



IN PARTNERSHIP WITH
BRAIN PRODUCTS
Solutions for neurophysiological research

This manual contains general operating instructions, precautionary measures, maintenance instructions, and information for use of the CGX Quick-32r.

Please read this manual carefully and familiarize yourself with the controls and accessories before using the product.

Note

- This is an investigational device designed for research and development efforts.
- It is not an FDA-approved medical device.
- There are no known side effects from the use of this product.

Description

The Quick-32r is a wireless, batteryoperated EEG headset utilizing dry sensor technology. Channel positions are arranged in an enhanced 10-20 montage with 10 additional fixed EEG channels on the head, plus 2 variableplacement ExG channels.

The headset provides an integrated approach to the wireless acquisition of recorded of EEG signals. Wireless technology allows the subject to move about while real-time data is collected and displayed. The headset obtains high-quality EEG with minimal scalp preparation. Patented mechanisms and replaceable dry sensors align to various head shapes and sizes, maintaining sensor positions in a standard montage.

EEG channels are sampled at a time resolution of 500Hz and converted to digital data at 24 bits of resolution.

The Quick-32r provides researchgrade signal quality and is ideally suited for general-purpose EEG and ERP research in laboratory and field environments. The Quick-32r is intended to be used to acquire the electroenchephalogram (EEG) and transmit it wirelessly to a computer.

This Device Is Intended For Research Only.

It Is Not Intended For The Following Uses:

- monitoring of patients in a clinical environment
- · use in medical diagnosis
- · on subjects undergoing surgery
- use in sterile environments
- · use with sleeping subjects

Do Not Use This Product In These Situations:

- · near high-frequency surgical equipment
- · if exposed to ionizing radiation
- in oxygen-rich environments (concentration > 25% at 1 atm)
- in wet environments
- in the presence of flammable anesthetics or gases

Precautions For The Practitioner

- Do not drop, sit on, step on, fold, push, pull or stretch the product.
- Check if your subject has a sensitive dermatological condition causing sensor intolerance.
- To avoid cross-subject contamination, do not use with subjects having open wounds or scalp infections.
- The Quick-32r headset is not a diagnostic tool. Any medical diagnosis related to the EEG should be derived by a certified physician.

Subject Considerations

- This device is intended for human use only.
- · Subject should have a healthy scalp.
- This device fits teens and adults with a head circumference from 52 to 62 cm.
- Do not use with infants or neonates.
- · Test subjects may or may not have hair.
- All sensors must be able to contact the subject's scalp.
- The entire headset may come into contact with the subject's skin.

Follow These Advisories To Keep Your Quick-32r In Good Working Order

- Do not immerse the headset in liquid.
- Do not expose the headset to direct sunlight or heat source, moisture, vibration, mechanical shock, excessive dust, or humidity.
- Do not open, modify or disassemble the headset this will void the warranty.
- Do not use if the headset is damaged.
- Do not use when wet if moisture penetrates the headset, remove the batteries and let it thoroughly dry prior to use.
- Do not use caustic or abrasive cleaners on the headset or sensors.
- · Avoid sharply bending the legs.

Disposable Sensors May Be A Biohazard

- · Store clean sensors in the provided jars.
- Clean sensors after each session following instructions on Page 13.
- Replace sensors at or before their stated lifecycle limits (Specifications, Page 26), or if they appear worn.

Always Use Supplied Accessories

Using accessories other than those supplied with your Quick-32r system may result in damage or diminished efficacy of the system.

The Quick-32r uses two AA Alkaline or NiMH batteries. Follow care and handling instructions provided by the battery manufacturer.

Avoid Cross-Subject Contamination

Clean the device and clean or replace sensors after use following the cleaning instructions on Page 13 to avoid crosssubject contamination.

Quick-32r Overview

EEG is the measurement — through the use of sensors and amplifiers — of scalp surface electrical potentials arising from activity in the cortex.

The Quick-32r follows an enhanced international 10-20 system standardizing 30 electrode placements across the scalp. The 10-20 system derives its name from measurements of 10% and 20% of the distance between landmarks on the head, specifically, the depression above the bridge of the nose (nasion), the bump at the back of the head (inion), and the depressions in front of each ear (preauricular points).

Sensors are labeled with a combination of letters and numbers indicating their respective locations, with even numbers on the right and odd numbers on the left side of the head. Midline locations are marked with a "z" for "zero." For instance, Fz sits on the frontal midline, while F3 sits left of and F4 sits right of Fz.

The Quick-32r is sized to fit most adult head sizes. See sizing chart on Page 27.

The Quick-32r meets the mechanical, electrical, and sensor needs required to make an effective dry EEG system.

Conventional wet systems rely on electrolytic gels to penetrate hair, contact the skin, and provide a conductive path. The gel serves as a buffer filling in gaps between the sensor and skin.

