EMOTIV®

MN8 User Manual

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Copyright

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Regulatory compliance

EMOTIV products are intended to be used for research applications and personal use only. Our products are not sold as Medical Devices as defined in EU directive 93/42/EEC. Our products are not designed or intended to be used for diagnosis or treatment of disease.

FCC ID Number **2ADIH-MN801** and IC ID Number **12769A-MN801**.

EMOTIV has tested Insight and confirms:

This device complies with the radio equipment directive (2014/53/EU).

FCC (Federal Communication Commission)

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference; and
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or experienced person for help.

FCC RF Exposure warning statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must be at least 20 cm from the user and must not be co-located or operating in conjunction with any other antenna or transmitter.

ISEDC (Innovation Science and Economic Development Canada)

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage.
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Radiation Exposure Statement: This equipment complies with the IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

Énoncé d'exposition aux rayonnements: Cet équipement est conforme aux limites d'exposition aux rayonnements ioniques RSS-102 Pour un environnement incontrôlé. Cet équipement doit être installé et utilisé avec un Distance minimale de 20 cm entre le radiateur et votre corps.

ISEDC Radiation Exposure Statements

Radiation Exposure Statement: This equipment complies with the IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

Énoncé d'exposition aux rayonnements: Cet équipement est conforme aux limites d'exposition aux rayonnements ioniques RSS-102 Pour un environnement incontrôlé. Cet équipement doit être installé et utilisé avec un Distance minimale de 20 cm entre le radiateur et votre corps.

Please Note: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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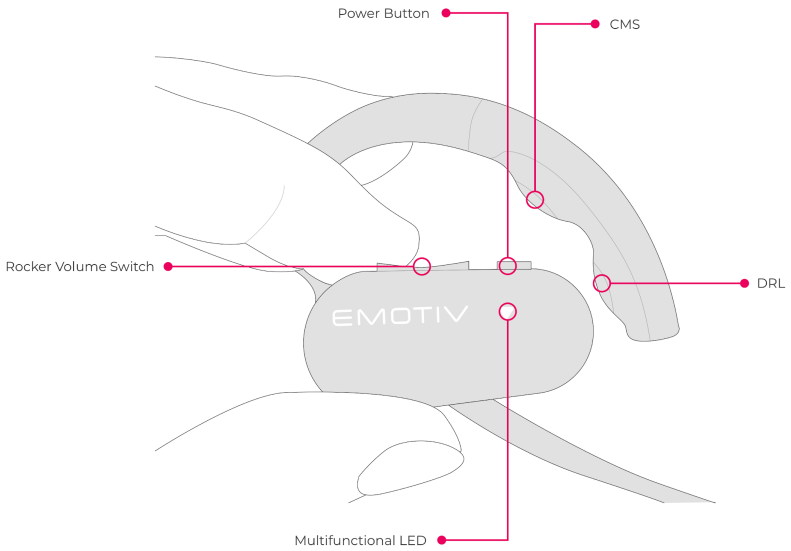
EMOTIV | MN8

EMOTIV is a neurotechnology company that aims to advance the understanding of the human brain with electroencephalography (EEG). Our mission is to empower individuals to understand their own brains and accelerate brain research globally.

MN8 Features

- In-Ear EEG measurement with our dry non-toxic non-allergenic conductive elastomer earbuds (provided in three sizes).
- Bluetooth stereo audio using the industry-standard CSR8670 radio supporting EEG recording in both music streaming with A2DP and HSP for hands-free calls.
- Internal 1-channel microphone with CVC noise cancellation.
- Split referencing for improved background noise cancellation.
- Adjustable earhook with replaceable sensors for improved comfort and fit for the user.
- Internal motion sensor with quaternion outputs for motion tracking.



There is a quick start guide for MN8 on our website. https://www.emotiv.com/setup/mn8/

Application compatibility

EMOTIV | MN8

compatible with:

EMOTIVPRO

EMOTIVBCI

EMOTIV LABS

Technical Specification

Feature	
No. Channels	2
Sampling Method	Synchronous
Sampling Rate	128Hz (8kHz internal)
EEG Resolution	14-bit
Bandwidth	0.5 - 45Hz
Filtering	Low-Pass Filter 45Hz Cutoff
Dynamic Range	8400uV
Couple Mode	AC coupled
Connectivity	Bluetooth Low Energy (4.2) Bluetooth Classic: Supported (A2DP, HSP)
Battery Life	Up to 6 hours (160mAh)
Charge Time	Up to 2 hours
Motion Sensor	6-axis ICM-20648
Motion Sampling	6.4Hz
Motion Resolution	10-bit
Quaternion Output	Yes
Sensor Material	Dry non-toxic non-allergenic conductive elastomer earbud

