USER MANUAL

OPERATION

PDP-9 Operational Characteristics

Carnegie-Mellon University
Hybrid Computation Laboratory
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PREFACE

The Carnegie-Mellon University Hybrid Computation Laboratory is operated in an open-shop manner: all users are required to operate the machines themselves. This write-up therefore describes all operational procedures which are necessary for efficient operation of the PDP-9 digital computer.

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1.0 PROCEDURAL MATTERS

Authorized users may sign up (account number and man number) for PDP-9 computer time in one-hour blocks on the sheet provided on the bulletin board outside of the hybrid lab. Each user is restricted to one block of time per day. Users must also register (by man number and time used) actual computer usage in the PDP-9 log book, which is always located on the PDP-9 console worktable.

Also at the PDP-9 console are reference copies of the DEC Keyboard Monitor Guide, FORTRAN IV, and Utility Programs manuals (marked CONSOLE COPY). These manuals may not be removed from the PDP-9 console area.

A user consultant or staff member is always available in the hybrid lab to assist the user with any reasonable problems.

2.0 CONSOLE FACILITIES

2.1 FRONT PANEL SWITCHES

The console switches described below are located directly above the PDP-9 console worktable.

2.1.1 START KEY

Depressing START starts program execution at the location specified by the ADDRESS register.

2.1.2 PROGRAM STOP KEY

Depressing PROGRAM STOP halts program execution at completion of the current instruction.

2.1.3 CONTINUE KEY

Depressing CONTINUE resumes program execution from the point at which it was stopped by depressing the PROGRAM STOP key.

2.1.4 I/O RESET KEY

Depressing I/O RESET clears all I/O devices and deselects the 680 console; turns off the real-time clock, program interrupt facility, and API system; and halts program execution.

2.1.5 READ-IN KEY

Depressing READ-IN initiates read-in of the paper-tape System Boot-strap beginning at the location specified by the ADDRESS register.

2.1.6 ADDRESS REGISTER

The switches in the ADDRESS register (4-17) specify a 14-bit core memory octal address (0-37777) to be used by the START or READ-IN operations.

2.1.7 AC SWITCH REGISTER

The AC (accumulator) switch register ($\emptyset$-17) constitutes an 18-bit word which is program readable by the PDP-9. These switches may be used as sense or parameter switches via the RSAC and RBAC linkage routines (see digital LINKAGE section of this manual).

2.1.8 POWER ON/OFF SWITCH

The POWER switch controls application of power to the PDP-9 and the EAI 693 hybrid interface.

2.1.9 CLK SWITCH

The up position of the CLK switch disables the PDP-9 real-time clock facility. The down position allows program control to enable or disable the clock.

2.2 FRONT PANEL INDICATORS

The indicators described below are located directly above the switches described in the previous section.

2.2.1 CLK INDICATOR

The CLK light remains lit while the real-time clock facility is pro-gram-enabled.

2.2.2 PRGM STOP INDICATOR

The PRGM STOP light is lit whenever the PDP-9 is halted.

2.2.3 DATA INDICATOR

The DATA light is lit whenever data channel activity is in progress; i.e., data is being transferred between core memory and DECtape.

2.2.4 PS ACTIVE INDICATORS

The upper four PS ACTIVE lights indicate API hardware level activity, levels 0-3 from left to right. The bottom four lights indicate API software level activity, levels 4-7 from left to right. Each indicator lights when processing at the corresponding priority level is initiated, each indicator goes off when the corresponding priority level is program-released.

2.3 MAINTENANCE PANEL

The maintenance panel is located behind the red door (above and to the left of the console worktable).

2.3.1 NORMAL/LOCK SWITCH

When the NORMAL/LOCK switch is in the LOCK position, all console switches described in section 2.1 are electrically locked (operation of any console control cannot affect the program in progress). Specifically, the START, PROGRAM STOP, CONTINUE, I/O RESET, READ-IN, and POWER ON/OFF switches are inoperative; the ADDRESS register is useless; and the CLK switch is electrically in the down (clock enabled) position. The AC switch register is still operative. When the NORMAL/LOCK switch is in the NORMAL position, all console switches operate as described in section 2.1. The other switch positions are for maintenance purposes.

2.3.2 HOUR METER

The elapsed time meter indicates, to the nearest tenth of an hour, the cumulative number of hours in which the system has been in the "power on" state. This reading should be entered in the PDP-9 log book at the beginning and ending of each user session on the PDP-9 (see section 1.0).

3.0 I/O DEVICES

3.1 DECTAPE

The standard DECtape assignment is the system tape (unit $\emptyset$) and three scratch tapes (units 1, 2, and 3). The system tape is permanently mounted on unit $\emptyset$ (note that software refers to unit $\emptyset$ and the dial on the physical unit reads to 8--both usages are synonymous), WRITE LOCK, and should never be WRITE ENABLED. The topmost DECtape unit is committed to this usage. Three scratch tapes (file-structured) are always available at the console for use on the other three units.

Those users with personal tapes should mount them on a scratch unit, laying the associated scratch tape aside temporarily. To mount a DECtape, push it firmly onto the left reel with the tape function switch in the middle (neutral) position and hand wrap a few inches of tape around the right reel. Then position the tape function switch to LOCAL and use the right direction control (marked with an →) to wind a couple feet of tape around the right reel. Finally, position the tape function switch to RE-MOTE. To dismount a DECtape, position the tape function switch to LOCAL and use the left direction control (marked with an ←) to rewind the tape. When the tape snaps off the right reel, turn the tape function switch to the middle (neutral) position to stop reel motion before removing the DEC-tape from the left reel (the metal bracket provided on the console is helpful for prying off tight reels).

The unit selection rotary indicators may be used to make desired DECtape unit assignments. These unit indicators are inoperative unless the associated tape function switch is in the REMOTE position. An OFF LINE unit cannot be accessed by any PDP-9 program.

Do not attempt to handle or clean the read/write heads. They are kept sufficiently clean by hybrid lab personnel during periodic preventive maintenance checks.

3,2 OTHER

If any other I/O equipment needs servicing or supplies (malfunction, teletype paper or ribbon, paper tape for the punch), see the user consultant on duty for assistance.

The FEED switch to the right of the punched paper tape receptacle will feed blank tape (sprocket holes only) for leader or trailer purposes for as long as it is depressed. The POWER switch controls power to the paper-tape punch mechanism. It should be left permanently on (indicator lit) except when the PDP-9 is turned off.

The ON/OFF switch on the teletype keyboard controls power to the teletype. It should be left permanently in the ON position. The BREAK indicator beneath the ON/OFF switch is inoperative. The red BRK-RLS button is also inoperative. The red LOC CR button will return the teletype carriage when depressed. The red LOC LF button will cause rapid paper upspacing as long as it is depressed. The red REPT button will cause the last character typed to be repeated as long as the REPT button is held down.