No conductive gel is used in a dry system. The benefits are obvious: faster set-up, and no after-use clean-up required.

Yet, dry systems are subject to several challenges. First, the sensor must be designed to directly touch the scalp or skin, even through thick hair. Second, the sensor must remain securely in place to minimize artifacts and noise. Finally, the electronics must tolerate impedances up to 200 times higher than wet systems - while rejecting noise and interference. A high-end dry solution - like the Quick-32r - balances sensors, mechanics and electronics achieving virtually the same signal quality as a traditional wet cap for most EEG applications.

The Package Contains60 Flex SensorsThe Following Items10 Drypad Ear Sensors

Quick-32r Headset with 2 ExG Channels and Bluetooth Dongle 30 Drypad Sensors 60 Flex Sensors 10 Drypad Ear Sensors A1 Earclip (left ear) A2 Earclip (right ear) 3 Active Lead Wires 3 Passive Lead Wires 30 Skintact Sensors 5 Alcohol Wipes 4 Rechargeable AA Batteries Battery Charger Carrying Case Manual





Device Overview

Amplifier

Bluetooth Dongle

High-speed receiver

dongle plugs into

your computer's

USB port.

0



Wireless amplifier collects signals and transmits to Bluetooth Dongle.

Drypad Sensor



Drypad sensors make direct skin contact for ECG and EEG recordings.

A1 Earclip



A1 left ear earclip has two sensor locations: Reference and Ground.



Flex Sensor

Flex sensors slide through hair for high-quality scalp contact.



Dedicated Drypad sensors for use with Earclips.

Drypad Ear Sensor

A2 Earclip



A2 right ear earclip is used in linkedears configurations.

Lead Wires



Active lead wire (3.5mm connector) for Reference/A1 and A2.

Passive lead wire (touchproof connector) for Ground and ExG.

1. Install The Software

Note: CGX Acquisition software runs on Windows only.

- Navigate to CGXSystems.com
- Select **Downloads** from the top navigation menu.
- Select Click Here For Acquisition Software
- Choose the latest version link under "Downloading and Installing the Software."
- Extract the zipped file to your desktop.
- Run CGX Setup and follow the instructions.
- If you see a security warning, select More Info and Run Anyway
- The software will create a shortcut on your desktop.

2. Select Sensors

Choose the appropriate sensor for your application.

Drypad Sensors

Use Drypad sensors in positions where the subject has no hair (forehead and bald areas).

Flex Sensors

Use Flex sensors to penetrate hair.

3. Attach Sensors

Sensors have a round flower pattern on the mating end that aligns with a recessed flower pattern on the snap connector.

- Lightly rotate the sensor until it begins to lock into the snap connector.
- Push firmly at the center of the sensor when installing.
- For Flex sensors, do not apply pressure to, or bend the sensor tips.
- When removing sensors, pry between the sensor and the connector.
- Do not pull on the tips of the Flex sensors.



Download the latest software from CGXSystems.com



Drypad Sensor for direct skin contact



Flex Sensor for hair







Attach sensor

It may require extra pressure to insert a sensor due to variability in surface coating. Try that sensor in an alternate pod location in case of a particularly tight fit.

4. Assemble The A1 Earclip

- 1. Pinch the earclip to opne.
- 2. Insert a Drypad Ear Sensor into each hole.
- 3. Attach the Passive and Active Lead Wires to either snap on the earclip.
- 4. Attach the Passive Lead Wire to the touchproof connector on the A1 handle.
- 5. Attach the Active Lead Wire to the 3.5mm connector on the A1 handle.

4a. (Optional) Assemble The A2 Earclip

Use the A2 Earclip for recordings requiring both ears.

- 6. Pinch the earclip to expose the single snap connector and attach a Drypad Ear Sensor.
- 7. Attach the Active Lead Wire (3.5mm connector) to the snap on the earclip.
- 8. Attach the Active Lead Wire to the 3.5mm connector on the A2 handle.

4b. (Optional) Attach The ExG Lead

For additional biometric data acquisition, attach a passive lead wire to the touchproof connector on the A2 handle.





Drypad Ear Sensor

A1 Earclip



Insert the Drypad Ear Sensor into the Earclip with snap facing out. Attach lead wire to snap as shown.



A1 uses a touchproof lead wire for Ground and the 3.5mm audio jack lead wire for Reference



Active Lead Wire

Plug Passive Lead Wire (touchproof connector) and Active Lead Wire (3.5mm connector) into headset, matching orientation as shown

5. Charge And Insert The Batteries

Use fresh alkaline batteries, or if using NiMH batteries, fully charge before using.

- Open the battery door on the A1 handle.
- Place the batteries in the correct configuration following the markings inside the battery housing.

