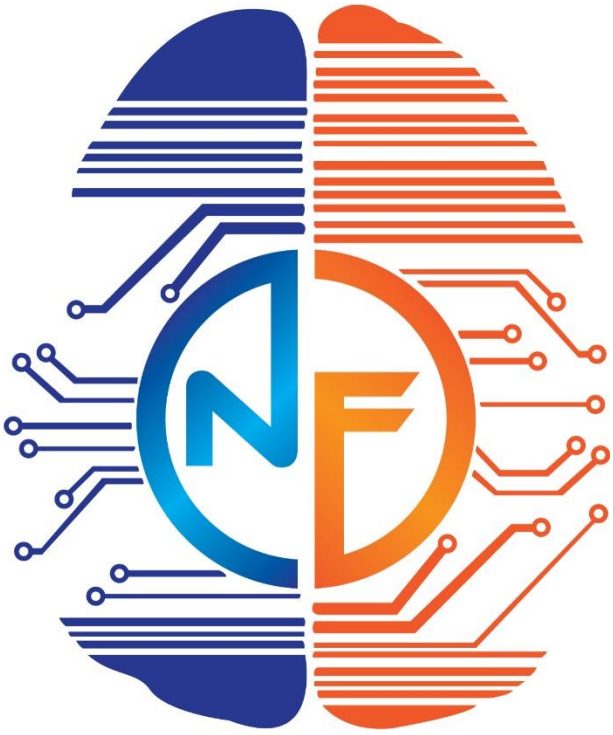
NeuroField64
User Manual



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Contents

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NOTICE OF COMPLETION

AND

AUTHORIZATION TO APPLY THE UL MARK

File E340499 Project Number 4786194205

Product Information

PLEASE READ THIS SECTION CAREFULLY!
IT CONTAINS VERY IMPORTANT INFORMATION
ABOUT YOUR RECENTLY PURCHASED HARDWARE.

CLASSIFICATIONS

In Accordance with IEC 60601-1

The NeuroField X3000 is classified as:

- Class I and internally powered equipment.

- Type B Applied Part complying with requirements for protection against electric shock. Equipment not suitable for direct cardiac application.

SPECIFICATIONS

- Input Voltage = 12v DC
- Maximum Power Consumption = 1.5 Amps
- Storage transport temperature = 0 – 120 degrees Fahrenheit
- Storage transport humidity = up to 95%, noncondensing
- Operating humidity = up to 95%, noncondensing

INSTRUCTIONS FOR USE

Read and follow these instructions when connecting and using the X3000.

- Read these instructions.

- Keep these instructions.
- Heed all warnings.
- Follow all cautions.

 Warnings:

These are potentially harmful situations that may cause injury to a patient or operator:

Electric Shock and Flammability hazard

- Power off the X3000 before cleaning or servicing.

Failure of Operation

- It is possible for any device to malfunction, therefore, always verify unusual data by performing a formal patient assessment.

Operator and Patient Safety

- Do not use this device near water.
- Only use the specific power supply provided by NeuroField, Inc. for the X3000 device.
- Use only attachments/accessories specified by manufacturer.

Patient Safety

- Do not test or perform maintenance on the X3000 while using it on a patient.
- Device is optically and magnetically isolated for patient safety.
- Do not place X3000 attachments over the heart.

Data Validity

- Conditions that may cause inaccurate readings include interfering substances, excessive motion, low signal strength, and incorrect placement of patient applied parts.

 Cautions:

These are conditions that may lead to equipment malfunction or damage.

Cleaning

- Clean with mild detergent and water only

- Use cleaning solution sparingly. Do not immerse the X3000 in liquid. Excessive cleaning solution may flow into the device and damage internal components.
- Do not use petroleum-based solutions or solutions containing acetone, Freon, or harsh solvents. These substances may damage the X3000 and cause a malfunction.

Maintenance and Repair

- There are no serviceable parts. NeuroField equipment is designed to provide years of service without the need for maintenance or calibration. There is no need for routine service or adjustment.

Disposal

- This device contains lead solder. When the unit has reached the end of its service life, the product described in this document and its accessories must be disposed of in accordance with local procedures and regulation.
- As you use the X3000 you will acquire solid wastes that require proper disposal or recycling. These include power supplies, patient applied parts, and packaging materials.

NOTICE: Special Instructions

Responsibility of the Manufacturer

NeuroField, Inc. is responsible for the effects on safety, reliability, and performance of the equipment only if:

- It is used in an area of normal room temperature and humidity, and unit is not subjected to excess moisture, vibration, dust, or shock.
- It is used in accordance with instructions in the “User Manual”.

Transport of Equipment

- Any transport of equipment should be done with the proper protection to prevent equipment from unnecessary jarring and movement within its container.

SECTION 1

The NeuroField System

I. About the NeuroField System

"I am convinced that the therapy of the future will employ heat, light, electricity and agents yet unknown. Toxic drugs shall cede their place to physical agents, the employment of which at least has the advantage of not introducing any foreign body into the organism."

------ Arsene D'Arsonval, 1896

History

NeuroField was developed in 2007 and first released in 2008 as the NeuroField X1000. But, production didn't stop there! Over the next twelve years, the NeuroField System has evolved to become a powerful and revolutionary hardware and software platform. Between 2008 and 2019NeuroField manufactured and produced the following:

- X1000 and X2000
- HRV
- NeuroField Plus
- X3000 Plus
- Q20/Q21
- Z3 (tDCS/tACS/tRNS)
- QCheck
- Neuron4

Z-Score functionality was added into NeuroField in May of 2011, at which time the Real-Time Z-Score (RTZ) procedure was developed. 2013 marked the advent of the Q20 EEG amplifier, and since then it has not only been integrated into the NeuroField software, but it is integrated into both Neuroguide and Bioexplorer as well. The NeuroField X3000 Plus pEMF device was registered with the FDA in 2014, and at that time became eligible to display the Underwriters Laboratories (UL) independent product safety certification mark. Most recently, in 2015 NeuroField released the tDCS/tACS unit with tRNS capabilities being added in 2016.

Overview

Not only has the NeuroField System evolved over the years, but research into stimulation technologies and the science behind it has a well. 2016 was an especially prolific year for research. As you become familiar with the NeuroField system, it is important to read and understand the many case studies available and fully recognize and appreciate the science behind this evolving technology. You can request these studies from NeuroField, Inc. directly.

In its application, the NeuroField System can be viewed as physical therapy for the brain, in that it is a set of devices that are used to rehabilitate a system that is deregulated. Units can be used individually or paired together and used as both a training device as well as a learning device. In doing so, there are specific assumptions to understand when applying the NeuroField System in a clinical setting. **Note:** As always it is important to attend one of the many BooCamps Dr. Dogris & Dr. Thompson teach throughout the year to become familiar with the technology and learn specific methods to pair the

system and accomplish your treatment goals. This document serves as a reference and a “how to”, however it does not replace the benefit of BootCamp discussions and hands-on experience.

Assumptions since 2007

Magnetic and Current Stimulation

The first assumption when using the NeuroField System is that the brain will mimic what is put into it whether it is magnetic stimulation (pEMF-pulsed Electro-Magnetic Frequency) or current stimulation (tACS-transcranial Alternating Current). If you give the brain 5 Hz, it will make 5 Hz. The brain will entrain to the stimulations that are given, and we know as of now, it will follow them up to 1000 Hz. It could be faster, but we don’t currently have proof of that yet. What we do know is that low intensity pEMF and tDCS/tACS can be given at high frequency without damaging tissue.

We also know that when you stimulate the brain and entrain it, you cause capillary dilation. When you stimulate the cells, the cells call for resources and you get more blood to the region causing the dilation. The more blood flow to the region, the more oxygen arrives and with it the potential for neurogenesis. The more oxygen to the region, the more cells proliferate, adding new healthy cells to a damaged network. When there is a damaged region, it’s important to not only heal the area but to also remove any damaged cells as well. When blood flow is increased in the area the more free radicals can get pulled out from the region which will in turn reduce inflammation. pEMF and tACS stimulations are both beneficial for reducing inflammation. Neural inflammation as well as inflammation in the body will reduce when using stimulation technology.

The NeuroField System allows pEMF stimulation with the coils to be combined with tACS alternating current stimulation with electrodes. tDCS direct current stimulation and tRNS random noise stimulation can also be used as an effective primer for pEMF and tACS stims, much in the way the Dehabituator has traditionally been used. When these technologies are combined sequentially or paired up and used simultaneously they can have a very powerful effect on the brain.

The Rich Club

Research has shown that key to maintaining the efficiency of the human brain is a set of large, highly connected network hubs known as the “Rich Club”. This intricate system of networks in the brain needs to be online and functioning as a primary strategy when working to return the brain to its optimal state. When working with the NeuroField System, it is important that you start thinking in terms of:

- Training a group of network hubs, rather than simply training a single Brodmann Area or 10/20 site.
- Identifying the hyper or hypo coherent/phase lag network hub locations for coil and/or electrode placement.
- Beginning to regulate these hub areas first before you start to train at specific locations.

When this large and densely packed network of neurons, known as the “Human Connectome”, is functioning properly, when these hubs are talking to one another, then everything works together — not just a part of the brain, but the whole brain.

The importance of this lies in the notion that if this hub system isn’t working the way that it is supposed to, then the brain cannot properly and efficiently regulate itself. If any two sets of hubs are out, the rest of system is going to be out. For example, if you look at the LORETA data in a brain map and you see an area that is deregulated with excess High Beta and hyper-coherence from front to back of the head, as soon as you get those two regions to start communicating, you start fixing the coherence and phase. Then, you will also start to see the amplitudes (High Beta in this case) begin to regulate. This is often immediately followed by the patient commenting that they feel different.

But, most importantly, if network hubs are not talking to one another, it will affect a patient’s ability to respond to Neurofeedback training. In other words, if the Posterior Cingulate is not talking to the Anterior Cingulate and there is evidence of either hyper or hypo-coherence, it makes brain regulation using RTH/RTZ or Z-Score Operant Conditioning more difficult to achieve. The largest hub in the Rich Club is the Posterior Cingulate. Ensuring that this region is regulated is very important in getting the rest of the hubs to start communicating with one another.

Note: Refer to “Section 2: Software Basics – Training the Rich Club and the Network Hubs” later in this manual for detailed information on using the Rich Club with the NeuroField System software. Also, refer to your NeuroField documents folder installed on your desktop for, “Rich-Club Organization of the Human Connectome”. It is strongly advised to read this document and any other pertinent documents to further understand the research that has been conducted regarding the “Rich Club”.

Cross-Frequency Coupling & The Gamma Frequency

Recent studies in the field of Cognitive Neuroscience have also revealed that not only can examining brain activity in each single frequency band guide us in understanding brain function, but the relation and interaction between oscillations in different bands can be extremely informative as well. This interaction between several oscillations is known as Cross-Frequency Coupling (CFC).

Cross-Frequency Coupling has shown to have an extraordinary effect in regulating cognitive processing and has been linked to both learning and memory. The NeuroField System software program contains several preset CFC protocols to use during NeuroField training sessions. In addition, you can also create your own customized CFC Protocols using the NeuroField Protocol Creator. **Note:** Again, attending a NeuroField BootCamp is highly recommended before creating your own custom protocols.

At the center of Cross-Frequency Coupling is the use of the Gamma frequency, for it is the key to stabilizing the brain and allowing the different Network Hubs in the brain to talk to one another. Gamma is the thread that pulls them all together. The CFC protocols available for use in the NeuroField System are built around the use of Gamma, both Lo Gamma from 40-80hz and Hi Gamma from 80-150hz. The

goal when creating and applying these protocols is to not only utilize the Gamma frequency, but to utilize it in the most effective way possible.

Research has shown that, yes, Gamma is the thread that sews the Network Hubs of the brain together, and it is what makes the Network Hubs talk to one another. But, research has also shown that Gamma can't operate alone. Gamma cannot travel through the brain, say from the front of the brain to the back of the brain by itself. For example, if you Stim Gamma at Fz, it will only propagate at Fz. But, if you want Gamma to help stabilize communication between Fz and Pz or Front (Anterior Cingulate) to Back (Posterior Cingulate) of the brain, it cannot do that on its own.

However, if Gamma is linked to a slow frequency waveform and phase/amplitude matched to that waveform, it can propagate from one end of the brain to the other. As long as a slower frequency is present and the frequencies are phase/amplitude matched, Gamma can ride on its back and get carried throughout the brain, making it more effective while propagating over a wider area. When small amplitude Gamma rides on the back of Theta and goes from Hub to Hub to Hub, those hubs all start communicating with each other. And when they do, you get regulation.

A good analogy is to think about the bottom of the ocean where the largest wave is created. As this wave moves through the ocean floor, it is going to carry everything else in its path. Similarly, if you don't have a slow frequency wave during a Gamma Stim, then you basically have "flat water" and the Gamma can't affect as wide an area as you would like. Linking Gamma with a slow frequency waveform solves that problem. As you see in the provided CFC protocols, along with the Gamma frequency, they also contain phase matched Delta, Theta, Alpha and/or SMR frequencies as well. This is known as "nesting" or "coupling" the frequencies. Again, this is an evolving technology. As more studies are published and additional research is conducted, the range of possibilities and the scope of what can be done with these revolutionary tools will expand as well.

X3000 Plus Unit

The X3000 is a low intensity 4 channel pEMF (Pulsed electromagnetic field) generator using four 200-wind coils packs for placement anywhere on the body. The frequency range is from 0.31 to 300,000 HZ with the ability to generate sine, triangle, and square waveforms. When paired with the Q20 or Q21, the X3000 Plus can combine stimulation with Z-score, norm referenced operant conditioning training. This is a STIMULATION ONLY unit, and it does not acquire any data. If you wish to collect EEG data, see the Q20 or Q21 devices.

rTMS & pEMF What is it?

The use of energy to address human ailments has been a source of exploration for centuries, beginning with the use of electric eels, to the use of static electricity, to various forms of magnetic therapies that used stones, ore, and the laying of hands to heal those afflicted with various illnesses (Kellaway, 1946; Payne, 1990; Quinn & Strelkauskas, 1993; Quinn, 1984, 1992; Krieger, 1975). In the past 30 years there

have been many different types of energy techniques offered as a form of valid therapy. One of these modalities is known as transcranial magnetic stimulation, or TMS.

TMS was originally developed by Anthony Barker at the University of Sheffield in 1985. Barker demonstrated an evoked motor response (thumb movement) by applying an electromagnetic stimulation (EMF of 1-2 Tesla) over the motor cortex of humans (Barker, Jalinous, & Freeston, 1985). As the technology evolved it became possible to give multiple pulses to people which gave rise to *repetitive* or rTMS. Since that time a great deal of research has been conducted strongly suggesting that rTMS has clinical value for the treatment of depression and other psychiatric conditions (Pascual-Leone et al., 1999; Arns, M., Spronk, D., & Fitzgerald, P. B. (2010); Avery, D. H., Holtzheimer, P. E., Fawaz, W., Russo, J., Neumaier, J., Dunner, D. L., et al.(2006); Brakemeier, E. L., Wilbertz, G., Rodax, S., Danker-Hopfe, H., Zinka, B., Zwanzger, P.,et al. (2008).

rTMS protocols are known as either being high frequency (HF-rTMS, EMF stimulation 5Hz or greater) or low frequency (LF-rTMS, EMF stimulation 1 Hz or less). The EMF frequency and site of stimulation is theorized to have clinical effects that can have either an excitatory or inhibitory impact on neuronal cellular activity. However, due to the high intensity of EMF, giving stimulation faster than 20-30 Hz at intensities >1 tesla for long durations can result in the generation of heat which can damage tissue. As a result, rTMS protocols are typically given in short pulses with an 'on' and 'off' time that prevents tissue damage, but it also limits the frequency range in which the therapy can be given. The safety of rTMS therapy was deemed safe by the FDA in 2008 and approved for the treatment of depression in the United States.

The notion that low intensity pulsed electromagnetic (pEMF) stimulation could be of clinical value was one of the driving forces behind the development of the NeuroField technology. The NeuroField X3000 is a Pulsed Electromagnetic Field (pEMF), four channel frequency generator that can generate a pEMF frequency range of 0.31 – 300,000 HZ. pEMF with an output intensity range from 1-50 microTesla (uT) that is 10,000,000 times weaker than an EMF pulse given by rTMS devices.

Unlike rTMS, which forces a depolarization of the neuron, NeuroField pEMF stimulation again is simply 'copied' or 'mimicked' by the brain. In this way, the brain can be 'driven' at different speeds depending on the clinical needs of the person. Since the output of NeuroField is so low, it is possible to give pulsed EMF stimulation faster than 10Hz, at long durations, without the concern of generating heat and causing tissue damage.

The Z3 (tDCS/tACS/tRNS) Device

The NeuroField Z3 unit is a very powerful device that provides you with a tremendous amount of clinical application for your clients. It's important at this point to go slow and take your time to get acquainted with it. This document will help you to get started, but is not a supplement for training. Here we touch on all the basics of the tDCS/tACS/tRNS system and help you to get setup and running as effortlessly as possible. However, it is highly recommended that you attend a formal training by

Dr. Nicholas Dogris & Dr. Tiffany Thompson to learn how to use this device for clinical purposes. Be rest assured you will soon experience for yourself what a great addition this unit is to your NeuroField System.

Research & Safety Standard Studies

NeuroField adheres to strict safety standards to provide the full benefit of this stimulation technology without the potential for its misuse. It is important to read and understand the safety standards adhered to with the NeuroField system. Telling a patient or family that you are going to run current through the head can be a scary proposition, so make sure you know the studies and can hand them out if necessary.

In the "Safety of transcranial Direct Current Stimulation: Evidence Based Update 2016" study one of the result highlights is that to date, the use of conventional tDCS protocols in human trials (for a maximum of less than or equal to 40 minutes and less than or equal to 4 mA) has not produced any reports of serious adverse effects or irreversible injuries. This study was with 1,000 subjects across over 33,200 sessions and with repeated sessions. It was performed by a group of researchers, so it is a meta-analysis and thus a very good study.

