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SLC Control Program

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Normalized rms for Fast Feedback Position and Angle States

August 16, 1994

Author: *Phyllis Grossberg*

Subsystem: *Fast Feedback*
User Impact: *Small*
Panel Changes: *None*
Documents: *No*
Help File: *None*

To facilitate the investigation of jitter problems, the representation of rms for position and angle states of fast feedback loops (shown on the vector display) has been changed from unit values to normalized values. In addition, a new red fast feedback loop state - BADRMS - has been defined and, when appropriate, will appear on the loop status display and the SDS display. The BADRMS loop status results from unfavorable comparisons of normalized rms values with predetermined cut values.

A normalized rms is the unit rms divided by the nominal beam size or angle. Each time a loop is cold-started, model parameters are checked and nominal beam sizes and angles are updated, if necessary. Nominal sizes, nominal angles and cut values per beam/plane are contained in FBCK secondaries NOMS, NOMA and NCUT respectively, and can be displayed for any loop by pressing [SINGLE UNIT LOOP] on the fast feedback diagnostic display.

To avoid confusion between rms values which have been normalized (position and angle states) and those which have not (all other states), a small change has been made to the formatting of the data on the vector display. When an rms is not normalized, the units of the rms are the same as those of the value and the format is:

value rms units

When an rms is normalized, the rms is unitless and the format is:

value units rms

To produce better alignment of columns on the vector display, the abbreviation for micro radians has been changed from urad to ur.

History buffers of rms values will be affected by these code changes. Normalized rms values are expected to be of smaller magnitude than the previously unnormalized values so an apparent drop in rms will occur beginning at the time this code is implemented. Re-scaling may be necessary to delineate the new values.

Threshhold values for rms checking may be entered from the fast feedback diagnostic panel by pressing [SET RMS CUT]. If a loop acquires a red BADRMS status as a result of comparisons between normalized rms values and cut values, a physicist should be consulted to determine: first, if there's a beam problem; second, if the cut values should be increased for the loop; and third, if there's a potential software problem. Only in the latter case should a cater be submitted.

User Defined Axes Labels in Correlation Plots

12-Aug-1994

Author: *Gregory White* **Subsystem:** *Accelerator* **User Impact:** *Small*
Panel Changes: *Few* **Documents:** *No* **Help File:** *Yes*

Shortly a new facility will be added to Correlation Plots which will allow you to enter your own axes labels.

Four buttons will be provided on the new `CORRELATION PLOTS OPTIONS` panel for the new facility.

These are: [X AXIS LABEL] [Y AXIS LABEL] [Z AXIS LABEL] [STICK LABELS]

The current axes labels will be printed below the buttons. To override any axis label, select the appropriate axis label button and enter a new label. In doing so, the highlight bar will appear on the "Stick Labels" button, which indicates that the labels on any generated plot will be taken literally from the strings displayed on the panel. That will remain in effect until the Stick Labels button is selected to remove the bar, even if a new acquisition is made or different variables are plotted. Only entering a new variable, either sampled or step, or cancelling the "stick" by pressing the Stick Labels button, will cause plots to avert back to using default labels.

Correlation Plots panel shuffle

August 12, 1994

Author: *Gregory White* **Subsystem:** *Accelerator* **User Impact:** *Small*
Panel Changes: *Few* **Documents:** *Yes* **Help File:** *Yes*

Shortly, some minor changes will be made to the Correlation Plots `DATA ACQ`, `APPLICATIONS`, and `AUXILIARY OUPUT` panels. With these changes, a new facility will be added which will allow you to override the axes labels printed on a plot (see above article).

Changes to Existing Panels

1. The BUTTON FILE DIR, SAVE BUTTON FILE and RESTOR BUTTON FILE buttons will be removed from the acquisition panels and put on the `AUXILIARY OUPUT PANEL`.

2. The "Reload CRR Data" button has been renamed to RELOAD FROM FILE and moved from the `APPLICATIONS PANEL`, to the `AUXILIARY OUPUT PANEL`. This means that both input and output of both Correlation Plots data and button files are all handled from this same panel; so, the panel itself will be renamed to `AUXILIARY I/O FUNCTIONS`.

New Panel

A new panel, the `CORRELATION PLOTS OPTIONS` panel, will be added. This panel will be available indirectly from the DATA ACQ panels via the `APPLICATIONS` panel, and directly from the `DISPLAY` panels. It will define some buttons moved from elsewhere and some new buttons:

1. The DISPLY SAMPLE VAR button will be removed from the `DATA ACQ` panels and defined here.

2. All of the math expression handling buttons, previously on the `APPLICATIONS` panel, will now only be defined here.

3. Four buttons will be added to control the new axis labelling facility. See previous article on this new facility.

The document describing the motivation for this re-arrangement is "Proposal for New 'Options' panel in Correlation Plots", in DOC$FUNC_REQ:CRRPANEL_REARANGEMENT.TXT.

Divide by 16 monitor

29-Aug-1994

Author: *Joe Frisch* **Subsystem:** *Feedback* **User Impact:** *Small*
Panel Changes: *Few* **Documents:** *This is it* **Help File:** *No*

A new compute-only fast feedback loop has been added to measure the output time from TGAS 3 and TGAS 4 (the photocathode gun pulsers). The loop is called "DIVIDE BY 16 COMPUT", or "DIVBY16". The measurement device is a TDC in LC00. If the TGAS time moves (for example due to a divide by 16 shift), the feedback will measure a different time, go out of range, and turn red. The status string will be "STATETOL". Note that while this feedback can be used to set the TGAS to approximately the correct time, it has a resolution and drift of about +/- 1nsec, and CANNOT be used to time in the TGAS exactly.

