg: 65536.00
- I/O Latency - Low: 1.00 Avg: 174.55 High: 598.00
- Incomplete CDBs: 0
- Maximum Queue Depth: 255**

The 'Graphs' panel features a 'Data Rate' line graph showing Write (red) and Read (yellow) rates over time. The Y-axis ranges from 0 to 60.0, and the X-axis shows time markers at 13120, 13140, 13160, 13180, and 13200. A callout box points to the 'Maximum Queue Depth: 255' value in the summary statistics, stating: 'Post capture Trace Performance Analysis shows the maximum queue depth obtained'.

And the I/O Statistics page also shows the maximum queue depth for each individual drive

The screenshot displays the BAM by SCSI Toolbox interface. The top section is a table of I/O operations, and the bottom section shows detailed statistics for device 5:0:0.

Ctrl	Device	Phase Type	CDB Desc	Data	Data Length	Delta	Driver	Cap Size (MB)
27507	5:0:0	Data In		FF FE FD FC FB FA F9 F8 F7 F6 F5 F4 F3 F2 F1 F0	65536 Bytes	5.5 ms		32
27508	5:0:0	Data In		FF FE FD FC FB FA F9 F8 F7 F6 F5 F4 F3 F2 F1 F0	65536 Bytes	6.4 ms		Data Size
27509	5:0:0	Data In		FF FE FD FC FB FA F9 F8 F7 F6 F5 F4 F3 F2 F1 F0	65536 Bytes	8.8 ms		512
27510	5:0:0	Data In		FF FE FD FC FB FA F9 F8 F7 F6 F5 F4 F3 F2 F1 F0	65536 Bytes	4.2 ms		
27511	5:0:0	Data In		FF FE FD FC FB FA F9 F8 F7 F6 F5 F4 F3 F2 F1 F0	65536 Bytes	5.5 ms		Sort by
27512	5:0:0	Data In		FF FE FD FC FB FA F9 F8 F7 F6 F5 F4 F3 F2 F1 F0	65536 Bytes	4.6 ms		Nexus
27513	5:0:0	Data In		FF FE FD FC FB FA F9 F8 F7 F6 F5 F4 F3 F2 F1 F0	65536 Bytes	4.7 ms		
27514	5:0:0	Data In		FF FE FD FC FB FA F9 F8 F7 F6 F5 F4 F3 F2 F1 F0	65536 Bytes	6.8 ms		
27515	5:0:0	Data In		FF FE FD FC FB FA F9 F8 F7 F6 F5 F4 F3 F2 F1 F0	65536 Bytes	6.5 ms		

Command OpCode Statistics	Device Statistics
<p>0x12 - Inquiry count = 6 0x25 - Read Capacity count = 2 0x28 - Read (10) count = 6875 0x2A - Write (10) count = 6875</p>	<p>- Device 5:0:0 Commands Sent = 13758 Read Commands = 6875 Read Bytes Transferred = 450560576 Read Average Transfer Rate = 10.59 MB/sec Read High Transfer Rate = 47.59 MB/sec Write Commands = 6875 Write Bytes Transferred = 450560000 Write Average Transfer Rate = 17.58 MB/sec Write High Transfer Rate = 190.84 MB/sec Other Commands = 8 I/O Latency Low = 1.00 uSec Average I/O Latency = 174.55 uSec I/O Latency High = 893.00 uSec <b>Maximum Queue Depth = 255</b> Incomplete Commands = 0</p>

In summary, BAM provides real-time monitoring of command queue depth, along with post capture analysis which enables you to insure that the peripheral under test is achieving the queue levels that you require.