Safety precautions

- MN8 is a consumer product; it **is not** intended to be used as a medical device or in hazardous environments.
- MN8 earbuds are very small and a choking hazard, please keep away from children.
- MN8 is designed for use in an office environment, it is not designed for use outdoors and is not waterproof. Do not submerge the headset.
- **WARNING**: MN8 is powered by a lithium-polymer battery that is rated for operation in <50°c environments. It **is not** user-replaceable. If you suspect that there is a fault with the battery, please contact EMOTIV Support.
- **WARNING: Do not** open the headset enclosure. Doing so will void the warranty and can damage the headset.
- **WARNING**: **Do not** wear MN8 when charging.

Précautions de sécurité

- MN8 est un produit de consommation ; il n'est pas destiné à être utilisé comme dispositif médical ou dans des environnements dangereux.
- Les écouteurs MN8 sont très petits et présentent un risque d'étouffement, veuillez les tenir à l'écart des enfants.
- MN8 est conçu pour une utilisation dans un environnement de bureau, il n'est pas conçu pour une utilisation à l'extérieur et n'est pas étanche. N'immergez pas le casque.
- AVERTISSEMENT : le MN8 est alimenté par une batterie lithium-polymère conçue pour fonctionner dans des environnements <50 °C. Il n'est pas remplaçable par l'utilisateur. Si vous pensez qu'il y a un problème avec la batterie, veuillez contacter le support EMOTIV.
- AVERTISSEMENT : n'ouvrez pas le boîtier du casque. Cela annulerait la garantie et pourrait endommager le casque.
- AVERTISSEMENT : Ne portez pas le MN8 lors de la charge.

Getting started

Package Contents

1. Replacement tips in.
2. MN8 Headset
3. USB Mini B Charge cable 0.5m
4. Travel case

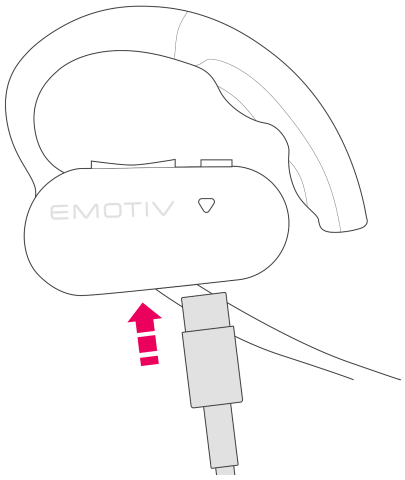
Charging your MN8

Your MN8 is charged and tested before shipping — so you can start using it straight away.

Charging the battery

To optimize the use of your headset, we recommend that you fully charge it before making recordings.

If the multifunctional LED does not glow when you turn your headset ON, it requires charging.



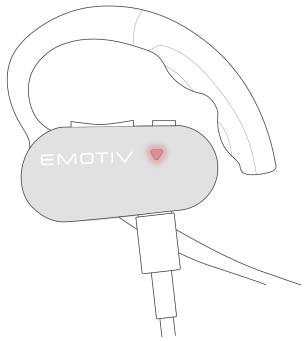
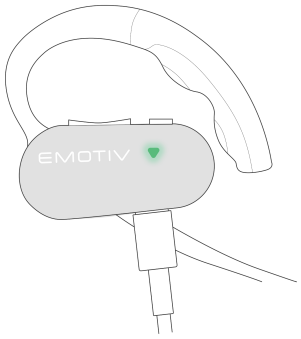
To charge the battery, plug the USB charging cable into the USB port located at the bottom (shown above) of the headset. Then, connect the other end of the USB charging cable to a power outlet or PC/Mac.

The length of time it takes to fully recharge your headset depends on the remaining capacity of the lithium polymer battery. Charging can take up to two hours.

