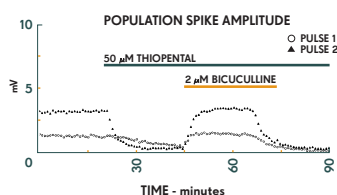


"I am writing to tell you how pleased I am with the ValveBank8 Perfusion System. It's great that I can load the reservoirs, press go, and start recording. I can read papers rather than fussing with solutions and switching valves every 10-15 minutes. Since solutions are switched at exactly the same time from one experiment to the next, I have been able to automate my data analysis protocols as well."

Brain Slice Field Recording



Unattended solution delivery using a ValveBank8 AutoPrime Perfusion System

**Dr. M. Bruce MacIver,
M.Sc., Ph.D.**

Department of Anesthesia
Stanford University
Medical Center

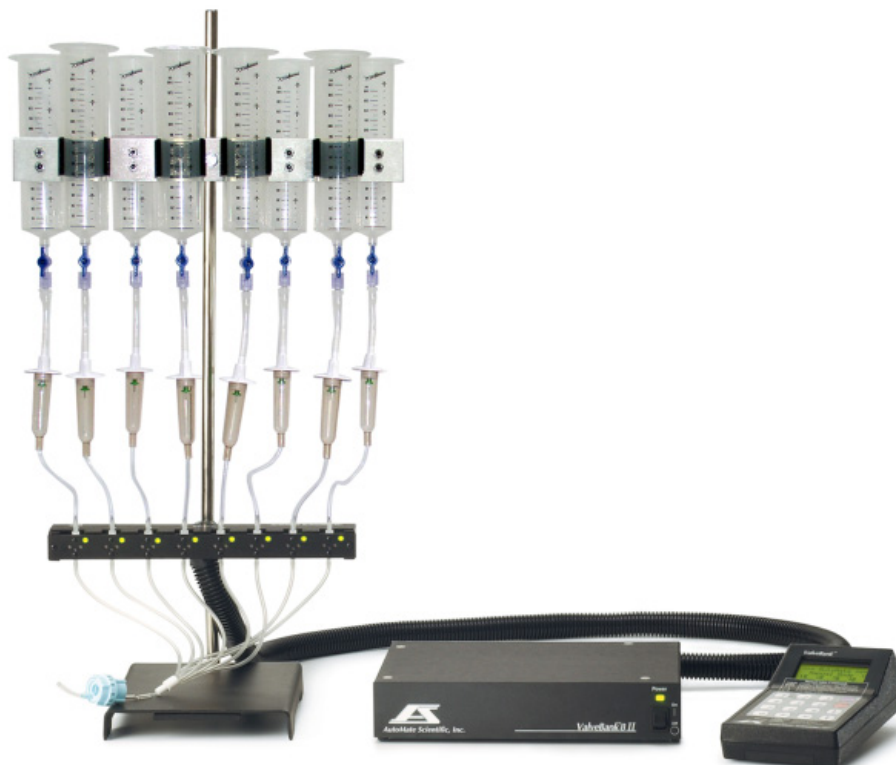
Ordering Information:

Design your own custom perfusion system at:

www.autom8.com/build_system.html

AutoMate Scientific®
READY FOR RESEARCH™

Increase reproducibility with fewer hours in lab.



AutoMate Perfusion Systems

- Unattended solution switching**
 Avoid vibrations from switching valves by hand. The ValveBank® or ValveLink® controller handles all solution delivery so that you can watch results – not switch stopcocks. Many special features are included for easy perfusion control. Low noise circuitry.
- Increased reproducibility**
 Valve switching is accurate to 0.01 seconds with programs up to 99 hours long under microprocessor control. Consistent liquid delivery means better data.
- Pinch & Teflon™ Valves**
 Choose between speed, cost, and ease of cleaning. Several options for fittings and reservoirs.
- Manual and external valve control**
 Flexible design. Easy cleaning and calibration. Slave mode valve operation controlled by your computer, pClamp, Pulse, Acquire, LabView, AxoGraph, etc.