6. Check Power Status and Trigger Status Lights On Top Of Amplifier

Power Light	Status
Off	Headset Off
Green	Headset On
Yellow	Low Battery
Red	Critically Low Battery (replace immediately)

Trigger

The Trigger Status Light is for use with the optional CGX Wireless StimTrigger, and indicates when the headset is receiving trigger signals from the StimTrigger unit.

Trigger Light	Status
Off	Trigger Out Of Range
Blue	Trigger In Range

7. Insert Bluetooth Dongle

Plug the dongle into your computer and Windows should automatically install the correct drivers. Verify driver installation by checking the Device Manager for problems, marked by a yellow exclamation mark.

- The dongle is specific to each headset.
- For best performance, ensure a clear line of sight between the dongle and the front of the headset

If Windows did not successfully install the driver for the dongle, refer to the FTDI driver installation manual on our website.



Slide to open battery door



Insert 2 AA batteries as shown

Amplifier



Each Quick-32r is permanently paired to a receiver dongle. The pair automatically discover and initiate a connection when both are powered on and within a 10m range.

The light on the dongle indicates its current state:

8. Start The Acquisition Software

Once you've established a connection, data should begin to stream.

Double click on the CGX Acquisition software icon. You should see CGX Quick-32r under Discovered Devices.

If you do not see the name CGX Quick-32r, remove and re-insert the dongle and restart the software.

- 1. First, click the device name in this window to select the Quick-32r.
- 2. Then click Connect.

You should now see the device configuration window.

If you do not, double check to make sure the Quick-32r is powered on.

Click Start Device.

You will now see data streaming into the display. Click the **Channels** tab on the top right-hand side of the program. This will bring you to the impedance check. You are now ready to use the device.

Dongle



9

Optimal Headset Placement



Ask the subject for any areas of discomfort and reposition the sensors to lay flat on the head, if necessary.



Both earclips fully populated

9. Place The Quick-32r On The Subject's Head

- 1. Grasp each handle and gently pull them apart to open the headset.
- 2. Slide the headset over the subject's head.
- Adjust the position of the headset so the earpads fit around the subject's ears.
- 4. Brush aside excess hair near and underneath the earpads.
- 5. Position Fp1 and Fp2 to sit 1cm above the eyebrows.
- 6. Reorient misaligned legs and pods.
- 7. Grasp and rotate each pod so the sensor is perpendicular to the subject's head.
- 8. Push the headset downward so the sensor at the crown (Cz) makes firm contact with the subject's head.
- 9. Ensure pods lie flat on the subject's head.
- 10. Brush aside excess hair on the forehead and any other positions where Drypad sensors are installed.
- 11. Lift the earpad to access the ear lobe and clean with alcohol.
- 12. Clip the A1 earclip to the left earlobe.
- 13. Option: Attach the A2 earclip to the right earlobe.
- 14. Option: Attach ExG passive lead wire on the A2 handle for additional biometric measurements.
- 15. Verify headset is properly positioned on the subject's head.



Don headset front-toback, positioning Fp1 and Fp2 1cm above the eyebrows



Pull down on handles until Cz makes firm contact with the top of the head



Apply A1 earclip to left earlobe

10. Optimize Sensor Contact

After properly positioning the headset on the subject, obtain direct contact on all sensors before recording.

The Quick-32r has impedance-level LEDs on the top of each sensor pod. The LEDs live-check the system's impedance and have a threshold of 2,500 k Ω .

Use the LEDs to assist in making contact with the scalp on each position. Then bring up the impedance check in the CGX Data Acquisition software under the **Channels** tab. The impedance check presents a color-coded map of the sensors on the device, corresponding to contact level:

Red	Impedance out of range (>2,500 k Ω default)
Green	Impedance within range $(<2.500 \text{ k}\Omega \text{ default})$

The range of impedances with dry sensors may be higher than what you are accustomed to when working with conventional wet sensor amplifiers. CGX devices utilize a combination of advanced electronics, shielding, and mechanics to obtain EEG signals even when contact is poor, and can tolerate sensor impedance up to 2,500 k Ω .

Threshold Spikes

You may see a brief glitch in the EEG signal when electrode impedance nears 2,500 k Ω . This is a natural effect when the LED on the pod changes colors. Continue adjusting the electrode until the impedance is below the threshold and the artifact will disappear.



11. Adjust Pods, If Required, To Improve Impedance Measurements

Check for acceptable impedance measurements on each channel.

To ensure good impedance measurements:

Impedance Map

Under The Channels Tab

Unacceptable



A1 Reference and Ground earclip must be applied for impedance check to operate.



Grasp pod on sides to reposition



Gently twist swivel mechanism without displacing pod

Final Steps

• Gently pull down on the handles until the Cz position reports adequate contact.

It is important the headset is seated properly in the correct position and all legs and pods are aligned with the subject's head before pulling down. Failure to do so may result in poor contact at the Cz position.

