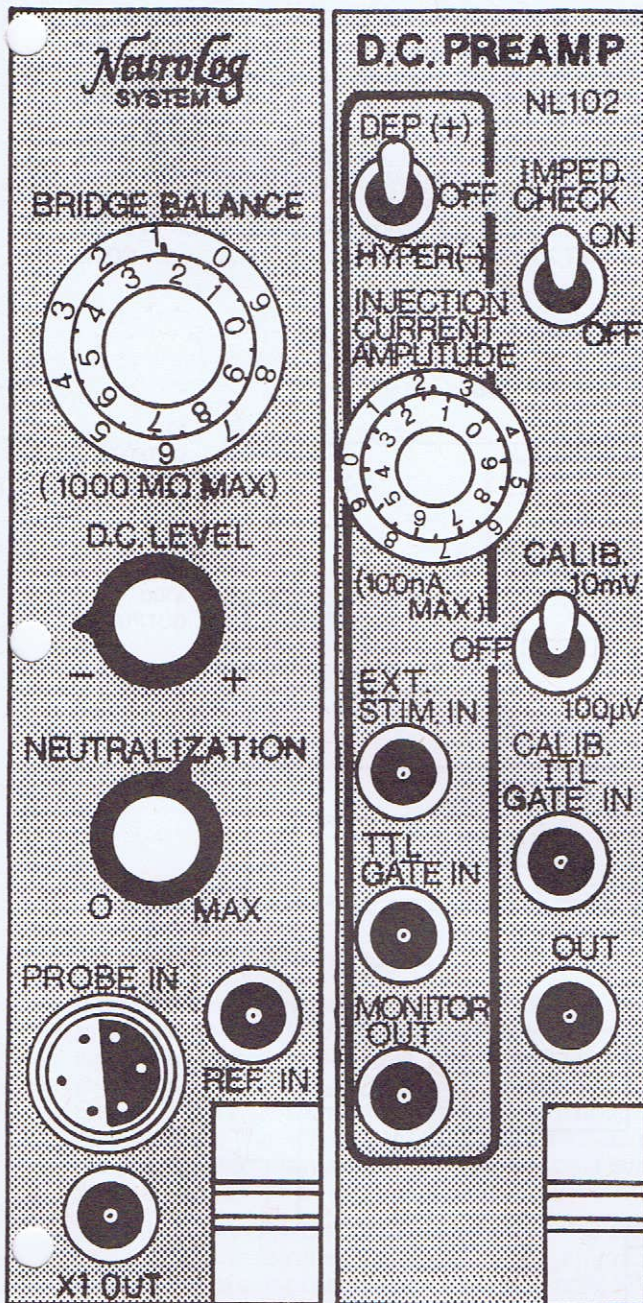
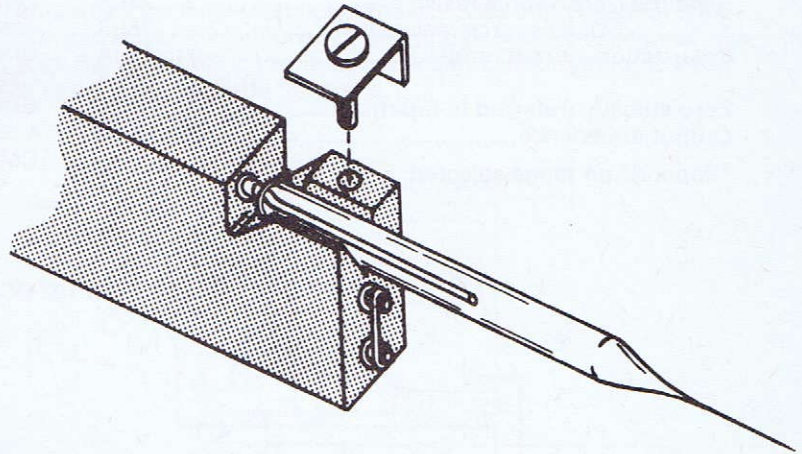