Pinch Valves

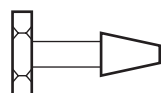


Teflon™ Valves



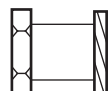
Teflon™ Valve Fitting Choices:

Hose Barb



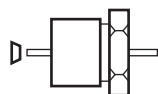
- Standard
- Available for 1/8" and 1/16" i.d. soft tubing

Lure-Lock



- For direct attachment of syringes
- Eliminates extra tubing between reservoirs and valves
- Includes 2-way stopcocks and 35ml syringes

Nut & Ferrule



- HPLC-like, screw-in fittings for rigid, small-diameter (1/16" o.d.) tubing

Valve Choices:

- **Pinch**
1/32" i.d. silicon tube passes through, and is pinched closed by the valve. No liquid comes into contact with the valve. Easiest valves to clean and switch tubing. Open and close in approx. 30-50 ms.
- **Teflon™**
Excellent chemical and corrosion resistance. Non-stick surface resists particle and chemical deposits. Faster opening and closing – in approx. 10 ms.

Perfusion Systems Include:

Controller, valves, 140 ml syringe reservoirs and drippers (or 35 ml syringes in Luer-lock systems), 2-way stopcocks, reservoir bracket, ringstand, 1/16" i.d. tubing and four-, eight- or sixteen-into-one micro-manifold with built-in flow control.

The Economy Pinch Valve System includes ValveLink8 controller, four pinch valves, 35 ml syringes, 2-way stopcocks, reservoir bracket, ringstand, 1/16" i.d. tubing and four-into-one micro-manifold with built-in flow control.

Computer Interfacing:

Perfusion systems can be controlled by a computer using data acquisition hardware (i.e., DigiData, ITC-16, or National Instruments board) and software (i.e., pCLAMP, Pulse, or LabView). Both ValveBanks and ValveLinks accept real-time TTL inputs to control valves. Most acquisition software already being used in your experiments can talk to our controllers. AutoMate offers an optional program called EasyCode® for the Macintosh and PC/Windows to program ValveBanks (not ValveLinks). This software is used before an experiment – valve sequences are downloaded into the memory of the ValveBank where they are run. An article by AutoMate Scientific can be found in Axon Instrument's AxoBits 17 newsletter outlining these strategies – accessible on our web site.

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"Our lab has been using ValveLink controllers for years with good, reliable results. The new ValveLink8.2 is even smaller and faster than its predecessor. It also looks cool and the buttons feel nicer than the previous version. I use it manually or programmed by outputs from my stimulator. I haven't observed any noise from the valve system on my electrophysiology rig."

Hillel Adesnik, Ph.D.

Department of Cellular and
Molecular Pharmacology
University of California,
San Francisco

Ten times faster,
new protection, inputs,
and event marker
in a smaller box.



ValveLink8.2 Controllers

- **ValveGuard™ technology detects bad valves**
Prevent damage to your ValveLink8.2® and easily observe problem valves.
- **Run experiments automatically – even unattended**
By running experiments automatically, AutoMate Scientific systems will leave you free to accomplish other tasks – saving you both time and money.
- **Microprocessor-based for accuracy and flexibility**
Our low-cost ValveLink8.2 controller has powerful perfusion commands and capabilities not offered by competing valve drivers: open single or multiple valves, master channel for control/buffer solution, computer control.
- **Low noise & low voltage valve control**
Designed for electrophysiology. CE marked for Europe.
- **Manual, TTL (digital), analog, and USB inputs**
Control valves manually (by pushbutton) or by computer – simultaneously thanks to the microprocessor design. Spill sensor protects your equipment when a leak is detected.

Ordering Information:

01-18	ValveLink8.2 Controller
01-09	ValveLink 4-BNC cable

ValveLink8.2 Controller

- Manual pushbuttons
- Red/green LED indicators
- 1.5 amp, 12V AC supply included
- Dimensions: 9.28" x 1.6" x 5.13"
- Weight: 3 lbs. (1.4 kg.)



