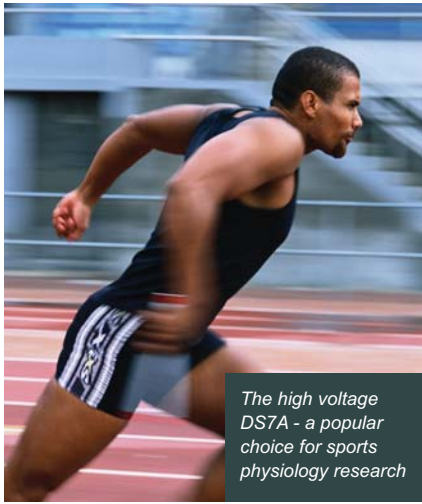


DS7A Human Muscle/Nerve Stimulator FDA Cleared

In October 2005, our DS7A/DS7AH stimulators were cleared by the FDA for marketing in the USA. This means that these extremely popular, general purpose nerve and muscle stimulators can now be offered in the USA for human use in either research, sports physiology or diagnostic settings.



The high voltage DS7A - a popular choice for sports physiology research

Having already gained FDA clearance for our D185 MultiPulse Cortical Stimulator, we decided it was imperative that another of our most widely used clinical stimulators was also available in the USA. By ensuring that all our stimulators are correctly certified according to local standards for their intended use, we feel we are best able to offer our customers assurance that our products are not only safe for the intended subjects but also for the operator to use.

The DS7A High Voltage Constant Current Stimulator is used for percutaneous (transcutaneous) stimulation of nerves and muscles within clinical or research environments. The stimulator uses mains power to provide a variable compliance of up to 400V, allowing a maximum stimulation current of 100mA, or 1A with the DS7AH variant. The stimulator has a built in "single-shot" trigger button, but also accepts TTL trigger input via a BNC socket on the rear of the unit or triggering from a contact closure footswitch. In addition, a TTL output allows triggering of recording equipment.

The DS7A has 6 selectable stimulus durations of between 50µs and 2000µs (restricted to 50-200µs with the DS7AH). Electrodes (not supplied) are connected to the stimulator via touch-proof safety sockets. Electrode extension cables or plugs are available from Digitimer or your local representative.



Available in two versions giving up to 100mA or 1A output current

Why Not Let the NeuroLog System Take the Strain?

The Neurolog System is a compact, versatile and modular instrument which can be used for a variety of purposes, including: intracellular, extracellular, transducer and multi-channel isolated amplification; pulse generation and electrical stimulation; signal processing and conditioning. In many cases a researcher is able to use a single NeuroLog System to perform several of these tasks simultaneously. As part of our expanding NeuroLog range, we now offer isometric force transducers to suit various applications. Our NL61 low range units are available in 7 ranges which cover 25g to 1500g. The larger NL62 dual cantilever transducer (pictured opposite), also available in 7 ranges, covers 2kg to 200kg. Both of these transducers can be interfaced with the NeuroLog System amplifiers.



The new NL905 NeuroLog System Case pictured with the NL62 Force Transducer

Still Having Problems with Mains Frequency Noise?

Quest Scientific
Innovative Devices For Research



Too good to be true... No, just a *Hum Bug*

Please Contact Us to Arrange a No Obligation Evaluation Loan

Digitimer has a reputation for design and manufacture of high quality electrical stimulators for both clinical and research areas and our range currently includes seven different models to suit various applications. Broadly speaking we can divide them into those certified for human use (CE Medical Device or FDA) and those which are designed as laboratory research use. Our research stimulators are generally suited to smaller animals or *in vitro* preparations.

We currently offer three standalone research stimulators as well as a compact stimulus isolator offered as part of the NeuroLog System.



The DS3 (left) and DS2A (right) stimulators provide a compact low noise solution to *in vitro* stimulation

DS2A & DS3 - Popular Compact Sources of Constant Current/Voltage Stimulation

The Digitimer DS2A (constant voltage) and DS3 (constant current) Isolated Stimulators are popular in electrophysiology laboratories all over the world. Their compact and user friendly design has generated a loyal following amongst researchers wishing to precisely stimulate nerve or muscle from an isolated power source.

