

CGX THE LEADER IN EEG TECHNOLOGY

Wireless, Mobile Dry and Wet
EEG Systems For Real-World
Neuroimaging

Product Guide



CGX A Cognionics Company

Distributed By



SYMBIOTIC
DEVICES

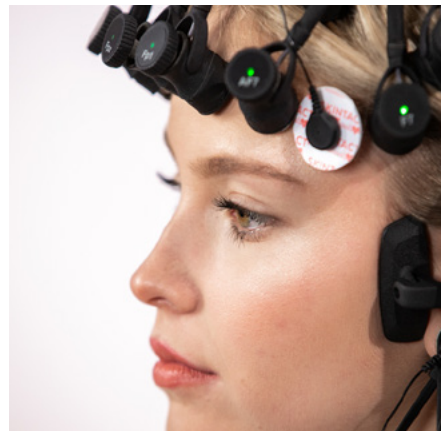


Helping Researchers Get Fast, Accurate EEG Results

CGX enjoys the reputation for designing the most accurate data-rich dry EEG systems for researchers and practitioners.

We've earned this reputation through engineering prowess and best-in-class technical assistance.

Our team of engineers focuses on dry-EEG technology, bringing the benefits of no-prep, accurate results to neurophysiological researchers.



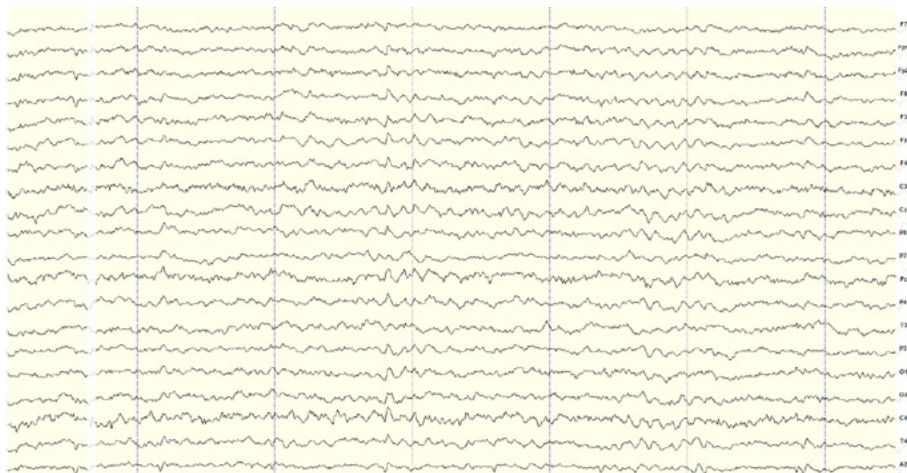
Highest Wireless Data Quality

We design noise reduction into our hardware, with active electrodes, active shielding, and extremely low-noise electronics.

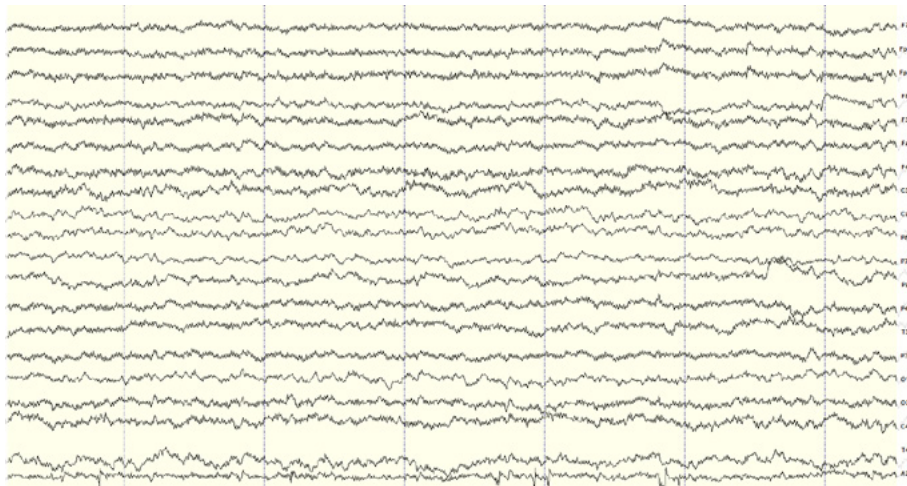
Unrestricted Data Access

We provide raw, unfiltered data in several formats:

