

PROPOSAL FOR THE CONTROL OF THE PS LOW FIELD CORRECTIONS
USING THE PDS-1 DISPLAY AND INTERPRETIVE INSTRUCTIONS

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The purpose of this note is to outline the system which will be used with the PS injection console to control the low field corrections. This will provide a framework for the software development. The hardware is already in construction and should be available, together with the display, by the middle of the year. It is hoped that this development will provide useful ideas, or even be a prototype, for the other main console systems (PS General and ejection; booster).

This system is concerned with control and acquisition of the backleg windings, new vertical dipoles and skew quadrupoles, together with the projected function generators for these elements. Additionally acquisition of the orbits, beam current at various times and hopefully the IBS and Q-values, will be incorporated.

The philosophy is to use an interpretive language, together with updating graphical displays to help the operator. This is considered preferable to a multi-pushbutton pre-programmed system, or a question and answer system, because of increased flexibility, easier software development (once the initial system is established), and the possibility of writing short, accelerator oriented programs on the spot and in an easy language. Examples of possible instructions are

SET VD(20) = 2 meaning set the vertical dipole in straight section
20 to 2 ampères

PLOT VDIP which would create a histogram type plot of the dipole positions and currents, updated every cycle

HOOK K1 TO VD(20) meaning connect (via software) the current in vertical dipole 20 to be adjusted by knob 1 (one of two shaft encoders).

A list of the proposed initial instruction sub-sets is given below. This list comprises only the basic control and monitoring instructions. Later arithmetic functions and program control instructions will be added to provide a complete and powerful interpretive language, though of course the initial subset will still be valid.

The display layout is shown in figure 1. Three user areas are distinguished: a plot area for updating displays, a scroll area for the interpretive instructions introduced on the keyboard, and a computer driven alpha-numeric area. This latter area allows updating values such as Ip or Trapping to be displayed, indicates the current state of the control knobs (HOOKS) and provides an area for tables, etc., produced say as a result of a scan.

From the software view point the system will work by continuous information transfer between the PDS-1 and the partition. In the PDS-1 the commands will be checked and 'stripped' before being sent to the IBM. The partition organization will consist of an interpreter and a 'mini-executive' which will handle input/output, display updating and knob control. A local area will be required for initialization routines for the displays.

It must be realized that this is the initial definition of the system. Much work will be involved in devising the interpreter and mini-executive and in writing the programs. During the course of this development, some changes may be made but it is hoped they will be minor.

INSTRUCTION SUBSET

SET

SET (VARIABLE) (OPERATOR) (VALUE)

VARIABLE can be individual element or predefined grouped control, e.g. harmonic distribution of dipoles

OPERATOR = for setting

UP for incrementing (abbreviation U)

DOWN for decrementing (abbreviation D)

TYPE

TYPE (VARIABLE) :

VARIABLE is as defined above. The system responds by acquiring the required value and writing it on the display immediately after the instruction in the form =(VALUE)

PLOT

PLOT (NAME)

NAME is the name of a set of elements. Their values will be plotted in a pre-defined format (graph or histogram) on the top section of the screen and refreshed every PS cycle.

HOOK, UNHOOK

HOOK (KNOB) TO (VARIABLE)

VARIABLE is as above. KNOB is a specified shaft-encoder. Unhooking will be performed by termination of the program, by re-hooking the knob, or by UNHOOK (KNOB). A record of which knobs are hooked to which element with an update value, will be visible in a fixed position on the bottom right of the screen.

PRINT

a) PRINT (VARIABLE)

Here VARIABLE is a single value, updated each PS cycle, printed on the special part of the screen

b) PRINT (VARIABLE 1) FOR (VARIABLE 2) = (VALUE 1),(VALUE 2),(VALUE 3)

This instruction tabulates a scan of VARIABLE 1 against VARIABLE 2, e.g.:

PRINT IP FOR VD(20) = -1000,500,3000

displays a table giving the measured value of Ip for values of the current in VD(20) from -1000 mA to 3000 mA in steps of 500 mA. This table will be in a fixed area on the bottom right of the screen.

QUIT

QUIT

This breaks off a scan operation already in progress as just described and restores control to the console.