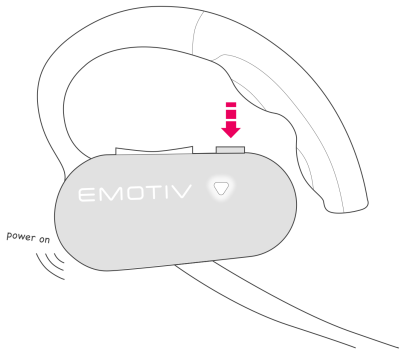
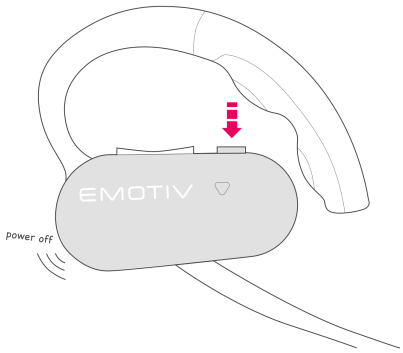
If the headset is unused for a long period of time, the battery will become heavily depleted of charge. If this happens, you may need to charge your headset for 24-hours.

If you have any issues charging your headset, please contact the EMOTIV Support team.

Charging behaviour

Charging	Charging Complete
	
When the headset is charging the red LED is displayed.	When the headset is fully charged the LED turns green.

Turning your headset on/off

Power ON	Power OFF
	
To turn the headset on press and hold the power button for 2s. When you do this, the multifunctional LED will flash and an audio prompt saying power on will be heard.	Press and hold the power button for 5s until a voice prompt saying “power off” is heard and the LEDs turn off. When your headset is turned off the LED will not be illuminated.

Detailed headset behaviour

Note: When the headset is first turned on it will enter pairing mode automatically.

Note: The LED indicator only shows the status of the audio connection and not data.

Action	Button	LED	Voice Prompt
Power On	Long Press Power 2s	Blue	“Power On”
Power Off	Long Press Power 3s	Off	“Power Off”
Pairing	From Off - Long Press Power 5s	Flashing Red/ Blue	“Pairing..”
Connected		3 short flashes BLUE	“Headset Connected”
Disconnected		2 short flashes RED	“Headset Disconnected”
Streaming Audio (A2DP)		2 flashes BLUE	
Incoming Call		Flashing Blue	
Phone Call Active		Slow Pulsing BLUE	
Charging		Solid RED	
Charging Complete		Solid GREEN	
Vol+	Press or Hold Vol+	None	Beep at Max
Vol-	Press or Hold Vol-		Beep at Min
Answer Call	Short Press Power Button		
Hangup Active Call	Short Press Power Button		
Play music	Short Press Power Button		
Pause/ Resume Music	Short Press Power Button		
Delete Pairing Information	From Power Off. Hold Power & Vol - 5s	Red & Blue Flash twice	
Enter DFU (Update) Mode	From Power Off. Connect to PC and Hold Power & Vol+ for 5s	Will turn off	

Button Shortcuts

Turn On/Off = Short Hold Power Button

Pairing Mode = From OFF, Hold Power button 5 Seconds

Delete Past Pairings = From OFF, Hold Power and Volume Down 5 seconds

DFU Mode (Update Firmware) = Plugged into the computer, From OFF, Hold Power and Volume Up

Connecting MN8 to a device

The MN8 reads your brain waves through the earbuds. They are coated with a conductive paint that enables the gold sensor underneath to read the small fluctuations in your brain waves. It does not input any signals to your body or brain (except for sound, of course) - it is purely a reading device.

The hook on the headset has reference sensors that enable the signal to be transmitted, so they must be in contact with the back of the ear on the skin in order for the headset to work properly.

The MN8 headset has 2 data streams; one for the EEG (Brain Data) and one for the Audio Stream (Music etc.) On your device, you will need to connect both streams separately to make sure both work well.

- First, connect the data stream
- Second, connect the audio stream

MN8 is currently stable and supported by Windows 10 and we recommend using EmotivPRO v2.7.3.

Windows computers have various internal wireless modules which handle both Bluetooth and Wifi connectivity which share a common radio. MN8 operates in both Bluetooth Classic Audio (A2DP + HSP) and transmits data over Bluetooth Low Energy. We use a single radio to handle both types of communication and they share a common MAC address. When recording data and audio your headset is in stereo mode which in classic Bluetooth is the A2DP profile and when you join a video call the headset automatically switches to the HSP profile which uses CVC noise cancelling. During this profile switch, there are short dropouts in data transmission while the chip reloads.

On macOS connecting to the same MAC address twice is not allowed and so we have provided a black USB dongle that creates a secondary Bluetooth low energy connection. You pair the audio normally to the internal Bluetooth adaptor and the dongle will be detected by EmotivPRO and provide a connection to the MN8.

