Accelerator Department
Brookhaven National Laboratory
Associated Universities, Inc.
Upton, L.I., N.Y.

EP&S DIVISION TECHNICAL NOTE

No. 69

D. Lowenstein

March 1, 1974

# COMPUTER CONTROL OF SECONDARY BEAMS

To zeroeth order the present system of a manual control circuit for each supply is being replaced with a central computer that is linked to every supply and a host of terminals with which an experimenter may command the computer to alter the condition of one or more power supplies. In addition, as the present state of the software is constructed, the computer will also act as a "watchdog" and report failures and power supply drifts beyond tolerance limits to the experimenter. The experimenter may also store up to 3 (this is arbitrary) sets of running conditions on a disk file. He may update and call these files into core as he sees fit. Polarity changing is also accomplished under computer control. Through a combination of a terminal command and a counter setting ("tune box") the computer will track a supply to the manually adjusted setting.

The system hardware consists of a central computer, PDP-11, with a "DATACOM" interface having up to 8 independent output channels. Each channel consists of a single 93 ohm coaxial cable onto which the power supplies are attached (Fig. 1). In addition, there are one or more terminals with which the experimenter may communicate with the computer and one "tuning box" per experiment.

Listed below are the tasks that the present software has been designed to perform:

1. ON--Brings specified supplies to "rectifier on" status (minimum current). Supplies that have their rectifiers on at some non zero value are not affected.
2. UP--Brings specified supplies to their setpoint values. Supply may be in any non-fault state.

4. STNDBY - Brings specified supplies to the "blowers on" and "rectifiers off" status. Supplies with their rectifiers off are not affected.
5. OFF - Brings specified supplies to "dead off" status; i.e., blowers are off.
6. MONITR - Performs "watchdog" service on specified supplies.
7. ENDMON - Terminates MONITR task.
8. UNDEFR - Removes specified elements from "deferred" status list. Supplies that experience failures, drift beyond tolerance limits are placed on a "deferred" status and cannot be acted upon until they are removed from this status.
9. SET - Allows one to modify the setpoint and tolerance values of a given supply which are stored in core. Allows one to change the polarity of the specified element.
10. LIST - Lists the present status, magnitudes, polarity, etc. of all the supplies under control or being shared by a given terminal.
11. DUMP - Allows one to save the present running conditions on one of any three disk files.
12. RESTOR - Allows one to retrieve into core a previously stored running configuration.
13. TUNE - Power supply is forced to track the value of a counter setting in the "tune box".
14. CALBRT - Calibrates the A-D converters in the "DATACOM" hardware. This task is normally scheduled automatically at regular intervals by the software.
15. TALK - Permits conversation between one or more experimenters and the "Watch" via the terminals.
16. ABORT - Terminates execution of all running and scheduled tasks at the given terminal.

Distribution: Admin.
Limited

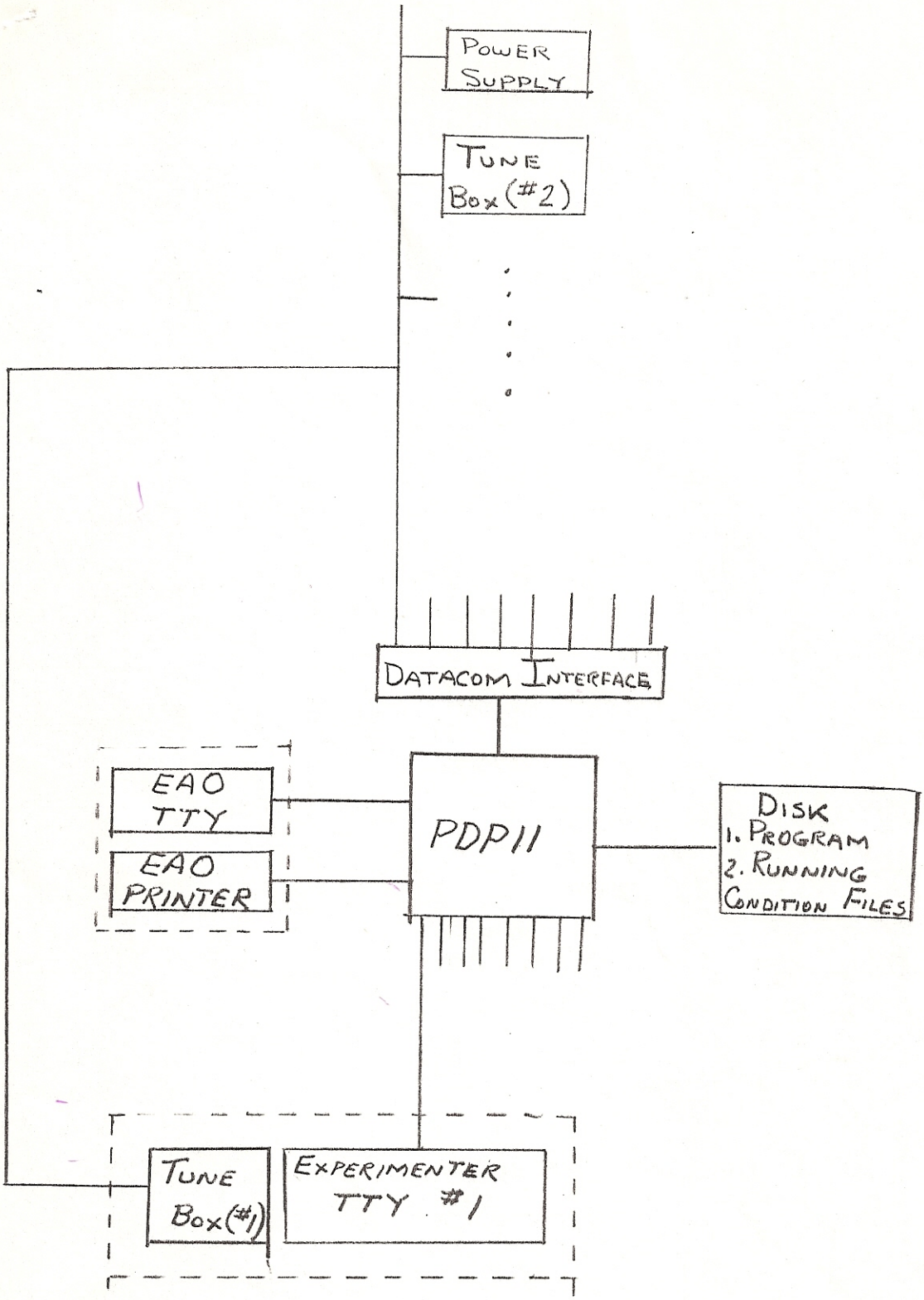


FIG. 1: COMPUTER CONTROL SYSTEM BLOCK DIAGRAM