.EEG / .EDF / .BDF / .CSV



Typical CGX data recording after 5 minute set-up.

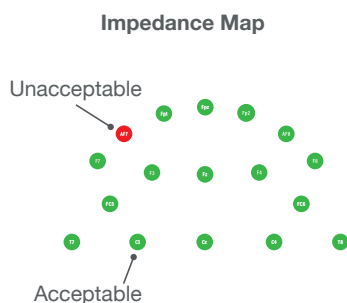


Typical competitor's dry EEG data.

Continuous Real-Time Impedance Check

On-board and in software.

Near-instantaneous impedance checking assures highest data quality.



Wireless Triggering

Our patented wireless triggers broadcast time markers with millisecond precision, resolving issues of latency and jitter.

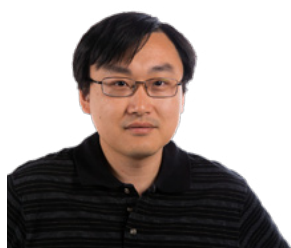


Portability And Ease-Of-Use

Most CGX headsets can be put on by a novice, or the user themselves. And once on, the user can move about freely.



Meet The CGX Management Team



Mike Chi, Ph.D.

Mike Chi founded the company in 2010. He holds a PhD in electrical engineering from UCSD.



Ira Friedman

Ira Friedman joined as president of CGX in 2019. He holds an MBA from Harvard Business School.



Spencer Linton

Spencer oversees engineering and production. He holds an EE degree from UCSD.

Started In 2008 In San Diego As Cognionics

We're a UCSD spin-off, funded through grants from NASA, NIH, Navy, Air Force Research Laboratory, Army Research Laboratory, DARPA, TATRC, and other institutions.





CGX QUICK SERIES HEADSETS

Quick Series Key Features

We redesigned the Quick Series headsets for 2021.

The most advanced dry headsets have undergone a complete redesign. With an advanced mechanical design, ground-breaking materials, and an eye to comfort and ease-of-use. Plus, they're integrated with BrainVision Recorder for seamless experimentation.





New Quick-20r v2

Fully redesigned wireless headset with active impedance check.

The CGX Quick Series is well regarded for generating research-level data from our active dry electrodes. The all-new Quick-20r v2 features a fully redesigned electrical, mechanical, and structural system for faster set-up, extended wear time, enhanced reliability, and immunity from artifacts.

Quick-20r v2

- EEG amplifier and wireless electronics integrated into headset.
- Active impedance check built into each sensor position for quick set-up and monitoring.
- Flexible composite arms create excellent contact between the sensors and head.
- Fits adolescents through adults.
- Includes 2 variable ExG leads for user-defined EEG, ECG, EMG, and EOG.
- 8 hours of uninterrupted data gathering with two AA batteries.
- Standard 10-20 montage.
- Fully integrated with BrainVision Recorder.



Fully Mobile, Fully Wireless. 3 Minute Setup

- Place headset on subject.
- Check impedance on each pod.
- Adjust sensors — if required — for comfort and contact.
- Begin wireless data acquisition.



IN PARTNERSHIP WITH

BRAIN PRODUCTS
Solutions for neurophysiological research

Quick Series Dry Headsets

Technical Overview

Wireless Amplifier

- A/D Resolution: 24-bit simultaneous sampling analog-to-digital converters.
- Sampling rate: 500 samples per second.
- Bandwidth: 0-131 Hz with true DC coupling.
- 3-axis accelerometer measures head motion.
- Wireless Range: 10 meters.
- Noise: <1.0 μ V RMS from 1-50 Hz, shorted inputs.