- Eight TTL inputs directly activate 8 valves
- Or control 16 valves with only four digital outputs

ValveLink PC Software

- Control valves directly from your PC screen by USB
- Network multiple ValveLinks into a single, virtual instrument

ValveLink8.2s can switch 12V DC solenoid valves open and closed in one millisecond using full power, then hold-in at 1/2 power to prevent thermal transfer to your solutions. Low noise circuitry minimizes recording artifacts in electrophysiology. Both ValveLink8.2s and ValveBanks are designed for use with pClamp, Pulse, AxoGraph, et al. All AutoMate Scientific products include a one-year limited warranty covering both parts and labor (see manual for more details).

ValveGuard™ technology detects bad valves to prevent damage to your ValveLink8.2 and easily observe problem valves. Front-panel LEDs are dark for broken or disconnected valves, or blink for short-circuited valves. Automatic networking lets you connect up to eight ValveLink8.2s to a USB hub and PC to create a single 64-channel controller. One analog input can control eight valves: zero volts closes all valves, and each half-volt increment opens the next valve (i.e. 3 volts opens valve six). Analog event marker allows you to record all valve activity.

ValveLink8.2s are less expensive than AutoMate Scientific's ValveBank controllers and include manual pushbuttons, digital/TTL, analog and USB inputs to control valves. They are designed for easy control by your data acquisition software. The ValveLink8.2 is the controller of choice for dose response work at pharmaceutical companies and the NIH. Its sophisticated design allows control of sixteen valves with only four digital outputs from pCLAMP. A spill sensor stops all valves when a leak is detected to protect your microscope and table. All LEDs blink until you press a button to continue. ValveLink8.2s can now power individual valves up to 1 amp (12 watts), and a total of 2 amps for all valves open simultaneously.

Features	ValveBank	ValveLink8.2
CHANNELS	4 or 8 channels available	8 channels each, USB network to 64 channels
COMPUTER I/O	8 digital in, 8 digital out, serial (RS-232)	8 digital in, USB, analog input, event marker out
DIGITAL INPUTS	One pulse can start a ValveBank program, or TTL inputs each control 1 valve	One TTL input per valve, or demultiplex and control up to 16 valves with 4 inputs
PROGRAMMABLE	Yes- ValveBank keypad, EasyCode software or digital outputs from your data acquisition software	Only using real-time analog or digital outputs from your computer / data acquisition software.
SOFTWARE	Mac and PC "EasyCode" software to pre-program ValveBanks (up to 16 ch.)	Free Windows XP real-time USB control and networking software for up to 64 valves at once
MANUAL CONTROL	External keypad	Front panel buttons
MANUAL FEATURES	1-on, master channel, timed open, TTL outputs	1-on, master channel
SPEED	10 milliseconds	1 millisecond
VALVE POWER	4 watts per channel or 8 watts total	Up to 12 watts (1 amp) per channel, 24 watts (2 amps) total
PRICE	Higher	Lower

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"We use the ValveBank in electrophysiology on a Xenopus oocyte recording rig. We have run a twelve-channel manual perfusion delivery system for several years with timed solenoid valves. The ValveBank and accompanying EasyCode Macintosh software allow us to program full wash and delivery sequences in advance with significantly more accurate switching. The new manual perfusion timing option allowed the ValveBank to perform exactly like the controller we had built before. Basically, the ValveBank saves us the worries of monitoring reagent-delivery, and it works."

Dr. David Julius

Department of Cellular and
Molecular Pharmacology
University of California,
San Francisco

Behind every great perfusion system is a reliable valve controller.



ValveBank Controllers

- Run experiments automatically – even unattended**
 By running experiments automatically, AutoMate Scientific systems will leave you free to accomplish other tasks – saving you both time and money.
- Microprocessor-based for accuracy and flexibility**
 The ValveBank® can store sixteen user programs with 10 millisecond switching accuracy. It includes powerful perfusion commands and capabilities not offered by competing valve drivers: open single or multiple valves, master channel for control/buffer solution, computer control.
- Low noise & low voltage valve control**
 Designed for electrophysiology. CE marked for Europe.
- Manual, TTL (digital), and serial (RS-232) inputs**
 Control valves manually (by keypad) or by computer – simultaneously thanks to the microprocessor design.
- Low cost & low profile, simple design**
 Optional BNC cables and 19" rack-mounting brackets.