What this study showed is as a safety standard, it is not recommended to use the NeuroField Z3 unit for any longer than this study, < = 40 minutes per day. If running two session a day it is suggested to keep the sessions at a max of 20 minutes to stay within the 40-minute safety standard. Also, NeuroField only produces a current up to 2.5 mA which is well below the < = 4 mA max used in the study, thus the device is well within the safety range. Even using 2.5 mA is more current than necessary to produce good clinical results. Quite often .1 mA or .5 mA has shown to have a therapeutic effect, especially for sensitive patients.

The NeuroField 2.5 mA cap may change in the future as manufacturers produce devices and the use of stimulation technology becomes more widespread. For now, 2.5 mA has proven to be sufficient for regulating a deregulated system. A good rule of thumb is to know the sensitivity level of your client by asking such questions as, are you sensitive to light and sound, then dial the mA range per their sensitivity levels—starting low and increasing as you go.

Both electrodes and sponges are supported when using current stimulation with NeuroField. The connectors are safe connectors so you can use any standard EEG electrode connector to deliver a current, including regular EEG electrodes. Most often gel electrodes are used on the skin i.e. over the Mastoid, and silver-silver chloride sintered electrodes are used over the hair with 10/20 paste. These tend to cover a smaller area, whereas if you use sponges it will cover a broader area. You can give > .5 mA through the smaller electrodes, it will just cover a smaller area and thus be more intense. Again, know the sensitivity level of your patient and start with low mA and gradually increase it.

As another matter of safety, the upper limit of the power frequency that can be given with NeuroField magnetic stimulation is topped at 50 microTesla (uT). The tACS current stimulation in NeuroField is capped at 1000 Hz and white noise at 8000 Hz. Thus, the NeuroField System can give long intensities at high

frequencies without burning or harming tissue.

One of the things that is coming out in the research now is HD tDCS/tACS, referring to when an electrode is placed directly on a specific 10/20 location. One of the studies talks about “Fluid Intelligence” and how to increase Fluid Intelligence. What the researchers did was place the anode at P3 (Left Parietal), and the Cathode on Fp2. The results of the study suggest that Fluid Intelligence improves with this specific electrode location. So, you can use electrodes and go directly over 10/20 locations as well to improve functionality. For more information, contact the NeuroField office to obtain this and other studies.

Calcium & Sodium Ion Activation

MRI data and multiple studies have shown that using stimulation technology causes calcium activation in the glial cells of the brain. Studies found that you not only get glial activation at the area where you apply the stimulation, but as soon as that area is activated, it cascades to surrounding areas and has a global effect. The current will go all the way through the brain, so it will affect the cortical, sub-cortical, and even the brain stem areas of the brain. Studies have also shown that sodium activation occurs as well, which can create an increase of evoked potential response.

When brain goes into a state of neuroplasticity it creates a phase shift giving you an open window for training. Thus, you can take a patient, put them into a neuro-plastic state and use the Neurofeedback feature and/or alternating current or electromagnetic features in NeuroField to train them.

tRNS what is it?

Of all the technology in the NeuroField system, tRNS is the most evolving of the set. If the theory of calcium ions and sodium ions is even remotely accurate, with tRNS you will cause surges to the entire system that is also giving rise to neuroplasticity. With tRNS every coherent connection and every phase connection will get broken up and “unstuck”. Once it does so, the brain can then reconfigure itself to its previous functional state. **Note:** It is important to know if your client has a good pre-morbid history or history of functioning prior to the existing problem. If so, the brain can reconfigure itself to an optimal state. If not, you will need to train the brain to do so once you have decoupled it. The brain is not going to know how to reorganize itself appropriately. You must show it how once.

tRNS is also a transcranial random noise stimulator that outputs “White Noise” as an alternating current. The definition of White Noise is random frequencies of equal intensity across a defined frequency spectrum. What makes White noise unique is that unlike a regular waveform, it creates all the frequencies in the spectrum simultaneously. It will give every frequency at equal intensity randomly. This creates noise in the system that saturates every neuron in the brain. You can think of the tRNS as another kind of Dehabituator. It is the “Ultimate Dehabituator” using current stimulation. However, it goes way beyond Dehab in that you are giving a significantly broader range of random frequencies simultaneously that the cellular network cannot maintain its pathology—it must decouple it.

The top end of tRNS in NeuroField is capped at 8000, but you can define the top end of the spectrum at or below that cap for any given treatment. For example, you can set the top end to its max of 8000 or set it to 1,000 or 100 or 50 and it will create random noise of equal intensity within the spectrum that you define. **Note:** The feeling is markedly different in each range that you set, and it is suggested that you experiment with different ranges. For more information on tRNS and building protocols, go to "Section III Software Basics - Using Stimulation Protocols."

tDCS/tACS/tRNS Benefits

Generating a Learning Paradigm

The pEMF stimulations and all the tDCS/tACS stimulation technologies are wonderful, and by themselves they will have a certain amount of clinical utility. For some people, it does the trick and they are good to go. But, for other people you need to generate a learning paradigm that allows the brain to learn how to establish these new pathways and to remember how to maintain the configuration that we are creating with the stimulation technology. That is why the RTZ procedure is effective. It creates a learning regiment for the brain to adhere to.

With people who have a poor pre-morbid history, this procedure is particularly good. So, if you have somebody, for instance a child with Autism or Asperger where they have never really had a good period of functioning, their pre-morbid history is poor. This means that the brain doesn't know how to reorganize itself after it has been decoupled. It must be shown how to reconfigure itself. The RTZ procedure can not only do just that, but it can also generate the learning necessary to deepen the effects and get longer term results.

Running Neuroguide

Another option is to run Neuroguide while having the electrodes either on the Frontals and the Mastoids or through the Mastoids directly. You can set low frequency stimulations at 0.1 or .1 cycles per seconds that don't get picked up by the EEG because they are below the high pass filter which will cut off at .5 cycles per second. This means that the EEG won't be corrupted and you can generate real Zscores and real EEG in real time and get some significant changes. But, what you are doing essentially is using polarity shifts at low frequencies to off-set the brain or decouple it. This changes phase dynamics and enhances the training effectiveness.

tRNS and Tinnitus

Tinnitus is the perception of a sound in the absence of an external sound stimulus. This phantom sound has been related to plastic changes and hyperactivity in the auditory cortex. Tinnitus affects 5–15% of the western population and between 6 and 25% of the affected people report symptoms that are severely debilitating. Neuroimaging and electrophysiological studies indicate that excessive spontaneous activity in the central auditory nervous system and changes in the tonotopic map of the auditory cortex are associated with the presence of tinnitus.

Traditionally neuromodulating techniques such as transcranial magnetic stimulation (TMS) and transcranial direct current stimulation (tDCS) have been used to try to reduce tinnitus symptoms. Most

recently, however, pulsed electrical stimulation using weak currents such as transcranial alternating current stimulation (tACS) and transcranial random noise stimulation (tRNS) have also shown significant neuromodulatory effects. In a recent study comparing tDCS, tACS, and tRNS in 11 tinnitus patients, the results showed that tRNS induced the largest suppressive effect on tinnitus loudness and the tinnitus related distress.

For further details, read "Tinnitus tRNS.pdf" located in your "NeuroField Documentation" folder placed on your desktop during installation. This case study supports the superior effects of tRNS as a method for tinnitus suppression, especially when set at 1 – 100 Hz and 100 – 640 Hz.

Entrainment vs Desynchronization (or Decoupling)

The NeuroField Stimulation technologies are not just entrainment devices i.e. using tACS or pEMF. This technology will not only entrain the brain, it will also desynchronize and decouple the brain to break up aberrant patterns. Think of it this way:

- **EEG Biofeedback** is operant conditioning and as such is not considered to be an entrainment method. Here you are training the brain based on a biofeedback loop and system of rewards.
- **pEMF** introduces an electro-magnetic field within a specific frequency range, applies it to the area of the coils and the brain will entrain to those frequencies. Thus, pEMF is an entrainment device.
- **tACS** introduces an alternating current within a specific frequency range, applies it right through the system, and then the system will entrain to and take on those rhythms. And, it will continue to do so after the treatment is complete. Thus, tACS is an entrainment device.
- **tRNS** introduces an alternating current at multiple frequencies randomly and simultaneously to break up aberrant patterns, thus it is not an entraining device. The brain does not know which frequency range to entrain to because it is getting hit with many different random frequencies simultaneously. Thus, tRNS is a not an entrainment.
- **tDCS** introduces a current through the system (no frequency) causing the system to desynchronize itself and break up aberrant patterns. Thus, tDCS is not an entrainment device.

Current Stim Montages

tDCS in both studies and in clinical application has proven to be effective for a variety of symptoms. For example, we have seen that if a Parkinson patient is really stuck in one area, i.e. motor cortex—either hypo and/or hyper-coherent, you can run 2 tDCS units simultaneously using a DC stimulation montage to break up the coherences. For example:

- Fp1 to 01
- Fp2 to 02
- Anodes on the Frontals
- Cathodes on the Occipitals

Once you have applied tDCS to break up coherences, you now have an open window to train patient. You can then continue and run AC stimulation on the area or even run a Neurofeedback treatment. After five sessions, Parkinson symptoms have shown to drop, exemplifying what can be done with the NeuroField System. Other studies have shown that tDCS helps treat depression symptoms as well as

improves accuracy on cognitive training tests. See “II References” later in this section for specific studies and their citing.

You can go to www.totaltdcs.com and find a comprehensive set of montages for direct current stimulation and electrode placement. These are montages that have been used for a long time and do have clinical efficacy. However, it is not advisable to treat anyone without working up their data, either through QEEG or other brain mapping methods. It is important to be diligent, get the data, conceptualize it, and come up with a hypothesis. Then, match the data to the person and have an individualized approach to building your treatment plan. If you have the data, make your electrode placements based on site deregulations rather than a “canned” solution these montages provide.

However, if you get someone that you don’t have data on and you have a “right now” situation, it may be necessary to “treat blindly”. In this case, you can go to these montages and pick one for the problem you are trying to treat. For example, if you want to get somebody out of a depressed state, F3 Anode and F8 Cathode is a good choice. If you have somebody with ADHD and you really want to get their frontal lobes going, 15 – 19 Hz Protocol (using Alternating Current, not Direct Current, as DC is not a frequency) at F3 and F4. More than likely you are going to entrain that area and speed it up. Here too you need to be careful not to speed them up too much and cause insomnia or irritability.

A good rule of thumb is to evaluate the behavior of the patient. If they are presenting too slow give 15 – 19 Hz, if they are going too fast, give them a 1 – 4 or 12 – 15 Hz Protocol. These have proven to be safe ranges. Again, it is advised to attend a BootCamp to learn the best methods for making these types of treatment decisions.

Peak Frequency

Most people average a Peak Alpha frequency of around 10 Hz, but it is important to know what your patients Peak Alpha frequency is. Alpha is a harmonic carrier, so you can use an Alpha harmonic at say 20 Hz to entrain and increase the amplitude of the Peak Frequency. To do this find what their Peak Alpha is, then double it, and then give them tACS to increase that amplitude. If a person is 9.58, you can double that number and enter it into NeuroField and give it manually. This is good for peak performance.

Severe Patients & Cautions

Again, this is evolving technology and the use of tRNS versus DEHAB is still being researched. A good rule of thumb is that tRNS is for more severe patients, i.e. people with Parkinson’s or Alzheimer’s or Stroke. Both tRNS and tDCS, as well as tACS have shown to have a good clinical effect for these types of pathologies. If you have a stroke patient make sure that they are sufficiently healed and medically cleared to use this procedure. You will cause capillary dilation, increasing blood flow to that region. Make sure they are at least 4 – 6 weeks post stroke, and you know where the stroke happened before you work on a stroke patient and/or make any treatment decisions for a stroke patient.

The same is true for Multi-Infarct Dementia or Vascular Dementia where a patient is having small little strokes in their brain, they may not be a good candidate for this treatment. For any presenting problem that vassal dilates, it will put pressure on the blood vessels and may not be a good candidate for treatment. Again, this is evolving technology and in another few years more will be known about the effects and how to treat vascular problems. For now, it is not advisable to treat someone with Vascular Dementia.

Q20 & Q21 Amplifiers

The Q20 EEG is a 19-channel EEG amplifier and now the newest device, the Q21, is a 19+1 channel EEG amplifier, both with a low-noise design that allows for recording EEG without worrying about noise contamination. Both devices are fully integrated into the Neuroguide software and utilize the Neuroguide (www.appliedneuroscience.com) Z-score normative database to determine the response of pEMF on the brain. In NeuroField64 you can not only acquire stand-alone EEG using either device, you can also use either the Q20 or Q21 to synchronize EEG with stimulation (pEMF, tACS, or both) during a single session. Combining Z-score with EEG takes Neurotherapy to a new level of effectiveness.

HRV/Neuron4 Unit

Body Protocols

The NeuroField system was designed to run protocols for the body as well as the brain. It can be used to target specific frequencies that effect changes in the body relating to pain, bone injury, inflammation etc. Using NeuroField in this way allows you to work with the whole person not just the brain, and often times it has been shown that when you stabilize the body, especially the gut, then the brain all of sudden begins to regulate itself. This has also been shown to facilitate better tolerance of subsequent neurofeedback training. In later Sections of the NeuroField manual we will discuss how to use the HRV option from the Neuronn4 with Nogier Frequencies, and how to make FEW water as a means to run protocols for the body. **Note:** NeuroField HRV can also be used with the tDCS/tACS device. See “The HRV Procedure” in the next Section for detailed information.

About Nogier Frequencies

One effective means to influence the body as well as the brain is to run protocols using the Nogier Frequencies. Paul Nogier was a physician in France who in the 1950’s and 1960’s developed a system of frequencies based on what he coined “Auricular Therapy” or acupuncture treatment on the ear. Nogier spent 30 years of his life devising a system of seven basic frequencies that correspond to every chakra system in the body. These frequencies, some of which have proven to be very effective for pain, have been tested over the last 50 years and have been shown to be extremely safe and effective.

There are two types of body protocols that can be built when using the 7 Nogier Frequencies in NeuroField: Custom Protocols and Built-in Protocols. A Custom Protocol uses the HRV sensor device to muscle test the heart. This is not HRV variability training, but rather a procedure to build protocols from the Nogier database that are customized for a particular client. This is done by first measuring the body's responses to receiving stimulations using the HRV sensor and then running the Nogier frequencies the

body likes the most. The idea behind this is that if the body wants a particular frequency then the heart rate variability will increase. And, if the body gets the Nogier frequency that it wants, this facilitates clients finding relief from their symptoms.

With the second type of protocol, Built-in Protocols, you can simply use an existing protocol from the Nogier database on the body in the area of complaint, for example bone, tissue, nerve, or inflammation. A very common use of built-in Nogier protocols on the body is "B – gastrointestinal and metabolic (Low)" over the gut. Nogier linked 4.75 Hz to the gastrointestinal and metabolic system in the body. If this frequency is given over the gut, it can help relieve toxins and a number of different ailments such as autoimmune issues, asthma, allergies. Research has also shown that 4.75 Hz inserted over the gut stimulates a serotonin release. This facilitates a neurotransmitter release and clients have reported feeling better as a result of just getting this protocol. **Note:** This procedure is an intermediate to advanced skill that requires training and experience to conduct. It is strongly recommended that you participate in a NeuroField training before using this technique.

QCheck

The QCheck is an electrode impedance checking instrument supplied by NeuroField, Inc. that can be used to read the:

- **Contact Impedance Levels** (Kohms) at the skin/electrode interface for each site to determine if there is noise and a reduction in (Kohms) is required.
- **Contact Potential Levels** (mVolts) for each electrode wired in the cap to determine if there is a deviant/broken wire and a sensor replacement may be required.

Once an E1-LEX cap has been connected to the D25 pin connector, you can then use the QCheck software option to easily evaluate where there is noise between the electrode and the scalp and/or whether or not you may have a bad electrode/broken wire. **Note:** The QCheck runs on a 9 volt battery. If you leave it on you will only have an 8 hour window of power. So be sure to turn it off immediately after you have checked your impedance.

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SECTION 2

Software Installation

I. NeuroField64 Software Installation

Thank you for purchasing the NeuroField system. The following instructions are designed to help you download and install the NeuroField64 software and ensure that you can access the NeuroField Message board from within NeuroField Yahoo Groups.

The minimum PC specifications for running the NeuroField64 software are an i5 Intel processor, 4 Gb RAM, nVidia graphics card capable of 1600x1200 resolution and 100 Mb disk space. At this time NeuroField supports:

- Windows 10
- Windows 8
- Windows 7
- Windows XP

Older operating systems are not supported and NeuroField does not support:

- Apple Macintosh systems
- Apple PC emulators
- Windows Vista

Overview

The instructions in the "NeuroField64 Software Installation" section of this manual will walk you step-by-step through the NeuroField64 installation process. Each section provides separate instructions for installing the NeuroField64 software for the first time or for installing an update release when appropriate. The following is a brief overview of the installation process in general:

Zukor Media Player and ANI Z-Score DLL

The Zukor Media Player must be purchased separately to use Zukor as your "Feedback Type". You can purchase the software directly from the NeuroField office for a 10% discount. At first run, Zukor will prompt you for an Activation Code. Once you purchase the software directly from NeuroField, you will be provided with an Activation Code. Also, if you want to use the RTH/RTZ feature in NeuroField, you must have purchased the ANI Z-Score Dll separately as well.

The NeuroField64 Installation Process

The following is an overview of the steps you will follow to complete the NeuroField64 software installation process. Detailed instructions for each step are included below. When installing, you will:

- Go to the NeuroField website and fill-out the "Download Form". A software download link will be emailed to you.
- Follow the link and download the Software from the NeuroField website.
- Unzip the software
- Back up your Patient Database (if updating the software only; not applicable for 1st time installing)
- Run the NeuroField64 Installation program. The NeuroField64 installer is a "5 in 1" installation process during which you will automatically launch several separate installers with prompts to install the:

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- NeuroField64 Software
- Microsoft Access Runtime Engine
- Peak CANBus USB Drivers
- Microsoft CLR Type for SQL Server
- Microsoft Report Viewer

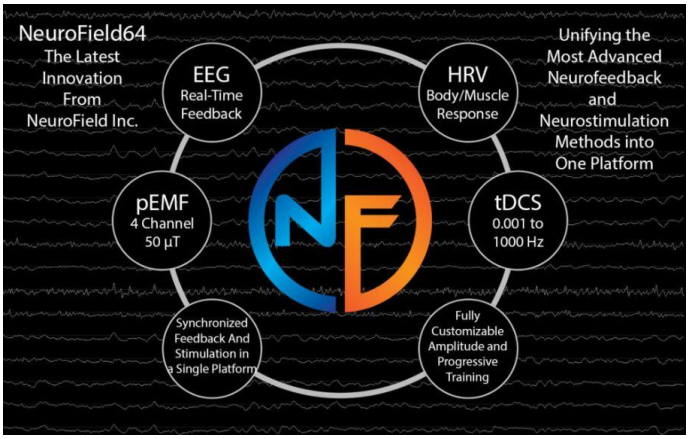
- Download and run the Support Files (if purchased and 1st time installing).
  - ANI DLL installer.
  - Zukor Media Player Installer
- Restore your Patient Database (if updating the software only; not applicable for 1st time installing)

Downloading the NeuroField64 Software

The instructions here will walk you through the process of downloading the software from the NeuroField website and unzipping the files to your computer.