Sensors

- Active electrodes and active shielding for highest signal quality.
- Choose Drypad or Flex sensors at any position.
- Sensor life (all sensors): 200 uses.

Data Stream

- Bluetooth Low Energy.
- Full access to raw data via real-time streaming API.

- Continuous on-board and on-screen impedance check with real-time monitoring of all channels simultaneous with EEG.
- Export data to .EEG, .BDF, .EDF, or .CSV.
- Compatible with BrainVision Recorder, NeuroPype, LabStreaming Layer, EEGLAB, BCILAB, MATLAB, BCI2000, OpenViBE, NeuroGuide and more.
- Open API allows you to build your own applications.

Power

- Two AA batteries: 8 hours.

Cleaning

- Hand wipe between sessions.

General

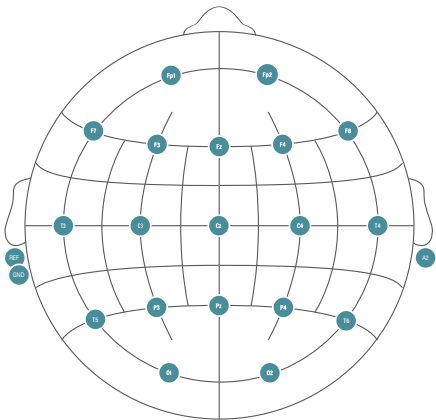
- Weight: 596g in use
- Fits heads sized 52-62 cm
- Dimensions: 20 x 18 x 19 cm

Included In System

Quick-20r Headset plus 2 ExG Channels
Bluetooth Low Energy Dongle
20 Drypad Sensors
40 Flex Sensors
10 Drypad Ear Sensors
30 Skintact Sensors
A1 Earclip
A2 Earclip
3 Active Lead Wires
2 Passive Lead Wires
5 Alcohol Wipes
4 Rechargeable AA Batteries
Battery Charger
Carrying Case
3 Year Warranty

Headmap

Standard 10-20 Montage



Head Size Accommodation

Percentage Of Subjects Per Age Range

Age	Male	Female
9-12	75%	50%
13-16	95%	90%
17-20	95%	95%
21+	97%	99%

The Journal of Pediatrics 2010. United States head circumference growth reference charts: birth to 21 years. J. Rollins, J. S. Collins, K. Holden





New Quick-32r

Fully redesigned for demanding EEG experiments.

Designed for researchers requiring the highest signal quality, the Quick-32r is a triumph in dry EEG technology. 30 fixed channels — 10-20 montage + 10 additional on-head channels — plus 2 ExG channels for gathering additional biometric data.

Featuring our new mechanical design for unmatched comfort and ease-of-use. With impedance check built into each sensor pod, set-up time is reduced to less than 8 minutes per subject.

- EEG amplifier and wireless electronics integrated into headset.
- Active impedance check built into each sensor position for quick set-up and monitoring.
- Flexible composite arms create excellent contact between the sensors and head.
- Fits adolescents through adults.
- Includes 2 variable ExG leads for user-defined EEG, ECG, EMG, and EOG.
- 8 hours of uninterrupted data gathering with two AA batteries.
- Use with our Wireless StimTrigger for sophisticated ERP experiments.
- Fully integrated with BrainVision Recorder.



**Quick Series headsets
are light-weight and
comfortable — rated for
hour-long sessions.**



IN PARTNERSHIP WITH

BRAIN PRODUCTS
Solutions for neurophysiological research

Quick Series Dry Headsets

Technical Overview

Wireless Amplifier

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- Wireless Range: 10 meters.
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Sensors

- Active electrodes and active shielding for highest signal quality.
- Choose Drypad or Flex sensors at any position.
- Sensor life (all sensors): 200 uses.