Both units can be triggered manually using the front panel single-shot button or automatically in response to TTL compatible trigger pulses. In addition, pulse duration can be defined by (i) the settings of the front panel control dials (ii) the duration of the incoming trigger pulse or (iii) the length of time that the single-shot button is held down. Power for both stimulators is derived from eleven standard 9V batteries, which offer low noise and long life. Power is only drawn from the batteries when a stimulation pulse is delivered.

One or two stimulators can be 19" rack mounted using our D121-11 mounting frame. In addition, the mounting frame also accepts our DG2A Trigger Generator, a device which provides a simple method of repetitively triggering the DS2A or DS3.

D330 MultiStim - Modular Multi-Channel Stimulation for Tissue and Organ Baths

The D330 MultiStim System is a modular and versatile multi-channel stimulator for biomedical scientists requiring accurate *in vitro* stimulation of multiple low impedance tissue preparations with different stimulating voltages or currents.

Timing modules are available to generate pulses, variable in frequency and duration, which can be controlled as trains using a gating waveform, variable in repetition rate and duration or pulse count. Sockets are fitted to allow full external control from data acquisition systems and synchronisation if required. The D330 MultiStim System comes as a 19" rack-mountable unit that can house up to ten stimulation channels - along with the pulse train generator, gating and meter modules.

As part of the MultiStim range, we now offer the D342 Bistim Module which is able to alternate the polarity of successive output pulses. This module means that electrodes and tissues will not become polarized during long periods of stimulation. Digitimer are able to upgrade existing D330 systems with extra numbers of channels or the Bistim modules, however, as each pair of channels or Bistim modules require two more bays in the rack, the existing system may need to be extended into two racks in some instances



The modular MultiStim is ideal for multiple organ bath stimulation applications

NeuroLog SYSTEM



The NL800A can be used on its own or in conjunction with other components of our NeuroLog System

NL800A Compact Constant Current Linear Stimulus Isolator

The NL800A is our smallest isolated stimulator and is offered as part of our NeuroLog electrophysiology system. It accepts a voltage input from the Neurolog System (or other devices capable of generating a voltage waveform) and produces a constant current output proportional to this voltage. This makes the NL800A unique amongst our research stimulator range, as its output is not restricted to square pulses.

When two NL800A's are used in conjunction with the NL512 Biphasic Buffer module, they can be linked to the preparation in parallel in order to allow biphasic constant current stimulation.

The NL800A uses standard GP23A batteries as a power source and is capable of producing an output of up to 10mA in four overlapping ranges. It measures a mere 40mm x 64mm x 120mm, excluding knob.

Unlike our other research stimulators, the NL800A does not feature an absolute amplitude control, therefore the output should always be calibrated against the input voltage before use.

Merger Brings Urodynamic Products



Digitimer has recently merged with Lectromed UK Ltd, the clinical urodynamics specialist formerly based in Letchworth Garden City. In March 2006, the Lectromed offices and staff fully relocated to the Digitimer offices in Welwyn Garden City and their clinical urodynamics instrumentation and consumables became the Digitimer Lectromed product range.

Why Lectromed? Interestingly, Lectromed and Digitimer have a common heritage, as both companies resulted from a series of spin-offs from the medical electronics manufacturer, Devices Ltd. In the early 1970's Digitimer was started and Lectromed followed in the late 1970's. The Lectromed product range includes clinical systems and devices for use in urological, oesophageal and anorectal investigations, as well as a large range of disposable consumables such as catheters and pressure transducer domes.

High Voltage Stimulation of Spinal Roots - Conduction Block Revisited



The D185-EH3 - just one of the electrode handles we now offer

In Digitimes 2004 we described how the D185 MultiPulse Cortical Stimulator could be used in place of the discontinued D180 High Voltage Stimulator as a tool for peripheral nerve diagnostics. Although the D185 was designed for and is FDA cleared for Motor Evoked Potential (MEP) production during intraoperative

monitoring of the spinal cord, the high voltage output makes it ideal for percutaneous stimulation of deep nerve roots. The ability to use high voltages to stimulate these nerve roots allows the clinician to identify nerve block even at sites proximal to the spinal cord.

