PDP OPTION LIST

PDPI

DEC PROGRAMMED DATA PROCESSOR

DIGITAL EQUIPMENT CORPORATION . MAYNARD . MASSACHUSETTS

Various options exist for the DEC Programmed Data Processors to enhance computing and data display facility. The following standard optional items exist, and special inter-system connections will be made available for special applications.

1. SEQUENCE BREAK SYSTEM

This is a 16 channel automatic interrupt feature, which allows concurrent operation of several in-out devices and the main sequence. The system has 16 automatic interrupt channels arranged in a priority chain. Each channel can be switched on or off by program control. The program can also initiate a sequence break to any channel.

When a device requests attention from the Sequence Break System and has the necessary priority, it will store the Accumulator, the Program Counter, and the In-Out Register in three of four adjacent Memory Registers unique to the channel. The next instruction of the break is taken from the fourth Memory Register which would usually contain a jump instruction. Once a sequence break has started, it can only be interrupted by a higher priority device. A normal way of terminating the sequence is to restore the Accumulator, and In-Out Register to the values before the break, and to return to the previous program by an indirect jump to the register containing the Program Counter.

2. HIGH SPEED IN-OUT CHANNEL

The device connected to an in-out channel communicates directly with memory through the Memory Buffer Register. At the completion of each machine instruction, a check is made to see if the in-out channel has a word for, or needs a word from the memory. When necessary, a memory cycle is taken to serve the channel. The operation is initiated by two in-out commands. The first in-out transfer command indicates the nature of the transfer, and the In-Out Register contains the starting address of a block to be transferred. The second in-out transfer command initiates the action of the channel, and the contents of the In-Out Register indicate the number of words to be transferred. If the Sequence Break System is connected, the completion of the transfer will signal the proper sequence. If no Sequence Break System is connected, the completion of the in-out channel transfer sets a program flag.

3. AUTOMATIC MULTIPLY AND DIVIDE PACKAGE

The order, Multiply, MPY Y will form the double length product of the contents of the In-Out Register and the contents of Memory Register Y. The high order part of the product will be left in the Accumulator, and the low order part in the In-Out Register. Both parts will consist of sign plus 17 digits. The instruction, Divide Y, will form the quotient of the double length dividend stored in the Accumulator and In-Out Register, and the divisor contained in register Y. The sign of the dividend's least significant part is initially adjusted to have the sign of the most significant part. The quotient appears in the In-Out Register and the remainder in the Accumulator. Multiplication requires 25 microseconds, and divide 40 microseconds.

4. ADDITIONAL MEMORY

When a second memory bank is added, the select memory bank order will be fully implemented and additional buffering circuits added. The third and succeeding memory bank is installed by plugging in the new memory units. A total of seven, 4,096 word memory banks may be connected to PDP-1.

IN-OUT EQUIPMENT

5. TALLY REGISTER CORPORATION PUNCH

A Tally Register 60 character per second punch may be substituted for the standard Friden 20 character per second punch.

6. VISUAL INPUT-OUTPUT

- a. 16" Cathode Ray Tube Display. The display command will plot one point at the position indicated by the Accumulator and the In-Out Register. The first ten bits of the Accumulator and In-Out Register determine the abcissa and ordinant of the displayed point. The cathode ray tube is mounted separately on the right side of the table. The mount can swivel about a vertical axis and tilt about a horizontal axis, thus the operator can set the scope to the attitude he desires.
- b. Light Pen. This device essentially allows information to be "written" on the scope. The light pen detects displayed information. The pen output sets a program flip-flop in the machine each time a pulse of light strikes the pen.

7. 5" PRECISION CATHODE RAY TUBE

This tube is equipped with mounting bezel to accept a camera or a photomultiplier device. The operation of this tube is similar to that of Item 6. The first 12 digits of the Accumulator and In-Out Register determine the co-ordinants of the displayed point.

MAGNETIC TAPE SYSTEM

A tape unit with control to read and write IBM 727 and 729 I format tape. Two hundred 7 bit characters of information are stored on each line of tape and the tape is read or written at the rate of 75 inches per second. Additional tape transports may be connected using the same control.

9. ANELEX 72 COLUMN PRINTER AND CONTROL

The control unit contains a 72 character buffer. The buffer is loaded from the In-Out Register in three character groups, using a program loop, in 960 microseconds. Additional machine instructions print the contents of the buffer, and space paper.

10. 18 BIT CLOCK

The clock is a crystal controlled counter. The appropriate in-out transfer order puts the clock count in the In-Out Register. The clock may be reset by the program. The clock counting rate is 4kc to 500kc, externally adjustable.

11. IN-OUT INTERVAL TIMER

An in-out transfer order sets the Interval Timer to the value indicated in the In-Out Register. The timer then counts down at a rate controlled by the crystal oscillator and a pulse is generated when the count reaches zero. The counting rate is the same as for the above 18 bit clock.

12. CARD READER CONTROL

This control is for use with standard card reading equipment. The control allows the read brush outputs to be directed to the In-Out Register.

13. CARD PUNCH CONTROL

This control operates a standard card punching machine and contains an 80 bit buffer. The buffer is loaded from the In-Out Register, using the in-out transfer command, for each card row punched.

14. DIGITAL PLOTTER CONTROL

The control permits a California Computer Products Model 560R to be used with PDP-1. A control word is placed in the In-Out Register, and an in-out transfer command is given which selects the plotting function according to the control word. The control commands are: move $\pm x$, move $\pm y$, pen up and pen down.

15. RELAY BUFFER

An in-out transfer command places the contents of the In-Out Register in an 18 bit flip-flop buffer. A relay is connected to the output of each flip-flop.