Data Stream

- Bluetooth Low Energy.
- Full access to raw data via real-time streaming API.

- Continuous on-board and on-screen impedance check with real-time monitoring of all channels simultaneous with EEG.
- Export data to .EEG, .BDF, .EDF, or .CSV.
- Compatible with BrainVision Recorder, NeuroPype, LabStreaming Layer, EEGLAB, BCILAB, MATLAB, BCI2000, OpenVIBE, NeuroGuide and more.
- Open API allows you to build your own applications.

Power

- Two AA batteries: 8 hours.

Cleaning

- Hand wipe between sessions.

General

- Weight: 646 in use
- Fits heads sized 52-62 cm
- Dimensions: 20 x 18 x 19 cm

Included In System

Quick-32r Headset plus 2 ExG Channels
Bluetooth Low Energy Dongle
30 Drypad Sensors
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10 Drypad Ear Sensors
30 Skintact Sensors
A1 Earclip
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5 Alcohol Wipes
4 Rechargeable AA Batteries
Battery Charger
Carrying Case
3 Year Warranty

Head Size Accommodation

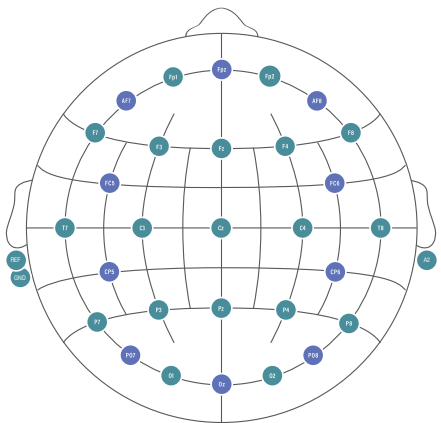
Percentage Of Subjects Per Age Range

Age	Male	Female
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17-20	95%	95%
21+	97%	99%

The Journal of Pediatrics 2010. United States head circumference growth reference charts: birth to 21 years. J. Rollins, J. S. Collins, K. Holden

Headmap

Standard 10-20 Montage + 10 Additional Channels



CGX DEVICES | DEV KIT



Dev Kit

Versatile Development Kit

The Dev Kit includes everything you need to undertake EEG experiments and custom hardware development: an 8-channel amplifier, lead wires, CGX dry electrodes, and a comfortable headband.

- Soft, washable fabric band with reinforced polymers for a snug, artifact-resistant fit.
- Standalone amplifier attaches to headband, streams via Bluetooth low energy.
- Eight hours of battery life.
- Configure loose lead lines to meet your experimentation needs.
- Use with CGX and Skintact sensors.

Use With

AurisDK In-Ear EEG sensor



Headband holds up to 8 active, shielded dry electrode pods.

Dev Kit

Technical Overview

Wireless Amplifier

- A/D Resolution: 24-bit simultaneous sampling analog-to-digital converters.
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- Continuous impedance check with real-time monitoring of all channels simultaneous with EEG.
- Export data to .EEG, .BDF, .EDF, or .CSV.
- Compatible with NeuroPype, LabStreaming Layer, EEGLAB, BCILAB, MATLAB, BCI2000, OpenViBE, and more.

Power

- Lithium-ion: 8 hour wireless.

General

- Weight: 80 grams
- Dimensions: 90 x 80 x 25 mm

Included In System

Dev Kit

Dev Kit Amplifier
Bluetooth Low Energy Dongle
Passive Ground Lead Wire
9 Active Lead Wires
10 Drypad Sensors
10 Flex Sensors
10 HydroFlex Sensors
30 Skintact Sensors
Headband
USB Charging Cable
Wall Charger
Carrying Case
3 Year Warranty

AurisDK

2 Auris Lead Wires (right)
2 Auris Lead Wires (left)
100 Disposable HydroFlex Earbud Sensors

Auris Earbuds

Unique in-ear EEG for researchers. Comfortable and lightweight with excellent signal quality. Plugs into a single channel on the Dev Kit.

