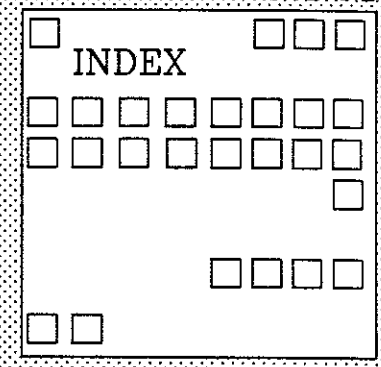
Index Panel

SLC Control Program



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Control System software

March 14, 1991

Author: *Spence Clark* **Subsystem:** *Controls Software* **User Impact:** *None*
Panel Changes: *None* **Documents:** *No* **Help File:** *None*

The following article originally appeared in the February 8, 1990 issue of the INDEX PANEL. *It is reprinted here due to the timeliness of the subject matter.* [*Editors*]

We are pleased to find so many individuals outside the Controls Software Group interested in writing software for use in the SLC Control System. This collaboration can lead to a better control system and help to alleviate the backlog of software requests. It can also lead to greater understanding of the systems from the user point of view. This insight will aid in the specification of new software based on everyone's enhanced perception of the complexities and subtleties of the software.

We need to put some procedures in place for implementing user generated software in order to enhance overall effectiveness and to maintain system integrity. It is essential that the documentation and implementation are up to standards so that the Controls Software Group can maintain the software in the future. We will be happy to work with you, to explain how things work and to help you get your code running properly. We can achieve this if everyone uses the same set of code development procedures as used in the Software Group.

1. All software procedures need a specification of how the code should interact with the user and the machine. This functionality should be supported by a detailed design which lays out how the new software will be implemented (e.g. new modules to be written, changes to existing modules, panels). Please feel free to come talk with us about this documentation, since the extent and detail required will scale with the complexity of the task.
2. We will review the requirements and the design and offer constructive suggestions on better implementation strategies, and guidance on where to find and how to use supporting software that already exists. We can also save you a great deal of time learning how to edit, compile, link, and test.
3. Read the Programmer's Guide (PG) which describes the software development environment, including standard procedures and tools. Also read the Basic User's Guide (BUG) which will give you an introduction to the control system and the SCP environment and will explain subsystems, support subroutines and utilities. This is the core reference manual for the SLC control system and how to work with it. You can get more details or assistance from your favorite software engineer.

4. Study the Fortran and C software standards to see how the actual code should be structured and written. This is critical for the maintenance and modification of the code in the future. These documents are in flux, so ask for a current version.
5. As the last phase of testing, a "walk through" should be arranged with one of the software supervisors to verify functionality and look for possible improvements to the user interface. When the software is ready for release, contact Kathy Charbonneau to arrange for Code Review. One of the programmers will go over the code to check for adherence to standards and look for potential problems. The librarian for the appropriate subsection of the SCP can then put the new code into CMS and release it into production.

Again, we are pleased to see user interest in writing code, and will do whatever we can to help make it a useful and successful experience. Feel free to approach your favorite software engineer, or talk to Nancy Spencer or myself. Good Luck.

Increased Bandwidth for BPM Readings and Wire Scans

March 13, 1991

Author: *Gromme, Hendrickson* **Subsystem:** *MPG, BPM* **User Impact:** *Major*
Panel Changes: *None.* **Documents:** *Yes* **Help File:** *None*

The Beam Position Monitor (BPM) and Master Pattern Generator (MPG) software internals have been upgraded to provide more available bandwidth for BPM acquisitions and wire scans. BPM bandwidth has been a long-standing limitation of the SLC Control system, particularly at low machine repetition rate. As the usage of wire scanners has increased, this has become more and more of a problem. With this release, the BPM and MPG software has been modified so that two SCP's can now collect BPM or wire data from non-overlapping sets of micro's without delaying each other. There should be no visible change to the user except that performance will be improved.

In the past, BPM or Toroid readings, wire scans and beam scans have been synchronized among micros by strings of YY codes broadcast by the MPG. (The YY code is the low-order eight bits of the sixteen-bit code broadcast at 360 Hz by the MPG.) Each beam pulse was reserved for only one user no matter where in the machine the devices were located. Now, each whole BPM data acquisition sequence, however long, is enabled by a single YY code, rather than being driven by a string of YY codes. Each micro can still satisfy only one request at a time, but different micros in different regions of the machine may be busy with different acquisitions on the same beam pulse. To coordinate this, the MPG must, for each request, keep track of how long that request takes to be satisfied and which micro's are participating in it. The MPG YY diagnostic display has also been enhanced to show when a particular request is complete.

Some special handling is required to get a consistent set of data from regions before and after the Single Beam Dumpers when the dumpers are rate limiting the beam into the ARCs. Internally the software now sets the previously unused two high-order bits of the eight-bit beam code (PP) to indicate that the MPG is going to fire the single-beam dumpers for rate limiting. In the micro software, these two bits are zeroed before the PP code is passed on to the PDUs, PAUs, and PIOPs. If the single-beam dumpers are limiting the downstream rate to 10 Hz, a measurement which includes micros both downstream and upstream of the dumper will take place at 10 Hz even though the beam rate upstream may be 120 Hz. If the single-beam dumpers are stopping all pulses, the same measurement will return data at the full beam rate including micros downstream of the dumpers which are seeing no beam.

