

Microelectrode Arrays



The Utah Array has become a benchmark for multichannel, high-density, neural recordings from large populations of neurons. Over the past two decades, this patented microelectrode array technology has undergone numerous refinements and repeated validations in a variety of species (humans, monkeys, birds, rodents, felines, fish) and preparations (in vitro and in vivo). This effort delivered a proven and well-documented method to obtain stable and long-term neural recordings of action potentials (spikes) and field potentials in brain and peripheral-nerve tissue. Because the array can be wired to various connector types, researchers can choose a connector that is optimal for chronic (long-term) or acute (short-term) recordings from small to large subjects as well as from slice and cell culture preparations.



Key Features

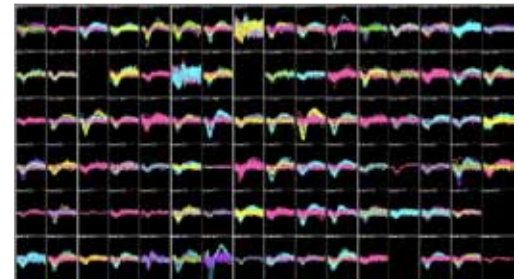
- >> High-density multichannel
- >> Up to 96 electrodes (various configurations)
- >> Customizable designs (pitch, length, hole)
- >> High-quality neural recordings immediately after implantation
- >> Floating neural interface
- >> Sterilizable
- >> Excellent acute and chronic stability
- >> Capable of microstimulation
- >> Various connector options

Applications

Example Applications

Electrical recording/stimulation of:

- >> Motor cortex
- >> Sensory cortex
- >> Spinal cord
- >> Peripheral nerve fibers



Isolated single units on a 96-channel microelectrode array 290 days after implantation in primate motor cortex



1 CerePort array
(chronic: large animal)



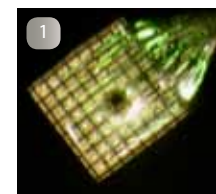
2 ICS-96 array
(acute: small or large animal, slice)



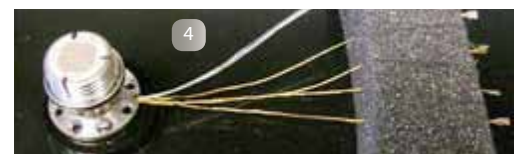
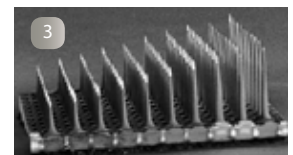
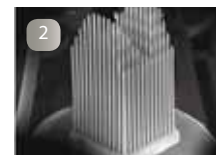
3 Omnetics array
(acute: small or large animal, slice)

Connector Style	Connection Dimensions	Implant Type	Skull Mount
CerePort	16.5 mm (H) 19 mm (d base) 11 mm (d body)	chronic	bone screws
ICS-96	18 mm (H) 17 mm (W) 37 mm (L)	acute	NA
Omnetics	9 mm (H) 7 mm (W) 13 mm (L)	chronic	dental acrylic

Custom Microelectrode Arrays



- 1 Laser-drilled hole for drug or light delivery
- 2 Convex geometry microelectrode array
- 3 Slant geometry microelectrode array



4 Connector linked to 4 arrays (MultiPort option)

Microelectrode Arrays

Specifications

Channel count	Up to 96 active electrode channels
Electrode site metal options	Platinum (~400 k Ω @ 1 kHz) Iridium oxide (~50 k Ω @ 1 kHz)
Reference and ground	2 reference wires and 1 ground wire
Insulation	Parylene-C
Standard electrode lengths	0.5 – 1.5 mm
Standard electrode pitch	400 μ m
MultiPort option	1 – 4 arrays per connector
Wire bundle	25 μ m Pt/Au lead wires between electrode array and connector
Wire bundle length	20 mm – 130 mm length potted with medical-grade silicone elastomer



Microelectrode Array Inserter

The Blackrock pneumatically-actuated inserter is a device for implanting high-density microelectrode arrays into brain, spinal cord and peripheral-nerve tissue. Its high-speed momentum-impulse insertion mechanism facilitates complete array implantation with minimal tissue damage. Adjustable insertion speed and implantation depth allows researchers to optimize device settings for different electrode configurations and tissue preparations.

Key Features

- >> High-speed pneumatic insertion
- >> Adjustable implantation depth
- >> Minimal tissue insult
- >> In vivo or in vitro preparations
- >> Sterilizable

Specifications

Control Module

Pressure range	0 to 30 PSI
Controls	Power, trigger enable, trigger
Dimensions	305 mm (L) x 305 mm (W) x 127 mm (H)
Weight	7.25 Kg
Power	110 VAC/2 A or 220 VAC/1 A

Wand

Dimensions	254 mm (L) x 8 mm (D)
Weight	71 g

Trigger/Trigger Cable:

Dimensions	76 mm (L) x 0.2 mm (D)/2 m (L)
------------	--------------------------------