The following procedures by operating system goes through how to get started with MN8, it is recommended to connect MN8 to your device first before fitting.

First please turn on the headset. Please note when the headset is new it has no pairing information and will automatically go into pairing mode and the multifunctional LED will flash alternately red and blue. Depending on the device you intend to connect it to there is a slightly different process. MN8 is compatible with Windows, macOS, iOS, and Android. The below flow is applicable to EmotivApp 2.7.3 and associated programs.

Windows

Pairing your headset - For EmotivApp version 2.7.3

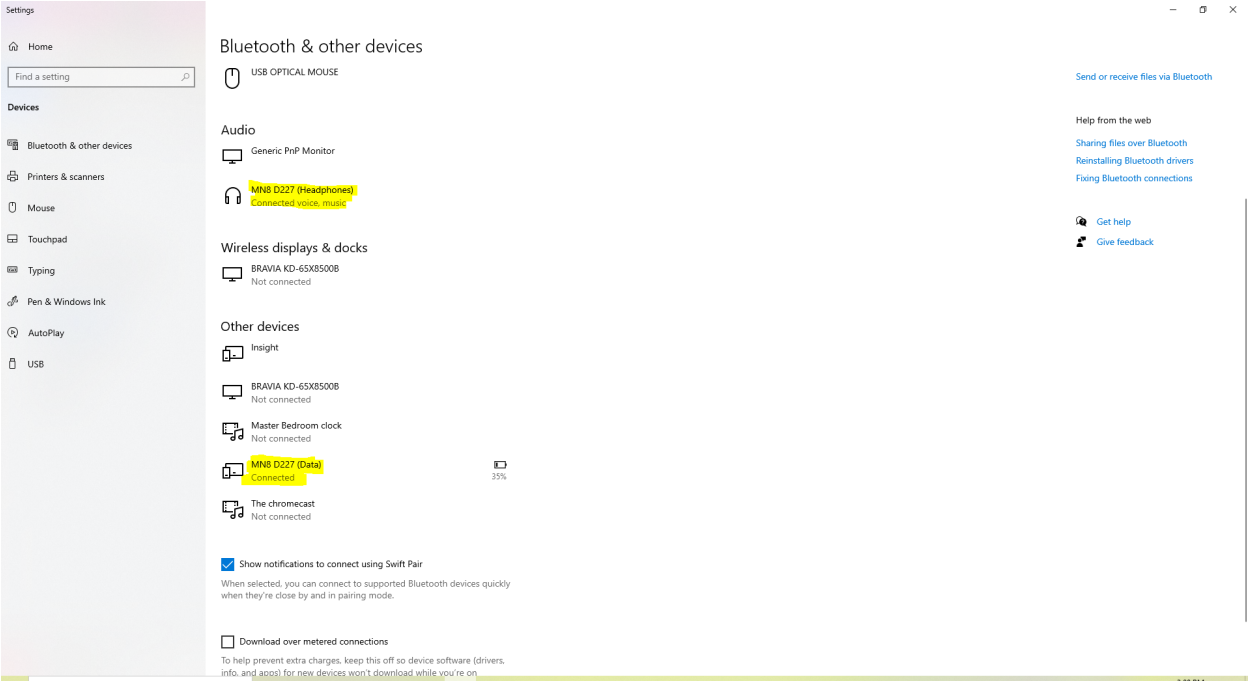
Note: MN8 needs to be connected twice as it has 2 different data streams - 1 for AUDIO and one for EEG DATA.

Before you start, make sure the headset is unpaired to any nearby device that you aren't trying to connect to. If in doubt, turn the Bluetooth off on nearby phones or computers. If the front light is slow flashing blue on your MN8, the audio is connected to something.

1. Turn the MN8 on by pressing the power button. You should see alternating flashing red/blue light (fast flash)
    a. Note: If not automatically in pairing mode. From off, press and hold the power button for 5 seconds until you see blue/red flashing lights.
2. In your Windows Search Bar, type "Bluetooth" and click on "Bluetooth and other device settings".
3. Click on "Add Bluetooth or other device" → Bluetooth → and then select MN8 (Data) from the list Nb: Do not select MN8 (Headphones) at this stage.
4. Click "Add Bluetooth device" again
5. Select MN8 XXXX (Headphones) from the list. Click "allow" in the popup window.