NeuroLog SYSTEM

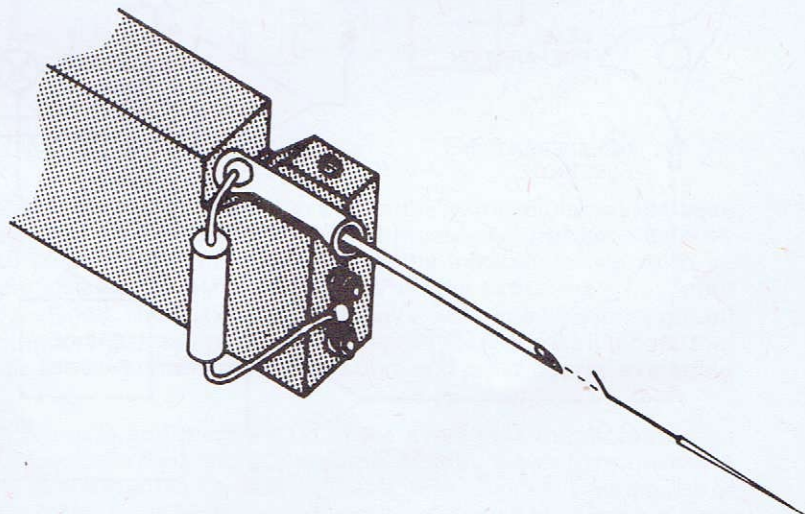
d.c. preamp module



REMOTE HIGH IMPEDANCE HEADSTAGE



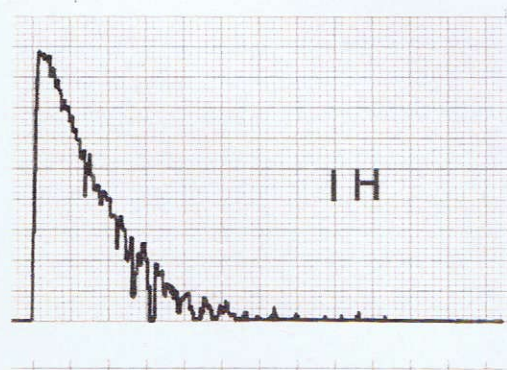
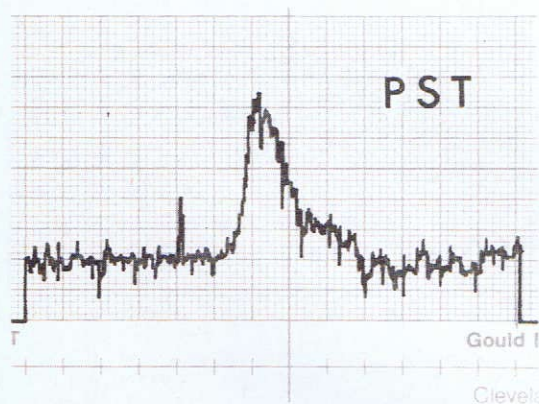
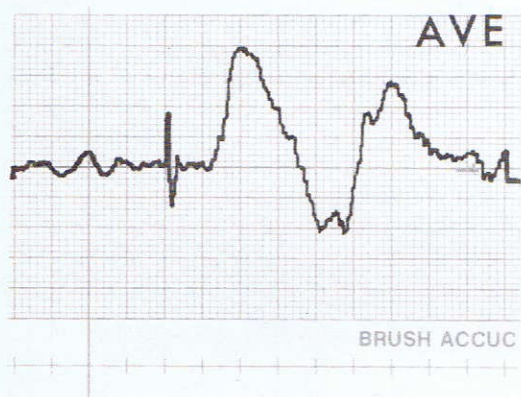
ELECTRODE CONNECTION



