Product Information

July 2010

Pico

USB-powered Miniature Patch Clamp Amplifier

- World's Smallest Full-featured Patch Clamp Amplifier
- Vclamp, Iclamp, Digitizer, Headstage All-in-One
- Continuous Clamping, 40kHz sampling
- USB-powered, Palm size, Only 0.8 watt power consumption

# of Channels	1
Integrated Digitizer	40kHz sampling rate per channel 16-bit A/D (18-bit internal resolution) Stimulus voltage range of ±250mV in Normal mode, ±2V for Electrochemistry Digital In x 1, Digital Out x 8 General Purpose DAC x 4
Integrated Headstages	5 feedback gain resistors per channel: 10M, 100M, 1G, 3.3G, 10G (Can be customized upon request.)
Low RMS Noise	20kHz Sampling: 0.25pA @ 5G, 1pA @ 1G, 7pA @ 100M 5kHz Sampling: 0.15pA @ 5G, 0.6pA @ 1G, 5pA @ 100M
Filters	Programmable 2-pole Low-Pass Filter (analog hardware circuit) Digital Filter available in TecellaLab software
Compensations	4 x Capacitance Compensations per channel Series Resistance Compensation per channel Offset Compensation (±250mV) per channel Optional Active Leak Compensation per channel
Current Clamp	+/-2nA, +/-20nA, +/-200nA ranges. True voltage follower.
Computer Interface	USB 2.0
Software	TecellaLab software, with Data Export to ATF, Tab-Delimited formats WinWCP from the University of Strathclyde LabView VI support SDK/API available for custom development
Mechanical & Power (W x D x H)	USB-powered. No external power supply necessary. Low Power Consumption of 0.8W. 5.6" x 2.5" x 0.7" (14..2cm x 6.3cm x 1.8cm) UL, CE certified

Apollo

384-channel Patch Clamp Amplifier

- World's First 384-channel Patch Clamp Amplifier
- Continuous clamping of all channels
- 20kHz sampling of full 384 channels
- Full-featured Patch Clamp Amplifier behind every channel
- Available in Patch Clamp, Electrochemistry, Bilayer configurations
- Any feature can be customized upon request

# of Channels	Up to 384 channels, in 48-channel increments.
Integrated Digitizer	20kHz sampling rate per channel 16-bit A/D (18-bit internal resolution) Stimulus voltage range of ±250mV (±2V for Electrochemistry) Zap voltage range of ±1V Sync Out, Digital I/O x 8 General Purpose DAC x 8
Integrated Headstages (Per Channel)	2 feedback gain resistors per channel: 10M, 500M – Typical Patch Clamp application 10M, 1G – Typical Electrochemistry application 1G, 5G – Typical Bilayer application
Low RMS Noise	20kHz Sampling: 0.2pA @ 5G, 0.8pA @ 1G, 7pA @ 100M 5kHz Sampling: 0.12pA @ 5G, 0.5pA @ 1G, 4pA @ 100M
Filters	3kHz Low-Pass Filter per channel (analog hardware circuit) Digital Filter available in TecellaLab software
Compensations	3 x Capacitance Compensations per channel * Series Resistance Compensation per channel Offset Compensation (±250mV) per channel Optional Analog Leak Compensation per channel (*Lose One Capacitance Compensation)
Computer Interface	USB 2.0
Software	TecellaLab software, with Data Export to ATF, Tab-Delimited formats
Cables	BNC, SMA, SMB, Samtec ERF8/ERDP, Samtec QTH/QSH, others
Mechanical & Power (W x D x H)	External Power Supply Low Power Consumption (10W @ 48ch, 28W @ 384ch) 8.2" x 7.5" x 14" (21cm x 19cm x 36cm) UL, CE certified

Jet

128-channel Patch Clamp Amplifier

- Continuous clamping of all channels
- 20kHz sampling of full 128 channels

  (Faster sampling rates available upon request)
- Full-featured Patch Clamp Amplifier behind every channel
- Available in Patch Clamp, Electrochemistry, Bilayer configurations
- Any feature can be customized upon request