- · Lift the pod slightly to move hair aside.
- Lower the pod back in place, keeping the sensor aligned to the subject's head.
- Gently twist the sensor adjustment back and forth to help
 move the sensor through the subject's hair.
- Lightly press down on the pod, holding for 5 seconds, then gently release the pod.

12. Record An EEG

After you have acceptable impedance levels, click **Record** under the Device tab to begin your recording. To end the recording, under the same tab, click **Stop Recording**.

13. End The Session

Close out the current file in the software if one is active and exit the program. Press the power button once to turn off the device.

The headset should be placed either upside down, with the top of the headset resting on a table top, or back into the carrying case.

Cleaning And Maintenance

To avoid cross-subject contamination, follow the cleaning instructions to clean sensors and headset after each use.

This device is not intended to be sterilized in an autoclave.

Cleaning Sensors

• Use hand sanitizer or alcohol wipes to clean all sensors.

Cleaning The Sensor Pods And Legs

• Use alcohol wipes to clean sensor pods and legs.

Battery Storage

Remove the batteries when headset is not in use.

Disposal Instructions

To protect the environment, always follow local law, rules, and policies regarding electronic and battery disposal. You may also return the headset to CGX for proper disposal.

Position Of The Subject During EEG

Use the Quick-32r headset for subjects in an upright position. Do not let the subject lie or sleep on the headset. It may damage the headset.

Use the supplied carrying case when transporting the headset.

It is not recommended to leave the Quick-32r in the carrying case for long term storage since the legs may become compressed. This will not affect functionality, but may cause the headset to be excessively tight on larger heads.

To restore the shape of your headset, place on a mannequin head for several hours until the legs relax.

Obtaining Clean EEG Data

The most important aspect of EEG recording is that output data is only as good as the recording input. While algorithms exist to remove artifacts, poorly recorded data cannot be fixed in post processing.

Recording good EEG data requires preparation of the participant for optimal sensor contact:

- 1. Participants should have their hair recently washed and fully dried before recording. Wet hair, hair gel, conditioners, and hair spray may cause interference and degrade signal quality.
- 2. Clean each sensor location on the head with a cotton swab soaked with alcohol.
- 3. In the event of difficulty establishing good contact, apply a small amount of water between the sensor and scalp to create an electrical bridge.
- 4. It is important for subjects to reduce tension in the head, neck, and shoulders during readings.

Typical Clean Data Recording

many mapping and the second seco
marine and and the second and the se
"
Run have been and the second of the second o
www.unfermanter
www.www.www.www.www.harman.com
www.mar.mar.mar.mar.mar.mar.mar.mar.mar.mar
www.weither with the second of the second se
and the second s
have and here and he
man when we want the second when the second wh
www.montesserverseters and the second s
Commence and the second s
men manufacture and the second s
warmen and and a second warmer where a second warmer and a second and a second and a second and a second and a
and and the second s
where where we wanted and the second of the
in the second descent and the second descent descent and the second descent des
Married Ma Arried Married Marr

Quick-32r sensor locations lie within 1.0 centimeters on the vast majority of handmeasured enhanced 10-20 placements on heads sized from 52-62 centimeters.

See sizing chart on Page 27.

This is a representation of a clean data recording.

Clean Data At Default Scale

	 1	
 	 	 Fp1
 	 	 112
 	 	 C3
		0
 	 	 PI
 		 n
 	 	 N
		13
 	 	 01
		42

Traces are thin and deviate minimally from the axis.

Blinks



Eye blinks will generate muscle artifacts in the frontopolar locations (Fp1 and Fp2) and less so in frontal sensors (F3/F4, F7/F8), overshadowing brain activity in EEG recordings.

Eye Movement



Moving the eyes will generate muscle artifact in the forehead and front of the head. A high concentration of neurons in the eyes generate strong electromagnetic fields, so eye movement causes disruptions in the EEG recording.

Muscle Artifact: Jaw Clench

encounterproperties to	enlandarrenafaldetelper	annares data ann daral	berrente se fallet fan de fan se fan se se	hipperaturationalphonarchier	uhardoniaanhahanhann	regedige-loss-filler 🖗	
- and a second		a formalise for a foregade of the second	an marked and a second second		80.000.000 ¹⁰ .000.000 ¹⁰ .00000000000000	and a construction of the	2
ment upogen where superior	warpened and and particular points	ersion generalised by a second se	lander wooden and the second	atronym astronopy i by totamain	ngorran ghayngyngy Marskaniada	mention and the P	
		a hand an	***	aa-daparananananapadaran-aharan-ah	han an a		
and and the property of the pr	and a second and a second adverse	many has some of the second	and an and a second	an and a state a		Maria B	
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				ar an Alastan an an Alastan an Ala	*	a	
					******		
	ware ware and the second s				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~ <u>*</u>	
				an a			
		www.y.www.www.	and the second		مەرىرىغىنىچى مەمىرىمىر مەر _{رىم} ىمە		
مەرىپ مەسىرىكىدىن بەلىمىلار بەلىرىپ مە 1945-يىلى بەلىرىكى بىرىكى بىرىكى بىرىكى بىر					Angun		
histologen i halan far for an angen o	alprovenenes	provide the second second	a to a garanta a garanta da faranta a garanta da ana ana ana ana ana ana ana ana ana	in stranget and the second	Manghabanathathathathat	www.sondor.co	
	and a second and a second and a second	*******					

Jaw clenching may affect most or all channels, especially if clenching hard. Light jaw clenching or tightness can be observed in F7/F8, T3/T4. Take note of any temporomandibular joint disorders: these can cause artifact without typical clenching.