AurisDK Dev Kit Accessory

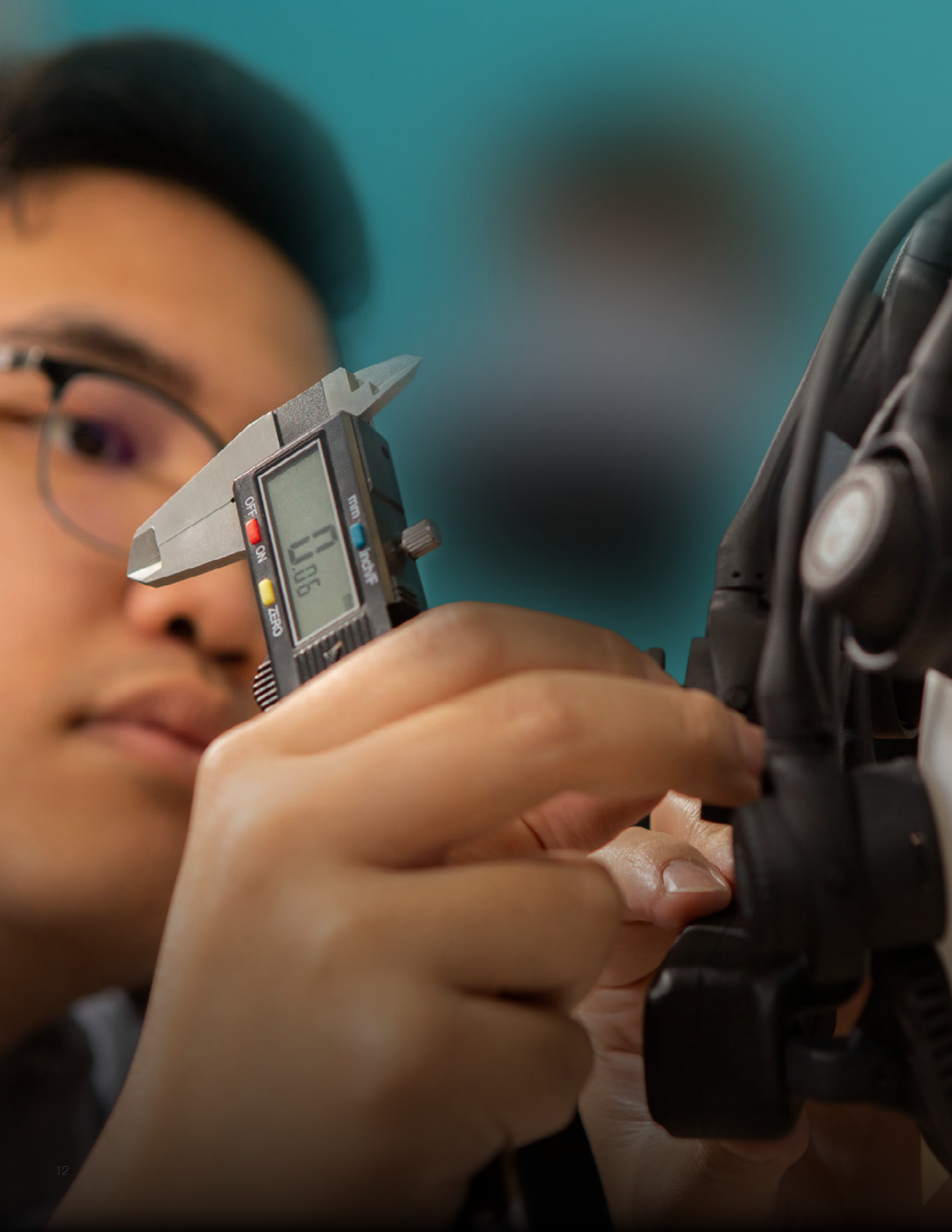
- Stays in place during motion.
- Kit includes 100 disposable HydroFlex Earbud Sensors.
- Replacement sensors available.