Some other requested features have also been included in this release.

- The MPG can now be asked to dump either or both beams during a wire scan or beam scan. This will be used with both the BSY and Final Focus wire scans. In the BSY, the beam is disrupted by the wire and must be dumped downstream of the scanner to prevent background in the Final Focus. For the FF wires, the other beam is dumped during a scan.
- It will be possible to collect data for the same pulse before and after being damped in one of the damping rings by specifying that the downstream data should be read one or two beam pulses later than the upstream data. At present, this is only implemented for the all Toroid display group used to measure Positron yield throughout the Positron system, including into and out of the South Damping Ring.
- For both old and new fast feedback loops, the rate of data acquisition and the timeslot used is now controlled by parameters in the database.

New Panel for BAS-I Control

March 11, 1991

Author: *Glenn Horton-Smith* **Subsystem:** *Sector 1* **User Impact:** *Small*
Panel Changes: *Few* **Documents:** *No* **Help File:** *Yes*

A new panel has been created to allow controlling the timing system, magnet, video, and profile monitor for BAS-I. The panel can be reached from the Injector/Sector 1 profile monitor selection panel or from the West End operator maintenance panel.

There are five triggers on this panel three of which are of the familiar type:

- There is one trigger for the sample-and-hold (BAS1SH).
- Two triggers exist for firing the magnet: one for electrons (E-FAST) and one for positrons (E+FAST). The magnet pulses every time one of the "FAST" triggers fires.
- Two new triggers (E-SLOW and E+SLOW) have been added for only causing the magnet to fire once about every 16 minutes. These are used by a "pulse-snatching" button macro that steals four pulses an hour for history-buffering the energy and energy spread.

More detailed information is available from the panel help.

New Entry Method For Correlation Plots

March 8, 1991

Author: *Rich Tighe* **Subsystem:** *Correlation Plot* **User Impact:** *Small*
Panel Changes: *Few* **Documents:** *No* **Help File:** *Yes*

There are now two additional ways to enter correlation plot step ranges. The first can be found on the 01-20 DATA ACQ panel. It allows the entry of the desired START value, STOP value, and number of steps. The increment is then calculated for the user and the results are placed in the familiar form in the PRIMARY (or SECONDARY) STEP VARIABLE button. No more having to reach for the calculator to convert the information you know into the information required for the correlation plot. The second method, which is on the Correlation Applications panel, allows entry of the desired center value, half of the full range, and the number of steps. What results is a range that is symmetric about the center value.

- The start value is: (center value - 1/2 range value).

- The end value is: (center value + 1/2 range value).
- The sign of the entered half range value dictates in which direction the acquisition proceeds.

For all entry methods the end value of the step variable is displayed on the terminal. Additionally, since all of the entry methods show default values in their prompts, other step entry buttons may be used to query for the step variable information in terms of that button's entry method. For example you may first enter the start, stop, and the number of steps, then use the (center, 1/2 range, # steps) button to see the center value of the entered range.

New Magnet Diagnostic Function

February 28, 1991

Author: *Nan Phinney* **Subsystem:** *Magnets* **User Impact:** *Small*
Panel Changes: *One* **Documents:** *No* **Help File:** *None*

At Operations request, a new function has been added to allow a user to change the setpoint for a magnet or other analog device to its current readback value. After selecting the device of interest, the user may go to the Diagnostic Panel and push the new [ACCEPT ACT -> DES] button. The user will be asked to verify that this is really the action desired. If so, the current BACT or VACT value for that device is loaded into the appropriate BDES or VDES.

This operation should not be required unless the hardware is not performing correctly as specified in the database. To help in tracking and fixing these problems, an Error message is logged to indicate that the operator has been forced to use this function to put the device within tolerance. These errors will appear in the daily error summary reports to call attention to the malfunctioning device so it can be repaired.

History Plots

March 11, 1991

Author: *Ralph Johnson* **Subsystem:** *All* **User Impact:** *Some*
Panel Changes: *None* **Documents:** *No* **Help File:** *Yes*

Having requested a history plot it may take some time for the SCP to collect and display the data. If you decide that you do not wish to wait, you may now type control-c to abort the plot. You will be presented with a message stating that the plot was aborted by a control-c.

BPM Difference Display

March 13, 1991

Author: *Mike Zelazny* **Subsystem:** *Accelerator* **User Impact:** *Small*
Panel Changes: *None* **Documents:** *No* **Help File:** *None*

The BPM Difference Display now permits DIFF Displays between two different display groups as long as the micro lists and units are exactly the same. In addition, the user may select a portion of two different display groups that are similar. A typical application of this facility would be to display the difference between the orbits of the two electron bunches in sectors 0 and 1.