Since Digitimes 2004 was printed, Dr Klaus Gardill, assistant medical director of the Neurological Clinic, Aschaffenburg, Germany, published a paper entitled "High Voltage Stimulation -



The D185 MultiPulse stimulator

Practical Application and Clinical Examples". In his paper, Dr Gardill described the techniques and equipment he uses, including several stimulating electrode handles manufactured by Digitimer. He also included

a series of photographically illustrated case studies. The paper was originally published in the German language journal *Das Neurophysiologie-Labor*, however, with the help of Dr Gardill and Elsevier Germany, Digitimer have obtained the rights to distribute an English translation. If you are interested in obtaining a copy of this article, please contact us and we will be happy to provide one.

DS5 Bipolar Constant Current Stimulator - Coming Soon



DS5 Bipolar Stimulator - Voltage in, isolated constant current output

The DS5 isolated, constant current stimulator has been developed for studies of peripheral nerve excitability using threshold tracking techniques and unlike traditional stimulators, which output a square pulse, the shape of the DS5 stimulus is determined by the shape of an input voltage waveform. In this way, the output from the DS5 can be controlled by an array of external devices such as waveform generators or personal computers connected to a digital to analogue interface. Professor Hugh Bostock at the Institute of Neurology in London is an expert on the use of threshold tracking techniques and has collaborated with Digitimer over a number of years during the development of the DS5 and his own QTRAC software which can be used with the DS5 to facilitate threshold tracking measurements.

Last year we prematurely reported the imminent arrival of the new DS5 isolated stimulator, however, following extensive progress we are optimistic that the DS5 will finally be available later this year. We understand that these development delays have been very frustrating for those of you wanting to start using this novel device, however, our engineers have been working hard to ensure that the DS5 is not only designed to meet the requirements of our intended users but also those of the various regulatory bodies, which grant medical device certification.

Computer Controlled 8 Channel Isolated Amplification



Eight Channel Isolated Amplification

The D360 8 Channel Patient Amplifier System is a computer controlled isolated amplifier. It can be used for multi-channel AC coupled amplification of electro-encephalography (EEG), evoked potential (EP) or electro-myography (EMG) signals. The system comprises a main amplifier unit with a remote active headbox and dedicated Microsoft Windows compatible control software.

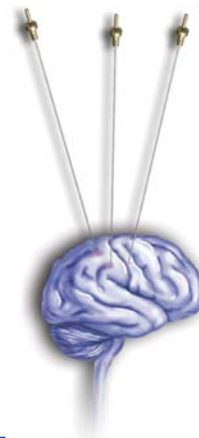
Multiple D360 amplifiers can be "daisy-chained" to produce a system capable of amplifying a greater number of channels (in multiples of 8). Grouping allows several channels to be configured with the same gain and filter settings, with the result that altering the settings for one of the channels leads to the same change across the group. The control software also provides impedance checking of the electrodes and deblock functions. It is now also possible for different users to setup and save amplifier settings for particular protocols, so that you can quickly reconfigure the D360 for your studies. Analogue output to your chosen acquisition interface is via a "D" connector on the rear of the main unit or from 8 BNC sockets on the front panel. The D360 has been designed according to the medical devices directive through implementation of the EN60601 Standard.

Try Alpha Omega Tungsten Micro-electrodes for FREE

Alpha Omega are already well known for their range of neurophysiology recording hardware and software, including the Alpha-Lab complete recording system and the EPS Electrode Positioning System. Adding to this range, they now offer glass coated tungsten micro-electrodes and have recently introduced two new sizes. The outer diameter of these electrodes

can now be specified at 125µm, 300µm or 350µm, making them even more customizable to suit your recording needs.

If you would like to try some of their electrodes for FREE, please contact us and we will send you a form to complete, allowing you to specify your requirements.