To Obtain a Download Link:

1. Go to the NeuroField website at www.NeuroField.org



2. Click on “Software and Support” option from the main NeuroField Menu Bar and select “NeuroField64 Downloads” from the drop-down menu. Several Download icons will appear.
3. Click on the “NeuroField64 Download” icon and the “NeuroField64 Download Form” page will appear
4. Fill out your name and email, solve the problem, and click on the “Submit” button. An email with a link to the software download will be sent to you.

To Download and Extract the Software:

Note: To access the files once you have downloaded them, you do not need to download any additional software products.

1. Create a folder on your Computer and name it i.e. “NeuroField64”. This will be the Destination folder for your downloaded files.
2. Go to the email from NeuroField, Inc. that contains your download link and click on the link. The

Google Drive download page will appear.

3. Click on the  download arrow in the upper right-hand corner of the screen. A "Google can't scan this file for viruses" message will appear.
4. Click on the "Download anyway" button. The download status will appear at the bottom of your screen and the "xxxx.Zip" file will download to your Windows download folder. **Note**: This may take a while, so you can check the downloading xxxMB status at the bottom of the page against the total (xxxM) listed at the top of the Google Drive page.
5. When the software is finished downloading, navigate to and open both the "Downloads" folder on your computer and the "NeuroField64" Destination folder that you created in Step 1. Both folders should be open next to one another.
6. Drag or Copy/Paste the "Volume_3_x_x_x.zip" file from your Downloads folder to your Destination folder. **Note:** Before proceeding make sure you don't have any other "Volume" folders from previous installs in your Destination folder. If you do, either rename or remove them.
7. Close your "Downloads" folder and from your Destination Folder, Right-Click on the "Volume_3_x_x_x.zip" and select "Extract All" from the drop-down menu. The "Select a Destination Window" prompt will appear.
8. Browse to your Destination folder where the files will be extracted to and when its pathname is listed, click on the "Extract" button. The "Volume" file folder with all its contents will be extracted into your Destination Folder. This folder contains the NeuroField setup software.

You are now ready to install the NeuroField64 software.

Installing the NeuroField64 Software

Important!!!!! If you have already installed a version of NeuroField64 and you simply want to update your software to a newer NeuroField64 version, **STOP NOW!!!! YOU WILL NEED TO BACKUP YOUR PATIENTS DATABASE BEFORE RUNNING THE INSTALLATION PROGRAM!!!!** So**,** skip down to the next section below titled, "Installing NeuroField64 – Update Release". There you will find instructions to back up your Patient database and continue with the installation program. Otherwise if installing for the first time, proceed to the section directly below, "Installing NeuroField64 – First Time".

Installing NeuroField64 – First Time:

You are ready to run the installation program. Proceed to the section below titled "To Install the NeuroField64 Software". **Important!!!!!** Again, if you are upgrading to a new version of NF64, you MUST follow the instructions immediately below to back up your Patient database first!

Installing NeuroField64 – Update Release:

If you are updating to a more recent version of the NeuroField64 software, you will need to back up your "Patients" database and uninstall the current version of NF64 BEFORE installing a new version of the NeuroField64 software.

To Back Up the Patients Database:

1. Launch the current NeuroField64 software program you have previously installed.

2. From the Main Menu Sidebar, click on the 

backup button**. Note:** Make sure you select the icon with the arrow pointing to the left, and when your cursor floats over the icon it should read "Click to Backup Patients Database".
3. Click on the "OK" button when the "Patient Database Successfully Backed Up" message appears. The backup of your Patients database will be saved to: C:/NeuroField64/NeuroFieldData/PatientData folder in a file name "PatientsBackup".

About the Backup – Date/Time Stamp

When you run a backup of your Patients database, the "PatientsBackup" file date/time stamp will not reflect the date and time you execute the backup, it will match that of the "Patients" database. Once you execute a backup the date/time stamps for both files will be the same as seen below.

Patients	9/19/2017 4:15 PM	Microsoft Access ...
PatientsBackup	9/19/2017 4:15 PM	Microsoft Access ...

However as soon as you add or edit a patients file, the date/time stamps will differ as seen below.

Patients	9/19/2017 4:15 PM	Microsoft Access ...
PatientsBackup	9/19/2017 4:01 PM	Microsoft Access ...

The date/time stamp for your "Patients" database now reflects the date and time of your latest changes. Looking at the date/time stamp will tell you if your backup is up-to-date or not. If the "Patients" database is a later date and/or time than the "PatientsBackup" file, then you have not backed up your latest changes. When you do, the date/time stamps will match each other once again.

4. Exit out of the NeuroField64 program.

To Uninstall the Existing NF64 Version:

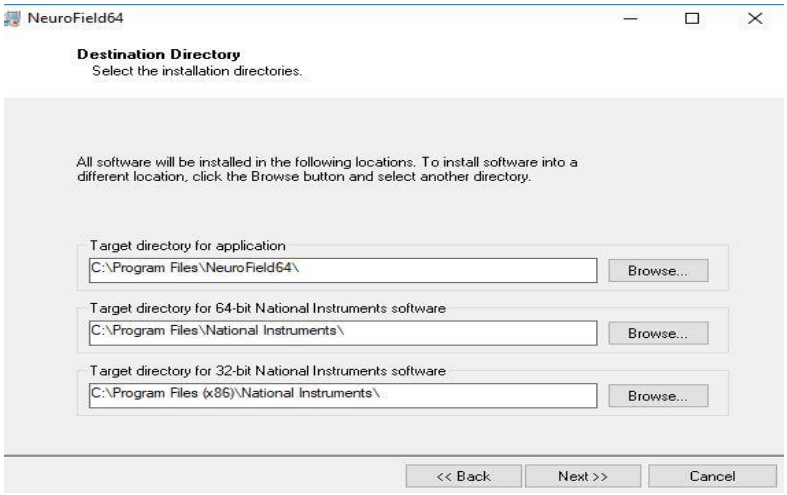
1. Be sure the NeuroField64 program isn't running. Go to "Settings/Apps".
2. Scroll down to the "NeuroField64" program file and click on the filename
3. Click on the "Uninstall" button.
4. Click on the "Uninstall" button again in the "This App and its related info will be uninstalled" alert and select "Yes" to any further messages. NeuroField64 will be removed from your system.
5. You are now ready to run the installation and update your version of the NeuroField64 software. For the most part, the instructions are the same as installing for the 1st time. When they differ, follow the instructions designated as "Update Install". Proceed to the next section directly below "To Install the NeuroField64 Software".

To Install the NeuroField64 Software:

Important!!!! If this is an Update Install, once you are done with the installation process, you will need to then **RESTORE** your "Patients" database. After you are done installing, be sure to follow the instructions in a later section below titled, "Restoring Patient Database" before using the NeuroField64 software.

The instructions here assume you have downloaded the NeuroField64 software and have extracted the application files. If you have not, go to the section above titled, “Downloading the NeuroField Software” for detailed instructions.

1. In your “Destination” folder, double-click on the “Volume_3_x_x_x” folder you just extracted from the .Zip file.
2. In your “Volume_3_x_x_x” folder, double-click on the “Volume” folder to open it. A list of files will be displayed.
3. Double-Click on the file where “Name” = “setup” (“setup.exe”) and “Type” = “Application”. This will launch the NeuroField64 Installer. **Note:** It is the first “setup” file in the list. The second file is “Type” = “Configuration”. If you accidently open this file, close it and open the application file.
4. Answer “Yes” in the User Account Control window. The NeuroField64 Installer will begin. A “Welcome” screen will appear briefly and then the “Destination Directory” window will appear.



5. Click on the “Next” button to install the NeuroField64 software application into the default directories.

6. Select the “I accept the License Agreement” radio button and click on the “Next” button. Notice the Installer window that appears on your screen.

First Time Install: The National Instruments Software License Agreement screen will appear. If not, you already have the latest installed on your computer and the “Start Installation” window will appear.

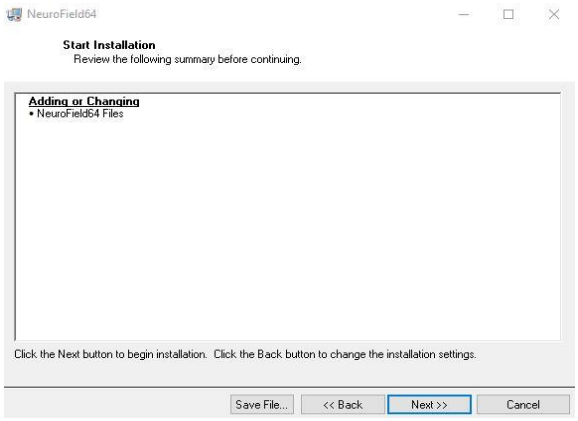
1st Time Installation:

a. Click on the “I accept” radio button in the National Instruments license agreement if one appears and click on the “Next” button to continue with the installation process.

b. Proceed to Step 7 below.

Update Install:

a. Proceed to Step 7 below.



7. Click on the "Next" button in the "Start Installation" window to start the install When the installation has finished, the "Installation Complete" screen will appear.
8. Click on the "Next" button on the "Installation Complete" screen and the "Welcome to Microsoft System CLR Types for SQL Server" screen will appear.

To Install the SQL Server:

1. To begin the SQL Server installation, click the "Next" button in the "Welcome to the Microsoft System CLR Types" window. Notice the SQL Server Installer window that appears on your screen.

   First Time Install: The "Microsoft SQL Server" license agreement appears. **Update Install:** The "Program Maintenance" screen appears.

2. **1st Time Installation**:

   a. Click on the "I accept the terms in the License Agreement." Radio button on the "License Agreement".

b. Continue to Click on the “Next” button to select the default locations until the “Begin Installation” screen appears.

c. Proceed to Step 3 below.

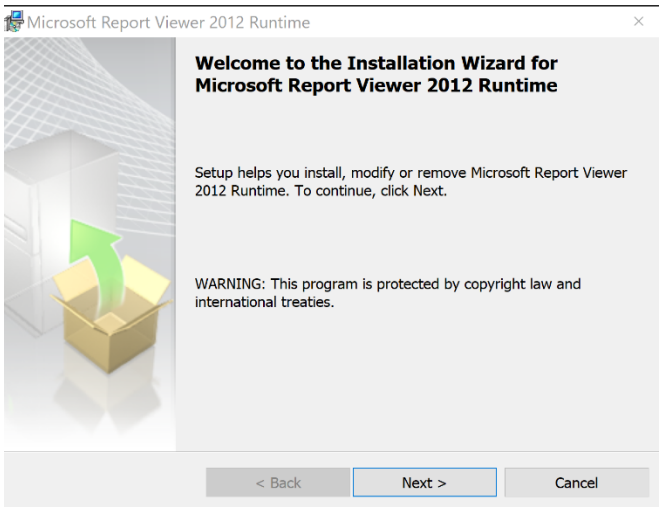
Update Install:

a. With the default “Repair” radio button selected, click on the “Next” button and the “Begin Installation” window will appear.

b. Proceed to Step 3 directly below.

3. Click on the “Install” button to continue with the installation process. If the “Restart” screen appears click on “No” to restart manually later.
4. Click on the “Finish” button and the “Welcome to Report Viewer” window will appear.

To Install the Report Viewer:



1. To begin the Report Viewer installation, click the “Next” button in the “Microsoft Report Viewer” window. Notice the Report Viewer Installer window that appears on your screen. **First Time Install:** The “Microsoft Report Viewer” license agreement appears. **Update Install:** The “Program Maintenance” screen appears.
2. **1st Time Installation**:

a. Click on the “I accept the terms in the License Agreement.” Radio button on the “License Agreement”.

b. Continue to Click on the “Next” button to select the default locations until the “Begin the Installation” screen appears.

c. Proceed to Step 3 below.

Update Install:

a. With the default “Repair” radio button selected, click on the “Next” button and the “Setup is ready to begin Installation” window will appear.

b. Proceed to Step 3 directly below.

3. Click on the “Install” button to continue with the installation process.

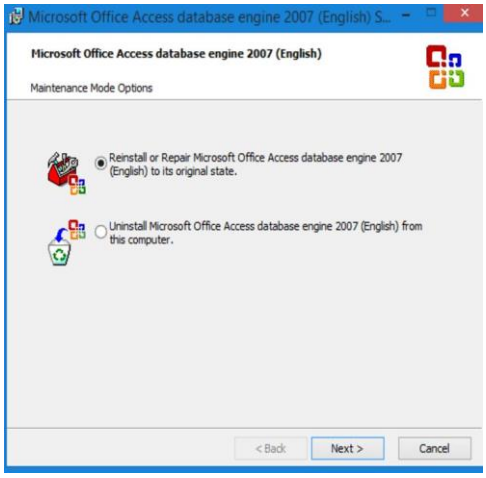
4. Click on the “Finish” button and the Microsoft Access database Engine window will appear.

To Install the Microsoft Office Access Database Engine:

The following instructions will install the Microsoft Access Database:

1. Notice the Microsoft Access Installer window on your screen. **First Time Install:** The “Microsoft Access” license agreement appears. **Update Install:** If you have been using a previous version of the NeuroField64 software, you have already accepted the license agreement and the “Maintenance Mode Options” screen appears.

First Time Install



Update Install

2. **1st Time Installation**:
   a. Click on the “I accept the terms in the License Agreement.” Radio button on the “License Agreement”.
   b. Continue to Click on the “Next” button to select the default.
   c. Proceed to Step 3 below.

   Update Install:
   a. Proceed to Step 3 below.
3. With the “Reinstall” radio button selected, click on the “Next” button and then the “Install” button to either install the software to the default location if installing for the first time, or reinstall the software if installing an update. The “Setup has completed successfully” window appears.

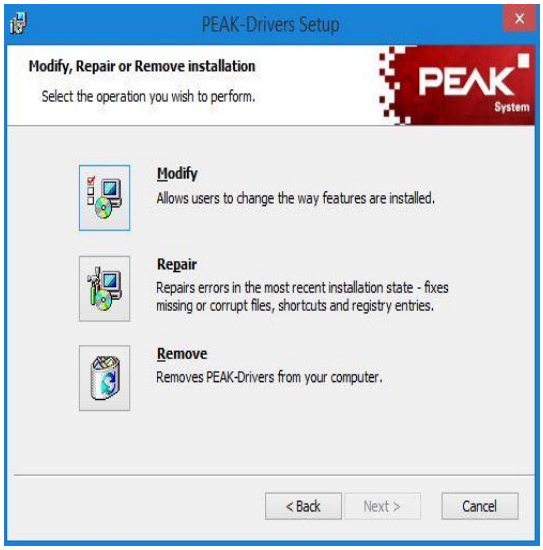
4. Click on the “Ok” button to complete the MS Database Engine installation process. The “Welcome to PEAK-Drivers Setup” screen appears.

To Install the Peak CANBus USB Drivers:

The following instructions will walk you through the process to install the PEAK CANBus Drivers:

1. To begin the CANBus Driver installation, click the “Next” button in the “Welcome to PEAK-Drivers” screen. Notice the PEAK-Drivers Installer window on your screen. **First Time Install:** The “Peak-Drivers” license agreement appears. **Update Install:** The “Peak Modify Installation” screen appears.

First Time Install



Update Install

2. **1st Time Installation**:
    a. Click on the “I accept the terms in the License Agreement” radio button on the “License Agreement”.
    b. Continue to Click on the “Next” button until the “Ready to Install” screen appears.
    c. Proceed to Step 3 below.

Update Install:

a. Click on the button to the left of the “Modify” option and the “Custom Setup” screen appears

b. Click on the “Next” button in the “Custom Setup” window to accept the default driver selection.

The “Ready to Install” screen appears. Proceed to Step 3 directly below.

3. Click on the “Install” button to install the CANBus drivers and the “Completing” screen will appear.
4. Click on the “Finish” button.

You have completed the NeuroField Installation procedure. **First Time Install:** You are now ready to install any support files, setup your hardware and launch the software. **Update Install:** You are now

ready to launch the software and restore your Patients Database. Go to “Section 4: Software Basics” and “II Software Run-Thru” for instructions on running the software. If you’d like to install any support files, proceed to the next section directly below.

Installing the NeuroField Support Software

Here you will find instructions for installing both the ANI dll software and the Zukor Media Player. Both software packages must be purchased separately, and you can do so through the NeuroField office.

To Install Zukor Media Player:

The Zukor Media Player is an optional feedback type when using the NeuroField EEG feature.

1. Go to the C:/NeuroField64/Support/Zukor folder
2. Double-Click on the “Zukor Media Player” application file.
3. Answer “Yes” in the User Account Control window if one appears. The NeuroField64 Installer will begin

4. Click on the “I accept the agreement” radio button and then click on the “Next” button. The “Select Destination Location” screen appears.
5. Click on the “Next” button to accept the default Destination location. The Zukor files will get installed and the “Installation Complete” screen will appear.

6. Click on the “Close” button. If you have already installed the ANI Z-Score dll from a previous version of NeuroField64, you are done with the Installation Process. If you have purchased the DLL and have not installed it, follow the steps below.

To Install the ANI Z-Score DLL:

This is for a 1st time install only. If you have installed the ANI dll’s from a previous version of NF64, you do not need to install the software again. Note: The Ani Dll needs to be purchased separately.