Ordering Information:

01-01	ValveBank4 Controller
01-08	ValveBank8
01-09	ValveBank BNC cable

ValveBank4 & 8



- Dimensions: 10" x 7.5" x 2"
Weight: 5 lbs. (2.27kg.)



- User-selectable for normally open or closed valves
- 1.5 amp, 12V AC power supply included



- Back-lit LCD display
- Detached 16-key membrane keypad
- Easy menu-driven interface
- 16 or 32 user programs of 256 commands up to 99 hours long

All AutoMate Scientific valve controllers switch 12V DC solenoid valves open and closed rapidly using full power, then hold-in at 1/2 power to prevent thermal transfer to your solutions. Low noise circuitry minimizes recording artifacts in electrophysiology. Both ValveBanks and AutoMate Scientific's ValveLink8.2 controllers are designed for use with pClamp, Pulse, AxoGraph, et al. All AutoMate Scientific products include a one-year limited warranty covering both parts and labor (see manual for more details).

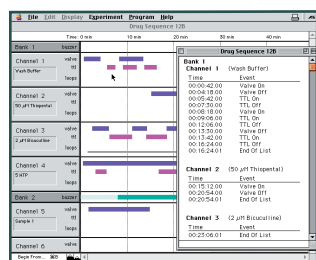
The ValveBank® remains the only programmable valve controller for physiology that does not require a computer. ValveBanks include digital and manual control, plus they can be programmed through their keypad and LCD screen or EasyCode® software from a Macintosh or PC. ValveBanks run user valve sequences without a computer and include eight programmable digital outputs for control of external devices such as stimulators, pumps and recording devices. Entire ValveBank programs can even be triggered by a single TTL pulse. Digital inputs activate valves by computer or external devices including level sensors, flow meters, and UV/VIS detectors.

EasyCode® - Expand the computing power of your ValveBank

Optional EasyCode software helps you program your ValveBank with a Macintosh or PC-Windows using easy "click-and-drag" time bars. Save and load unlimited programs to disk, print out program listings, then download your sequences into the ValveBank's memory with the included serial cable in one simple step. Transfer and run programs on the ValveBank, which can be disconnected from the computer.

ValveBank or ValveLink8.2: Which controller is right for you?

EasyCode Software

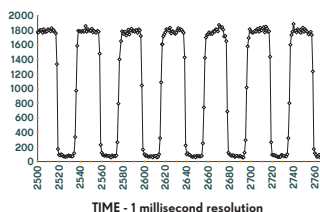


- Program up to sixteen channels of valves and digital outputs.
- Open multiple experiment windows. List sequences to screen or printer. Copy and paste. Zoom in and out of your experiment.

Features	ValveBank	ValveLink8.2
CHANNELS	4 or 8 channels available	8 channels each, USB network to 64 channels
COMPUTER I/O	8 digital in, 8 digital out, serial (RS-232)	8 digital in, USB, analog input, event marker out
DIGITAL INPUTS	One pulse can start a ValveBank program, or TTL inputs each control 1 valve	One TTL input per valve, or demultiplex and control up to 16 valves with 4 inputs
PROGRAMMABLE	Yes- ValveBank keypad, EasyCode software or digital outputs from your data acquisition software	Only using real-time analog or digital outputs from your computer / data acquisition software.
SOFTWARE	Mac and PC "EasyCode" software to pre-program ValveBanks (up to 16 ch.)	Free Windows XP real-time USB control and networking software for up to 64 valves at once
MANUAL CONTROL	External keypad	Front panel buttons
MANUAL FEATURES	1-on, master channel, timed open, TTL outputs	1-on, master channel
SPEED	10 milliseconds	1 millisecond
VALVE POWER	4 watts per channel or 8 watts total	Up to 12 watts (1 amp) per channel, 24 watts (2 amps) total
PRICE	Higher	Lower

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Liquid Switching in 3-4 msec.