EPC10 plus - Cophasic Acquisition for Multi-channel or High-Resolution Patch Clamping



The EPC10 plus is just one from a range of computer controlled patch clamp amplifiers from HEKA Elektronik

The EPC 10 PLUS and NEW EPC10-2 PLUS are fully computer controlled patch clamp amplifiers with built-in Instrutech ITC-18 interface boards. Continuing the tradition of providing some of the world's best electrophysiology amplifiers, the EPC 10 PLUS series have all the features of the standard EPC 10; but go further by offering many data acquisition improvements. The EPC 10 PLUS interface has eight 18-bit AD converters with a clock rate of 200 kHz (aggregate), making it ideal for multi-channel or high-resolution recordings.

EPC 10 PLUS with ITC-18 built-in: The fully computer controlled EPC 10 PLUS has an ITC-18 AD/DA converter interface built-in and is connected to the host computer via the PCI-18 interface board.

True 16-bit data resolution: The ITC-18 uses separate 18-bit AD converters for each channel to provide true 16-bit data resolution.

Current, Voltage and 5 additional AD channels: The EPC 10 PLUS can simultaneously record the current and voltage monitor channels of the patch clamp amplifier and five additional AD channels from other devices. The five channels can be used to record parameters such as fluorescence signals, amperometric signals, or signals from other amplifiers in parallel with those obtained from the clamped cell.

Cophasic Acquisition: The EPC10 PLUS makes use of the separate AD converters for each channel to achieve cophasic acquisition on all input and output channels. With cophasic acquisition, the acquisition board samples all AD-channels at once, and all DA-channels are simultaneously updated to their new output values. Thus, there is no time delay between the different ADC-samples and no delay between setting a DA-channel and acquiring its corresponding AD-channels.

The EPC10 PLUS is designed for use with PatchMaster amplifier control and acquisition software, which operates on personal computers running Windows and MacOS (9 and higher). For further information on the EPC10, EPC10 PLUS or any other products in the HEKA range, please contact Digitimer for a brochure.

InstruTECH Interfaces - Now with Optional USB Connectivity



The USB-16 adds USB connectivity to the ITC-16

Since 1984 Instrutech have established themselves as a renowned manufacturer of high quality data acquisition devices, including the interfaces incorporated into the HEKA EPC9 and EPC10 patch-clamp amplifiers.

Until recently, the Instrutech range of data acquisition interfaces have been exclusively connected to computers via a PCI interface card, however, Instrutech now offer USB-18 and USB-16 host interfaces which are a USB 2.0 interface for Apple and PC compatible computers. The USB-18

provides the necessary interfacing to connect from the computer to Instrutech's ITC-18 interface and Heka elektronik EPC10 Plus, while the USB-16 provides the necessary interfacing to connect from the computer to Instrutech Corporation's ITC-16 interface and Heka elektronik EPC9.

Please note, these interfaces require a computer with a USB 2.0 Hi-speed port. An additional feature of the USB-18 and USB-16 is the addition of sixteen asynchronous digital input and output lines.

ValveLink 8.2 Valve Controller - Faster, Smaller & More Convenient

The new **ValveLink 8.2 Controller** from AutoMate Scientific puts you in total charge of your perfusion system. This upgraded perfusion system valve controller now incorporates a number of additional features and changes giving you increased flexibility:-

- **FASTER** - Individual valves now respond to any input with one millisecond accuracy.
- **GREATER CONTROL** - Control of all 8 valves is now possible via a single analog input:- zero closes all valves and each 0.5V increment opens the next valve (i.e 3V opens Valve 6). As well as analog control, valves can be opened or closed manually, through digital/TTL inputs or under USB control. Eight numbered push buttons on the front of the controller provide the manual input, while connectors on the rear allow

for the other modes of control.