#### **Muscle Artifact: Tongue Movement**

		- Marina	1/ marine		m		m min	a paper and the
			warmon warmon war	and the second s	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		mm mm	
			and the second second		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		m	
	-	my im	and the second	and the second second	and and a second and	and the second	m man man	
	Ļ		Marina and a second			·······	- Maran - Mara	manufana Pa
		warman warman warman warman warman warman warman wa mana wa ma	and the second second	war and the second s			- mar marine	manner R
		and the second	appendie		and the generation of the second s		ama	
	Ļ	Mary and a start and a start and the	Aproxim for and an an and a day	and a share and a share and a share a s	moneyounencentral	manapunghunghlama	and war and all winds	anna a
		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	mannen		mannen		man for an and the second	mmma.
	J	man man market	affyrihay sector radiator bearing as aff	and the half strangeness of the the strangest	and a familie and a second second second second second	abannes well an marger	a avance may make when	anners where
		mannen	- Contraction of the second second	and the second and the second		munghaman	aby the second and the second	mansher m
		and the second second second	-	and the second s		and the second production of		mann R
		and the second and the second s	hand a second and the second		and a construction of the second s	a.m.aa.c.accurate		Martin N.
		and the second states	all manusman	many many	and a start and a start of the		to many properties and	www.mha
	Ļ	a show and a show and a show a	and a second and a second and a	and a second and the second	and the second s		and the stand of the	manna a
		ويام معادرو سور مدين ويعد من	and the second and the second se	water and the second second	man management and the second	and and a second a secon	mon man and a second	water provident of the
		-	m mann		man	many m	marine and the second	mone
a a for the second s	J	man and worth	Som many your	and had been and a second a second	mare and	an margaret and and	manner	anoneth a
	-	- way we have	all and a second second second	and a state of the second and a second and a second a s	and the second	agerroughter daugestation spaces and	And and a second a	
			man and the second second				m	A2

The tongue is a large polarized muscle, with the tongue's tip negative with respect to the base of the tongue. When the tongue moves around the mouth, it generates a moving field causing recording disruptions. Disruptions may be seen down the midline (Fz, Cz, Pz). Tongue movement during talking can be seen on many channels.

Muscle Artifact: Swallowing

				 ~~!-		n
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		under and	 	~~~~	10
	****		South the second	 ~~~~		Fp2
	****	and the second	and when when he have	 m		
			entrelan			ĥ
			proprofession	 		
			MANJACAMIN	 		0
			epholan	 		Ca
and the second s			Marthe	 		-
			Service and			
			opday and	 ~~~~		
			WM.	 	~~~~	13
			sphalper	 		-
		- All	NJNN Jummer	 		01
manum			William	 		
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		and the second	 		T 4
			production	 ~~~		A2

Swallowing invokes movement of several muscles in the mouth, including the tongue, causing disruption of many channels. Ignore swallowing if infrequent, but frequent swallowing may limit usable data.

Muscle Artifact: Neck Tension



Neck tension may affect channels on the back of the head, predominantly O1/O2, but also in parietal sensors (Pz/P3/P4, P7/P8). Subjects should be comfortably seated, with appropriate bracing at the back and neck. Avoid slouching.

Headset Or Electrode Disruptions: Sensor Pops



Brief disruptions in contact between sensor and scalp may cause "sensor pops" on recordings. Occasional pops can usually be ignored in processing, but if the problem persists, check the contact between the sensor and scalp. Wipe popping locations with a small amount of alcohol on the sensor.

Headset Or Electrode Disruptions: Head Movement



Excess or quick movement of the head may disrupt connection between sensors and scalp causing data artifacts as shown.

Pulse Artifact



EEG sensors are sensitive enough to detect small electrical signals on the cortex. Occasionally, sensors may lie directly atop a blood vessel. When this occurs, sensors may detect the subject's pulse. Slightly move the sensors to reduce pulse artifacts.