If the divide by 16 loop turns red on the CUD:

1. Look at the state history for the loop. If this is due to a slow (more than 1 day) drift, the problem is probably with the measurement, and not with the TGAS.
2. If there was a sudden change, check to see if anyone intentionally changed the TGAS.
3. If the TGAS was not intentionally changed, check (or reset) the divide by 16.
4. If that doesn't work, contact Controls - probably timing system problem.

New Features for IP Optimization Scans

August 4, 1994

Author: *Lee Ann Yasukawa* **Subsystem:** *IP Scans* **User Impact:** *Small*
Panel Changes: *Few* **Documents:** *No* **Help File:** *No*

There are two new diagnostic features for IP Optimization Scans. In addition to saving timestamps when the last Quad, Waist, Eta or Sext scan is performed, the scan data is now saved to a file and can be recalled. The FF BEAM-BEAM SCAN, North IP Wire and South IP Wire panels have a new button, [LAST IPOPTZ SCAN], which will display the last scan for the scan type and scan axis selected. The display will have a timestamp when the data was taken which should match the timestamp labeled as Last Scan on the panel.

The second feature is a tracking system to monitor which scans were implemented with [ACCEPT BEST VALUE]. Each time a successful scan is performed, the tracking bit is cleared. When the button is pressed and the results are implemented, "**Implemtd**" will be written to the 4th line of the button in red. As the different scan types and scan axes are toggled, the "**Implemtd**" label will appear for the implemented scans or the 4th line of the button will be blank for those scans not implemented.

LGPS Second ADC Polynomial - IVA2

19-Aug-1994

Author: *Kristi Luchini* **Subsystem:** *Magnet* **User Impact:** *Small*
Panel Changes: *None* **Documents:** *Yes* **Help File:** *NO*

Some LGPS units have a second transductor available which is read into the PSC2 hardware and stored in the database IMON secondary. In the past the magnet software converted this voltage reading to current using the IVA polynomial which is related to the first analog input. Typically the second transductor has very different characteristics so that current stored in IMON was not very useful. Therefore, an additional secondary, IVA2 has been added to the LGPS primary which is now used for the second transductor conversion from voltage to current.

Mini Standardize

19-AUG-1994

Author: *Kristi Luchini* **Subsystem:** *Magnet* **User Impact:** *Medium*
Panel Changes: *Few* **Documents:** *Yes* **Help File:** *Yes*

When a magnet is standardized it is cycled up and down between zero and its maximum operating current several times, and then returned to a pre-defined setpoint. This restores the magnet to the condition under which its magnet field as a function of current was measured, and allows the magnet to be set reliably to a Bdes value.

This cyclying of the magnet during standardization is done in a specific direction, referred to as upward or downward. This direction is defined in the HSTA_IVBD bit of the database secondary HSTA. If this HSTA_IVBD bit is set the device is to be cycled in a downward direction towards the lowest current. Otherwise, the device is to be cycled upward towards the highest current.

In the past, once standardization had been achieved and the device then moved in a direction opposite to that of standardization, the reliablitiy of setting to a particular Bdes along the hysteresis was lost. The only way in which to restore this reliability in the past was to standardize the magnet again.

Since standardization can be time consuming, especially when setting superconducting magnets, and the loss of standardization occurs frequently, a new method has been developed to maintain the reliablilty of setting the magnet when moving in a direction opposite to that of standardization without having to restandardize the magnet. The method used is to adjust the magnet a few steps beyond the desired setpoint, which would be moving opposite to the standardization direction, and then adjusting the magnet to the desired setpoint, which would then move the magnet in the direction of standardization. This method is called "mini-standardization".

Currently the amount that the device is taken beyond the setpoint is five percent of the maximum operating current of that device.

It is important to note that it is not necessary for a device to have been standardized to receive the benefits that the mini-standardize provides.

All magnet and magnet-like devices except for shunted or boosted devices are allowed to use the mini-standardize procedure. If mini standardize is required for a unit it is performed prior to the trim or perturb (ie:knob) request.

The [TOGGLE MINI STDZ] button has been added to the MAGNET DIAGNOSTIC PANEL. This button toggles the HSTA mini-standardize bit to the state of REQuired or DISabled. If a mini standardize REQuired state is set for this unit the magnet software in the micro will perform the mini standardize procedure prior to a trim or perturb (ie: knobbing) request. However, it is important to note that only trim requests will notify the operator that the mini standardize has occured. This was done to eliminate a flurry of messages while knobbing a device.

New Xwindows Cow

August 19, 1994

Author: *Ralph Johnson* **Subsystem:** *Operation's Console* **User Impact:** *None*
Panel Changes: *None* **Documents:** *No* **Help File:** *No*

Cow 01 in the operation's console is now an Xwindows based Cow which has non-Xwindows Slcnet knobs and a touch screen overlay.

The Scp which is run on it is functionally the same as that for the older Xwindows Cows and the Xwindows calves except that the hardware knobs replace the trackball and mouse movement for effecting knob changes.

The popup knob panel functions as before except that mouse motion does not change knob values and the gains are now also applied to the hardware knobs. If you attach the mouse to a knob, the left and right buttons function as before to increase or decrease values.

The touchpanel screen has a touch sensitive overlay so that you can "push" the buttons by using the mouse as before or by pushing on the screen with your finger.

Adjacent to the touchpanel window are icons for often used functions such as Cater. These are windows which are not associated with the Scp.