If you cannot see the device in the list, close the dialogue box and click on "Add bluetooth or other device" again. Make sure the MN8 is on, in pairing mode and no nearby devices are trying to connect. If it still fails, power cycle the MN8 off/on and retry.

Your headset should now be connected to BOTH Data and Audio and you should be able to see the following in the Bluetooth connectivity window under settings.



Keep in mind: Headset PAIRED, and headset CONNECTED are 2 different things. You can be paired and not connected, but you cannot be connected without being paired. In theory, you only need to pair ONCE, and then the headset should automatically connect (to headphones) however it's important to check that both HEADPHONES and DATA are connected before each data collection run.

For more information, see https://www.emotiv.com/setup/mn8

macOS

The MN8 headset has 2 data streams; one for the EEG (Brain Data) and one for the Audio Stream (Music etc.) It is not possible to connect both streams to the internal Bluetooth radio because they have the same MAC address. In these instructions, you will pair the internal Bluetooth to audio and you need to use an external dongle for data. If you only use data and no audio then you can do this with the internal Bluetooth only.

Best practice on Mac's show both Sound and Bluetooth Icons in Top Menu Bar
Do this by System preferences > Sound > "tick" show volume in menu bar (bottom of page)
System preferences > Bluetooth > "tick" show Bluetooth in menu bar

There are 2 Connection options for Mac. For all of the options, it is best practice to pair the DATA first then HEADPHONES.

nRF Dongle (Dual Connection)

1. Stream EEG (Data) via nRF dongle
   AND
2. Stream Audio (Headphones) via in-built Computer Bluetooth - works with Stereo Audio

No Dongle (Single Connection Only)

- Stream EEG (Data) only on via in-built Computer Bluetooth
  OR
- Stream Audio (Headphones) via in-built Computer Bluetooth

Pairing EEG (Data) via mac Bluetooth from EmotivApp

Ensure the headset is not connected to any nearby device. Turn it on, it should be flashing RED and NOT say "headset is connected". If it is flashing blue, it needs to be UNPAIRED (not just disconnected) from the device it's connected to. If you cannot find the device it's paired to, "Delete Past Pairings" using the "Button Shortcuts"

If you have a black USB dongle, keep the dongle unplugged for this step.

Data is NOT paired via the MAC Bluetooth settings. Instead, paired directly through EmotivApp.

1. Turn the MN8 On - you should see a flashing RED light on the device
2. Open EmotivApp (Brain Symbol) → Devices → Connect the device

   If you can't see it?

   a. Turn off any nearby Bluetooth such as phones and nearby computers
   b. Move away from Wifi routers and TV's
   c. If you cannot see the device, turn the MN8 off and on again. Wait at least 10 seconds for the device to show. If you cannot see it after 10 seconds, turn it on and off again. You may need to repeat this process a few times. Make sure no nearby Bluetooth devices are on.
3. Once you are connected to MN8 data, you should see it in your Bluetooth connection list (top menu bar) with a paired symbol and MN8 XXXX (Data) written in bold.

Pairing EEG (Data) via nRF Dongle

Ensure the headset is not connected to any nearby device. Turn it on, it should be flashing RED and NOT say “headset is connected”. If it is flashing blue, it needs to be UNPAIRED (not just disconnected) from the device it’s connected to. If you cannot find the device it’s paired to, “Delete Past Pairings” using the “Button Shortcuts”