# of Channels	Up to 128 channels, in 16-channel increments.
Integrated Digitizer	20kHz sampling rate per channel (Faster sampling rate available upon request) 16-bit A/D (18-bit internal resolution) Stimulus voltage range of ±250mV (±2V for Electrochemistry) Zap voltage range of ±1V Sync Out, Digital I/O x 8 General Purpose DAC x 8
Integrated Headstages (Per Channel)	3 feedback gain resistors per channel: 10M, 100M, 1G – Typical Patch Clamp application 10M, 100M, 1G – Typical Electrochemistry application 100M, 1G, 5G – Typical Bilayer application
Low RMS Noise	20kHz Sampling: 0.2pA @ 5G, 0.8pA @ 1G, 7pA @ 100M 5kHz Sampling: 0.12pA @ 5G, 0.5pA @ 1G, 4pA @ 100M
Filters	3kHz Low-Pass Filter per channel (analog hardware circuit) Digital Filter available in TecellaLab software
Compensations	4 x Capacitance Compensations per channel * Series Resistance Compensation per channel Offset Compensation (±250mV) per channel Optional Analog Leak Compensation per channel (*Lose One Capacitance Compensation)
Computer Interface	USB 2.0
Software	TecellaLab software, with Data Export to ATF, Tab-Delimited formats
Cables	BNC, SMA, SMB, Samtec ERF8/ERDP, Samtec QTH/QSH, others
Mechanical & Power (W x D x H)	External Power Supply Low Power Consumption (8W @ 16ch, 17W @ 128ch) 8.2” x 7.5” x 14” (21cm x 19cm x 36cm) UL, CE certified

Jet-Bilayer

128-channel Bilayer Amplifier

- Specially customized to meet needs of Bilayer applications
- 10 feedback gain settings per channel
- Programmable 6-pole analog low-pass filter per channel
- 20kHz sampling of full 128 channels

  (Faster sampling rates available upon request)
- Any feature can be customized upon request

# of Channels	Up to 128 channels, in 16-channel increments.
Integrated Digitizer	20kHz sampling rate per channel (Faster sampling rate available upon request) 16-bit A/D (18-bit internal resolution) Stimulus voltage range of ±250mV Zap voltage range of ±1V Sync Out, Digital I/O x 8 General Purpose DAC x 8
Per Channel Integrated Headstages, Noise, Range	10 feedback gain resistors per channel. Listed with RMS noise and current range. 15M RMS: 40pA @ 20kHz, 24pA @ 5kHz ±300nA range 20M RMS: 28pA @ 20kHz, 17pA @ 5kHz ±225nA range 75M RMS: 9pA @ 20kHz, 6pA @ 5kHz ±60nA range 100M RMS: 6pA @ 20kHz, 4pA @ 5kHz ±45nA range 300M RMS: 2.3pA @ 20kHz, 1.4pA @ 5kHz ±15nA range 500M RMS: 1.4pA @ 20kHz, 0.8pA @ 5kHz ±9nA range 700M RMS: 1.0pA @ 20kHz, 0.6pA @ 5kHz ±6.5nA range 1G RMS: 0.8pA @ 20kHz, 0.5pA @ 5kHz ±4.5nA range 2.5G RMS: 0.4pA @ 20kHz, 0.23pA @ 5kHz ±1.8nA range 5G RMS: 0.2pA @ 20kHz, 0.12pA @ 5kHz ±900pA range
Filters	Programmable 6-pole Low-Pass Filter per channel (analog hardware circuit) Digital Filter available in TecellaLab software
Compensations	Offset Compensation (±250mV) per channel
Computer Interface	USB 2.0
Software	TecellaLab software, with Data Export to ATF, Tab-Delimited formats
Cables	BNC, SMA, SMB, Samtec ERF8/ERDP, Samtec QTH/QSH, others
Mechanical & Power (W x D x H)	External Power Supply Low Power Consumption (8W @ 16ch, 17W @ 128ch) 8.2” x 7.5” x 14” (21cm x 19cm x 36cm) UL, CE certified