Fast Flow Rhodamine B Fluorescence
Switching - 40ms period using the
AutoMate Scientific Pressurized
Perfusion System at 2 psi

Thilo Lacoste

Materials Science Division
Lawrence Berkeley
National Laboratory

Precision Components



- Stainless steel construction
- 5 micron filter and gauge
- Precision regulator delivers
0-10 psi (69 kPa)

Ordering Information:

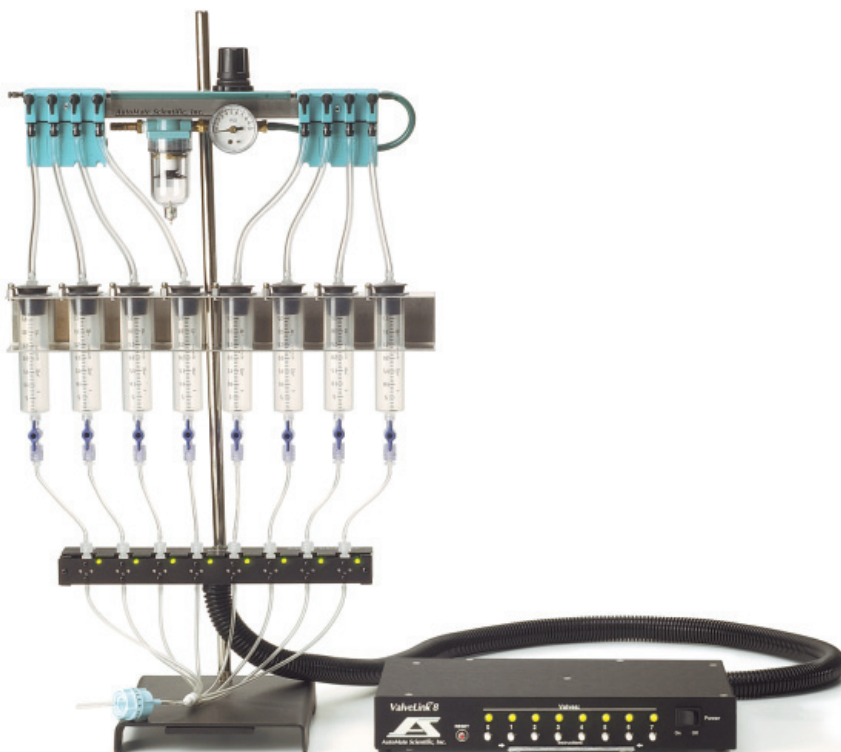
Perfusion Pressure Upgrade

09-04 4-channel
09-08 8-channel
09-16 16-channel

Volatiles Pressure Upgrade

09-04V 4-channel
09-08V 8-channel
09-16V 16-channel

Precise control for whole-cell or single-cell superfusion.



Perfusion Pressure Upgrade

For anyone who needs:

- **Faster switching and steady flow**
- **Fine microliter perfusion and microinjecting**

Easy to add to any new or existing gravity perfusion system from AutoMate Scientific, any third-party manufacturer, or even homemade rigs. Connect to house air or compressor (30 to 100 psi). Does not introduce bubbles into solution; helps overcome flow problems due to bubbles. Available in four-, eight- or sixteen-channel configurations. Syringe reservoirs may be placed in a water bath for temperature control. Elegant design allows individual control of each air line.

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Pencil Tip Cross Section



4 to 16 micro-bore tubes into
1 outflow

Liquid switching times in milliseconds without moving sewer pipes.

250 Micron Removable Tip



Flow rates (+/- 0.05):

Gravity	.35 ml/min
2 psi	1.66 ml/min
8 psi	5.16 ml/min

100 Micron Removable Tip



Flow rates:

Gravity	zero flow
2 psi	0.07 ml/min
8 psi	0.25 ml/min

100, 250 and 360 micron removable
delivery tips available



Perfusion Pencil® Multi-Barrel Manifold Tip

- **Rapid solution change with micro-liter dead volume**
No piezo or stepper motor translation. No clumsy rotating valves.
- **Single-cell and patch delivery**
For mounting on any micromanipulator.
- **Vacuum cross-contamination prevention**
Use one tube to vacuum the tip volume clear between solution changes.
- **Solid construction**
Easy to connect and clean.

