

Using PET

Course Outline

L. Hammons, T. D'Ottavio, P. Ingrassia, N. Kling, J. Laster,
G. Marr, S. Nemesure, T. Shrey
August 2008

Background

PET (Parameter Editing Tool) is one of the fundamental software applications used to view, monitor, and control the wide range of devices found in the C-AD accelerator complex. Operators in the control room are likely to use PET on a daily basis.

The PET application allows groups of devices to be arranged into pages containing lists and tables. These pages can be selected from a hierarchy and are arranged by accelerator. Once such a page is selected, the devices and their associated parameters appearing on the page can be viewed and edited.

PET has a long history within the controls system, previously only serving as a way of controlling “RHIC-style” devices and data structures (ADOs) and, later, adding the ability to control “AGS-type” devices (CLDs and SLDs). The current version of PET can be displayed on X-windows based machines and can handle any type of device in the controls system.¹

Objective

The objective of this training module is to provide novice and intermediate users of the controls system with grounding in the basic structure and features of PET and its role in the control of accelerator systems and components at C-AD. The course is specifically aimed at addressing the needs of the MCR operations staff in their day-to-day responsibilities and is designed to:

- Augment their effectiveness in using PET to properly control and monitor accelerator systems and functions by exposing learners to the basic as well as some of the more advanced features of the PET application.
- Train operators to use PET for diagnosing and troubleshooting problems and failures in accelerator systems and components.

Course participants for this module are assumed to have some familiarity with the use of the controls system.

Scope

The basic features of the PET application will be explored, focusing on those features that are most relevant to day-to-day operational activities as well as those features that are helpful for diagnosing and analyzing device status, performance, and operational activity. Not all features of PET will be discussed in this course. However, a large variety of

¹ PET help page - <http://www.cadops.bnl.gov/Controls/doc/pet/pet.html>

topics will be presented, with emphasis falling on those topics that are deemed most important to MCR operators.

Prerequisites

Course participants in this module are assumed to have received training in the basic architecture, services, and terminology of the C-AD controls system. This includes, but is not limited to:

- ADOs
- ADO clients and servers
- SLDs and CLDs
- Asynchronous data delivery
- Archiving

Course Structure

The course will be taught in the Main Control Room, and each course participant will be seated at a terminal with access to the PET application. The course will be structured to provide an interactive experience for the participants, exposing students to the features of PET by allowing them to explore those features under the guidance of the instructors and by providing students with small in-class exercises and activities that amplify the concepts.

Program Overview

A program overview for this application is available from the Help menu and can be found at <http://www.cadops.bnl.gov/Controls/doc/pet/pet.html>.

Course Outline and Topics

1. Introduction to PET

- a. What is PET?
- b. Introduction to devices and device parameters
 - i. "RHIC-style" devices (ADOs)
 - ii. "AGS-style" devices (SLDs and CLDs)
 - iii. PPM and non-PPM devices
- c. What kinds of devices does PET control and when should PET be used for device control?
- d. Starting PET –
What are the various ways that PET can be started in MCR?
 - i. From the command line
 - ii. From StartUp
 - iii. From the desktop icons in the Main Control Room

Suggested exercises and activities: Open the PET application from command line, StartUp, desktop, look at SLD and CLD pages, discuss various kinds of devices and how PET sets and controls their parameters in Booster, AGS, and RHIC, etc...

2. Using PET

a. Features of the PET main window

- i. Pulldown menus
- ii. Menubar color
- iii. Default user identification

b. Introduction to the PET user interface

- i. File
- ii. Page
- iii. Options
- iv. Help

c. The PET tree

Suggested exercises and activities: Expand various branches of the PET tree and discuss contents of various branches. Look for commonalities and differences among various machine branches (i.e. each machine branch has a 'Vacuum' branch. Some machines have 'Timing' branches, some do not, etc.). Have students look for various devices within the machine tree to determine what kinds of devices are located in what parts of the machine tree. Discuss basic philosophy of machine tree organization and basic guidelines for finding various devices in machine tree. Discuss what kinds of devices may not be found or devices that have counterintuitive locations, etc...