Mild Power Line Artifact

and the second	and all all and a second and a se	and the second sec	*******	and a state of the	and the second	and and a second	11
and the second sec	and the second states and a se	and the constant of the second state of the se	and an strange of the set of the	angadya salahaya yaamagaayahandi tarahan	and real material	Www.www.WA	P1.
وسرجا والمارية المجر الالهماره مهامه معتمر	and a set of the product of the set of the s	and an and a start and a special providence of the second start of the special	gan an a	in mary deline groups with all these	and a second	menusely my miles	62
and a second and a s	mannen	manne	all them a the response of a new	man mannen	and and the second second	mour	٩.,
and the second s	and her and a second and a grant of the second	⁴ 440 - 100	and a start and a start a start and a start a s	and a second and a second and a second	and a marine and an and	manya	9
all and the second an	My an manage and the	ويتحصونهم ويوفحون مدامي تصويعان والمحاظم	and a second and a second s	an distance interesting to play any second	and and a second and	mann	h.,
and a star and a second	and the state of t	and an all and the second and the	and the second second	and a state of the	mary and and a server	mann	٨.
and and a second and a second and the second and th	well the way was a why have	and the second second second	Mandal and	and a second	March March March March	allow and a c	٩.,
mannon	monorm	mannanan	www.www.www.ww	mmmmmm	manno	manna	a.,
and what when we	manner	and the constraint	and the and the second	and Annally	and the second	when the server of	ġ,
manymen	monorm	mann	wan marine a	and an and a service of the service	munitedim	mm	ų.,
and a second a second s	mar - marin	and the second of the second	al and the second	and the state of t	warner	man.	4
an and a supering and a supering the supering the supering and the supering and the supering the	and a grant of the product of the pr	and a second	and states the same and a state of the same	and a second and a second and a second	and the second	Anna maria	ŭ.
and a second and a second	and a spectra was a series of the series of	an de la constante de la consta La constante de la constante de	والمحصور ويتارك والتقور والمالة المرادية	Maraha and a server of the	and a support of the second second second	alma concept	ñ.
market and the second second	ward and the second ward	and a second and a s	and a second	فيوسبوا والمعروفين وتبري وتجرو المحاصر ووحا	american A	the start and a	٥.,
	man man marker	montering	mannon	and and the second s	mariner	mino	я.
· · · · · · · · · · · · · · · · · · ·	and the second have	mather manner	warman pering may	an marganessand	mananterrante	and which which a	22
and the state of t	and the second	and a constraint of the second second second second	and the second	adden to the maken from a second	and a second	Man and	ĝ.
	Make a As			A	ma m.M.	A.m.s.	14
	way man was a way a	and when a comparison	have a marting the	for many wards for	Man call and and	and the second second	a.

Power lines operate between 50 and 60 Hz. Unsecure power sources may leak electromagnetic frequencies. Because EEG records frequencies from 1hz to about 40hz, power line noise may negatively impact recordings on all channels. This is especially the case when connection between sensor and scalp is poor.

Strong Power Line Artifact

a security and a security of the second descent second and a second descent of the second of the second	Mantur parta provide all and
and a second and the second of the second	MARINAN WINDOW NOW WAY TO THE
When the second to the second decision of the second of th	You and a set of the s
warmen with a march the strate the second and the s	month march?
have a series of a	12 martin Alman ??
and a second and the second and a second and a second and a second and a second a	Att Canal Course John and
here some time and an anterior and the statements have a solution of a regular water and a regular and real are	HUNN March Marsh 1 1
and the second	and the property of the series of the
which the second of the second	purpuparent and a
numper and the second of the	Martin UMAnager beginting age .
monthly and and the second of the second and the se	man warman ?
March	a provide the produce of
and a contraction of the set and the state of the state of the set of the	Mary Mary Mary Mary Start Start and and and
which you want a show he a further and the show the the show and a show the second and the second and the second	um . Mun
house a part of the share and a share and a share and the second of the share and the share a sh	Shart Hard Hard Start of a
With a March M. And March M. March	donney home on
when the offer a proper the property the property that and when the and the property of the second of the property of the second of the property of the second of the seco	HAMME ME WHAT WANT OF
man and the second second and the second of the second second second second second second second second second	Heat We upper Why in a
and the second second and the second s	L. Law M. H
And the second se	March Mar
and the second	

To avoid power line artifacts, have subjects sitting at least 3 feet from power cords, plugged-in devices, and lighting or overhead fluorescent lights. The Quick-32r shields the sensors from environmental noise, but issues can still occur with poor skin contact. If power line artifacts appear on all channels, lightly wet A1 Reference Drypad Ear Sensor.

Understanding Readings

Improper Setup: No Connected Reference







fig. 2



There are a multitude of recording errors when the A1 reference earclip is not connected to the subject.

The most common are:

- Impedances match or nearly match at a low value but do not appear on the display or in the impedance head map. (fig. 1)
- No traces appear and impedance values are zero. (fig. 2)
- No traces appear and impedance values are high. (fig. 3)

fig. 3

Understanding Readings

Improper Setup: Reference Contact



When the reference channel is touched or jostled, all channels will be affected. Avoid disrupting the A1 Reference earclip during use.