1. Go to the C:/NeuroField64/Support/ZScore DLL folder
2. Double-Click on the Volume folder and a list of installer files will appear.
3. Click on the “setup” application file.
4. Answer “Yes” at the “User Account Control” prompt and the installation will continue.
5. Click on the “Next” button until the software has been successfully installed.

   Note: If the DLL has previously been installed, the “Installation Summary” will say “No software will be installed or removed” and the “Next” button will be greyed out. Simply hit the “Cancel” button and answer “Yes” to the “Are you sure?” prompt, and you are done with the installation process.

SECTION 2

Hardware Setup

I. Hardware Setup – Basic Setup

NOTE!!!!!! This document assumes that you have installed or upgraded to the latest version of the NeuroField64 software. If you have not, please **STOP NOW!!!!!** and follow the software installation instructions in the previous Section. There you will find instructions that walk you step-by-step through the process of installing the latest NeuroField software.

The X3000 NeuroField System kit includes:

- X3000 Device
- RJ45 Ethernet Cables
- CANBus USB Adapter
- Velcro cap
- 200-Wind Coils
- D25 Connector Cable
- Medical Grade Power Supply

The Q20/Q21 NeuroField System kit includes:

- Q20 or Q21 Device
- 4-Channel Breakout Box
- RJ45 Ethernet Cables
- CANBus USB Adapter (if purchased without the X3000 device)
- Rechargeable Battery and Charger

The Z3 (tDCS/tACS/tRNS) NeuroField System kit includes:

- tDCS/tRNS/tACS Device
- 60” DIN EEG Snap Electrode Leads
- EEG Cup Electrodes with Pellets
- 35mm SilverRest Wet Gel Foam Electrodes
- RJ45 Ethernet Cables
- CANBus USB Adapter
- Rechargeable Battery and Charger

The Neuron4 kit includes:

- Neuron4 Unit (4 Channel EEG and HRV)
- Rechargeable Battery and Charger
- RJ45 Ethernet Cable
- CANBus USB Adapter

The QCheck NeuroField System kit includes:

- QCheck Device
- RJ45 Ethernet Cable
- CANBus USB Adapter (if Purchased - sold separately)
- 9v Battery – not connected

EEG electrodes, Nu-Prep, 10-20 electro-paste and ElectroGel are not included with the NeuroField System kits. An Electro-Cap from Electro-Cap International is required to run full cap EEG and/or

QCheck Impedance Checking. The cap must have drop reference and be Lexicor compatible. You can obtain these items from several sources, but NeuroField, Inc. recommends that you purchase them from (http://bio-medical.com/) Bio-Medical products. See "Using and Connection a Cap" later in this Section for cap ordering details.

When setting up the NeuroField hardware, there are several different types of connections. The following is an overview and a few things to note when connecting and/or "daisy chaining" these devices:

➔ All your devices can be hooked up and powered onto one CANBus, allowing you to enable/disable them as needed. You can connect as many devices as you like. This is known as "The Tower".

➔ When you connect the Q20 to the X3000, the Z3, and/or any other NeuroField unit, you have what is called a "daisy chain," where multiple devices are wired together in sequence. See "Hardware Setup – The Tower" later in this Section which shows daisy chaining:

- 1 Q20
- 2 X3000 devices
- 2 Z3 devices
- HRV
- QCheck

➔ Two X3000 units can be hooked up together to Stim with 8 coils rather than the standard 4 coils. This is known as "The Octopus".

➔ The Q20 on its own is not a Stim Unit and will not be recognized in NeuroField as such without the X3000 and/or the Z3 attached.

➔ You can connect the Q20 to the X3000 and/or Z3 unit(s) and use them to synchronize Stimulation Technology with EEG Neurofeedback. And, with 2 separate CANBus, the Q20 can be used as an amp to run EEG Neurofeedback with:

- Neuroguide
- BioExplorer or
- Brain Avatar

➔ The QCheck can be hooked up with a separate CANBus and used as a standalone unit for Impedance checking. The NeuroField software program will recognize it as a separate hardware device. You can also daisy chain the QCheck to other NeuroField devices.

Basic Setup – The Q20 and One X3000

Basic Q20 and X3000 System

Again, **BEFORE PROCEEDING** with setting up your hardware, be sure you have installed the NeuroField software. To do so, download the "Software Installation Guide" from the NeuroField website "Downloads" page for step-by step instructions.

The Field Replaceable Battery

An ion lithium battery is included with the Q20 and tDCS/tACS/tRNS unit that is inserted into the back of the units. You will see a little ribbon that you can grab to pull the battery out of the unit. When inserting the battery into the unit, the ribbon should be positioned at the top of the battery. There is an LED indicator on the battery itself, which when the button is pushed, will light up telling you the current charge of the battery:

- If the indicator lights up all the way and all the LED lights turn on, then you have a full charge.
- If you only see one LED, then it means that your battery is almost dead.

Battery hygiene is important, as batteries have a lifespan and will eventually die. However, if you take good care of it, a battery can last a long time. Typically, it can last one year, maybe two if you treat it right. This means discharging the battery appropriately, and establishing good memory for it. Yes, batteries do have a memory, so:

- When you turn the unit on, keep it on all day or for approximately 8 – 10 hours.
- Shut it off at the end of the day.
- Do this whether you are using the battery or not.

Following this procedure will allow you to extend the life of your battery for as long as possible by creating a long "memory" of run time.

The battery is field replaceable, meaning that you can replace it at any time. You can also purchase additional batteries from NeuroField and have a supply of batteries on hand as a backup to ensure you are ready to go at any given moment with zero downtime. This new battery solution is also available for the Q20 EEG amplifier.

WARNING!!!!! If you are carrying this battery on a plane, do not check it with your luggage. Always carry it with you on the plane.

To Connect CANBus USB Adapter (Q20 or X3000 as a Stand-Alone Device)

1. Plug the RJ45 Ethernet cable into the CANBus USB adapter. **Note**: The max length Ethernet cable that may be used is 6 feet.

Q20 with CANBus

X3000 with CANBus

2. If hooking up a single device (either Q20 for Amp only or X3000 for Stim only/Dehab):
    a. Plug the other end of the CANBus RJ45 cable into *either port* of the NeuroField Q20 or the X3000. There are two RJ45 input ports, and you can select either port to plug in the device as pictured below:

To Connect the Q20 and the X3000 (X3000 Plus)

Please Note: All references to X3000 in this section apply to the X3000 Plus as well. If you want to use the Q20 and the X3000 together for RTZ training, you will need to connect them with a separate RJ45 jack supplied in your NeuroField X3000 kit. Then, power on the Q20 first and X3000 second, and you're all set up and ready to launch the software. **Note:** Plug the CANBus RJ45 cable into the Q20 rather than the X3000. This way it is ready to use as a stand-alone acquisition device. To do this:

Connecting the RJ45 Jack between Q20 and X3000

Connecting the RJ45 Jack between Q20 & X2000 Plus

1. Plug one end of the RJ45 jack into either port where designated, “CANBus” on the X3000 unit.
2. Plug the other end of the RJ45 jack into either port where designated “CANBus” on the Q20 unit. The units are now connected and can be used for pEMF and Z-Score training together. **NOTE: When using the Q20 and the X3000 together for Stim and RTZ, CONNECT ONLY 1 CANBus USB adapter!!!!** See picture above to the right which shows a single CANBus adapter**.**

To Connect the Coils

1. Plug the coils cable into the back of the NeuroField X3000 or X2000 Plus unit where designated, “Coil Drive”.
2. Gently tighten the screws on the connector to ensure that the coils are secured.

Basic Setup – Neuron4 & HRV

The Neuron4 & HRV unit can be connected to any unit in the NeuroField stack. For detailed instructions follow the steps above “To Connect the Q20 and the X3000”. Simply replace one of those units for the Neuron4 device. The following instructions are for connecting the HRV sensor to the Neuron4. Note: It is a good idea to turn off the system before plugging in the HRV sensor.

To Connect the HRV to the NeuroField System:

1. Plug one end of the RJ45 jack into either port where designated, “CANBus” on the Neuron4 unit.

2. Plug the other end of the RJ45 jack into either port where designated “CANBus” on the closest NeuroField unit in your stack.

To Connect the PPG Sensor to the Unit:

1. Connect the PPG sensor firmly into the plug labeled “HRV” on the rear panel of the Neuron4 unit. (If you have an X2000, plug it into the slot marked “HRV”.) This is a standard PPG sensor that can also be purchased from HeartMath.

Neuron4 Box with HRV

2. Turn the system back on and start the software. **Note:** It is important to power down the unit before either plugging in or removing the PPG sensor. This will prevent damage to the unit.

Basic Setup – QCheck

The following instructions are for setting up and running the QCheck as a standalone device prior to running the NeuroField Q20 device in Neuroguide (or any Amp that uses the standard Lexicor pin out matching the E1-LEX cap and is supported in Neuroguide) for data acquisition and training sessions.

To Connect the QCheck 9V Battery

Before you can setup the QCheck, you must connect the 9V battery that comes with your device. To do this:

1. On the bottom of the QCheck, open the battery compartment. Notice that the battery is laying inside, but the wires are not yet connected.
2. Peel off the protective covering on the 9v battery clip and connect the clip/wires to the battery.
3. Close the battery compartment cover and turn the power switch to “On”. The green power light should come on.
4. Power off the QCheck and you are ready to connect the device.

To Connect the CANBus to the QCheck

The CANBus for the QCheck is sold separately. If you are using multiple NeuroField devices, you can easily switch the CANBus between devices or “daisy chain” them together as described earlier in this Section. However, if you do not have a CANBus, or you would like to use a dedicated CANBus for your QCheck, you will need to purchase one from NeuroField, Inc. To connect your QCheck do the following:

QCheck with CANBus

1. Plug one end of the RJ45 Ethernet cable (Yellow Cable shown in the picture above) that came with your device into the CANBus USB adapter.
2. Plug the other end of the RJ45 cable into *either port* of the NeuroField QCheck. There are two RJ45 input ports, and you can select either port to plug in the CANBus.
3. Insert the USB Connector on the CANBus into an empty USB port on your computer. Your QCheck is now connected and you are ready to power it on. Go to "powering On the Devices" at the end of this "Hardware Setup" Section.

II. Hardware Setup – Octopus

Octopus Setup – Using Two X3000 Units Simultaneously

To Connect two X3000's and the Q20 – Octopus Setup

If you want to setup your Q20 amplifier with two X3000 units to run 8 coils Stims with NeuroField protocols (known as "the Octopus"), you will need two RJ45 jacks. Use the RJ45 jacks supplied in each of your NeuroField X3000 kits and connect them to each other and to the Q20. Power on the Q20 first, one X3000, and then the other X3000, and you're all set up and ready to launch the software. You can also setup one X3000 and an X2000 Plus with the Q20 as well.

Note: If you are not using a Q20 and want to do a "Stim Only" using the "Octopus", instructions are also below.

Connecting two X3000 units & a Q20 with 8 Coils - 2 RJ45 Jacks

To do this (as displayed in the photos above):

1. Using the top X3000 unit, plug one end of the RJ45 jack #1 (Orange jack) into either port where designated “CANBus”.
2. Plug the other end of RJ45 jack #1 (Orange jack) into the 2nd X3000 unit using either port where designated “CANBus”.
3. Using the 2nd X3000 unit, plug one end of the RJ45 jack #2 (Purple jack) into the remaining empty port where designated “CANBus”.
4. Plug the other end of the RJ45 jack #2 (Purple jack) into the Q20 using either port where designated “CANBus”.
5. Using the CANBus adapter, plug one end of the CANBus (Yellow jack) into the remaining empty port on the Q20 where designated “CANBus” and the USB connector at the other end into your Computer. The units are now connected and can be used for pEMF and Z-Score training together. **Note: USE ONLY 1 CANBus CONNECTOR for this setup!**
6. Attach the two sets of coils by plugging each set of four coils into the back of each X3000 Stim Unit where designated “Coil Drive”. NeuroField will generate Stims from all eight coils.

To Connect two X3000 Units – Octopus Setup

If you want to setup the Octopus using two X3000 units without a Q20 for Stim Only (or an X3000 and an X2000 w/ Plus Unit), you will only need one RJ45 Jack. See pictures below.

Connecting two X3000’s – 1 RJ45 Jack

Connecting an X3000 and X2000 Plus – 1 RJ45 Jack

To do this (as displayed in the photos above):

1. Using the top X3000 unit, plug one end of the RJ45 jack (Purple jack) into either port where designated “CANBus”.
2. Plug the other end of RJ45 jack (Purple jack) into the 2nd X3000 unit using either port where designated “CANBus”.
3. Using the CANBus adapter, plug one end of the CANBus (Orange jack) into the remaining empty port on the bottom X3000 where designated “CANBus” and the USB connector at the other end into your Computer. The units are now connected and can be used for pEMF Stims using 8 coils. **Note: USE ONLY 1 CANBus CONNECTOR for this setup!**
4. Attach the two sets of coils by plugging each set of four coils into the back of each X3000 Stim Unit where designated “Coil Drive”. NeuroField will generate Stims from all eight coils. See photo

below displaying the 2 sets of coils connected where designated “Coil Drive” on the X3000 and X2000 w/ Plus Unit.

Connecting 1 Sets of Coils into the X3000 & 1 Set into the X2000 Plus

III. Hardware Setup – Z3 (tDCS/tACS/tRNS)

Overview

Let's review what you have received with your new Z3 unit and how things connect:

- **tRNS**

  The NeuroField Z3 device includes the ability to give tRNS or "Random Noise Stimulation" along with Alternating Current and Direct Current. There is no additional setup required as tRNS is built into the Z3 unit and can be added to existing tACS/tDCS units for free.

- **CANBus Adapter**

  The USB CANBus plugs into the back of the unit using the end of the adapter that looks like a telephone jack. The other end of the cable, which is a USB connector, plugs into the port in your computer. If you have installed the software at this point, the CANBus will be recognized by your PC and the driver will be loaded automatically.

- **Field Replaceable Battery**

  There is an ion lithium battery that can be inserted into the back of your unit. You will see a little ribbon that you can grab to pull the battery out of the unit. There is an LED indicator on the battery itself, which when the button is pushed, will light up telling you the current charge of the battery:

  - If the indicator lights up all the way and all the LED lights turn on, then you have a full charge.
  - If you only see one LED, then it means that your battery is almost dead.

  Battery hygiene is important, as batteries have a lifespan and will eventually die. However, if you take good care of it, a battery can last a long time. Typically, it can last one year, maybe two if you treat it right. This means discharging the battery appropriately and establishing good memory for it. Yes, batteries do have a memory, so:

  - When you turn the unit on, keep it on all day or for approximately 8 – 10 hours.
  - Shut it off at the end of the day.
  - Do this whether you are using the battery or not.

  Following this procedure will allow you to extend the life of your battery for as long as possible by creating a long "memory" of run time.

  The battery is field replaceable, meaning that you can replace it at any time. You can also purchase additional batteries from NeuroField and have a supply of batteries on hand as a backup to ensure you are ready to go at any given moment with zero downtime. This new battery solution is also available for the Q20 EEG amplifier.

- **Snap-On Leads & Electrodes**

  The unit ships with two DIN Snap Leads. These Leads support both the Gel and Pellet Cup electrodes which are also shipped with the unit.

  - **Gel Electrodes**: These electrodes are designed for use on the body. They are not for use on the scalp or hair line. The tape peels off to expose a small amount of foam hydro gel

that is sticky. You can place these directly onto the skin where it is able to make a good connection When choosing which size of ECG Gel electrodes to use take the following into consideration:

  - With the small Gel electrodes, the dispersion of the electrical field is more focused, but it can be more "prickly" and intense for a person.
  - With the large Gel electrodes, the electrical field is more dispersed over a larger area and can be easier to tolerate for some people.

- **Pellets & Cups**: The pellets also snap into the Leads and the Cups snap into the Pellets.. They are silver/silver chloride are adhered with 10/20 paste placed into the cup and then placed on the patient. These electrodes can be used on the body and on the scalp.

Note: Sintered Electrodes along with 10/20 paste are also ideal for using with the Z3 unit and can be ordered separately. See "Hardware Setup – Accessories" later in this Section for details on how to order them.

- **Anode and Cathode / Touch Proof Connector**

  If you look on the front of the box, you will see two touch-proof connectors. They are both inputs, and one says "Neg" and one says "Pos", meaning Negative and Positive. These are the connector slots for the electrodes.

  Important!!!! See "VI. Hardware Setup – Accessories" below for detailed instructions on how to connect the electrodes into these slots.

Connecting the Z3 Units

To Connect the two Units

If you want to setup two Z3 units as standalone devices, you will only need one RJ45 Jack and one CANBUS. See pictures below. **Note:** For instructions on hooking the Z3 units up with other NeuroField devices, go to "Hardware Setup - The Tower" later in this Section.

2 Z3 Unit Stack

Connecting 2 Units – 1 RJ45 Jack and 1 CANBus

To do this (as displayed in the photo above/right):

1. Using the top Z3 unit, plug one end of the RJ45 jack (Orange jack) into either port where designated “CANBus”.
2. Plug the other end of RJ45 jack (Orange jack) into the 2nd Z3 unit using either port where designated “CANBus”. The two units are now “Daisy-Chained” together.
3. Using the CANBus adapter, plug one end of the CANBus (Yellow jack) into the remaining empty port on the bottom Z3 unit where designated “CANBus” and the USB connector at the other end into your Computer. The units are now connected and can be used for Current Stims using electrodes on the head or body.

`

IV. Hardware Setup – The Tower

With NeuroField64 you can Daisy Chain all the units you own together into one stack and then tell NeuroField which units in the stack you want to use for any given treatment – up to a maximum of 4 units simultaneously. The Tower setup is great because all your units are ready to go and you simply enable and disable the ones you want to use from sessions to session.

You can plug a separate RJ45 jack into the back of each unit and then use it to connect (or daisy-chain) all your NeuroField devices to each other. When you plug the CANBus into the back of the unit, you will see there are two RJ45 ports. Either one can be used as they are both inputs and outputs. You can daisy-chain from either slot to another unit. There are no rules regarding the number of units on one CANBus:

- You can chain more than 3 units together at one time.
- You can have a Q20, two X3000 units, two Z3 units, an HRV unit, and a Q Check on the same CANBus all at the same time.