N.B. All commands and operators may be abbreviated to their first letter.

Distribution

PS Operation	F. James
CO Computer Section	H. Koziol
MST	J.H.B. Madsen
E. Asséo	J.J. Merminod
S. Battisti	G. Plass
D. Bloess	K.H. Reich
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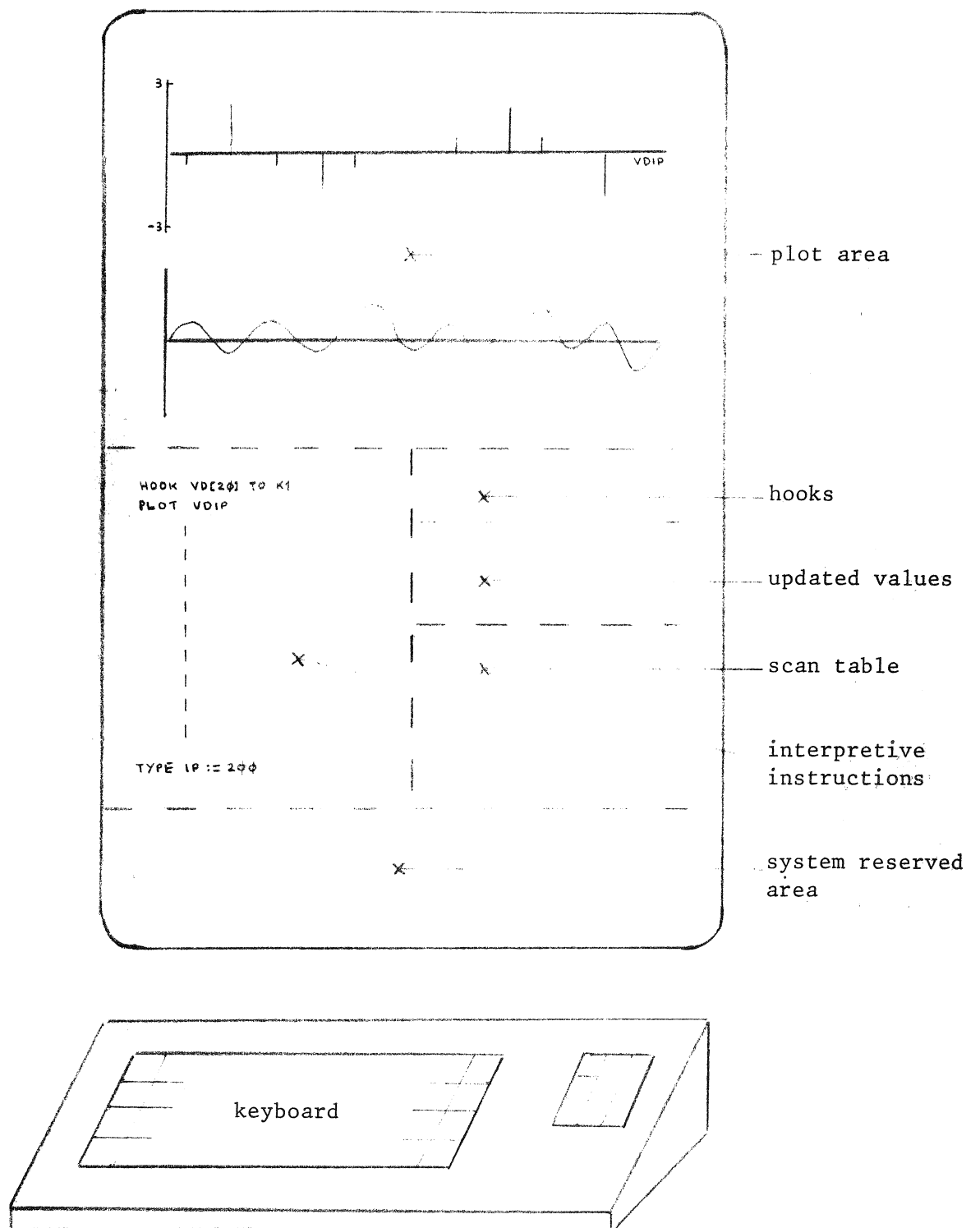


Fig. 1 Screen layout

