

COMPUTER CONTROL OF 500 MEV BEAM TRANSPORT LINE AT KEK, PART III  
(SOFTWARE SYSTEM)

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ABSTRACT Tests for computer control of 500 MeV beam transport line of KEK proton synchrotron were done. Analog data of the beam transport magnets are taken by the satellite computer S-2, and the magnet currents are adjusted by the pulse train outputs from this computer. Data from profile monitors are taken by the satellite computer S-0 through a high-speed process input/output controller. These data are displayed on a graphic display terminal, and can see conditions of the beam transport line on the screen and adjust the magnet current by typing in the value to be set.

As KEK proton synchrotron is a cascade machine, it is important to adjust the beam transport lines between accelerators. A program system for tuning the beam transport line between the booster and the main ring synchrotrons was developed and tested.

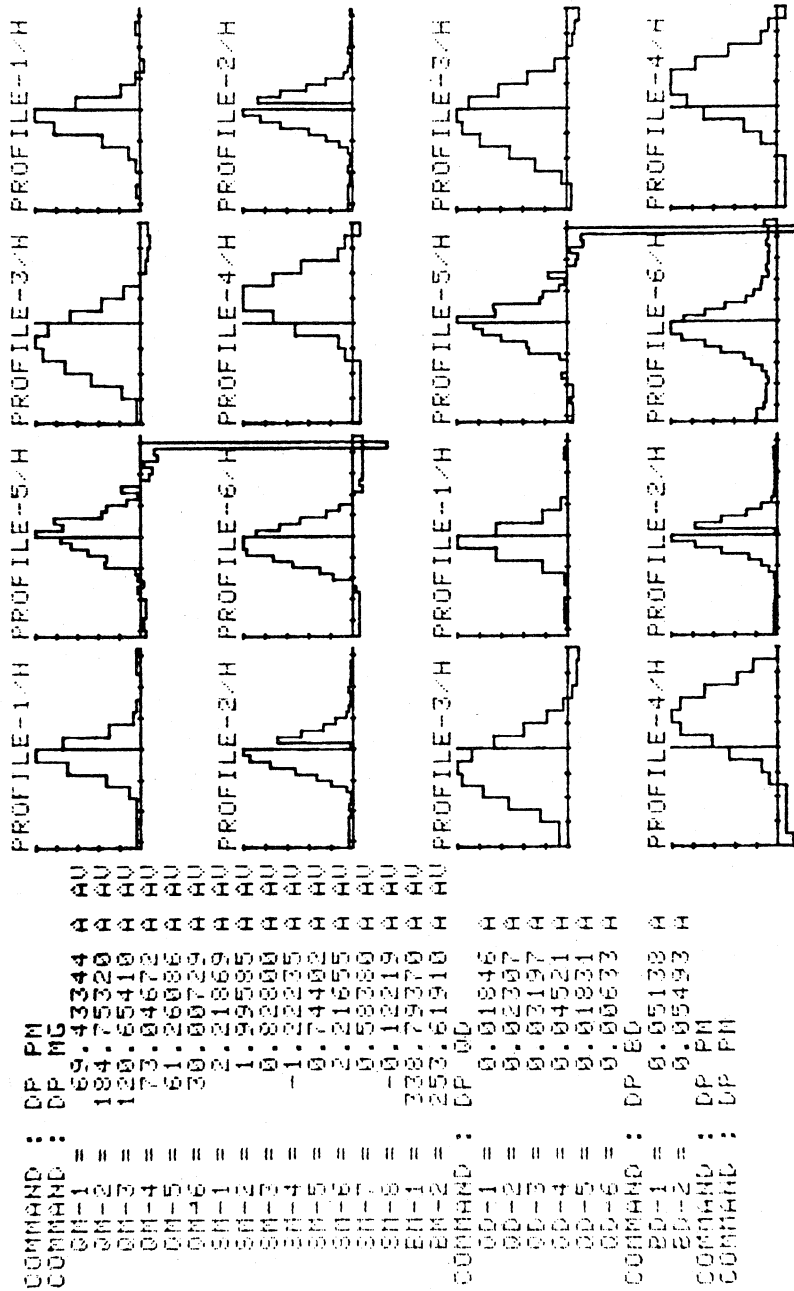
The control computer system for KEK proton synchrotron is composed of 8 mini-computers.<sup>1)</sup> And for this purpose, the central computer and two satellite computers are used. The main program runs on the central computer using a graphic display terminal to display magnet data and beam profile data. The program runs responding to input commands. There are commands for displaying beam profile data and magnet data, saving current values, resetting magnet currents, setting and modifying magnet currents, initialization, and program termination.

The data from profile monitors are gathered by a program on the satellite computer S-0 through a high-speed process input/output controller.<sup>2)</sup> Then the central computer reads data and averages them for later process. The magnet data are taken by the system task on the satellite computer S-2 responding to the commands from the central computer and sent to the main program.<sup>3)</sup> The magnet current can be changed by sending pulse output command to S-2.

An example of the graphic display screen is shown in Figure. Left part field is used for command inputs and digital data displays, and right part is used for displaying profile patterns.

References

- 1) T. Katoh, et al., "Control Computer System for KEK Proton Synchrotron", IEEE Transactions on Nuclear Science (June 1977), Vol.NS-24, No.3, pp.1789-1791.
- 2) Z. Igarashi, et al., "Computer Control of 500 MeV Beam Transport Line at KEK, Part I", of this meeting.
- 3) Y. Arakita, et al., "Computer Control of 500 MeV Beam Transport Line at KEK, Part II" of this meeting.



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Figure An example of the graphic display screen after processing of some commands.