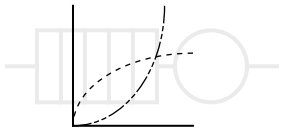

Performance Evaluation

Integrated Systems
Advanced Technology Group

SCSI Monitor 4.0 User Manual

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April 6, 1995

SCSIMonitor records disk access information, including the number of read and write operations, the number of sectors read and written, and the I/O time used to perform these operations The accumulated data is shown in SCSIMonitor's window. SCSIMonitor also reports the accumulated I/O and non I/O time and shows the number of megabytes per second read and written. SCSIMonitor's tracing capabilities can be turned on and off using an FKEY resource, so a context switch is not necessary.

1. Introduction

SCSIMonitor is a tool for observing the disk I/O behavior of Macintosh systems. It can be used to observe the I/O performance of specific devices, individual application operations or to collect statistics on I/O operations over long trace periods.

SCSIMonitor is an INIT - CDEV combination. It will not work with systems earlier than System 7.0. It front and tail patches the read and write Atraps, recording data on driver calls. SCSI Monitor will correctly report I/O service times for both synchronous and asynchronous disk accesses. SCSIMonitor can also record I/O times for RAM disks. Figure 1 shows a picture of SCSIMonitor's window.

2. Installation and Use

To install SCSIMonitor, place it in the Control Panels folder and reboot the machine (see appendix for a step by step description of how to use SCSIMonitor). SCSIMonitor can then be launched from the Control Panels folder or from an alias.

Two methods of starting and stopping data collection are provided. The second method does not require making the SCSIMonitor's window the active window.

1. Click on SCSIMonitor's "Start" button to start data collection. Click on the "Stop" button to stop data collection.

2. Toggle data taking on and off using an FKEY. An FKEY is a resource in the system resource fork (see section 3). The FKEY provided with SCSIMonitor is activated by pressing the key combination Shift-Cmd-6 (an FKEY to clear SCSIMonitor's display using Shift-Cmd-5 is also provided).