Triton+

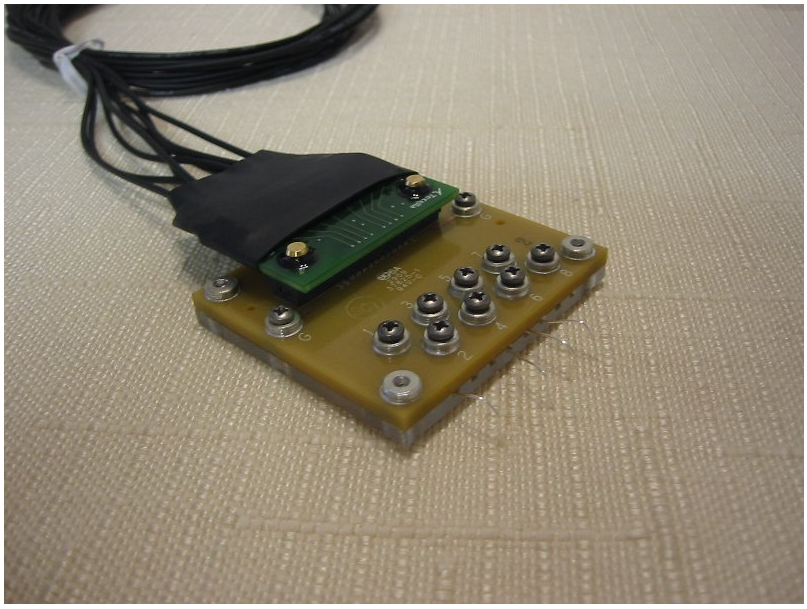
16-channel Patch Clamp Amplifier

- World's Smallest 16-channel Patch Clamp Amplifier
- Continuous clamping of all channels
- 20kHz sampling of 16 channels (Faster sampling available)
- Full-featured Patch Clamp Amplifier behind every channel
- Available in Patch Clamp, Electrochemistry, Bilayer configurations
- Any feature can be customized upon request

# of Channels	Available as 1, 2, 4, 8, or 16-channel configuration.
Integrated Digitizer	20kHz sampling rate per channel (Faster sampling rate available upon request) 16-bit A/D (18-bit internal resolution) Stimulus voltage range of ±250mV (±2V for Electrochemistry) Sync Out Digital I/O x 8 General Purpose DAC x 8
Integrated Headstages	4 feedback gain resistors per channel: 10M, 100M, 1G, 5G – Typical for all applications Can be customized upon request.
Low RMS Noise	20kHz Sampling: 0.2pA @ 5G, 0.8pA @ 1G, 7pA @ 100M 5kHz Sampling: 0.12pA @ 5G, 0.5pA @ 1G, 4pA @ 100M
Filters	Programmable 6-pole Low-Pass Filter per channel (analog hardware circuit) Digital Filter available in TecellaLab software
Compensations	4 x Capacitance Compensations per channel Series Resistance Compensation per channel Offset Compensation (±250mV) per channel Optional Analog Leak Compensation per channel
Computer Interface	USB 2.0
Software	TecellaLab software, with Data Export to ATF, Tab-Delimited formats
Cables	BNC, SMA, SMB, Samtec ERF8/ERDP, Samtec QTH/QSH, others
Mechanical & Power (W x D x H)	External Power Supply Low Power Consumption (4W @ 1ch, 6W @ 16ch) 10" x 7" x 1.5" (25cm x 18cm x 4cm) UL, CE certified

Terrapin

8-channel Electrode Holder



- Holds 8 electrodes
- Standard 4.5mm spacing between electrodes
- Can be used with any Tecella amplifier
- Screw holds down electrode
- Cable connector is standard Samtec QTH/QSH series
- 2 Ground screws provided