MARK 6 MEMO #006

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November 24, 2014

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Subject: Mark6 Reliability and Power Requirements Study

This memo looks at two aspects of the Mark6, the reliability of the system and its power requirements and the spare components a station should keep on site. To summarize each site should have a spare power supply (model here) for the host and expansion chassis. These components have the lowest reliability rates for the Mark6 system. The SATA cables have a maximum insertion threshold, but it can be managed on the system. The power requirements for a Mark6 is a maximum of 1000Watts of power is required if all 4 disk modules, 32 hard disk drives, are turned on simultaneously. The average power draw during 16Gbps of recording is 750Watts. The details now presented.

The reliability of a Mark6 or the mean time between failure is 41,720 hours. The components that drive this number: 1) Power supply, 2) Host bus adapter controller failures and 3) SATA cable connector failure rate.

The power supply has a failure rate of 95,150 hours for the host server and 135,268 hours for the expansion chassis. The SAS controllers, of which there are two in the system, has a failure rate of $2x10^6$ hours, but experience in house has seen higher failure rate. The last component is the SATA cables, or which the specification lists 250 cycles between failures.

For the SATA cables, it is recommended that after 200 insertions / removals from the Mark6 disk module, the cable should be reversed for an additional 200 insertions. The reversal of the cable is simply to swap the ends being inserted in the Mark6 disk module with the end statically inserted end in the SAS controller card, thus doubling the lifetime of the cable.

The power requirements of a Mark6 was measured in the lab. Power was calculated when all of the disk modules are keyed on and brought on-line, maximum power draw, and during normal operations, average power draw.

The Mark6 systems with 4 disk modules has a host server platform and an expansion chassis. The host system contains the motherboard, CPU, NIC cards, SAS controllers while the expansion chassis contains only a power supply for the disk modules.

The maximum power draw occurs when the disk modules are keyed on. For the host system 5 amperes of current was drawn when both disk modules were simultaneously powered on. The expansion chassis had a current draw of 2.5 amperes on the power up of the two disk modules in its bay. The result is 1000 Watts of power required if all four disk are powered on simultaneously on a Mark6 system.

The power required for the normal operation of a Mark6, 16Gbps recording to four disk modules (or 32 disks) is 4 amperes. The resulting power requirement of 750 Watts.