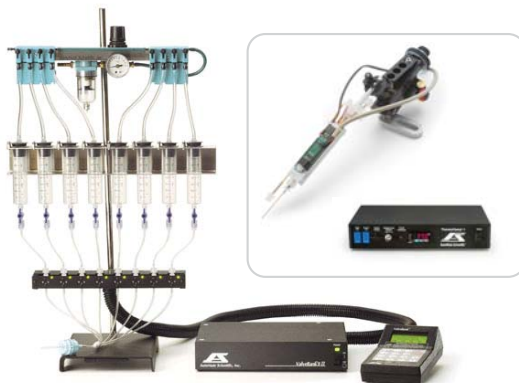
- **USB CONTROL** - Free software (Windows or Mac compatible) can be downloaded from the AutoMate website which allows valves to be opened and closed from a computer when the controller is connected via the USB connection.
- **LOGGING & SPILL SENSOR** - An analog event marker also allows you to record all valve activity, while a spill sensor input allows automatic shutdown of the system in the event of a leak.



ValveLink 8.2 Controller - simplifying drug delivery

ThermoClamp - Temperature Controlled Bath and Focal Drug Delivery

The new **ThermoClamp-1 Temperature Control System** from AutoMate Scientific allows you to focally and bath apply preheated perfusates to cells or preparations at temperatures between ambient and 50°C. This gives you the opportunity to maintain bath temperature and rapid drug washout with a high flow bath line while quickly switching 4-8 preheated solutions through a perfusion pencil. Flow rates of up to 5ml/min are possible at 37°C through tips of 100, 250 or 360µm.



AutoMate ValveBank Perfusion System & ThermoClamp Heated Perfusion (inset)

The ThermoClamp also features a "ramp and hold" function, which allows you to observe temperature sensitivity of a response or effect over the course of an experiment, by varying the setpoint over time.

The system is designed specifically for physiological research applications, having excluded metal from the flow path and ensuring that low noise electronics are used throughout. The system comprises the main unit, a heated perfusion pencil (4 or 8 channels) and separate bath/pencil temperature sensors. The ThermoClamp is designed for use with the AutoMate range of ValveBank or ValveLink perfusion systems, but can be incorporated to work with other systems.

Pulling Down the Price of Pipette Production



The Narishige name has always been synonymous with high quality and this is no less true when we take a look at their range of pipette pullers, including the PC-10 patch pipette puller (pictured opposite). Until recently this pipette puller was offered alongside the slightly less expensive PP-830, however, with the recent discontinuation of the PP-830, the price of the PC-10 has been significantly reduced, making its additional features more accessible to those on a more restricted budget.

Unlike the discontinued PP-830, the PC-10 does not have a manual control for re-positioning the heater between each pull. Instead, a motor repositions the heater automatically to ensure that the second pull is made at precisely the same location each time a capillary is pulled. This not only reduces the amount of user intervention required during pipette manufacture, but also helps to produce consistent pipettes every time the puller is used.

Narishige continue to design and manufacture a comprehensive range of micro-manipulator, cell injection and stereotaxic instruments - please contact Digitimer for copies of their latest product brochures.



PC-10 Pipette Puller

Free-standing or Bench Mounted Anti-vibration Solutions

We continue to supply the TMC range of anti-vibration tables, Faraday cages and associated accessories. If you are setting up an electrophysiology rig that uses other equipment from Digitimer, why don't you ask us for a quote? We can arrange for an installation engineer to deliver and setup tables at your convenience.

Standard tables are available in sizes from 25" x 36" to 36" x 60" with stainless steel laminate, plastic laminate or drilled top plates designed to suit your particular applications. The variety of optional accessories includes casters, arm rests and sliding shelves. Optional Faraday cages include provision for a hanging shelf, rubber lined holes for cable passage in and out of the screened environment and a "roller blind style" front panel which is more convenient to operate than hinged doors. For those of you needing a bench top-based isolation solution, TMC now offer the 66 Series CSP TableTop isolation system, which features passive anti-vibration technology.



TMC Anti-vibration table and Faraday Cage

Other Digitimer Products



The PLI-100 - as used by the Cold Spring Harbor Laboratory workshops

Reproducible Pico-litre Cell Injection

Our most popular small volume injector, the PLI-100 Pico-injector reliably delivers a range of volumes through micropipettes by applying a regulated pressure for a digitally set period of time. Using compressed gas the user can inject volumes from femtolitres to microlitres whilst simultaneously holding the cell. A popular choice, the PLI-100 is also standard instrument at the prestigious Cold Spring Harbor Laboratory workshops. Alternatively, we offer the PLI-90 Pico-Injector which is useful for applications that do not require a vacuum (commonly used for filling pipettes barrels or holding cells).