1. Plug the nRF dongle in
2. Turn the MN8 On
3. Your MN8 Data Stream should show on the EmotivApp under “Devices”

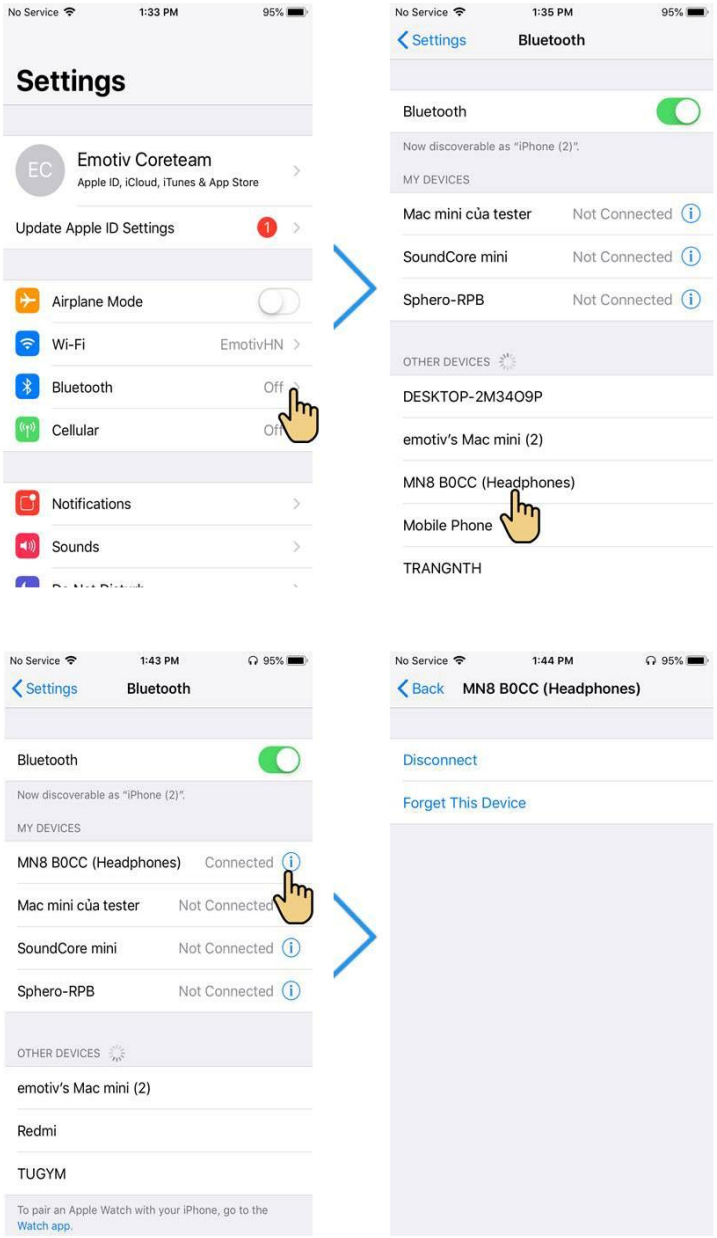
Pairing Audio (Headphones) via Computer Bluetooth in MAC Settings

Ensure the headset is not connected to any nearby device. When you turn it on, it should say power on and either me in pairing mode (flashing red and blue) or it should be in unconnected mode (slow flashing RED). If it is connected to a nearby device it will give a voice notification on power on saying “headset connected” and slow flash blue. If this is the case it needs to be UNPAIRED (not just disconnected) from the device it’s connected to.

1. Put the headset is not in pairing mode please power it off and then to start up in pairing mode, press and hold the power button for 5 seconds, it will turn on and after a few seconds enter pairing mode(you see red/blue flashing lights).
2. On your mac bluetooth setting, add a new device.
3. Find MN8 (Headphones) on the device list and select it to connect.
4. Once you are connected to MN8 Audio you should see it in your Bluetooth connection list (top menu bar) with a paired symbol and MN8 XXXX (Headphones) written in bold.

iOS

Note: EEG Streams through EmotivPRO and EmotivApp for iOS are only available through special BETA Access. However, Connecting to Audio to play music is possible without EmotivPRO or EmotivApp.



Pair Audio (Headphones)