Use included Drypad, Flex, or Skintact sensors. Place under headband for a snug fit.

Place Skintact sensors directly on skin.





TECHNOLOGY OVERVIEW

Overcoming Dry System Challenges

Challenge 1: High Impedance

Dry systems use no gel to make contact through hair, nor adhesive to affix electrode. Removing gel increases impedances.

Challenge 2: Noise

Noise is caused by movement, electrical interference, and electrochemical interference.

The Solution

A successful dry EEG system is the sum of its parts: specific sensor design coupled with a flexible, yet comfortable mechanical solution, driven by a purpose-driven electrical system.

All three of these components — the sensors, headset mechanics, and amplifier — are designed as a system for best performance, as explained below.



Superior Sensor Design

We design our patented sensors in-house. Headsets use two interchangeable designs: DryPad sensors for direct skin contact, and Flex sensors to part hair, making contact with the head.

Sensors are coated in our bio-compatible conductive material, and are rated for 200 uses each.

DryPad Sensor



For direct skin contact. Durable design rated for 200+ uses.

Flex Sensor



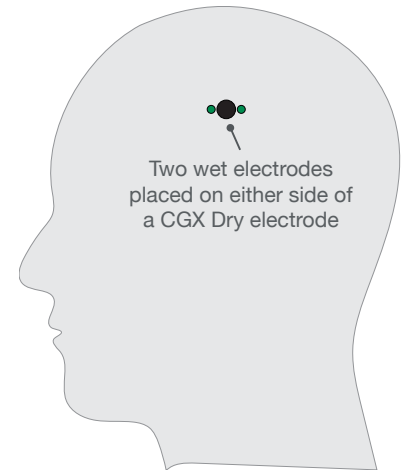
Comfortable legs slide easily between hair to make good contact on the scalp.

Comparing Dry Systems To Wet

We built a testing unit comparing real-time, concurrent wet and dry performance.

Test Unit

A custom-built dual-mode headset concurrently recording EEG from a CGX Dry system and a high-quality traditional gel-based sensor. We measured a single CGX Dry sensor vs. the average of two wet electrodes (minimizing spatial displacement effects).



Protocol

- Test multiple subjects capturing real-world performance while minimizing experimental variability effects.
- Record simultaneous signals from dry and wet electrodes.
- Examine 10 second raw EEG and evoked potential (50 odd trials, 150 normal trials).
- Repeat swapping dry electrode under test with wet for control data.

