

# Smart Analog Monitor (SAM) Contention Management

## Introduction

After analyzing the current handling of SAMs in the PEP-II micro analog status, magnet, and feedback jobs there are several issues that will need to be resolved before any implementation of SAM contention management. The analog status job is quite conventional. The magnet job is fairly straightforward, but handling of the SAM's calibration mode has not been handled as intended. The feedback job needs further consideration because of the use of a collection of individual channels and SAMs that may be in the Fast Scan Mode.

The analog status job utilizes 1 or 2 CAMAC packages to readout a SAM depending upon the number of channels. Additional code handles the obnoxious unasserted Q problem when a SAM module can't swap data buffers because it is being hammered by CAMAC operations.

Some magnet job operations such as trimming a power supply require the latest data before estimating the next step. The magnet job retries the CAMAC operation one time after a 500ms sleep when a SAM calibration is in progress, but no other error is indicated. Waiting just 500ms should only return the same data that the magnet job would have obtained if it had not waited at all. I need to study this further as I am blissfully ignorant of any such magnet control problems.

The feedback job uses 1 or more CAMAC packages to handle up to 11 individual SAM channels, potentially in multiple SAM modules. Any of these SAM channels may require that that SAM be operated in the Fast Scan Mode.

## SAM metrics

- Normal Scan Mode takes at least 640ms to measure all 32 channels. Range or polarity changes will increase the measurement time up to a worst-case time of 2s.
- Fast Scan Mode takes a fixed 120ms to measure all 32 channels. This mode does not reject any 60hz ripple on a channel.
- Internal DC calibration occurs every 2 minutes. The SAM returns the last measured data, but does not assert X during the unspecified duration of the calibration.
- Normal Scan Mode AC calibration occurs every 2 minutes. The SAM returns the last measured data, but does not assert X during the unspecified duration of the calibration.
- Q is asserted until excessive CAMAC activity for at least 2s prevents swapping the data buffers. Data buffer swap requires at least 200ms of no CAMAC activity for unmodified SAMs and is probably not an issue for modified SAMs.

## **Problems**

Process and update everything  
Multiple uncoordinated CAMAC module access  
Excessive SLCNET network traffic

This also places unexpected constraints on the database generation order to avoid unnecessary updates of intervening data from other jobs.

## **Goals**

Manage CAMAC module contention  
Exploration of NLC requirements  
Minimize restructuring of existing code

## **Assumptions**

PEP-II (SLC Legacy) Control System  
Support SLCNET and TCP/IP networks

## **Types of Requests**

Periodic requests are those that don't need current data. For example stale data on the order of a few seconds is probably good enough for a magnet or analog status display.

Demand requests are those that require the latest data. For example a magnet trim or feedback operation will require the latest data before estimating any correction.

## **Typical CAMAC Operation**

1. CAMALO: allocates and initializes a CAMAC package
2. CAMADD: adds a CAMAC packet to a CAMAC package
3. CAMGO: executes a CAMAC package

## **Proposal**

Initially manage contention by SAMs in MGNT, ASTS, and FDBK jobs  
Extensible to other module types and jobs

## **Time Estimates**