NeuroLog SYSTEM

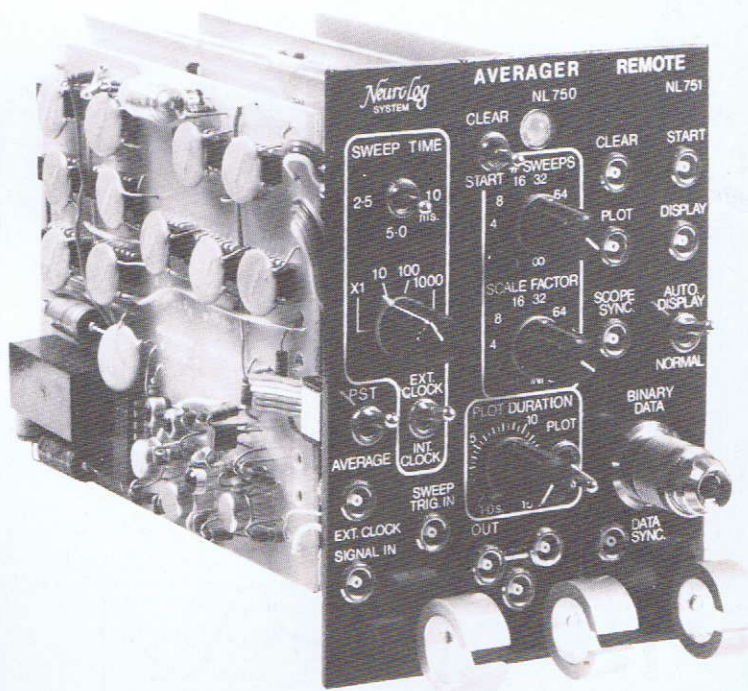
The Neurolog averager in use

NEW Instantaneous Ratemeters



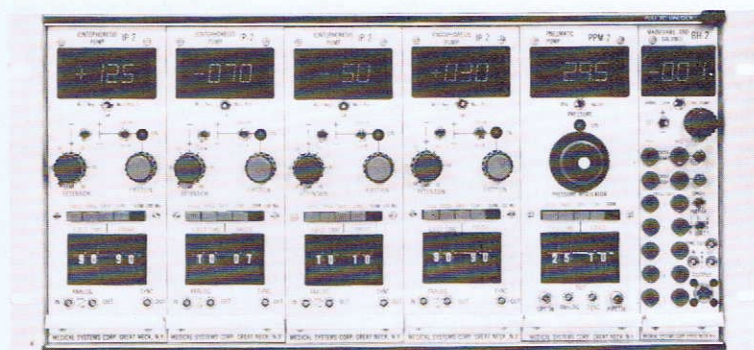
The plug-in NL750 Averager is a fully digital averaged response computer, with solid state memory, Analogue to Digital conversion etc. It will compute averages of Analogue input signals or Post-Stimulus Time (PST) Histograms for pulse inputs.

Described in this newsletter are two methods of expanding the facilities offered by the Averager.