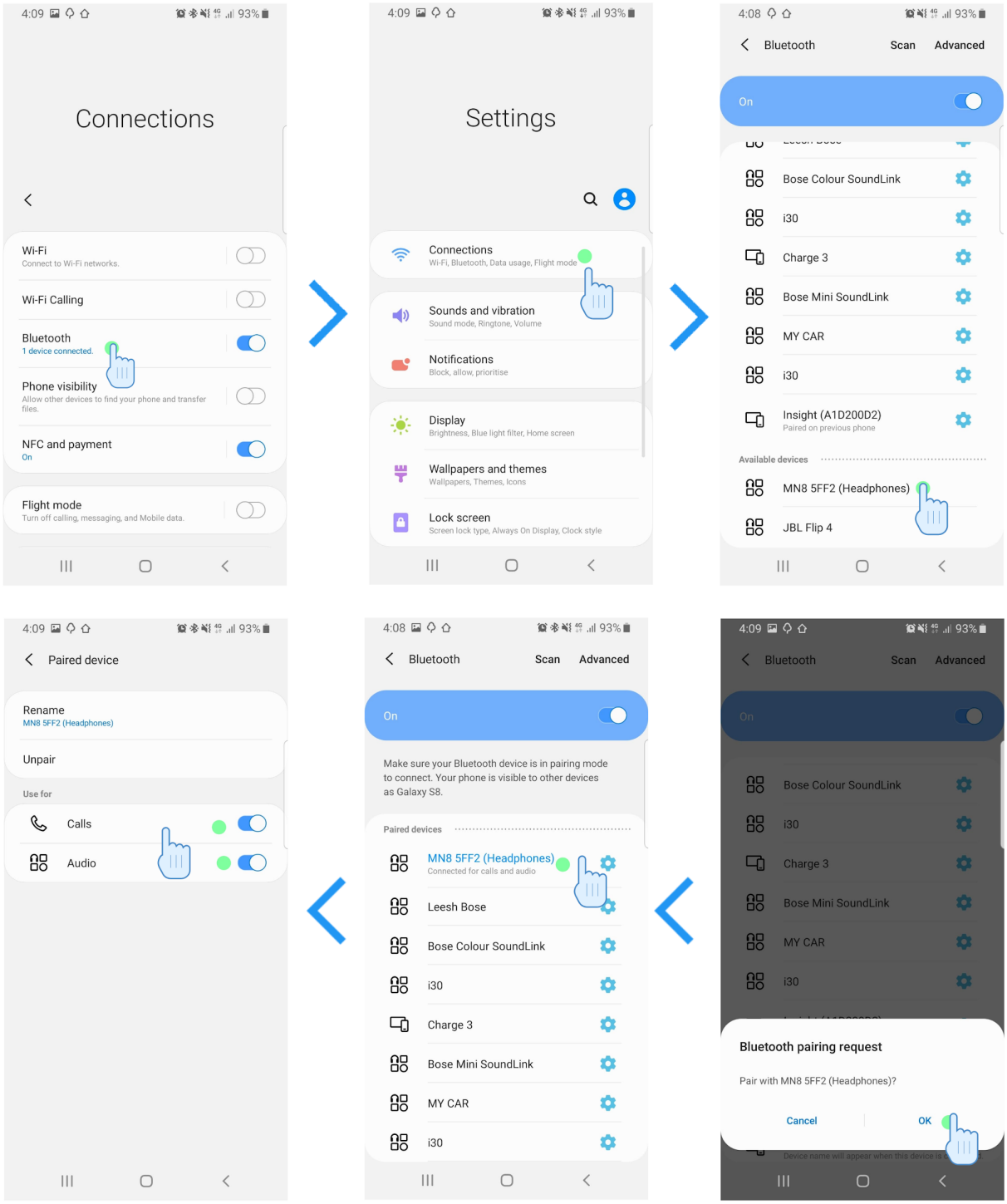
1. From off, put the headset into pairing mode - Press and hold the power button for 5 seconds until you hear “Pairing” and see red and blue alternating flashing lights.
2. In the iPad Bluetooth Menu, In “Other devices” Select MN8 (Headphones) from the list of devices.
3. If cannot find it, turn the headset off and repeat the process.
4. Turn off nearby Bluetooth devices.

Record EEG (Data) - EmotivPRO and EmotivApp TestFlight Beta Access ONLY

Ensure your Bluetooth is **on** on the Ipad

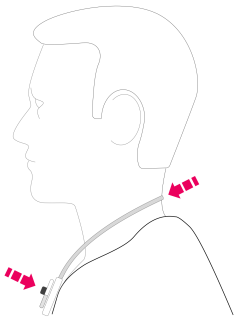
1. Open EmotivApp (Black Icon)
2. Turn the Headset on
3. In the “Device List”
4. Press on the Device you wish to connect and wait
5. If the connection times out, turn the headset on and off and try again
6. If it fails again, turn off all nearby bluetooth devices or move away from them and try again.
7. Once the headset is connected, go to EmotivPRO
8. Click the “Connect Headset”
9. Adjust the headset to achieve 100% Contact Quality and see your raw EEG