d. Opening device pages – Viewing and editing parameters

i. Device types and their associated pages

1. Features of SLD and CLD pages

- a. Pulldown menus
- b. Devices
- c. Readback
- d. Setpoint
- e. On/Off and other device controls
 - i. Triggering – CHN/EVT/EXT...
 - ii. Op mode – NOR/AUT/CLR
- f. Communication/Device report status
- g. Nudge
- h. Status fields
- i. Status indicators
- j. Buffer field
- k. Context menus and windows (i.e. device descriptions)
- l. Device menu options
 - i. PPM users / Showing all PPM users
 - ii. CLD editor
 - iii. Metadevice editor
 - iv. Delay channel editor

Suggested exercises and activities: Open SLD/CLD pages. Ask students to identify various features of the pages including readback and setpoint fields. Ask students to determine setpoints for various PPM users. Pick devices and ask students to determine controller and station information as well

as other details from device information window. Edit CLD values using CLD editor. Practice using channel editor.

2. Features of ADO pages

- a. Pulldown menus
- b. Device name
- c. Setpoint and readback fields
- d. Other device controls (i.e., buttons, pulldown menus, etc.)
- e. Cursor position
- f. Cell description
- g. Cell types
 - i. Editable
 - ii. Noneditable
 - iii. Locking cells
- h. Page activity
- i. Message area
- j. Context windows (i.e. parameter information windows)

Suggested exercises and activities: Open ADO pages. Pick a device and display device information. Ask students to find generic system name, FEC, person responsible, etc. Pick a parameter and display parameter information. Determine generic and system name, description, etc...

3. Branches with multiples pages of same and varying device types

Suggested exercises and activities: Open branch displaying pages of varying types. Compare and contrast the look and structure of ADO and SLD/CLD pages as well as the nature of the devices controlled. How do the devices differ? How are they the same? What are the locations of the devices? What functions appear in an ADO and what functions appear in SLD/CLDs, etc...?

e. Using buffers

- i. What is a buffer?
- ii. How are buffers used in PET?

f. Loading buffers from archives and archive types

- i. Full machine
- ii. Local branch
- iii. SLD and CLD pages
- iv. ADO pages
- v. Display of ADO buffer windows

Suggested exercises and activities: Open buffers for SLD/CLD pages and for ADO pages. Examine buffer contents. Discuss strategies, best practices for loading archives. Describe a situation in which an archive could appropriately be loaded and a situation where using archives is not advised. Ask students to find a particular archive from a particular date and time and load the archive, etc...

g. Searching for devices

Suggested exercises and activities: Search for several different devices, etc...

3. Diagnosing Devices Errors in PET

- a. Disagreement between readback and setpoint
- b. Devices in and out of tolerance
- c. Device error indications
- d. Communication error indications
- e. On/Off status indications
- f. Fault and warning status indications
- g. FEC/Server errors
- h. Delayed device reports
- i. Missing device reports
- j. Determining physical location of devices

Suggested exercises and activities: Look at various examples of device errors and warnings. Discuss the nature of the error and possible actions necessary to remediate the error. How can more information be obtained about a device problem should an error be suspected or an error indication be observed? Also, display device information for a particular device and use controller and station information to determine physical location for a device.

4. Additional Features of PET

- a. Creating GPM plots
 - i. Stripcharts
 - ii. Correlation Plots

Suggested exercises and activities: Create various kinds of GPM plots. Instruct students to add particular devices to the plot from throughout the PET tree to give course participants practice in finding these devices and adding them appropriately, etc...

- b. Selecting SLDs via controller
- c. Creating temporary PET pages
- d. Filling out crash reports
- e. Using the Help menu
 - i. Program Overview
 - ii. Program Notes
 - iii. Feedback

- f. Embedding PET in other applications –
PET can be invoked from other applications such as ADT, FIT, and programs that control functions for multiple devices, such as AGSSnakeControl, among others.

5. Concluding Remarks