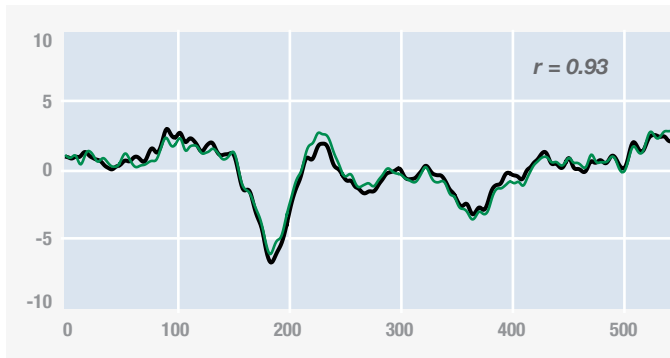
Oddball Experiment

Normal Tone: 150 Trials Odd Tone: 50 Trials

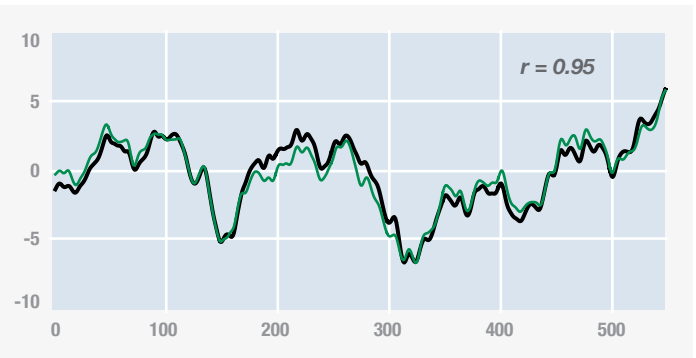
- Wet Electrode
- CGX Dry Electrode

Normal Tone

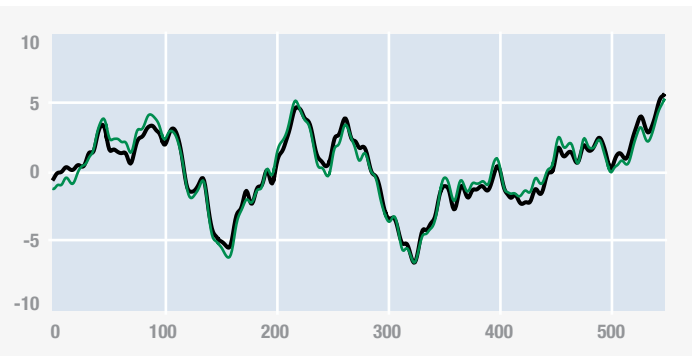
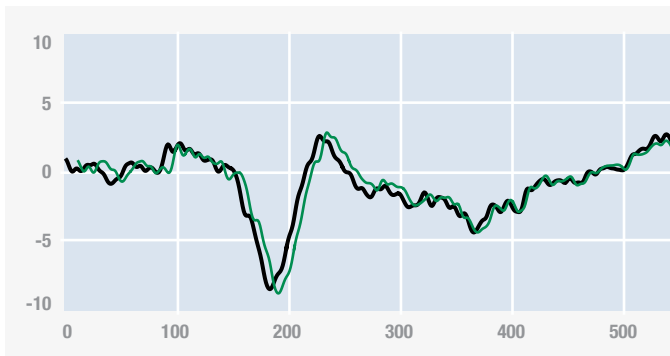
Wet vs. Dry