To Connect Multiple NeuroField Units

FRONT

BACK

Chaining with the devices shown in the picture above would require six RJ45 jacks and one CANBus (one Jack for each device and a CANBus from the last device in the Chain to the Computer.)

Your Daisy Chain reference numbers for each device from the top down would be:
1 = QCheck

2 = HRV (or Neuron4)
3 = Z3 Device 1
4 = Z3 Device 2
5 = X3000 Plus Device 1
6 = X3000 Plus Device 2
7 = Q20 (or Q21)
The Daisy Chain as shown in the picture above uses:
White Jack one to connect units #1 and #2
White Jack two to connect units #2 and #3
Orange Jack three to connect units #3 and #4
Orange Jack four to connect units #4 and #5
Orange Jack five to connect units #5 and #6
Orange Jack six to connect units #6 and #7
Light Orange CANBus Connected from unit #7 to the Computer

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V. Hardware Setup – 2 CANBus

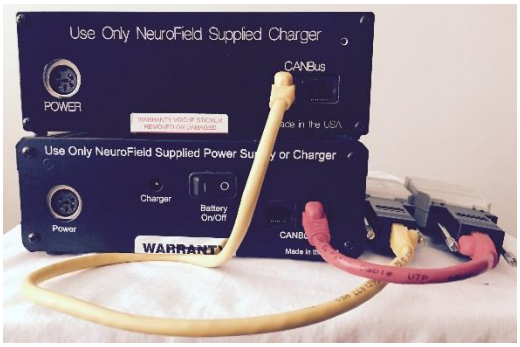
NeuroField/Neuroguide Combo Setup - 2 CANBus for X3000 and Q20

IMPORTANT!!!!!: Use this setup ONLY if you want to run the Q20 with Neuroguide on one CANBus and simultaneously run Magnetic and/or Current Stims with NeuroField on the other CANBus. Also, it is imperative that you follow the instructions in "Section 5: Combo Techniques" later in this manual to properly startup the hardware/software as this setup can cause CANBus conflicts and prevent NeuroField from recognizing your devices. When not using this specific training technique, it is advised to return to a standard setup using 1 CANBus for all other NeuroField operations.

The NeuroField system allows you to launch Neuroguide and NeuroField together side-by-side on your monitor and run them simultaneously from one computer. This is called the "Combo" and to do this you must have two separate CANBus plugged in, one plugged into the Q20 and the other plugged into any one of the NeuroField Stimulation units. This example shows the X3000, but you can use any of the NeuroField stim units. The following instructions will show you how to setup your hardware to run this technique.

To Connect 2 CANBus using the Q20 and the X3000:

If you want to use the NeuroField and Neuroguide simultaneously, you will need to connect one CANBus directly to the Q20 and the other CANBus connected directly the NeuroField Stimulation Unit(s). Below is an example of the Q20 and 1 magnetic stim unit (X3000 or X2000 Plus), but you can have multiple NeuroField Stim units daisy-chained together and connect the other CANBus to any one of them. **Note:** Notice that a RJ45 jack is not included in this setup, and the X3000 is not connected to the Q20. You must not "daisy chain" the two devices together or the "Combo" setup won't work. Each unit must be operating independently of each other. To do this:



Connecting the X3000 & Q20 with 2 CANBus

Connecting the X2000 Plus & Q20 with 2 CANBus

1. Plug the CANBus Adapter RJ45 jack #1 (Yellow jack) into the NeuroField X3000 unit using the empty port where designated "CANBus".
2. Plug the other end of the Yellow CANBus jack #1 into an empty USB port on your computer.
3. Plug the CANBus Adapter RJ45 jack #2 (Orange jack) into the Q20 unit using the empty port where designated "CANBus".

4. Plug the other end of the CANBus jack #2 (Orange jack) into another empty USB port on your computer.

You are now ready to prep your patient, connect the cap, and power on the hardware.

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VI. Hardware Setup – Accessories & Prep

Ordering Accessories/Supplies

NeuroField provides you with electrodes for the Z3 unit when you purchase the hardware as seen below:

DIN Snap Leads

Pellet & Cup Electrodes

Gel Electrodes

However, there are additional accessories and supplies that you will need to purchase in order to complete your hardware setup and prepare for a session. Each item is listed below with links to purchase. **Note:** If you run out of the supplies that NeuroField provides with your hardware, you can order them from the following links:

- **DIN Snap Leads** at https://bio-medical.com/catalogsearch/result/?q=+snap+lead
- **Pellet & Cup Electrodes** at https://bio-medical.com/catalogsearch/result/?q=pellet
- **Gel Electrodes** at https://bio-medical.com/catalogsearch/result/index/?p=2&q=+gel+electrodes

Cap and Ear Electrodes

NeuroField supports the use of a cap for 19-Channel training and uses the Lexicor D25 pinout with the Q20/Q21 and QCheck units. If you own caps with this connector, they will work! **Note:** EEG amps can have different pinouts on the D25 connector. Only the caps noted below for ordering are approved for use with the Q20/Q21 and QCheck. Any other Cap must be evaluated and approved for use with NeuroField devices. Please contact NeuroField Neurotherapy, Inc. for further information on cap evaluation and approval.

Caps

Caps can be purchased from Electro-Cap International, Inc. https://electro-cap.com/index.cfm/caps/
It is highly recommended that you call and setup an account when you order your caps as it will save you money in the long run. It is also recommended that you purchase one Large, one Medium-Large and one Medium cap to start. You will need to order a Small cap if you work with kids.
When ordering you must ask for a specific type of cap. The caps that work with the Q20 are coded as:

- Cap Code# = E1-L, or E1-M, or EI-SM. The L, M or SM designates the size of the cap, so you will need to choose one of those letters for each cap size you order.

3 ½" Ear Clips

Clips can be purchased online at https://bio-medical.com/catalogsearch/result/?q=ear+clips

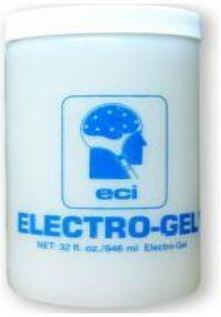
- Ear Clip Code# = ECA E5-9SDROPS. These are very short "drop-down" ear electrodes and are important to order over the longer ones as they help to minimize noise.

Paste, Electro-Gel, Sponge Disks, Syringes, NuPrep, Swabs, & Sintered Electrodes

In order to properly setup the above accessories to your hardware and run a session, you will need to order and use the following supplies**: Note:** For Instructions on how to apply the paste and gels see the various "Placing and Connecting" instructions below.

https://bio-medical.com/catalogsearch/result/?q=+10-20+paste

- TEN 20 Paste



https://bio-medical.com/catalogsearch/result/?q=+electrogel

- Electro-Gel

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https://bio-medical.com/catalogsearch/result/?q=+Sponge+disks

- Sponge Disks

https://bio-medical.com/catalogsearch/result/?q=syringes

- Syringes & Blunt tip Inserts

https://bio-medical.com/catalogsearch/result/?q=nuprep

- NuPrep

https://bio-medical.com/catalogsearch/result/?q=+alcohol+swabs

- Alcohol swabs

https://bio-medical.com/catalogsearch/result/?q=+Sintered+silver+silver+chloride+electrodes

- Sintered Electrodes

  The Z3 kit comes with Snap-On Leads with Cup or Gel electrodes. As an alternative you can also order Sintered Silver/Silver Chloride disks with 60” Leads. Either way the electrodes are silver-

silver chloride electrodes. Silver-Silver Chloride (Ag-AgCl) Electrodes are known for their low offset voltage, low noise, and stability. Re-usable and non-toxic, the electrodes can be cold sterilized and used often with minimal care. The sintered electrodes to order are:

Prepping & Capping

As the old saying goes “Garbage in / Garbage Out”. So, there are a few hints and tricks you can follow to not only prepare your client ahead of time to assist the data acquisition process, but to also ensure that while you are capping your patient you will easily and quickly acquire a good signal.

Patient Prepping Prior to Appointment

There are specific requests that you can tell your patient prior to their appointment in order to prepare them for a successful data acquisition. The following are some of the most common requests to communicate prior:

- Ask client to refrain from any Conditioners or Hair Product (gel, wax, hair spray) in the hair for the time of the recording. Encourage them that shampoo is fine, and they should not avoid washing their hair.
- Ask client to be awake for at least 1 full hour before the time of the recording. Also, if possible, to avoid any caffeine before the recording.
- At the time of the QEEG, ask client to remove any earrings or clips/pins in the hair that would sit beneath the cap.

Prepping & Capping Best Practices

- NuPrep (clean) the forehead, temples, and any area where skin is exposed. If you have someone who has no hair, clean the entire head if possible. NuPrep the ear lobes where you will be placing the ear electrodes.
- Place foam disks on the 2 forehead electrodes (Fp1 & Fp2). Place over the Fp1 & Fp2 points on the forehead of the client (just above the eyebrows without the foam disk sticking to the eyebrows). Gently pull cap down on the client's head holding on to the ear ring areas.
  Note: Before proceeding it is a good idea to select a specific path around the cap that you follow each time you Cap a patient i.e. gel all electrodes down the midline first, then all electrodes on the left side, then all electrodes on the right side. This will help ensure you always know where you are in the capping process.
- Take up Electro-Gel into your syringe avoiding any air bubbles. Begin inserting gel by placing your syringe to the client’s scalp and gently parting the hair to expose the scalp area. Then, lifting the syringe just slightly away from the scalp, hold the electrode between your fingers, and inject a small amount of gel into the electrode. You only need slightly more than the size of a pea. With the hand that was holding the electrode, settle it back down on to the scalp creating a suction.
- Continue along each area making sure to not miss any electrodes. Be careful when doing the Fp1 & Fp2 above the eyebrows, they have the highest chance of dripping into people's eyes or onto their clothing. Also, be careful putting too much gel at the Ground and Fz sites, they are the closest together and have the highest chance of creating a salt bridge.

- Once done with the head, you will need to put a small pea of gel into the cups of your ear electrodes, making sure to clip them to the same area of the ear that you previously cleaned.

You are now ready to calibrate your QEEG cap.

Calibrating & Connecting the Cap

When calibrating the cap, you basically want to ensure that you have a good connection between the electrodes and the scalp. This is referred to as impedance levels measured in kohms. An impedance at 5 kohm is research level, however NeuroField sanctions 10-15 kohm as acceptable impedance levels for data acquisition and/or training. If you cannot get your impedance as low as 10-15 kohm, then try to get all your sites to as similar a resistance or impedance level as possible.

To Calibrate the Cap – QCheck and or Checktrode

QCheck

1. Once you have your cap fully prepped, attach the D25 pin connector on the front of the QCheck or a Checktrode.

2. Turn the switch on the side of the QCheck unit to the “On” position. A green light will appear meaning that your device is now receiving power. **Important!!!!** Remember to power off the QCheck when you are done checking impedance or you will wear out the battery.

You are now ready to launch the NeuroField software and run the Impedance Checker. For detailed instructions go to “Section 4 – Software Basics / X. The QCheck”. Here you will find step by step instructions on running through the QCheck software. **Note:** Once the QCheck is powered on and the software is launched, NeuroField will recognize the QCheck at startup.

Checktrode

If you are using a Checktrode, proceed as follows:

1. Press the Red Power button until the Checktrode turns on.
2. Flip the blue switch to “Ref” to check your ear electrodes impedance.
3. Switch the blue switch back to the “Cap” option and turn the dial to the first Site. It is recommended that you start with your GND or Ground Site. Check your impedance and make any adjustments as necessary.
4. Proceed through the whole head until all your impedances are in range.

You are now ready to connect the cap to your Q20/Q21 and power on your NeuroField Unit(s).

To Connect the Cap - Q20/Q21

1. Once you have prepped your cap, attach the D25 pin connector to the front of the Q20 labeled “Cap”.

2. Proceed to “Charging and Powering-On the Devices” later in this Section of the manual to power on the Q20 in your stack and complete the Hardware Setup Process.

Once you have powered on the device you are ready to run the Software to acquire the data and/or run a training session.

Prepping the Electrodes – tDCS and/or tACS

Here you will find instructions on how to successfully prep electrodes for use with your patient.

To Prep the Electrode Sites

Correctly prepping the electrode sites is very important. If you don’t prep them correctly, the electrode won’t sit on the skin properly and you won’t get the right current into the system. Also, the electrode could pull away from the skin and cause a sparking sensation.

You will most likely develop your own system, but to start here are a few steps you can follow once you have reviewed the map and decided upon your electrode placements: Go to the first site and do the following:

1. With your fingers or other implement part the hair until the scalp is showing.
2. Take an alcohol swab and thoroughly scrub the scalp area.
3. Grab a tiny bit of 10/20 paste and dab it on the cleaned scalp area. This will mark the exact spot that has been prepped and is ready for electrode placement.
4. Move to the next spot.
5. Repeat steps 1 – 4 until all of the spots are prepped and marked.

You are now ready to place the electrodes on the head and or body and connect them to your device. Read the “Connecting and Placing Electrodes” instructions below carefully before proceeding.

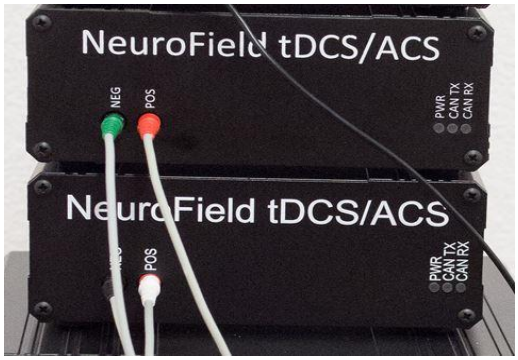
Connecting and Placing Electrodes – tDCS

Here you will find instructions on how to properly connect the tDCS electrodes to the hardware units and place them on the head of your patient. Before beginning there are a few items to note:

- The gel electrodes are used for sites on the body and the sintered and/or snap-on cup electrodes are used for sites on the head and/or the body.
- Never let the wires hang down in front of the patient’s face as it is unsettling and distracting.

To Connect the Electrodes - tDCS

When setting up for a tDCS treatment it is imperative that you know which electrode is going to be your Anode and which electrode is going to be your Cathode. The directions below provide a guideline for making those decisions. Also, you must connect them correctly as follows: **Important!!!!!** You must follow the instructions below carefully! These electrodes are NOT interchangeable like they are in tACS mode described later.



- Positive is associated with the Anode
- Negative is associated with the Cathode

The electrode designated to be the Anode must go in the slot marked “Pos” and the electrode designated to be the Cathode must go into the slot marked “Neg”. You designate the electrodes as follows:

- Anode pushes energy into the system
- Cathode pulls energy out of the system

To Place the Electrodes - tDCS

So, based on the brain map, you will place the:

- Anode electrode on the spot where you want to push energy into the system and connect the other end into the “Pos” slot on the back of the Z3.
- Cathode electrode on the spot where you want to pull energy away from the system and connect the other end into the “Neg” slot on the back of the Z3.

Also, in tDCS or Direct Current (DC) mode, it is important to remember, again, there is no frequency only voltage. AND it is important to note that since there is only one polarity (either positive or negative) the energy flow will go in one direction. It will go into the Anode and out through the Cathode:

- tDCS = unidirectional or one direction

Connecting and Placing Electrodes – tACS

Remember, the gel electrodes are used for sites on the body and the sintered or snap-on cup electrodes are used for the head and/or the body. Also, never let the wires hang down in front of the patient’s face as it is unsettling and distracting.

To Connect the Electrodes - tACS

When you run the unit in tACS mode, positive and negative polarities alternate between both electrodes. The current will flow in through the Anode and out through the Cathode, but then also go back in through the Cathode and out through the Anode. In other words:

- tACS = bidirectional

When running tACS with the current going back and forth, each electrode is an Anode and each electrode is a Cathode, so you don't have to designate one from the other. It doesn't matter which slot you put them in on the back of the Z3 unit or where you place them on the head (other than following the map designation) because they are both going to push energy into and out of the system.

So, based on the brain map, you will place:

- Either electrode on the spot you want to train and connect the other end into the either slot on the back of the Z3.
- The second electrode on the spot where you want to train and connect the other end into the remaining slot on the back of the Z3.

Another thing to note when running tACS is that again, the current is going to go from positive to negative then back to positive and then to negative again. When tACS alternates the polarity in this manner, the number of times it does so in 1 second defines the frequency:

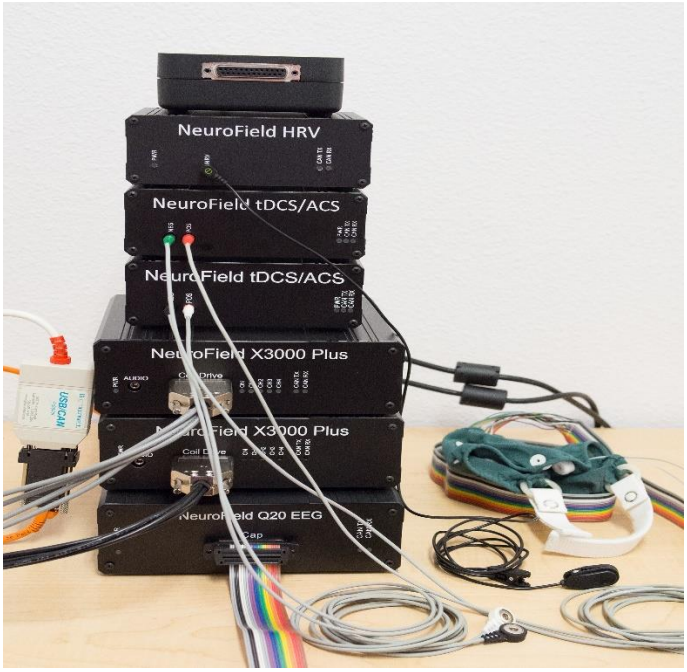
- If it does it 10 times per second, then you are giving 10hz or an Alpha frequency
- If it does it 20 times per second, then you are giving 20hz or a Beta frequency

Using and Connecting "The Tower" Accessories

NeuroField supports the use of many different accessories, especially when using "The Tower" setup. Here multiple accessories are connected to their respective units (Daisy-Chained together) and then attached to the patient's head and/or body. For details on connecting multiple units together refer to "Hardware Setup – The Tower" earlier in this Section, or for details on connecting a specific accessory to its hardware device refer to the individual unit setup described earlier in this Section of the manual.