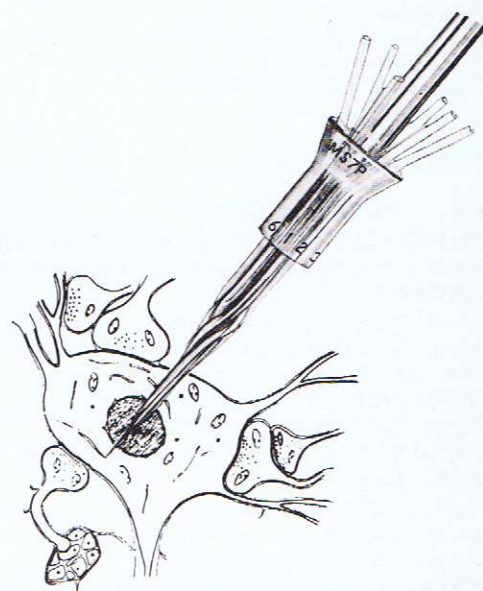


IONOPHORESIS with the NEUROPHORE SYSTEM

INSTANTANEOUS RATEMETERS – more information



TYPICAL SYSTEM COMPRISING FOUR IONOPHORETIC PUMPS AND ONE PNEUMATIC PUMP

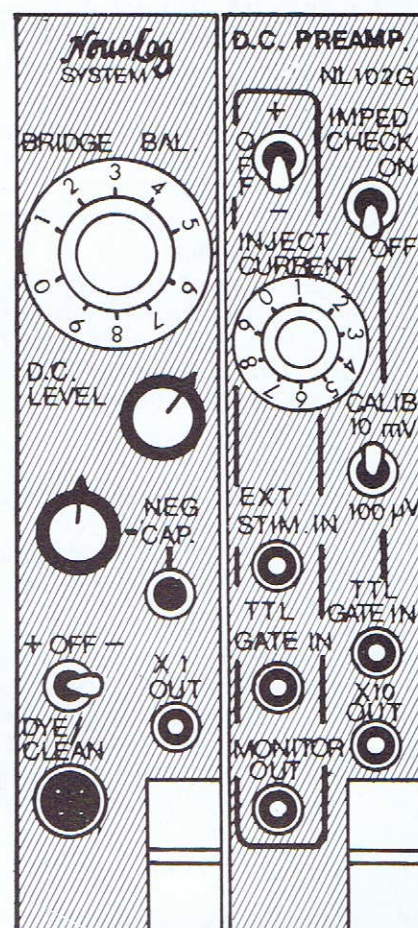


The release of ionised drugs such as putative neurotransmitters from glass microelectrodes using micro-electrophoresis (or iontophoresis) has become a well established and widespread method of investigating their action on nerve cells. The NEUROPHORE system has been designed to meet the varying requirements of Researchers in this area and offers facilities for continuous injection and for drug injection in a preprogrammed sequence governed either by the equipment's own internal clock or by an external programmer such as the DIGITIMER D4030. Drug ejection is controlled by a constant current source which has a high compliance ($\pm 105V$) so that very high resistance pipettes can be used. If the product of current times resistance exceeds the compliance of the instrument a flashing display indicates this to the user.

The usual technique involves recording from a spontaneously active neurone and subjecting it to the effects of a number of drugs given in a regular sequence with suitable pauses between applications of the different drugs. This, the unit is admirably suited to do but the facilities for ejecting drugs in response either to an external trigger pulse or to an external gating pulse offers more flexibility and a greater range of experimental opportunity. With these controls it is possible to apply short current pulses of 10msec or less and so to mimic more closely the natural release pattern of many neurotransmitters.

This method of iontophoresis is most powerful when used with nerve cells in tissue culture or with *in vitro* slice preparations (1, 2). Under such circumstances it is possible to use separate ionophoretic pipettes through its dendritic tree in the search for zones of high sensitivity to specific neurotransmitters. This arrangement permits a comparison of the actions of several putative neurotransmitters at a single point on the dendrites of a neurone and it is possible to compare not only the sensitivity of the system to the released drugs but also the latency with which they produce their actions. Such information may be important when, for example, one is attempting to distinguish between the actions of two excitatory agents such as glutamate and aspartate (see Fig 1).

- ☆ **The NEW Neurolog D.C. Pre-amplifier module**
NL107 (Transducer Amplifier) – more information
- ☆ **The NEW Neurolog Pulse Integrator**
- ☆ **The NEW Model D200 Signal Analyser for clinical evoked responses**



NL102G DC PRE-AMPLIFIER – TECHNICAL DESCRIPTION & SPECIFICATIONS

The NL102G is the 2nd generation of our popular intracellular pre-amplifier. In response to requests from Neuropharmacologists we have eliminated the floating reference bridge balance system of the old NL102, replacing it with a conventional ground reference. We have also increased the input dynamic range to $\pm 10.0V$, thus allowing its use in situations where large voltage drops occur across the recording electrode.

NEW FEATURES INCLUDE:

- Push button overcompensation control, used for assisting penetration of small cells.
- **Dye/Clean** (+ OFF –) toggle switch which can be used either for clearing blocked pipettes or for depositing dyes through extracellular pipettes (max current $\pm 1.0\mu A$).
- In addition to the dye injection switch, the constant current injection features of the old NL102 have been extended to four ranges ($\pm 100nA$, $\pm 50nA$, $\pm 20nA$, $\pm 10nA$) with four corresponding bridge balance ranges (100M Ω , 200M Ω , 500M Ω and 1000M Ω).
- The DC offset range has been increased to $\pm 2.0V$.
- The miniature input headstage now includes a driven guard; (X1 OUT).
- 'Constant Current' input capacity compensation, which largely eliminates re-adjustment with changes in input source resistance.

NEW TO THE RANGE;