Odd Tone



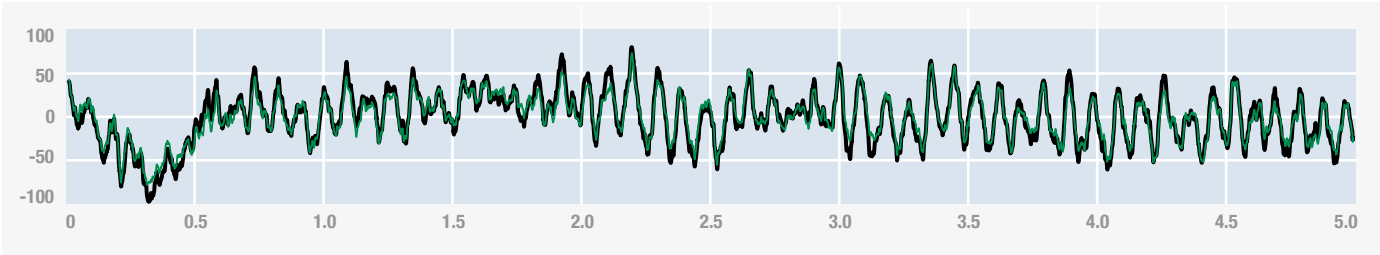
Wet vs. Wet



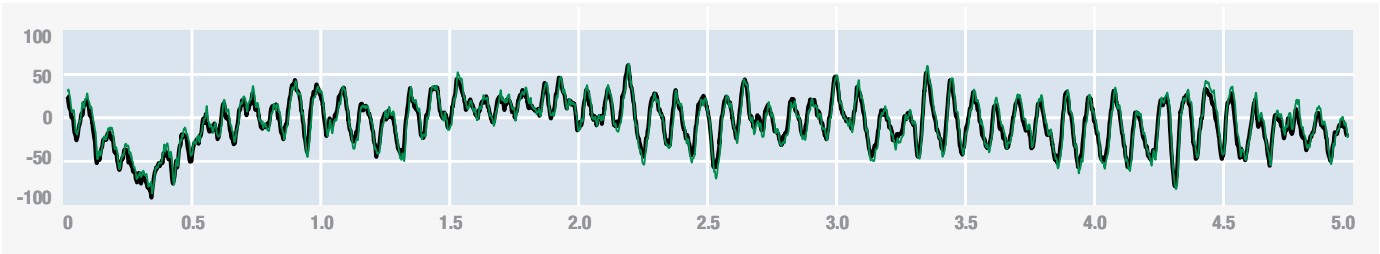
Wet vs. Dry and Wet vs. Wet

Device: CGX Quick-20. Resolution: 24-bits, 1,000 sps. Bandwidth: Raw 0.4-100 Hz

Wet vs. Dry



Wet vs. Wet



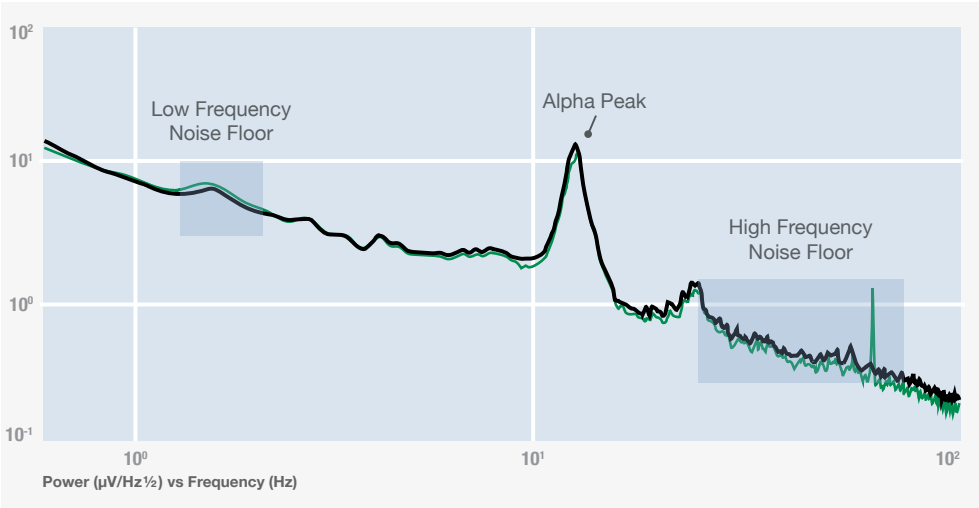
Correlation Results

Wet/Dry and Wet/Wet results show excellent correlation.

	Raw EEG		AEP Normal		AEP Oddball	
	<i>r-Dry</i>	<i>r-Wet</i>	<i>r-Dry</i>	<i>r-Wet</i>	<i>r-Dry</i>	<i>r-Wet</i>
S1	.90	.95	.99	.99	.98	.99
S2	.95	.98	.93	.96	.95	.98
S3	.96	.97	.97	.99	.96	.98
S4	.97	.99	.97	.98	.94	.99
S5	.93	.98	.93	.98	.95	.97
S6	.97	.99	.97	.98	.94	.97
Mean	.95	.98	.96	.98	.95	.98

EEG/ERP Bandwidth

Device: Quick-20. Resolution: 24-bits, 1000 sps. Power spectrum over 5 min



Warranty

Headsets And Devices

3 year warranty on manufacturing for headsets and devices. 1 year warranty on Wireless StimTrigger. Warranty is void if the device has been opened or tampered with.

Accessories

1 year warranty on manufacturing defects. 90 day warranty on lead wires and lead wire bundles.



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