The instructions here are simply a description of what can be connected and attached. It is assumed that you have a working knowledge of electrode and/or coil 10/20 placement based on individual brain map review.

To Use Multiple Accessories:



The Tower setup allows you to connect and attach the following accessories: **Note:** This list is the full set of accessories that can be hooked up at any given time. You can mix and match them as needed.

- 1 Electro Cap connected to either the Q20 or the QCheck and placed on the Head.
- 2 Sets of Coils connected to two X3000 units and attached to Black Velcro cap.
- 2 Sets of Electrodes (either Gel and/or Sintered) connected to two Z3 units and attached to either the head or the body. See below for details.
- 1 HRV Sensor connected to the Neuron4 unit and attached to the Ear or Finger.

To Connect and Attach Multiple Accessories to a Patient:

With the Tower setup, you can use a maximum of 4 units simultaneously in NeuroField, and with a 2nd CANBus also use a 5th unit, the Q20, to run a NeuroField/Neuroguide Combo treatment. This means that you can setup your patient with multiple accessories at one time. If you are going to do this, it's important to keep in mind that there is a specific order to attaching everything to the patient.
For this example, use the Max setup for a Combo Treatment using 5 units. Connect and attach accessories to run NeuroField Magnetic and Current Stims simultaneously using 2 X3000 units and 2 Z3 units for Interval training between rounds of Neuroguide EEG operant conditioning using 1 Q20. You would connect the required accessories to their respective units and attach them to the patient in the following order:

Note: You would follow the same order below if you were running a NeuroField EEG treatment using 4 units simultaneously i.e. 1 X3000, 2 tDCS/tACS/tRNS units for Current and Magnetics stims, with 1 Q20 for EEG Neurofeedback:

1. Current Stim Sintered electrodes on the scalp at the desired 10/20 locations or Gel electrodes on the body say on the forehead or mastoids.

2. EEG Electro-Cap over the Electrodes then gel and check impedances.
3. Black Velcro cap over the EEG Cap using a surgical cap between the Electro-Cap and Velcro Cap.
4. Coils on top of the Velcro Cap

You are ready to go!!!!!!

Charging and Powering-On the Devices

These instructions assume you have your devices connected to one another and the CANBUS Adapter hooked up. If not go the appropriate "Hardware Setup" instructions earlier in this Section to setup your devices.

To Charge the Battery - Q20/Q21 and/or Z3 (tACS/tDCS/tRNS) Units:

1. Plug the Power Supply into the charging unit. To tell if the unit is charged, press the button on the front of the battery and 4 green lights = fully charged.
   Note: Special care must be taken to ensure the optimal lifetime of the Battery. If the Battery in the Q20/Q21 is allowed to fully discharge, it can cause significantly reduced Battery life or may cause early failure of the Battery not covered by warranty. It is suggested that the:
   - Q20/Q21 be used throughout the day without charging. This will allow the battery to discharge the recommended amount.
   - Power Switch on the unit be turned to "Off" at the end of each day.

To Power on the Q20/Q21 and Stimulation Units (And HRV if Neuron4 was purchased)

When these devices are connected, they form what is called a "daisy chain". Once they are all connected you will need to turn them all on or you can simply turn on the devices that you want to use: **Note:** You can turn these units on in any order.

1. Turn on the Q20/Q21 so this device is receiving power. On the back of the Q20/Q21, set the "On / Off" switch to "On". The Device is now receiving power.
   AND / OR
2. Turn on the X3000(s). Plug in the X3000 Power Supply that came with the device. Set the "On and Off" switch on the power supply to "On". The Device is now receiving power.
   AND / OR
3. Insert the Battery and Power on the Z3 tDCS/tACS/tRNS unit by setting the "On and Off" switch to "On".
   AND / OR
4. If you have Neuron4 device with HRV, power it on.

You are now ready to launch the NeuroField Software to acquire data and/or run a NeuroFeedback session. For detailed instructions on running the software go to the next section - "Section 4 – Software Basics."

SECTION 4

Software Basics

I. Software Overview & Training Options

This chapter will give you an overall understanding of the general concepts and techniques for using the NeuroField64 software program, including attaching the coils and the electrodes. If you simply want step-by-step instructions for Restoring your Patients Database and using the NF64 software suite, go to "II Software Run-Thru" later in this section.

Using Stimulation Protocols

NeuroField Stimulation protocols can be run using the X3000 or /X2000 with a Plus Unit and/or the Z3 (tDCS/tACS/tRNS) unit. The Stimulation treatments described below are very powerful tools and can also be run both as a primer to or in conjunction with operant conditioning using the Q20. **Note:** For further details on the information contained here, refer to "Section 1: The NeuroField System" earlier in this manual to reference background, history, and detailed descriptions of the NeuroField System. The information here is meant to aid in the protocol decision process only.

When planning a session for your client, you can choose between multiple treatment options and built-in protocols that go along with them. **Important!!!!** Knowing when and how to use any of these treatment options is crucial, and it is strongly recommended that you participate in a NeuroField training before using any of these techniques.

- **pEMF Treatment** using a Magnetic Stim (X3000/X2000) with say a Standard 1 – 4 HD protocol with a traditional 4 Coil setup or a CFC 1-4/40-80 CHIRP protocol with a stacked 8 Coil setup on the head and/or the body.
- **Z3 Treatment** using an Alternating Current Stim (tACS), a Direct Current Stim (tDCS), or a Random Noise Stim (tRNS) either on the body using Gel electrodes, say at the Mastoids or Shoulder, and/or on the Head using Sintered electrodes.
- **Mirror Treatment** using a blend of the above treatments; Magnetic stimulation with coils and Current stimulation with electrodes together at the same time/using the same protocol, either on the head or on the body.
- **DEHAB Treatment** using the Dehabituator to give random frequencies using a Magnetic and/or Current stim to cause the brain to engage in Phase Shift.
- **HRV Treatment** using the Neuron4 unit in combination with a Magnetic and/or Current Stim to muscle test the heart and find which frequency the body wants.
- **EEG Treatment** using the Q20/Q21 and 19 channel EEG (either Z-Score or Amplitude) training with a blend of Magnetic and/or Current Stims to utilize NeuroField Stimulation technologies as a primer for NeuroField operant conditioning.
- **Combo Treatment** using the Q20/Q21 and 19 channels EEG with Magnetic and/or Current Stim to combine NeuroField Stimulation technologies with Neuroguide Operant Conditioning using custom protocols generated from the SCL and/or LPR.

Giving standalone Stimulation (either Magnetic or Current) treatments as well as Mirror and/or Triad and Spindling treatments (Magnetic and Current simultaneously) are both effective strategies to guide the brain towards regulation on its own without the aid of Operant conditioning. However, in many

situations it is also important that learning take place, so using NeuroField Stimulation protocols in combination with either NeuroField EEG or Neuroguide LORETA 19 Channel Neurofeedback via the Q20/Q21 can be even more effective.

Dr. Dogris & Dr. Thompson offer several trainings per year in different locations around the United States & abroad. They also offer Webinars and online mentoring consultations to learn these skills and procedures. Dr. Dogris uses the Neuroguide QEEG software to acquire and analyze EEG data for protocol selection. You can learn more about Neuroguide by going to the www.appliedneuroscience.com website.

In addition, please remember one simple rule with this and any NeuroField procedure. This process pulls a lot of energy from the brain and will deplete your client. Imagine running on a treadmill for long periods of time without eating or drinking fluids to maintain your strength. You will run out of gas and will not be able to work out. The same goes for these treatments. It is important to encourage patients to eat healthy protein and drink plenty of water pre and post sessions. This gives the brain the energy it needs to stabilize itself.

Enabling Stim Units

The NeuroField System software allows you to enable both Magnetic and/or Current devices up to four units at a time. The "Software Basics - Magnetic and Current Stim-Only" instructions described later in this "Software Basics" Section provides detailed instructions for a "Synchronized Treatment" and pertains to enabling both the traditional Magnetic (pEMF) units with coils and the Current Stimulation with electrodes. However, at any point in this process, you can simply enable only one Magnetic Stim device, say an X3000, and pick a single protocol (say 1 – 4 HD) to simply run a Standard pEMF treatment.

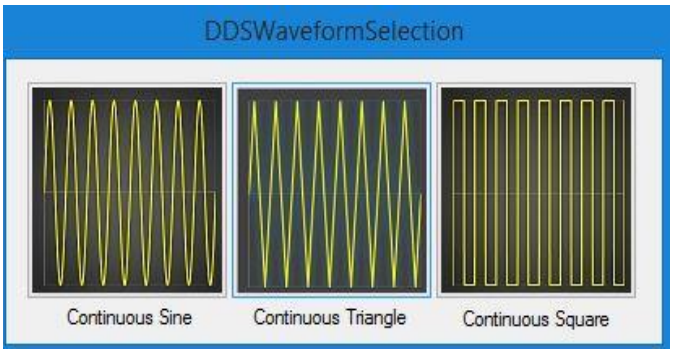
You can also, simply enable a single Current Stim device, tACS/tDCS/tRNS, and give alternating current, direct current, or random noise treatment. The "Current Stim-Only" instructions described later in this "Software Basics" Section details how to do this. What is important to note here is that, yes you can run a single unit at any given time, however you are encouraged to start thinking in terms of enabling multiple devices as the NeuroField system has shown to be very effective when synchronizing Magnetic and Current Stim during a single treatment as well as when combining it with EEG Neurofeedback.

Selecting Waveforms - X3000 Plus & Z3 tDCS/tACS/tRNS

NeuroField allows you to choose between several types of waveforms for either a Magnetic (X3000 DDS device purchase 2015 or later) or a Current Stim (the Z3 tDCS/tACS/tRNS) units.

Magnetic and Current Waveforms

Magnetic Waveforms



With either one or two Magnetic Stim units enabled, the available Waveform options are Continuous:

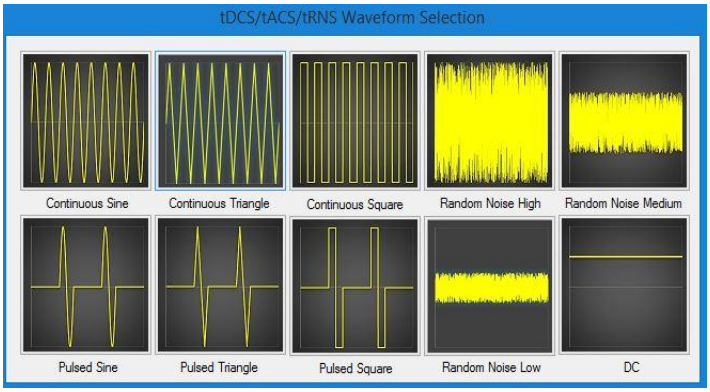
- **Square** Wave
- **Sinusoidal** (Sine) Wave
- **Triangle** Wave

When using the X3000 DDS unit, these three waveforms are automatically available. However, NeuroField defaults to using a Square wave. The waveforms can be rank ordered, in terms of intensity, as follows:

- **Square** Wave – The highest output / strongest stimulation
- **Triangle** wave - The next highest output
- **Sine** Wave **–** The least amount of output. It is a nice smooth stimulation, and is one of the waveforms that is often used because people can tolerate it well. It can move a person very quickly and easily with very little discomfort.

The body naturally makes Sine Waves. So, if you put a Sine Wave into the brain you are putting what the brain considers to be one of its own, and will treat it as such. Whereas, when a Square Wave goes into the brain, the brain knows that it is not one of its own. The thinking is that the brain will follow or mimic a Square Wave for a while, habituate to it, and eventually will realize it's not one of its own and stop listening to it. However, no matter what wave form goes into the brain, the brain can still decide not to follow it. Variation of stimulation treatments is advised.

Current Waveforms



tDCS/tACS/tRNS can run in several different modes and defaults to Continuous Sine, the least intense waveform.:

- **Continuous** Square
- **Continuous** Triangle
- **Continuous** Sine
- **Pulsed** Square
- **Pulsed** Triangle
- **Pulsed** Sine
- **Random Noise** High
- **Random Noise** Medium
- **Random Noise** Low
- **DC**

Note: To get a good feel for when and how to select waveforms, go to "The Protocol Creation Wizard" later in the Section, and try creating a simple protocol. This will walk you through the steps and will give you an overview on how Magnetic and Current stims differ and can be setup to be work together.

AC vs DC?

With the tACS/tDCS/tRNS unit you have both AC (tACS) and DC (tDCS) transcranial stimulation capabilities (as well as RNS see below)

- AC = Alternating Current = bi-directional
- DC = Direct Current and = uni-directional

A good point to remember when making protocol decisions is that when giving AC (or pEMF), you are entraining the brain, and when giving DC (or RNS) you are decoupling the brain.

Alternating Current (AC)

AC is given via a waveform, thus you will setup a frequency to run in AC mode. This allows you to synchronize a current stim tACS with a magnetic stim pEMF for a very effective treatment. When using alternating current, you also have the capability of assigning a sinusoidal (sine) wave, a square wave, or a triangle wave in either Continuous or Pulsed form. These waveforms are going to alternate from positive to negative polarity. Again, AC is bi-directional:

- The current will go in thru the Anode and out thru the Cathode, back into the Cathode and out through the Anode.

Direct Current (DC)

DC is not a waveform, thus you will not setup a frequency to run in DC mode. You are simply giving a current which is either going to be positive or negative. DC is very effective if you want to get the Rich Club online – getting the front of the brain talking to the back of the brain by training the "long tracks", say from Fp1 to O1 and Fp2 to O2 with 2 Current units or Fz to Oz if you only have one unit. **Note:** Refer "Training the Rich Club and Network Hubs" later in this Section for further details. Again, DC is unidirectional:

- The Current will go in thru the Anode and out thru the Cathode only.

When choosing electrode placements for Anode vs Cathode, it is important to know that the:

- Anode = positive and stimulates the area or “adds” to it
- Cathode = negative and inhibits the area or “carts” it away

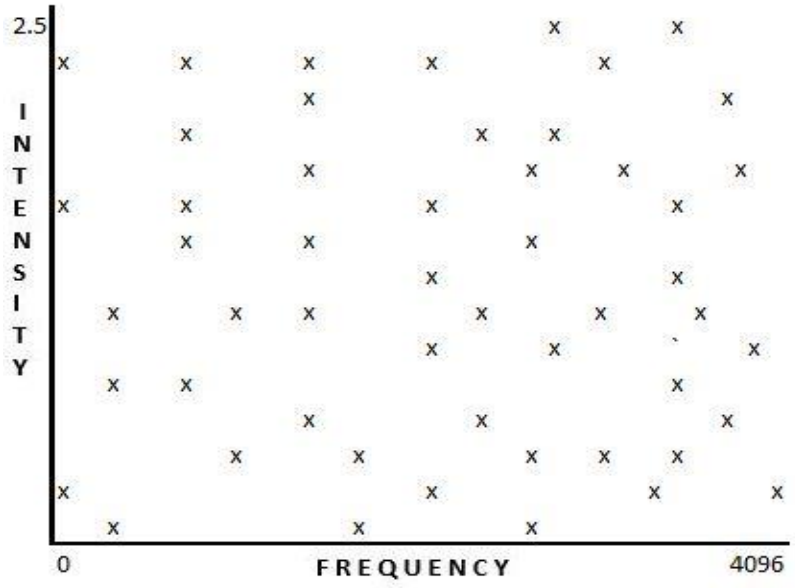
tRNS (Random Noise)

Random Noise is useful for breaking up any stuck patterns such as hyper or hypo-coherence. Because tRNS gives you the option to choose between High, Medium, and Low power, you can control the power of the treatment. Random Noise is giving alternating current (not direct current), so it can also be referred to as Random tACS.

Alternating current is a frequency, alternating polarity. Whenever there is a frequency associated with a current stimulation, it is alternating current and is polarity going from the positive into the negative back to the positive and to the negative and the number of times it cycles is how many frequencies it is. If you see 10 cycles per second it is running that polarity 10 x per seconds.

You can also create random frequencies using the Dehabituator. tRNS is the same as tACS, but it pulses and you can choose how long you want it to pulse. The strongest treatment you can give is “High” power at 2.5 mA and 8000 Hz. The random noise max settings are as follows:

- **Power** = tRNS High
- **Frequency** = 8000 Hz max
- **Intensity** = 2.5 mA max



For example, with a setting of 2.5mA and 8000 max Frequency, the Intensity is set at 2.5 mA and the Frequency is set fixed at its top level of 8000. This means that the unit will generate random noise frequencies from 1-8000 Hz at equal intensity across the spectrum. The frequencies are not generated simultaneously, but it happens so fast that it appears to be.

The frequency number can be changed from 0 to 8000 Hz. Doing so will tell NeuroField to generate tRNS starting at 0 Hz to whatever value that you choose between 1 to 8000 Hz.

Using tRNS

You tRNS in three different modes which will simply determine the amount of power (or level of intensity) that will be generated. The three modes are tRNS:

- **High** (Meaning High Power)
- **Medium** (Meaning Medium Power
- **Low** (Meaning Low Power

You don't have to use High Mode to get an effect. Signal generators have been added to the system to create the Random Noise. There are sixteen signal generators in the hardware, and to make sure the spectrum didn't get distorted, the output has been limited:

- Low Mode: = 16 signal generators
- Medium Mode: 8 signal generators
- High = 4 signal generators

When you select the tRNS mode, the number "8000" will automatically be entered in the frequency box. You can also choose between Sine, Square, and Triangle wave. Since wave is the gentlest, so people with depression don't often feel it and do better with giving a square wave.

Again, it is important to experiment with the power (levels of intensity) because "less is more" with some people.

Training the "Rich Club" and Network Hubs

Understanding the "Paradigm Shift"

With the evolution of the NeuroField System, the whole notion of using both Magnetic and/or Current Stimulations to train specific areas of the "Rich Club" has caused a paradigm shift in the way that training strategies are prioritized. In general, training methods have predominantly been focused on thinking in terms of Amplitude training, giving a Stim or training a specific frequency to bring up or calm down a specific area of the brain. For instance:

- If a person is low in Delta, give them Delta,
- If they are low in SMR, give them SMR.
- If the brain is completely and tightly locked, dehabituate them and then give them the frequency that is most deregulated according to the QEEG and the client's presenting symptoms.

