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AVERAGER

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DESCRIPTION: AVERAGER is a five channel averager designed for analysis of slow neural potentials. Its features include: variable number of sweeps (00-99), variable sampling time (001-999 msec per pt.), variable number of points (001-512), and the ability to average selected trials. The latter feature enables user to average trials according to a preselected sequence. The sequence may be entered via paper tape or keyboard and any ASCII characters are legal entries. This feature is useful when averaging of different experimental conditions is desired.

HARDWARE REQUIREMENTS: PDP-12A, KW-12A, 8K, and EAE are required to use the program. If EAE is not available, a small program modification is necessary.

STARTING PROCEDURE: AVERAGER is loaded using the DIAL-MS monitor and is automatically started. If a manual start is desired, the following is necessary: I/O preset in LINC MODE; START 20.

COMMANDS: All routines in AVERAGER are called using a one letter command. The following is a summary of the commands:

- A - exit to average routine
- C - store code character for selected trial averaging
- D - exit to DIAL-MS
- I - input trial select coding
- T - store channel (01-05) on tape unit 1
- 1 - display average channel 10
- 2 - display average channel 11
- 3 - display average channel 12
- 4 - display average channel 13
- 5 - display average channel 14
- RUBOUT - automatic exit to display routine, used when a typing error has occurred or as the terminator for I routine.

A - This command displays the following frame on the scope:

```

MSEC PER PT      - 001
NO. OF SWEEPS   - 10
NO. OF POINTS   - 256
SELECTED TRIALS -  N

```

The operator must type in the requested information in the following manner: Type msec per point using leading zeroes; type return; type number of sweeps, again using leading zeroes; type return; type number of points (leading zeroes); type return; type either an "N" or a "Y", depending on whether selected trial averaging is desired. Then type linefeed and the averager is now waiting for the trigger pulse to start the average. The trigger pulse should be placed into channel 1 of KW-12A and the five channels of data should be placed in channels 10, 11, 12, 13, 14, respectively.

NOTE: The averager routine uses the following algorithm to compute the average:

$$M(t) = \frac{\sum_{i=1}^N x(i)}{N}$$

i = # of sweeps

1 ≤ t ≤ # of points

Where X(I) is the ith sample
N = Number of Sweeps
t = Number of Points per Sweep

If it is necessary to stop the average at any time, press the stop key and restart in LINC mode at address 20 of IF = 2 (i.e. I/O preset, START 20).

Selected trial averaging is accomplished by using the C and I routines (explained below) and typing a "Y" as an answer to the selected trial question in the display frame of average.

C - Code character input routine which accepts one character from the teletype and returns to the display routine. This routine also reinitializes the interrogation list generated by the I routine to begin interrogation at trial 1. PLEASE NOTE: This routine must be called immediately before A is called. If this is not done, the interrogation will continue from the point at which it stopped in the previous average.

I - Input interrogation list via keyboard or paper tape. If paper tape is used, simply type I and load the coding tape into the reader and push lever to start. Blank leader is ignored. After the tape has stopped, press rubout and the display will reappear. A maximum of 256 code characters may be entered.

T - Tape routine used to store data on linc tape. After typing T, the following message will be typed on the TTY:

```

ENTER TAPE BLOCK No.
ENTER CHANNEL No.

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Enter tape block no. using leading zeroes and then message two will be typed out. Then enter channel no. (1—5). After this entry, the data will be stored and the data display will return on the scope. If an incorrect entry is typed in this routine, type rubout and then recall tape routine by typing T.

1—5: Displays average of any one of five channels on the scope.

CONCLUSION: AVERAGER was written to decrease data analysis time, by simultaneously averaging five channels of data. If more detailed manipulation is necessary, simply use CATAL (DEC-12-UW1A-PB) to manipulate the data stored on your LINC TAPE.