Ordering Information:

04-04-xxx	4-channel Perfusion Pencil with tip
04-08-xxx	8-channel Perfusion Pencil with tip
04-16-xxx	16-channel Perfusion Pencil with tip
04-xxx	Removable tips (-xxx = specify 100, 250, or 360 µm)

Heated Perfusion Pencil with Neoprene Sleeve Removed



Easy luer-lock connections and manipulator mounting. Thermodynamic design maintains temperature with 5ml/minute flow from both tips without any metal tubing.

Temperature Sensors Included



Separate chamber bath and Perfusion Pencil thermocouples included.

Ordering Information:

ThermoClamp-1 Temperature Control System - with controller, bath sensor, heated Perfusion Pencil and tip

03-14-xxx 4 channels plus bath line
03-18-xxx 8 channels plus bath line
(xxx = specify 100, 250, or 360µm tip)

AutoMate Scientific®
READY FOR RESEARCH.™

Accurate temperature control, rapid solution switching and fast wash-out.



ThermoClamp™-1 Temperature Control System

- Combination inline heater plus multi-channel focal drug delivery**
 Maintain bath temperature and rapid drug wash-out with a high-flow bath line while quickly switching 4-8 preheated solutions through the Perfusion Pencil.® Steady 37°C at 5 ml/minute flow rates through both the bath line and tip.
- Advanced auto-tuning temperature lock**
 Fuzzy logic PID software maintains chamber or reagent temperature to within 1°C of setpoint or better. The ThermoClamp calibrates its own tuning for ideal temperature control - no need to guess "loop speed" settings.
- Designed for physiology research**
 No metal anywhere in the flow path - unlike some competitors. Low noise for electrophysiology with internal and external grounding plus electrical isolation between liquids and heating elements.
- Ready to use**
 Includes everything you need for heated perfusion: power supply, temperature sensors, and inline heater with easy luer lock tube connections.

Easy to Read or Record



- Large LCD 0.1°C temperature display
- Analog temperature output

ThermoClamp-1



- Dimensions: 11.5" x 2" x 7"
- Weight: 4 lbs. (1.8 kg.)



Low noise - designed for electrophysiology.

You can have rapid switching, fast wash-out, and accurate temperature control at the same time. Set the ThermoClamp temperature from ambient to 50°C. A front-panel BNC provides an analog output of current temperature for recording. Different sizes of replaceable tips are interchangeable with our standard Perfusion Pencil. The tips have microliter dead volume for rapid switching. No messy water jacket is required, but the separate high-flow line is capable of heating a perfusion chamber with water jacket if desired.

Do you need to change your prep's temperature over the course of an experiment? A programmable "ramp and hold" feature can automatically vary the setpoint over time. The ThermoClamp system includes bath and Perfusion Pencil thermocouple sensors. Automatic overtemp and thermocouple failure protection alerts you to any problems. Incorporate temperature control into your perfusion rig with simple micromanipulator mounting.

Operation

Connect multiple reagent tubes from any perfusion system to the heated Perfusion Pencil on a manipulator directed into your chamber. If desired, connect a separate buffer line to the "high-flow" bath luer connection on the Pencil, and the outflow to your chamber. If your chamber includes a water jacket, you can use the high-flow line with a constant flow of water to heat the chamber. Place the bath thermocouple sensor in the chamber. Set your desired temperature on the controller and begin liquid flow. The ThermoClamp will monitor bath temperature and heat the liquids flowing through the Perfusion Pencil to keep the chamber at exactly the desired temperature. Your perfusion system can quickly change solutions through the Perfusion Pencil tip and also deliver buffer for fast wash-out. Sophisticated circuitry will "auto tune" the ThermoClamp heating parameters based on your flow rates, chamber, and tubing to clamp the temperature and minimize over/undershoot.