Although standard strategies are important and certainly have their place in your training plan, it is important to now think first in terms of overall communication and ensuring that the Network Hubs are talking to one another, and then proceed with additional training strategies. The paradigm shift looks at Network Configuration and Network Optimization as a key to subsequently getting a good response with Neurotherapy. As a primary focus before anything else, you would now ask yourself:

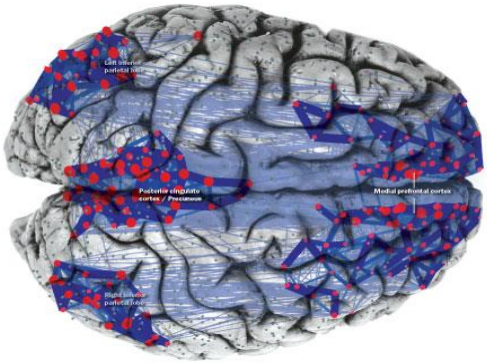
- Is the Default Mode Network online?
- Do I see the Rich Club working the way it is supposed to?
- Do I see hyper or hypo-coherence there?
- If so, how do I get those areas to talk to each other?

"Rich Club" Locations:

So how do you get these hubs to begin talking to one another if they are off line? By giving NeuroField Magnetic and/or Current stimulations, and placing the NeuroField stacked coils and/or electrodes on specific areas of the "Rich Club".

The Brodmann Areas included in the "Rich Club" are:

- Frontal Lobe = BA 9, 10
- Anterior Cingulate = BA 24, 32, 33
- Posterior Cingulate = BA, 23, 29, 30, 31



- Superior Parietal Cortex/Precuneus = BA 5, BA 7
- Visual Cortex = BA 17, 18, 19
- Hippocampus/Medial Temporal Lobe = BA 27, 28, 34, 35, 36, & 48
- Insula = BA 13

Phase Reset Dynamics:

When Stimulation technologies are run targeting the "Rich Club", it influences Phase Reset dynamics. Phase Reset is a combination of Phase Lock and Phase shift. The brain will go through a Phase Lock for a period and then go into a Phase Shift for a period. The two together are known as Phase Reset. The brain must do this to communicate effectively between each of these hubs. When the hubs can talk to each other, they can regulate each other. Research is showing that the:

- Length of a Phase Shift is correlated with levels of Intelligence
  - Neurons are calling out for resources / talking to each other
- Length of a Phase Lock is associated with Pathology
  - Neurons are running independently / not talking to one another
- There is an optimum range of Phase Reset that when it's achieved, the whole system runs well.
  - Don't want Phase Lock or Phase Shift to be too short
  - Don't' want either of them to be too long

So, the Posterior Cingulate must be able to talk to the Anterior Cingulate, and if it can then the whole brain will operate optimally. For example, let's say you are in a room full of people that are all members of the Rich Club, and your one goal is to match the volume of your voices. To do that, in order for you to speak at the same volume as another person, you have to be able to hear them long enough. There m bust be enough communication between the two of you in order for you to make an estimation about how loud you need to speak to get the job done. If you can get that information, you can actually match it and regulate your voice at the same volume as their voice and every other person in the room.

If you can't, if the communication is too short, such as in hypo-coherence or hypo-phase (deep blue lines in the QEEG representing short communication), there is not enough time for you to hear the person across the room, and if you can't hear them, you can't make an estimation of how to match them to get the job done and confusion ensues. Or, if it is hyper-coherent or hyper-phase (deep red lines in the QEEG), then you may be able to listen to one other person and only match their volume level, but you get stuck there and you are not going to be able hear what is going on with anyone else around you.

The same is true with network hubs. When they are in hyper or hypo mode they cannot effectively listen to the rest of the system and they will not and cannot operate efficiently. Then again, confusion ensues.

Current Stim – Decoupling the Brain:

DC and RNS is very effective if you want to break up aberrant patterns to get the Rich Club back online and optimally functioning. By sending a current through the system either Direct Current or Random Noise, you can cause the system to decouple itself and break up stuck patterns. For example, by using tDCS to train the "long tracks", say from Fp1 to O1 and Fp2 to O2 with 2 Current units or Fz to Oz if you only have one unit, you can get the front of the brain talking to the back of the brain.

Cross-Frequency Coupling – Carrier Waves and Harmonics:

When using Magnetic and/or Alternating Current Stimulations to train the Rich Club research has shown that an effective method is to use Cross-Frequency Coupling and nesting the frequencies. When using CFC, you can run two separate frequencies simultaneously to stim using both the carrier wave and Gamma frequency simultaneously. The options to do so are as follows:

- **Using Magnetic Stim Only**
    - 2 X3000 units w/ 8 Coils Stacked
        - Bottom Coil = Slow wave carrier frequency
        - Top Coil = Gamma Frequency
- **Using Current Stim & Magnetic Stim**
    - 1 or 2 tDCS/tACS/tRNS units w/ 2 electrodes 1 unit or 4 electrodes 2 units
        - Slow Wave Carrier Frequency
    - 1 or 2 X3000 units w/ 4 coils 1 X3000 or 8 coils 2 X3000 units
        - Gamma Frequency

Note: For Magnetic Stim Only, you must stack the coils. This means that you place one coil on top of another coil instead of placing each one separately on the cap. Refer to the Segment below titled “To Stack and Place 4 or 8 Coils” for detailed information on how to stack coils.

Again, what research has shown is that if the frequencies are phase matched, if they are in the same phase, and they have the same amplitude, then the slow frequency wave will become the carrier. The high frequency waveform (Gamma) will naturally match it and get carried right with it over a wider area. Frequencies are phased matched if they are harmonically matched. The two go hand-in-hand. 40 Hz Gamma is a harmonic of 5 Hz Theta (it is 8 sets of 5). If you draw those wave forms next to each other, you would see how they actually click in and they phase match. This is a key component to making Magnetic stimulations using CFC training work. The CFC protocols are all designed with the harmonics carefully calculated to be phase/amplitude matched.

To generate the harmonics every wave form is calculated by itself. So, if you have 5 Hz Theta, you would multiply it by sets of 5 to get its specific set of harmonics, or 6 Hz, multiply it by sets of 6 and you will come up with the equal harmonics. You can do the same for say, 7hz, 8hz etc. So, 5hz and Theta will ring out harmonics at the following frequencies:

Alpha / Beta Range	**Gamma Range**
10 Hz (5x2)	40 Hz (5x8)
15 Hz (5x3)	45 Hz (5x9)
20 Hz (5x4)	50 Hz (5x10)
25 Hz (5x5) etc.	55 Hz (5x11) etc.

In the case of the CFC Theta Gamma / Alpha Gamma Protocol, for example, it efficiently utilizes the Gamma frequency by using Theta as the carrier and building harmonics of Theta in the Lo Gamma frequency range (40-80Hz). So, the protocol starts with Theta 5 Hz in Coil 1 (CH1), ringing out harmonics starting at 40hz Gamma in Coil 2 (CH2). As the protocol steps through the Theta Band (6hz, 7hz, 8hz), harmonics within the Gamma range are created for each of the Theta Frequencies. See “Stim CH1 Frequency” and “Stim CH2 Frequency” columns below.

List of Stimulation Cycles for Primary Signal Generator

Index	Stim CH1 Frequency	Stim CH2 Frequency	Stim CH3 Frequency	Stim CH4 Frequency
1	5	40	9	45
2	5	45	9	54
3	5	50	9	63
4	5	55	9	72
5	5	60	9	81
6	6	42	10	40
7	6	48	10	50
8	6	54	10	60
9	6	60	10	70
10	6	66	10	80
11	7	42	11	44
12	7	49	11	55
13	7	56	11	66
14	7	63	11	77
15	7	70	11	88
16	8	40	12	48
17	8	48	12	60

The same holds true for the Alpha Gamma portion of the protocol. It starts with Alpha 9 Hz in Coil 3 (CH3), ringing out harmonics starting at 45 Hz Gamma in Coil 4 (CH4). As the protocol steps through the Alpha Band (9 – 12Hz), harmonics within the Gamma range are created for each of the Alpha Frequencies. See "Stim CH3 Frequency" and "Stim CH4 Frequency" columns above. **Note:** Placement of stacked coils for each CFC protocol is crucial and is something that is taught by Dr. Dogris & Dr. Thompson at BootCamp, Advanced Trainings and/or Webinars.

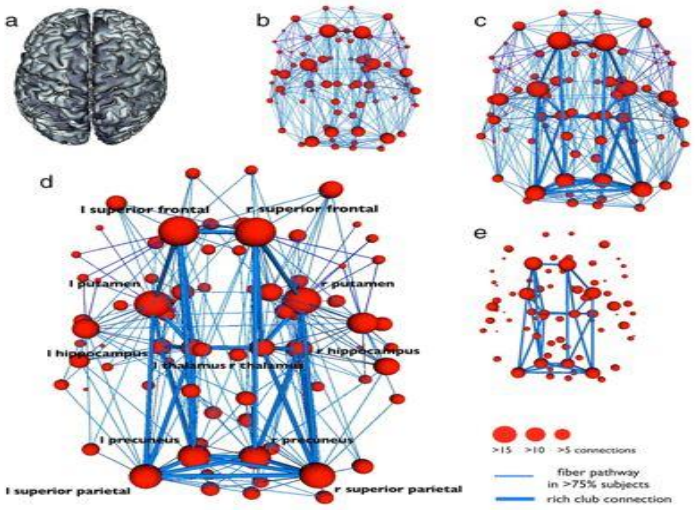
Reviewing the QEEG

It is important to know that acquisition of the QEEG data and having a brain map is essential in making the proper decisions on what NeuroField protocols to use and what areas of the brain to train with either NeuroField or Neuroguide. However, as we discussed above, simply knowing where the brainwave excesses and deficiencies are to determine your overall training strategy, while important, it is not necessarily the first line of attack. With the evolution of the NeuroField System to include using Magnetic and/or Current stimulations, it is now suggested that you review the QEEG to determine if the "Rich Club" is offline or showing signs of poor communication, and if so, train to regulate it first. Then go ahead and train the overall amplitudes and/or Z-Scores according to the QEEG.

To Check for "Rich Club" Dysregulation and Choose Coil/Electrode Placement:

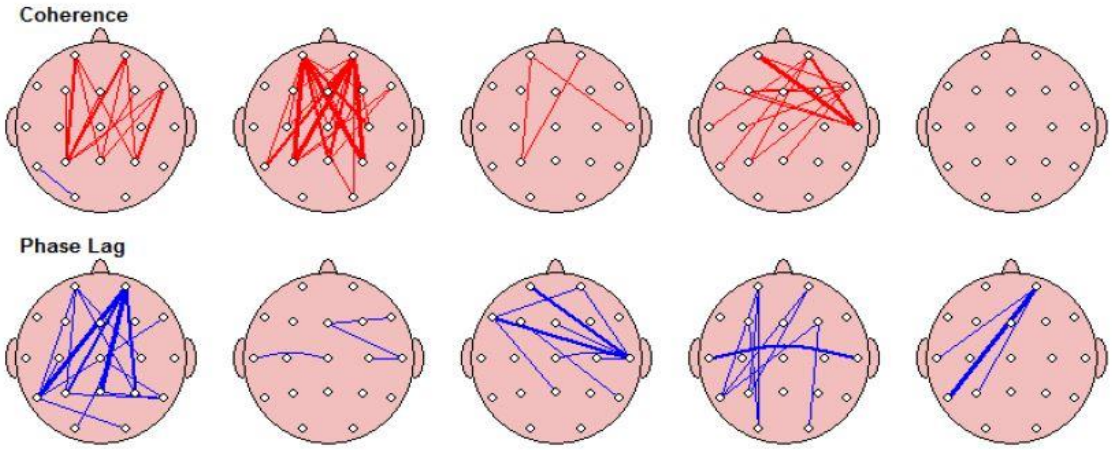
There are several large hubs within the "Rich Club" which can easily be seen in the following diagram:

Rich-club regions and connections.



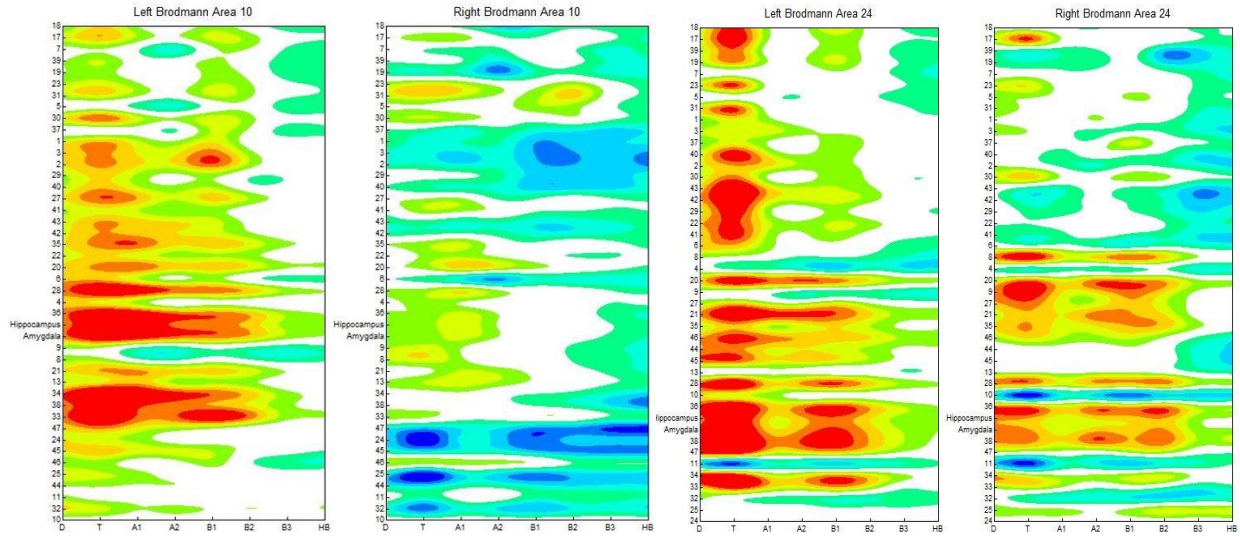
van den Heuvel M P , and Sporns O J. Neurosci. 2011;31:15775-15786

1. Generate a QEEG and look at the Coherence and Phase Lag in the Z-Score Surface Maps. Then compare them with the large hubs depicted in the diagram above to determine if there are any Hyper-Coherences/Phase Lags and or Hypo-Coherences/Phase Lags in a frequency band. Any one of these markers represents dysregulation in the “Rich Club”.



2. To further identify how well the “Rich Club” is communicating for a given client, generate a LORETA Z-score Coherence Bitmap analysis file to look at areas in the “Rich Club” and see how they are communicating with the rest of the brain. Specifically, you would want to look at BMA 24 which is the Anterior Cingulate and see how it is communicating with the Posterior Cingulate or BMA 23, 29, 30, 31.

   Refer to the example below where you can see BMA 10 and BMA 24, both Rich Club areas, are having problems communicating with other “Rich Club” areas, they’re either hyper or hypo coherent.



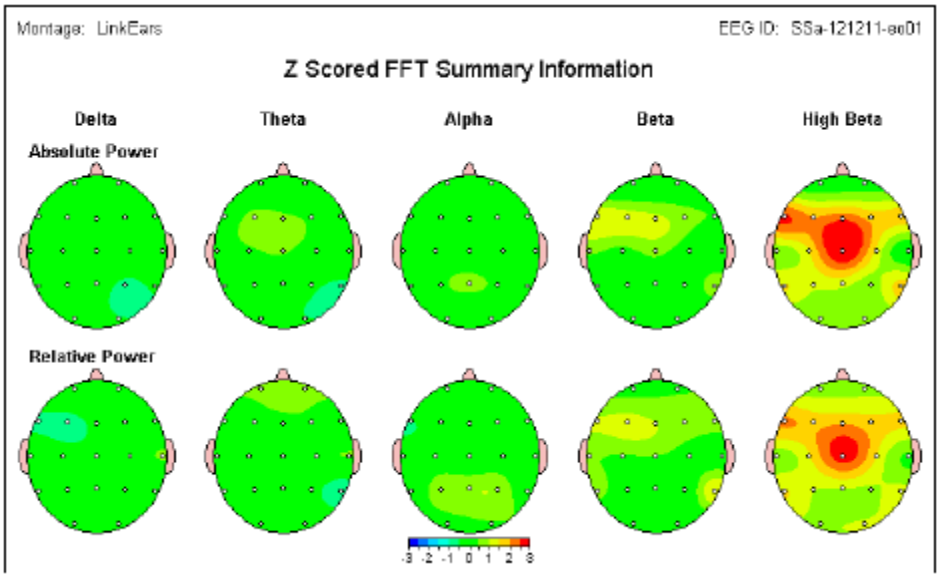
3. If there are any dysregulations in any one of these areas, say to yourself, "I need to regulate the Rich Club first and then I can go to other training strategies!" This is a prime case to run for example, DC "Long Track" training first to decouple the brain and get the Network Hubs online and properly communicating. Then proceed with using either NeuroField Magnetic and/or Current stimulations along with EEG Neurofeedback training methods. The data being generated now strongly supports that if you get the "Rich Club" working first, you will facilitate the efficacy of these Neurofeedback technologies exponentially.
4. Next, make a note the 10/20 site and/or Brodmann Area locations of the dysregulation. This will guide you when identifying the coil and/or electrode placement. Refer to "Rich Club Locations" earlier in Section for detailed information. In the QEEG example above, we see that the "Rich Club" is indeed not properly communicating:

You can now place your electrodes and/ or coils accordingly and begin training the Rich Club sites you have identified. It always a good idea to generate subsequent post training maps and compare them to pre-training maps to identify the changes in the "Rich Club" connectivity. **Note:** Wait at least 24 hours before generating a post map because the brain is depleted after a treatment. Waiting will give it time to recover and settle.