Temperature Controlled Incubators & Chambers

Digitimer supply a range of temperature controlled chambers, including the Medical Systems PDMI-2 Open Perfusion Micro-incubator pictured opposite. Other Medical Systems incubators include the PSMI, Patch Slice Micro-incubator which was specifically designed for patch-clamp recording from brain slices and the CSMI, Chamber-slide Micro-incubator. The temperature of all Medical Systems micro-incubators is regulated by the TC202A Bipolar temperature controller which permits both heating and cooling. We also offer a number of chambers manufactured by Scientific Systems Design, which are heated by their own dedicated temperature controller. Scientific Systems Design produce brain slice chambers for use with upright microscopes, as well as a range of microscope stage and tissue chambers.



The PDMI-2 and TC202A provide a temperature controlled environment for 35mm dishes



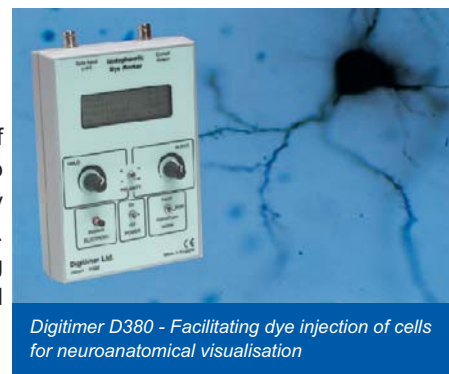
NeuroPhore System - Modular iontophoretic and pneumatic drug application

Pneumatic or Iontophoretic Multibarrel Drug Application

The NeuroPhore BH-2 is a modular system for application of drugs and other dissolved agents onto biological preparations. Each BH-2 system must comprise the BH-2 Mainframe, Power Supply and Balance Module and ANY FIVE IP-2 Iontophoresis Modules, PPM-2 Pneumatic Pump Modules or DP-1 Dummy Modules. The modular design allows further ejection channels to be added (up to a maximum of five). It accommodates 7 barrel pipettes (five drug, one recording and one balance). Digitally controlled eject and pause timing provide several operating modes. Out of compliance, unbalance warnings and impedance checking. Analogue inputs and outputs for external control and monitoring.

Digitimer D380 - Low Cost Iontophoretic Dye Marking

The D380 Iontophoretic Marker provides a compact and easy to use solution for dye labelling of cells or injection of pharmacological agents. Electrophysiologists often use a patch clamp amplifier to provide current to carry out such tasks, however, if these techniques are not already being used in the laboratory, alternative iontophoretic devices are often prohibitively expensive. The D380 provides a cost effective answer, delivering currents of up to $\pm 12\text{nA}$, with a holding current of up to $\pm 6\text{nA}$. A deblock button provides a means of removing blockages from the end of electrodes and an LCD display allows continuous monitoring of several parameters.



Digitimer D380 - Facilitating dye injection of cells for neuroanatomical visualisation



The DG2A is an easy to use trigger source suitable for use with our stimulators

Digitimer DG2A - A Simple, Battery Powered Trigger Source

The DG2A Trigger Generator is a compact, free-standing, battery powered device which can be used to generate trigger pulses necessary for repetitive stimulation. Also featuring DELAY controls, it can be used for determining nerve or axonal Effective Refractory Period (ERP) through the production of a delayed second pulse. Various modes allow output pulses to be produced singularly, continuously or in a burst, with the burst/train duration and pulse frequency determined by the front panel controls. In each of the modes (except FREE-RUN), outputs can be initiated either by the front panel push button, a TTL compatible trigger/gating pulse or a suitable foot switch. The unit is especially suitable for use with our range of isolated stimulators.

If enclosed, please use our Faxback Form. Alternatively, visit our website or contact us directly for further product & pricing information

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