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"The EasyCode software you provided is simple to use. We use a large screen Macintosh for creating and storing protocols. We especially like the ability to create new protocols and download them directly to the ValveBank, it really couldn't be easier."

Dr. Susan Abrahamson
University of California,
Berkeley

EasyCode Dialog Box

Start Time: 00:00:08.40
End Time: 00:01:54.00
Iterations: 2

Loop Options

☐ Multi-Channel

☐ Channel 1
☐ Channel 2
☐ Channel 3
☐ Channel 4

OK Cancel

- Enter start and stop times accurate to 0.01 sec.
- Use all ValveBank commands including multi-channel looping and interface triggering

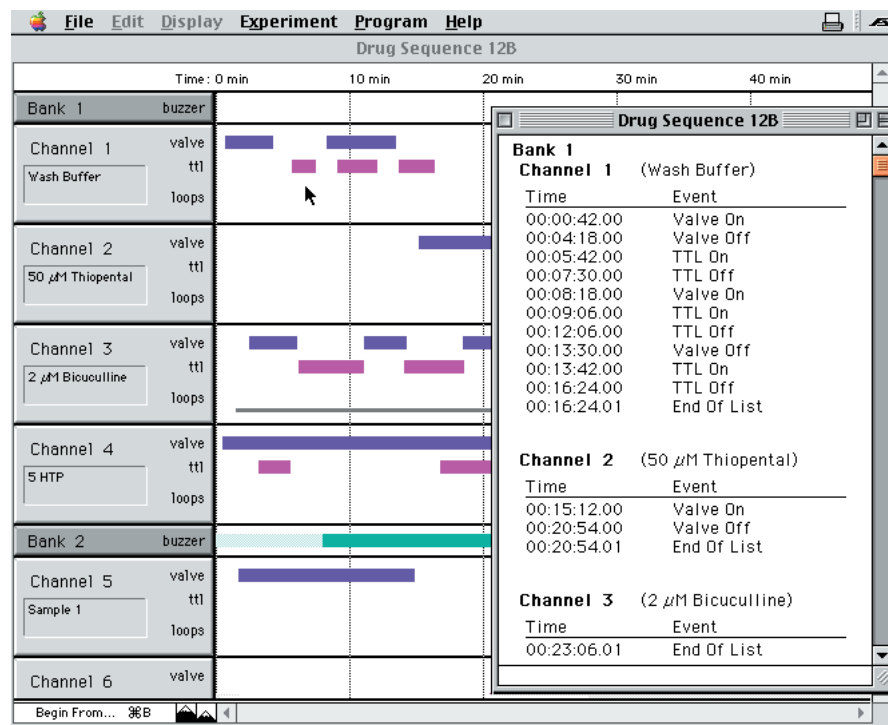
Ordering Information:

01-02 EasyCode Mac serial
01-02-USB EasyCode Mac USB
01-03 EasyCode Windows 3.1-95
01-03-2000 EasyCode Windows 98-XP

(All include cable and manual)

AutoMate Scientific®
READY FOR RESEARCH™

Expand the computing power of your ValveBank system.



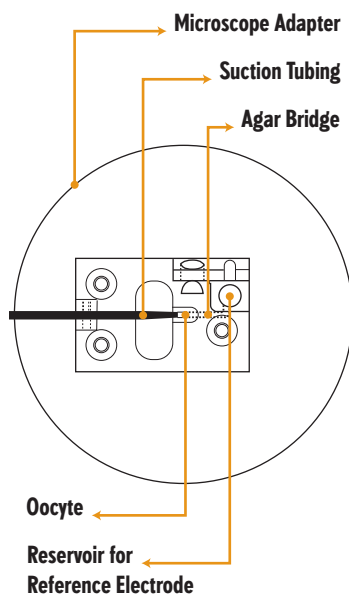
EasyCode® Software

Program your ValveBank® with a Macintosh or PC using easy "click-and-drag" time bars. Save and load unlimited programs to disk, print out program listings, then download your sequences into the ValveBank's memory with the included serial cable in one simple step.