Improper Setup: Reference Disruption



When the reference is disconnected, all channels will disconnect as well.

Improper Setup: Ground Disruption



If the ground has poor contact, all channels will be impacted. Avoid disrupting the connection of the A1 Ground earclip during use. For best results, lightly wet A1 Reference Drypad Ear Sensor.

Device Tab

CGX Acquisition File Tools



Device Configuration

- **Discovered Devices** Connected dongles will be listed here. Select the device name of your system and hit **Connect**.
- The software automatically connects to your device to retrieve stored settings.
- The Device Configuration window is only for your information; changing the settings will not change the configuration of the device. If you need to change device configuration, contact support at CGX.

Data Recording

- Record Click to open a file dialog. Select the desired location, file name, and file type. (CSV files have a time stamp built in). Recording begins when you press OK.
- **To Stop Recording** hit the button again. Elapsed time is shown in the box above the button.
- Start LabStreamingLayer Hit the Start LabStreamingLayer button.
- **Start RDA Server** To use the BCl2000 software with the Data Acquisition Software, click on this button. Then, connect to the application in BCl2000.
- **Timer** The timer allows you to limit file recording to a specific length.

Display Tab

8	CGX Acquisition			-	$\sigma \rightarrow$	<
	File Tools					
÷		Device	e Display (Damels N	laken Sati	15
		See	aling: Headset			
		Tex	* 2	2	~ x	
		See	ele (EEG):	le/V	✓ /Dr/	
•		Sei	sle (ACC): 2	200mg	✓ /Dr/	
		0m	arnela: 🤌	ALL	✓ /Pag	•
		She She	ov Page:		\sim	
		Sa	alng: AM-2			
1		Sa	ala (EXT):	wV.	 ✓ /Dr/ 	
		Sector Se	ale (ExC)	leV.	× /0v	
			ale (Base)		- (Dr	
			- COD			
			-			
					- /0/	
			se vost []	mv .	~ /00	
		Re	sing .		_	
		Here and the second s	h Pass:).5	~ Hz	
		Law	a Pase	100	V Hz	
		Mar	ek H-2 Chern	els .		
		The second se	eshold: 5	5000	✓ kΩ	
		ACC 2				
		ACC23				
•						

Scaling: Headset

- Time sets the x axis time window. By default, it is set to 2 seconds.
- Scale (EEG) sets the y axis vertical gain for the EEG channels on the head.
- Scale (ACC) sets the y axis vertical gain for the accelerometer channels.
- **Channels** sets the maximum number of channels displayed per screen. To flip through the pages of channels, use the option below.
- Show Page switches between different pages of channels.

Scaling: AIM-2 (Optional)

Filtering

- **High Pass** sets the floor (removes offsets and slow signals) corner frequency for the display.
- Low pass sets a ceiling (removes high frequency signals and noise) corner frequency for the display.
- Note: filtering is for display only. Data files are saved raw and unfiltered to preserve the maximum amount of information.

Mask Hi-Z Channels

Threshold hides channels with sensor impedances above the specified threshold from the display.

The display tab controls scaling and other viewing parameters for the signals.

Channels Tab

Image: Section of the section of th		45	Device Daplay	Channels Market	en Status
			Number F	ane Z (kG)	× 0
		Ppa	1 .	4F7 50	
		17	2	-pe 20 F7 110	
		Ta Pa	4	Fz 650	
			5	17 770	
			6	C6 570 Eo1 70	
		FO	8	F4 340	
		Pp1	9	C4 210	
		F4	11 1	286 280	
			12	Ca 560	
			13	08 500	
		02	15	02 540	
		CPI	16	01 1130	
		Cz	17	P3 430	
		80	19	P7 420	
			20	P8 710	
		CH	21	Pz 270	
		02	23	T8 180	
		01	24	C3 1340	
		Pa	25	Fp2 20 F3 180	
			27	F8 200	
		P	28	C5 360	
		P7	29 .	4-8 20 A2 60	
		- PB	31 E	G1 0	
		Pa	32 E	4G.2 0	
			30 4		
			35 A	0034 +	
		T8	36 Pa	sket	
			3/ 10		
		Fe3	٤		>
			been descent O	. beed	in and the second se
		P	ingenance of	i iipis	ande on
		F8			
		FC			
		Art			
		~			
			9 g	0 0 0	•
		ACC:	12 🕒		©
		400			0
			ີ່ຄັ		۵ ۵
		ACC		0 0	-
N N N N N N N N N N N N N N N N N N N		Packet Co	w		
	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	N hace	2R 🗿 🍯	0 0 °	-
					^

The bottom half is a graphical map of sensor contact quality. Red circles indicate poor contact, whereas green circles indicate acceptable contact. The threshold for this contact quality is, by default:

Red Above 2,500 kΩ

Green Below 2,500 kΩ

This threshold can be changed with the Mask Hi-Z menu Threshold for the Quick-32r is set at 2,500 k Ω .