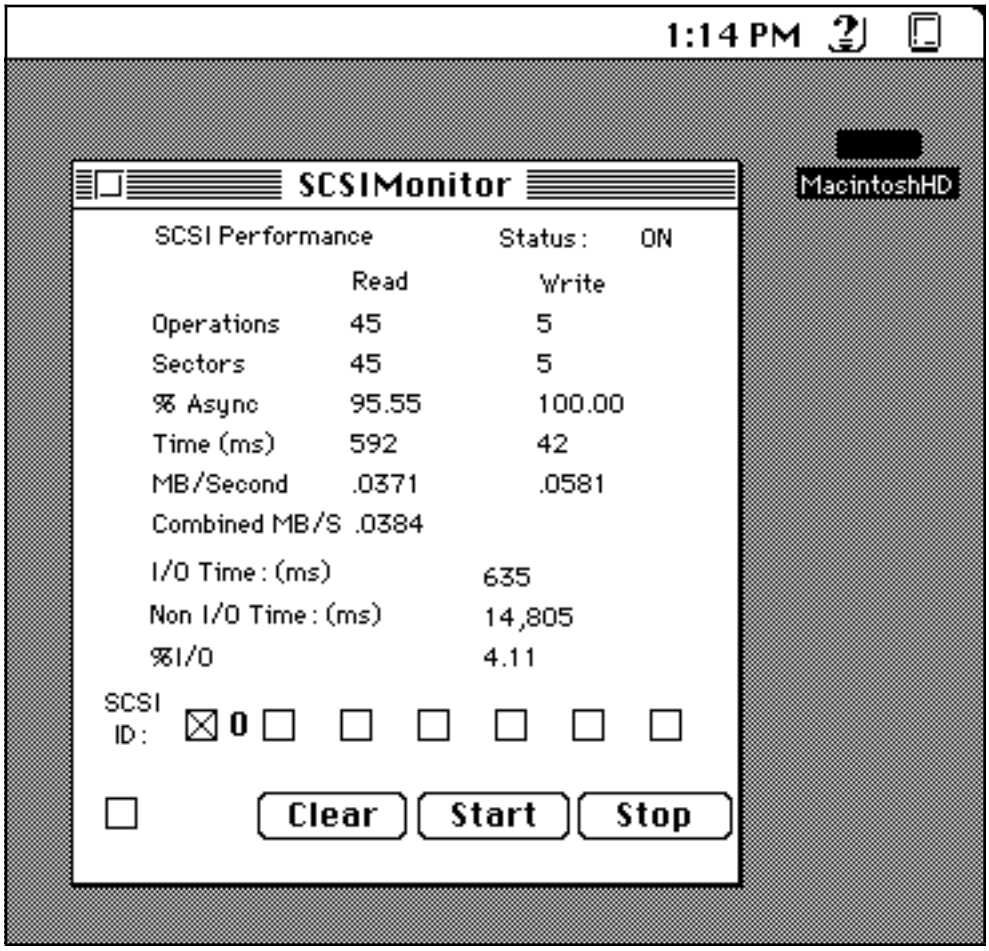

Figure 1. SCSIMonitor

SCSIMonitor must be running in order to start and stop taking data using the FKEY option. If the FKEY is used while the window is closed, SCSIMonitor will not start recording I/O events until it is launched. SCSIMonitor does not need to be the active window to start data collection with the FKEY option. The FKEY will trigger data collection regardless of which application is the active application (assuming the active application follows cooperative multitasking protocol by calling WaitNextEvent). Once data taking is turned on, SCSI Monitor's window may be closed without effecting its ability to capture data but must be opened to stop data collection.

The number of read and write operations shown by SCSIMonitor refers to the number of read and write SCSI driver calls issued while SCSIMonitor is on. The number of sectors refers to the number of sectors transferred in these operations. The time spent in the read and write driver calls is shown after the number of operations and sectors. The number of megabytes per second is calculated using the number of sectors transferred and the driver execution time. The I/O time shown by SCSIMonitor is the sum of the read and write driver execution time. For synchronous read and write calls, driver execution time is the time between the entrance of the read or write Atrap into SCSIMonitor's patch, and the return from the Atrap code to SCSIMonitor's tail patch. For asynchronous reads and writes, driver execution time is the time between the entrance of the Atrap and the call of the completion routine when the request is finished. The non I/O time shown is the total trace time minus the I/O time. While SCSIMonitor is running, the non I/O time is updated after each I/O operation. When SCSIMonitor is turned off, an "end time" reading is taken which is used in the final non I/O time calculation. The % Async field on SCSIMonitor's window shows the percentage of issued requests that are asynchronous. If this percentage is low, the non I/O time gives a good picture of CPU execution time.

Clicking SCSIMonitor's "Clear" button will set its counters to zero and update its window. If the "Clear" button is clicked while SCSIMonitor is on, the counters will be set to zero and a new start time reading taken. It is not necessary to clear SCSIMonitor before turning it on; when SCSIMonitor's data taking is enabled, it will clear its counters. SCSIMonitor can also be cleared using an FKEY resource.

The SCSI ID checkboxes on SCSIMonitor's window can be used to exclude individual SCSI IDs from tracing. Any combination of active SCSI IDs may be selected. Individual IDs can be selected and deselected during a trace. SCSI Monitor's initial state has all available devices selected.

3. FKEY Resource

An FKEY is a resource which must included into the system resource file to add its functionality to the system. To install the FKEYs used with SCSIMonitor, launch the provided application "Install SCSIMonitor FKEYs". Once the FKEYs are installed, it is important to restart the machine before attempting to use them. This application will add two FKEY resources to the active system folder, one to toggle SCSIMonitor's data collection and one to clear SCSIMonitor's display. The FKEY used to toggle data collection is triggered by the key combination Shift-Cmd-6 and the FKEY used to clear the display is triggered by the key combination Shift-Cmd-5. It is not necessary to clear SCSIMonitor before taking data, SCSIMonitor will clear its counters when data taking is turned on.

4. Timers

SCSIMonitor will search the NuBus slots (if any) for an MCP card. An MCP card is a NuBus card which has (among other things) a timer. If one is found it will load the card's timer, setting it to give 25.6 microsecond resolution ticks, using this timer when collecting data. It is not necessary to have an MCP card to use SCSIMonitor. If no MCP card is found, SCSIMonitor uses the Atrap $A193 one microsecond resolution timer.

5. Appendix A. Installing SCSIMonitor

1. To install SCSIMonitor, drag the SCSIMonitor file into the Control Panels folder of the startup disk. The Control Panels folder is found in the System Folder.

2. Double click on the application "Install SCSIMonitor FKEYs" to install the FKEY resources into the system folder of the startup disk. The installation program will install the resources and allow a choice of quitting and restarting or simply quitting the installation program (a restart is recommended). THE FKEYS MUST NOT BE USED BEFORE RESTARTING THE MACHINE (step 3). The FKEYs are not required to use SCSIMonitor. SCSIMonitor can also be started using the "Start" and "Stop" buttons.

3. Restart the machine.

4. Launch SCSIMonitor from the Control Panels folder.

5. Turn on data taking by either clicking on the "Start" button or, if using the FKEY resource, hit the keys Shift-Cmd-6. When the FKEY is used SCSIMonitor does not need to be the active window. The FKEY will also work when a modal dialog (such as one of the Standard File Package dialog boxes) is up.

6. Execute the application or operation to be monitored. The disk activity and non-disk time will be reported in SCSIMonitor's window.

7. Turn off data taking by either clicking on the "Stop" button or, if using the FKEY resource, hit the keys Shift-Cmd-6.