- **Program up to sixteen channels of valves and digital outputs**
Open multiple experiment windows. List sequences to screen or printer. Copy and paste. Zoom in and out of your experiment.
- **Free your computer during experiments**
Transfer and run programs stored in the ValveBank, which can be disconnected from the computer – leaving it available for data acquisition.

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tel 415.239.6080 | fax 415.239.6801 | e-mail info@autom8.com

Oocyte Chamber Diagram

- Integrated outflow tube and agar bridge
- Chamber dimensions:
45 x 30 x 10 mm.

Oocyte Chamber Side View

Insert micro-manifold for very low dead space

Ordering Information:

OPC-1	Oocyte Perfusion Chamber
05-04	4-into-1 Manifold
05-08	8-into-1 Manifold
05-16	16-into-1 Manifold

Available with a choice of four different stage adapters for stereo microscopes from Nikon, Olympus, and Leica (80, 90, 100, or 120 mm diameter).



AutoMate Scientific®
READY FOR RESEARCH.™

Low working volume means fast exchange times.

**Oocyte Perfusion Chamber**

- **Small working volume (< 20 µl)**
- **Fast solution exchange**

Expression of recombinant receptors in oocytes has been a favorite choice for researchers to assess the pharmacology of signal transduction pathways. Since the oocytes are 1 - 1.5 mm in diameter, however, fast solution exchange around the oocyte was difficult. After several years of electrophysiological research, we have designed a *Xenopus* oocyte perfusion chamber for use in automated and unattended experiments. Combined with an automated perfusion system, this chamber allows researchers to obtain dose-response data quickly and easily.

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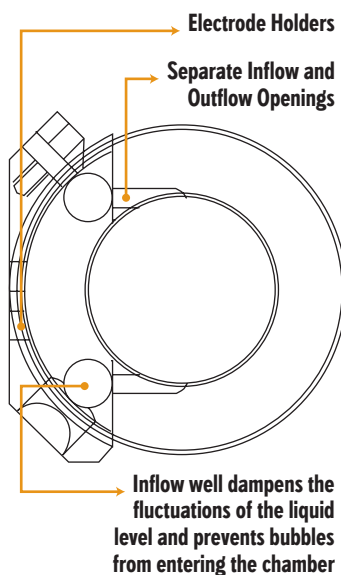
800.998.MATE | www.autom8.com | 336 Baden Street, San Francisco, CA 94131 USA
tel 415.239.6080 | fax 415.239.6801 | e-mail info@autom8.com

"We do, indeed, get a rapid change of solution (depending, of course, on the adjusted fluid level), with mechanical stability otherwise very good, and no problems with noise, and the system is otherwise rather easy to set up. I could confidently recommend it to any investigator who works with cells that adhere strongly to the substrate."

Dr. Jonathan E. Freedman, Ph.D.

Department of
Pharmaceutical Sciences
Northeastern University

Petri Chamber Diagram



Ordering Information:

PCP-1	Petri Dish Perfusion Insert
05-04	4-into-1 Manifold
05-08	8-into-1 Manifold
05-16	16-into-1 Manifold

Available for Corning, Falcon, Nunc #153066 and #171099 Petri dishes.

Why transfer to coverslips?



Petri Dish Perfusion Chamber Insert

- **Perfuse cells right in your Petri dish**

Cells cultured in Petri dishes are a popular research tool used in numerous applications, including patch clamping and intracellular ion probe imaging. True perfusion (continuous inflow and outflow) of solutions in the dish can be difficult to configure. This forces scientists to plate cells on cover slips for placement into specially designed perfusion chambers. However, such transfer is a time consuming process which introduces the potential for contamination plus additional expense. The PCP-1 chamber was designed by scientists after years of patch clamp research to overcome this problem. Perfuse cells right in your Petri dish with any perfusion system and an optional Teflon manifold (sold separately). Ideal for inverted microscopy using optically clear Petri dishes. Adjustable metal suction tube included. Dimensions: 35 mm outside diameter x 20 mm tall.

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mobile: (+39) 339 5330322

info@kftechnology.it - www.kftechnology.it