The top half of the Channels tab contains a table displaying information about each channel in the system including its number, name, contact impedance (Z ($k\Omega$)) and sensor offset (Off (mV)). The offset is calculated relative to the reference channel A1.

Markers Tab

0	CGX Acquisition					-	σ×
	File Tools						
						Device Display Channels Recieved Triggers 47831	Makers Satus
						Oear Hat:	9
						Mark 1 Mark 2 Mark 3	Mark 5 Mark 6 Mark 7
						Mark 4 TCP Triggers Port Number: 50000 Start TCP Rec	Made 8
		 	 	 	ACC21		
			 ļ	 	ACC23		
				AAA.	Packet Cour TaiGGER		

Received Triggers

- · The box shows all of the received triggers chronologically.
- If no trigger is in range, value received will be 47831 (in hex: 0xBAD7).
- **Clear History** This button will clear all of the triggers in the box. It will not delete triggers from the recording itself.

Insert Manual Triggers

• You have the option to select any one of eight trigger codes to insert into the recording. These will be inserted in the same way as a normal trigger sent from our Wireless StimTracker. However, we recommend only using the trigger for precision event marking, and to use these software triggers for general annotation.

TCP Triggers

- **Port Number** Allows you to choose which port to receive triggers.
- Start TCP Receiver Starts the receiving service.
- Do not use for precision event marking.
- For general annotation only.

Status Tab

CGX Acquisition					-	σ×
File Tools						
•					Device Display Channels M	arkers Status
					Tranamisaion	
					Data Nate: 3	04. Abts/sec
					Compression Ratio:	1:1
					Lost Packets:	0
					AIM Service	
					Hard Date	0
					1.000 Files.	
					5902	0
					Temperature:	0
					Battery Level	
					Bet A	2.34 V
					Det D	0.00 V
•						
					40034	
	and the second s	farmen and the second s				
•					ACC22	
					ACC23	
S N N N N N N	A A A A A	A A A A	A A A A	A A A A	h h	
					harren	
					- dunner	
				$\mathbf{N} = \mathbf{N} = \mathbf{N} = \mathbf{N} = \mathbf{N}$		

Transmission

- Data Rate Allows you to see the bandwidth being used for the data being sent.
- **Compression Ratio** Shows you the ratio at which data is being compressed and sent to the computer.
- Lost Packets Shows the amount of information dropped in communications between the headset and the computer, increasing as the headset moves away from the computer.
- · AIM Sensors (not applicable)
- **Battery Level** Battery status is displayed at the bottom of this tab. The Quick-32r only uses Batt: A.

Specifications

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			
Accelerometer	3-axis measures head motion			
Range	10 meters			
Noise	<1.0 µV RMS from 1-50 Hz, shorted inputs			
Drypad Ear Sensor	Part No: SEN-DE-40 200 uses			
Drypad Sensor	Part No: SEN-DP-40 200 uses			
Flex Sensor	Part No: SEN-FX-40 200 uses			
Wireless Type	Bluetooth Low Energy			
ΑΡΙ	Full access to raw data via real-time streaming API			
Impedance Check	On-board and on-screen continuous impedance check with real-time monitoring of all channels simultaneous with EEG			

Export To	EDF, BDF, CSV			
Compatible With	Brainvision Recorder, NeuroPype, LabStreaming Layer, EEGLAB, BCILAB, MATLAB, BCI2000, OpenViBE, NeuroGuide and more			
Battery Type	Two AA Batteries			
Battery Life	8 hours			
Applied Part	Type BF			
Minimum Computer Hardware Specifications	8th Generation Intel Core processor 8 GB DDR3 RAM 256 GB solid state drive Integrated graphics processor Microsoft Windows 10			
Weight	646g			
Fits Heads	Sized 52-62 cm			
Dimensions	20 x 18 x 19 cm			

CE RR



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

Quick-32r Headset

3 year warranty on manufacturing defects. 90 day warranty on accessories and disposable parts. Warranty is void if the device has been opened or tampered with.

Returns

All units returned to CGX for repair and assessment must have an RA number issued by CGX.

CGX will pay outbound shipping costs only.

Ship all returns with an RA number to:

CGX Attn: Service 8445 Camino Santa Fe, #213 San Diego, CA 92121



8445 Camino Santa Fe, #213 San Diego, CA 92121 858-864-9400 Sales@CGXSystems.com



Imported By: Brain Products GmbH Zeppelinstrasse 7 82205 Gilching, Germany www.brainproducts.com

Covered by Patents issued and/or pending under license from Cognionics, Inc US9314183B2, US9615761B2, US9935726B2, US8798710B2, and International patents. © 2024 CGX, LLC. Doc: Q32R040524