AN INEXPENSIVE MICROCOMPUTER - CONTROLLED ACTIVITY MONITOR FOR MICE

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Commercially available equipment for monitoring spontaneous locomotor activity (S.L.A.) in mice is expensive and hence unsuitable for routine screening on cost grounds alone. Further, many such systems have other disadvantages. For example, those which rely on ultrasonic detection, tuned resonance circuits or 'jiggle meters' fail to distinguish between ambulation and rearing behaviour; a factor which can affect the interpretation of results (Kehne et al, 1981). We have also found it impossible to eliminate 'between machines' variation in non-photobeam systems. The combination of a cheap microcomputer and a simple photobeam monitoring system has overcome many of these disadvantages.

The activity monitor demonstrated provides five identical chambers for simultaneous testing. Each of these chambers is fitted with three industrial-grade infrared source/detector pairs. An Acorn Atom microcomputer monitors the state of these fifteen sensors every 10ms. A parallel/serial interface of our own design allows the fifteen outputs to enter the Atom using a single line of the computer's versatile interface adaptor. The detector circuitry incorporates an electronic filter to eliminate the effects of ambient light changes and this allows the sensors to operate within a wide range of lighting conditions. Figure 1 illustrates the system.

Experimental protocols and analyses are under software control (BASIC) and are thus flexible. For routine screening of S.L.A. a suitable program can be stored semi-permanently on an EPROM device. The program demonstrated here monitors the detectors, collates and stores data, displays summary information and performs statistical analyses. The equipment has been in use for over six months and has proved reliable and simple to operate. The system was inexpensive to construct and is sufficiently flexible to allow the Atom to be used for other tasks when not running an experiment. The design provides for expansion of the system to monitor 30 or more test chambers. The same circuitry can be readily configured for use with other behavioural paradigms. Although we selected an Acorn Atom, the parallel outputs from the detectors could be suitably interfaced to other microcomputers.

Finally, the elimination of machine variation has significantly reduced the number of animals required for each experiment as compared with our previous non-photobeam techniques.

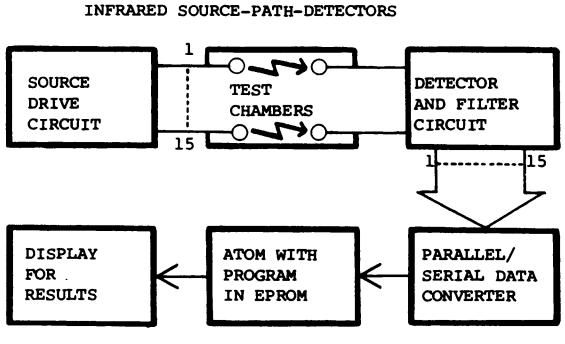

Figure 1 Atom-Controlled Activity Monitor

Kehne, J.H. et al (1981) Psychopharmacology 75, 363-367