Android

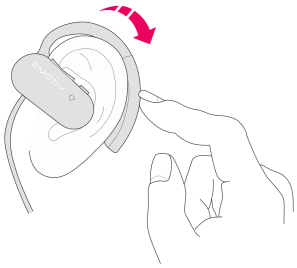

Connections
Wi-Fi
Connect to Wi-Fi networks.
Wi-Fi Calling
Bluetooth
1 device connected.
Phone visibility
Allow other devices to find your phone and transfer files.
NFC and payment
On
Flight mode
Turn off calling, messaging, and Mobile data.
Settings
Connections
Wi-Fi, Bluetooth, Data usage, Flight mode
Sounds and vibration
Sound mode, Ringtone, Volume
Notifications
Block, allow, prioritise
Display
Brightness, Blue light filter, Home screen
Wallpapers and themes
Wallpapers, Themes, Icons
Lock screen
Screen lock type, Always On Display, Clock style
Bluetooth
Scan
Advanced
On
Bose Colour SoundLink
i30
Charge 3
Bose Mini SoundLink
MY CAR
i30
Insight (A1D200D2)
Paired on previous phone
Available devices
MN8 5FF2 (Headphones)
JBL Flip 4
Paired device
Rename
MN8 5FF2 (Headphones)
Unpair
Use for
Calls
Audio
Make sure your Bluetooth device is in pairing mode to connect. Your phone is visible to other devices as Galaxy S8.
Paired devices
MN8 5FF2 (Headphones)
Connected for calls and audio
Leesh Bose
Bose Colour SoundLink
i30
Charge 3
Bose Mini SoundLink
MY CAR
i30
Bluetooth pairing request
Pair with MN8 5FF2 (Headphones)?
Cancel
OK

Fitting your MN8

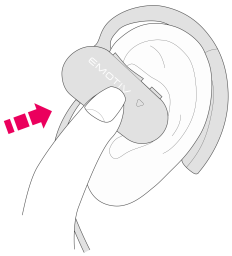
MN8 is designed to be a personal device with an adjustable earhook for improved fit and comfort.



Place your MN8 over your neck with the pod resting against your shoulders.



Take the left-hand pod and feed the ear hook over your ear. Repeat with the right-hand pod. Make sure there is no hair caught in between the headset and the ear.



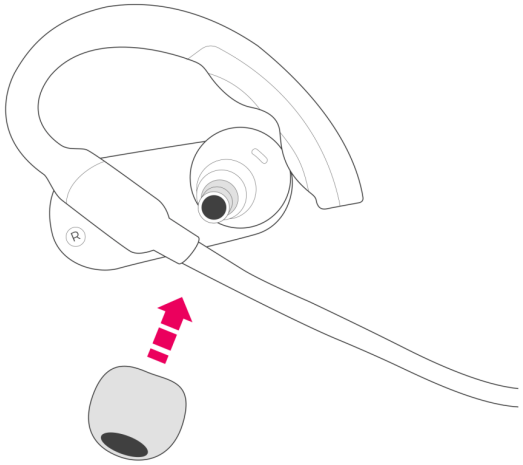
Push the earbuds into your ear canal and make sure that it fits comfortably, but snuggly. Both bumps in the earhook should be touching the back of your ear.

Adjusting your headset

Fitting / Changing the tips

MN8 is shipped with medium tips fitted and we have included two additional sizes in the ziplock, large and small. To do this, pull to remove the current ones from the metal canal sensors. Once removed, you can fit the new earbuds by pushing them onto the metal canal sensor.

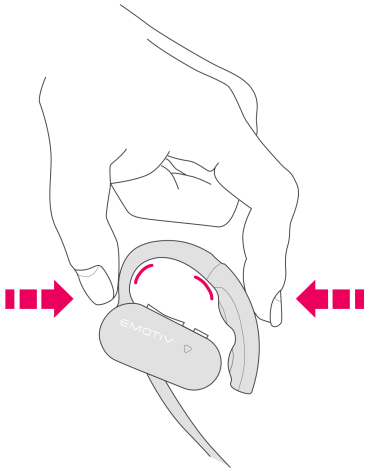
Due to the sensitive nature of EEG recordings, the buds should feel very snug in your ear so there is no gap. If in doubt, size up.



Adjusting the ear hook

If it feels like the ear hook is too tight or loose around your ear, it can be adjusted by gently squeezing or pulling it. The middle section of the hook is flexible - the harder plastic where the reference sensors are not. Take care in bending only the soft section part of the hook.

Do not apply too much force as this could break the ear hook.



Support

EMOTIV Support

If you are encountering problems with your MN8 headset, or have any technical questions, the EMOTIV Support team can assist you. Visit the Contact Support page of the EMOTIV website and submit your query.

EMOTIV Knowledge Base

EMOTIV Knowledge Base provides useful information and solutions for common tasks related to EMOTIV's headsets, software, and user accounts.

FAQs

EMOTIV's FAQs provide answers to some of the most common questions asked by the EMOTIV community.