★ **D170** system for signal conditioning, amplification and display

★ **NEUROLOG SYSTEM; NL108 T1 Isolated pressure transducer**

NL108 Pressure Amplifier

NL202 A C Signal Delay

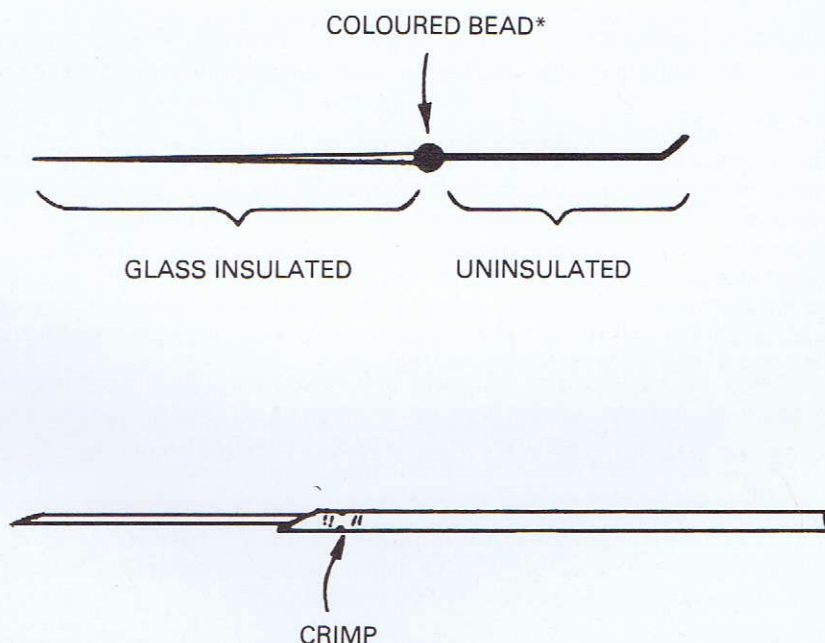
NL515 Interface — more information

NEUROLOG TUNGSTEN MICROELECTRODES LIFT OFF

These electrodes are insulated with pyrex glass, either with platinum black plated tips (RECORDING) or bare tungsten tips (STIMULATING). The recording electrodes have exposed tips approximately 15µm long and the stimulating electrodes 20-25µm long. These electrodes are made according to the technique of Merrill and Ainsworth (Merrill, E G and A Ainsworth, **Med and Biol Eng** 10 662-672 1972), and have been used successfully to record from visual cortex (Zeki, Blakemore) hippocampus (O'Keefe), thalamus (Wall and Egger), cerebellar parallel fibres (Yaksh et al), various brain stem cells (trigeminal nuc, Dubner et al; nucleus of the solitary tract, N Ambiguus, N Retro-ambiguus, Merrill; N Cuneatus and N Gracilis, Millar and Basbaum, etc), spinal cells (lamina IV and V, Wall et al, substantia gelatosa, Wall et al) Lissauer unmyelinated fibres, (Wall et al) as well as optic tectum terminals in various amphibians (Keating, Gase et al).

NeuroLog microelectrodes will fit snugly into 25, 26 or 27 gauge hypodermic needle tubing (the slight bend in the butt end ensures a low resistance contact). A holder for these electrodes can be easily made by crimping a short length of 26 gauge needle stock in a length of O gauge needle stock.

25 MICRONS



This composite tube can be bent to suit, and it can be fitted with pin connectors appropriate for particular preamplifiers or microelectrode holders (use stainless steel flux or ortho-phosphoric acid when soldering to the hypodermic tubing).

NOMINAL SPECIFICATIONS:

NL02 (RECORDING-GREEN*) SHANK DIAMETER, 125µm; OVERALL LENGTH, 35mm; INSULATED LENGTH, 20mm; TAPER, 2°; EXPOSED TIP LENGTH, 15µm; TIP PLATING, platinum black on gold; IMPEDANCE AT 1 KHz, 200kΩ.

NL05 (STIMULATING-RED*) as NL02 except: EXPOSED TIP LENGTH, 20-25µm, no tip plating.

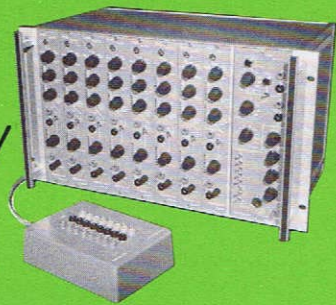
Digitimer

Short Form Catalogue

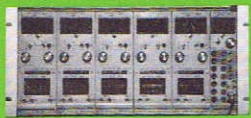
Pulse Programmers



A.C. Amplifiers



Controlled Drug Injection



D.C. Amplifiers



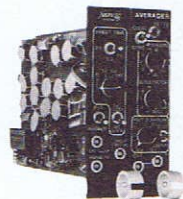
MEDICAL RESEARCH

Physiology
Pharmacology
Neurology
Psychology
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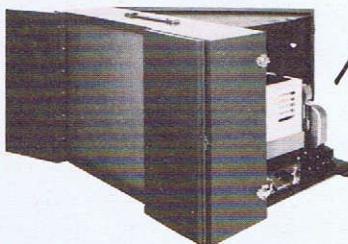
Isolated Electrical Stimulation



Signal Processing



Visual Pattern Stimulation



Signal Display