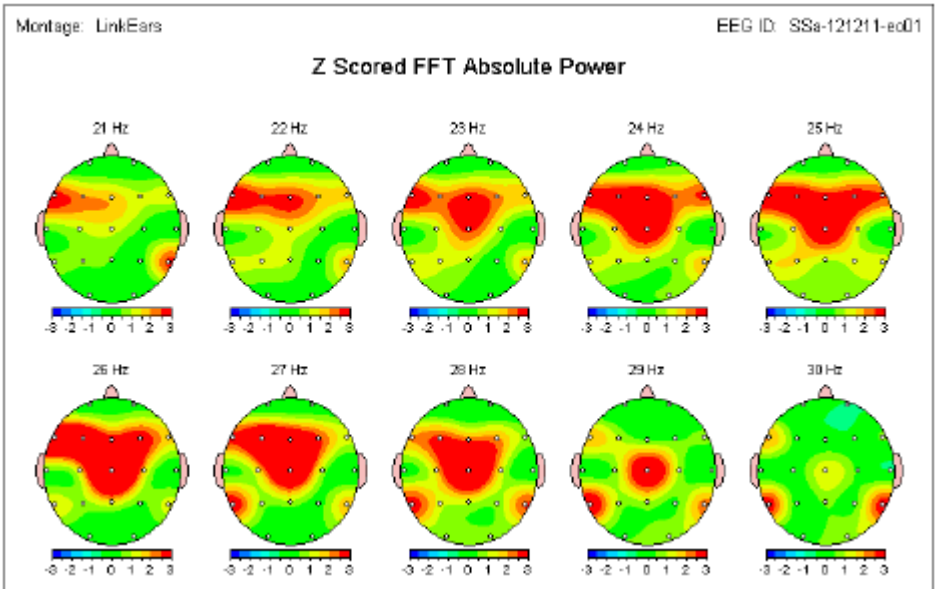
To Check for Frequency Dysregulation and Choose Coil/Electrode Placement:

Before continuing, it is important that you have received the proper training, and that you use the QEEG data ***along*** with the presenting symptoms from your client to guide you in protocol frequency selection and coil placement. There are several ways to look at a QEEG map.

1. In the QEEG map, go to the "Z Scored FFT Summary Information" page.
2. Look for excessive frequencies (orange and red areas) or deficient frequencies (light blue and dark blue areas). In the example below, you can see an excess in the High Beta frequencies.



3. Go to the "Z Scored FFT Absolute Power" page.
4. Look at each of the 1hz bins to further explore the excessive or deficient areas determined in Step 2 above. In the example below, you can confirm that the High Beta moves across the 21 – 30 hz bins and can see that the excess High Beta is for the most part centered around the 10/20 sites F7/F8, F3/F4, and C3/Cz/C4. This identifies the coil/electrode placement and confirms that since the presenting symptom is anxiety and High Beta frequencies are associated with anxiety, the treatment should be a protocol that gives stims in the low frequency range. This will drive the brain at those frequencies and reduce anxiety.



About the Electrodes

Before proceeding, the electrodes must be properly connected to the hardware as well as to the scalp and/or body of your patient. For detailed instructions on connecting and placing the electrodes, refer to "Section 3 – VI. Hardware Setup Accessories and Prep" and go to "Connecting and Placing Electrodes – tDCS and tACS" for more information.
Note: Correct electrode placement is crucial, and it is recommended that you attend a BootCamp given by Dr. Dogris & Dr. Thompson to learn the correct process for electrode placements.

Again, Silver-Silver Chloride electrodes come with the system in both the Pellet/Cup and Gel styles that snap onto the supplied cable. **Note:** When using the Q20 to acquire EEG or running NeuroField RTZ/RTH, you will need to purchase an ElectroCap and ear electrodes. Make sure that you do not mix metals i.e. using gold ear electrodes with silver electrodes in the cap or you will generate artifact in the record. To ensure this does not happen, order the recommended caps and ear clips detailed earlier in "Section 3 – VI. Hardware Setup Accessories and Prep" / "Ordering Accessories/Supplies".

Pellet/Cup Style

You can reuse the pellet style 3 – 5 times but any more than that the electrode will lose its surface and will no longer be an electrode. The Pellet/Cup style can push current very easily through the system. You will use 10/20 paste with these electrodes to place them on your Patient. These electrodes can be used on both the body and the scalp. **Note:** You can also purchase Sintered electrodes that have a wider surface area and fit easily under the cap. These too can be used on the body and the scalp.

Gel Style

The Gel electrodes are for use on the body only. With gel electrodes, you will simply peel off the tape and place the Gel side down onto the skin. Common areas to apply them is on the Mastoids and/or Forehead. Gel electrodes snap on to the supplied cable do not need 10/20 paste. The Gel are disposable after a single use.

Attaching the Coils

Once you have determined coil placement based on the patient's qEEG, you are ready to attach them to the head. On the back of each coil is a Velcro strip which attaches to the black cap supplied in your NeuroField kit. Next you will attach the coils to the head and then start the software program. The following instructions walk you through attaching 4 coils, 4 coils stacked, and 8 coils stacked. **Note:** Correct coil placement is crucial, and it is recommended that you attend a BootCamp given by Dr. Dogris & Dr. Thompson to learn the correct process for coil placements.

4 Coil Setup

To Attach the 4 Coils:

1. Cover the head with a surgical cap.
2. Place the black NeuroField Velcro Cap over the surgical cap.
3. Attach the Coils to the Velcro strips on the NeuroField cap at the 10/20 sites you identified from the QEEG. **Note:** When removing the coils only do so by firmly holding the coil box (NOT THE WIRE) and gently pulling the coil away from the Velcro cap.

4 Coils Stacked

8 Coils Stacked

To Stack and Attach 4 Coils:

Each coil is marked with a number and/or colored tape: 1 (Black), 2 (Red), 3(Yellow), and 4(Blue).

1. Take Coil #2 (Red) and put it on top of Coil #1 (Black). Even numbers on top. This is your first set of stacked coils and it is going to produce Stims from Channel 1 and Channel 2. For example, if using the Theta Gamma / Alpha Gamma CFC Protocol, the frequencies generated by this protocol would stim using the stacked coils with Theta (CH #1-bottom coil) and Gamma (CH #2-

top coil) **Note:** The slower frequency (Theta) is positioned on the bottom of the stack and the faster frequency (Gamma) is positioned on the top of the stack.

2. Take Coil #4 (Blue) and put it on top of Coil #3 (Yellow). This is your second set of stacked coils and it is going to produce Alpha (CH #3) on the bottom of the stack and Gamma (CH #4) on the top of the stack. **Note:** if you choose Alpha/Gamma Alpha/Gamma Coils generate the same frequencies.
3. Place Stacked Coils #1 and #2, for example, at the Anterior Cingulate (Between Fz and Fpz)
4. Place Stacked Coils #3 and #4, for example, at the Posterior Cingulate (Between Pz and Oz)

To Stack and Attach 8 Coils (The Octopus):

If you have setup 2 Stim units as described in 'Octopus Setup" earlier in this manual, you can now use a total of 8 coils. To do so, follow the same steps listed above for stacking your 2nd set of coils, and continue setting up from where you left off by doing the following:

1. Place the 2nd set of stacked coils #1 and #2 next to the 1st set of stacked coils #1 and #2 described in Step 1 or they can be placed Central/Temporal – Left (C3 and T3) as pictured above.
2. Place the 2nd set of stacked coils #3 and #4 next to the 1st set of stacked coils #3 and #4 described in Step 2 above, or they can be placed Central/Temporal – Right (C4 and T4) as pictured above.

Note: Again, correct placement of stacked coils for each CFC protocol is crucial and is something that is taught by Dr. Dogris & Dr. Thompson at BootCamps, in Webinars, and/or through their Mentoring program.

II. Software Run-Thru: Magnetic & Current Stim-Only

This chapter will give you step-by-step instructions for Restoring your Patients Database and using the NF64 software suite.

Launching NeuroField64 & Restoring Patients Database

Important!!! If you are updating from a recent release of NeuroField64 to the latest version, you must Restore your Patients database once you launch the software. The database will be restored from the Backup you made before uninstalling your current version of NF64.

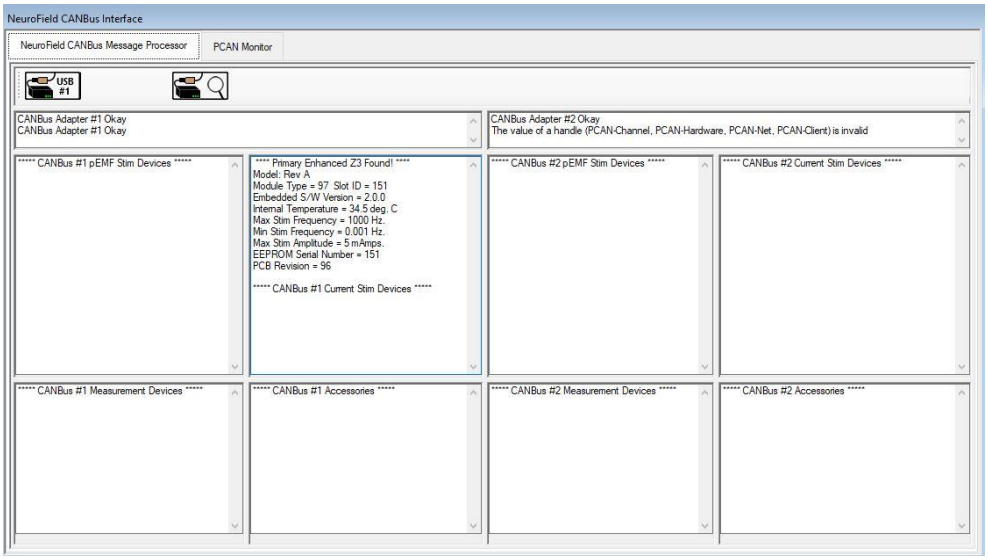
To launch NeuroField64 and start the Program, a NeuroField unit must be properly connected and your CANBus adapter setup before proceeding with the instructions below. See the previous "Hardware Setup" Section earlier in this manual for further details.

Be sure to turn on the power for each device before proceeding with the instructions below. However, with NeuroField64 if a unit has been disconnected or is not powered on at startup, when the main CANBus screen appears you can power on your hardware and hit the "Search for Devices" button. NeuroField will find the units that are now powered-up and connected to the CANBus.

To Launch NeuroField64, Start the Program, and Restore Patients Database:

1. Click on the NeuroField64 icon located on your desktop and it will launch the NeuroField64 software. The program opens in a minimized state, however you can maximize the window if need be.
   Note: During installation, the NeuroField shortcut placed on your desktop is set to "Run as Administrator." If you are having problems launching the program some operating systems may cause this to get reset. If this is the case, check the shortcut setting. To do this:
   a. Right-click on the NeuroField Icon.
   b. Select "Properties"
   c. Select the "Compatibility" Tab
   d. Under the "Privilege Level" area make sure the "Run this program as Administrator."

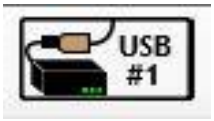
   The CANBus selection screen appears. **IMPORTANT!!!!!: YOU MUST FOLLOW THE INSTRUCTIONS BELOW** to select either USB #1 or USB #2 **BEFORE** proceeding to select your client or use any of the NeuroField Sidebar options.



NeuroField will automatically query the CANBus for you. The main NeuroField screen will appear listing each unit that is hooked up and powered on. Once the query is complete, you will see a possibility of 3 buttons depending on how many devices you have attached:

- "USB #1"
- "USB #2"
- "Search for Devices"

2. Check the units listed on the screen:
    a. If the hardware listed represents the units you want connected to the system, click on the "Use CANBus #X" button that applies to the set you want to use (X = either #1 or #2). **Important!!** NeuroField will not work properly unless you choose an option her0065.



    b. If you forgot to power up a device or decide you want to add another device, set it up and/or power it on and click on the "Search for Devices" button. NeuroField will find the unit and populate it in the appropriate window.

    Once you are happy with the list of hardware NF64 displays, click on the "Use CANBus #X button that applies to your setup.

3. Notice the "Patient Database Update Status" window that appears. Certain update releases of NeuroField64 may contain a new/updated version of the Database software used to store your Patients data. Once you click on the "USB #1" button, NeuroField64 will compare the version of the Database software in the NF64 update release you just installed against the version of the

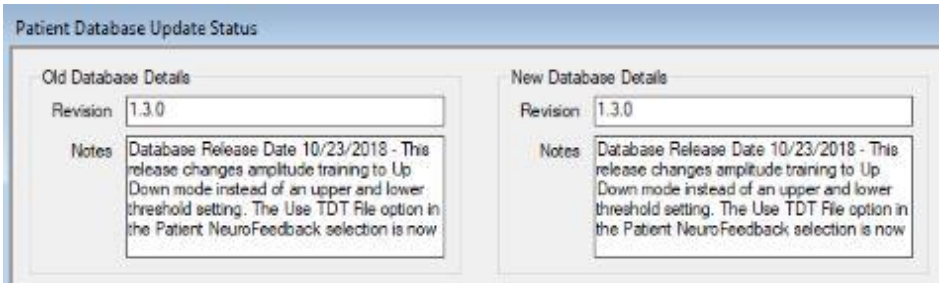
Database software in the NF64 release you had been using. Once it has done so, a status window will appear with details, and the NF64 software will behave as follows:

First Time Install

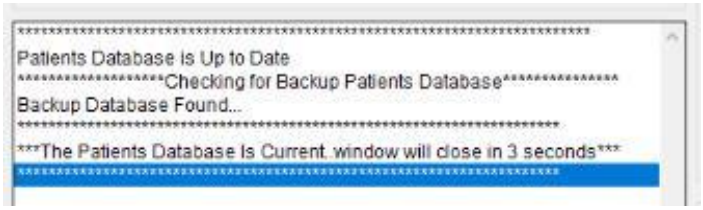
- You are good to go; no Database Conversion or Patient Database Restore is required. The "Patient Selection" window will appear with a single entry, Nicolas Dogris, in the "Patient Grid" and you are now ready to setup your Patient information.

Update Install – Recent NF64 to Current NF64 w/ No Database Software Revisions

This section pertains if you have been regularly installing all recent NF64 update releases. **Important!!!!!** Be sure to follow the "To Restore Patients Database" instructions directly below.



- In the "Database Update Status" window, the "Database Details/Revision" area will briefly show the same Database versions i.e. "Old" = "1.3.0" and "New" = "1.3.0" and will detail in the "Notes" section the same date release and update description since nothing has changed.



- "Patients Database is Up to Date" etc. will be posted briefly in the status window.
- The "Patient Selection" tab will activate and the "Patients Grid" will appear. Notice the Grid will appear populated with your Patient data from the latest backup. As of software version 3.3.0.3 and later, it may appear that your Patients database has been fully Restored, but it is always a good idea to go ahead and restore your Patient data from the latest backup, i.e. the Backup you performed earlier in this manual before you uninstalled the software.

To Restore Patients Database

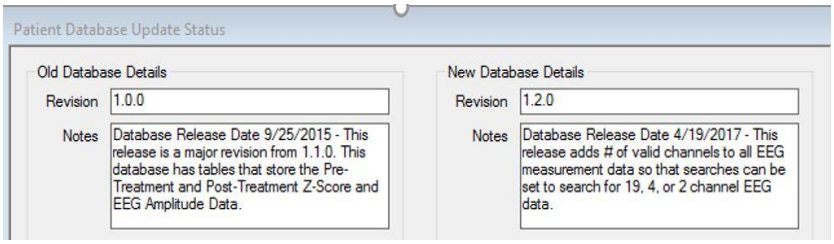
1. From the Main Menu Sidebar, Click on the 

"DB" button. **Note:** Make sure you select the icon with the arrow pointing to the right, and when your cursor floats over the icon it should read "Click to Restore Patients Database".
2. Click on the "OK" button when the "Patient Database Successfully Restored" alert appears and "Please Restart the Program".

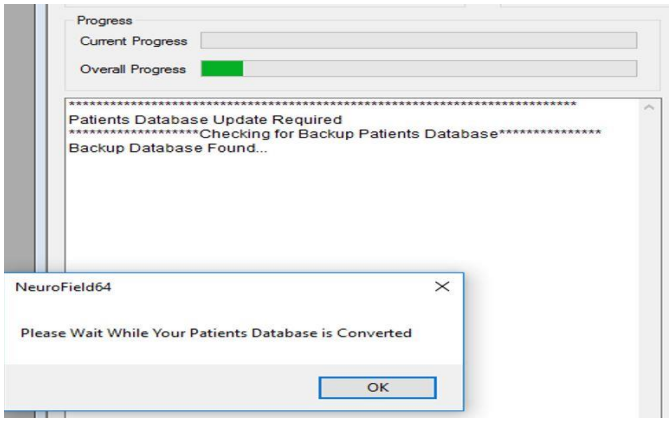
You are now ready to use your NeuroField Software Program. Before you select your patient, it's a good idea to become familiar with the NeuroField software Main Menu i.e. the icons and the tabular interface.

Update Install – Earlier NF64 to Current NF64 w/ New Database Software Revisions

This section pertains if you haven't been updating NF64 regularly/had been running an early version, say 3.0.2.2 and you are now updating to release 3.3.5.4. The following will occur:



- In the "Database Update Status" window, the "Database Details/Revision" area will show differing Database versions i.e. "Old" = "1.0.0" and "New" = "1.3.0" and will detail in the "Notes" section the date of the releases and what has changed.
- "Patients Database Update Required" will be posted in the status window.



- A "Please Wait While Your Patients Database is Converted" alert will appear.
    i. Click on the "Ok" button to start the Conversion.
    ii. When the green "Overall Progress" bar stops moving, click on the "Close" button at the bottom of the screen to continue with the NF64 software launch.
- The "Patient Selection" tab will activate and the "Select Patients Grid" will appear populated with your Patient data from the latest backup, i.e. the Backup you performed earlier in this manual before you uninstalled the software.

You are now ready to use your NeuroField Software Program. Before you select your patient, it's a good idea to become familiar with the NeuroField software Main Menu i.e. the icons and the tabular interface.

Overview - "Main Menu Sidebar"

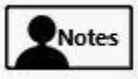
The various icons on the Main Menu Sidebar allow you to navigate to and open different pieces of the NeuroField software. **Note:** Be sure that you have selected your USB #1 or USB #2 detailed in the section above before using any of these icons to access the NeuroField program otherwise the software may not run properly.

The various icons on the Main Menu Sidebar navigates to and opens the following:

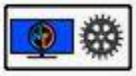
 Treatment Window

 Data Viewer

 Treatment History

 Patient Notes

 Thresholds Settings

 NeuroField Settings

 Device Settings

 Backup Database

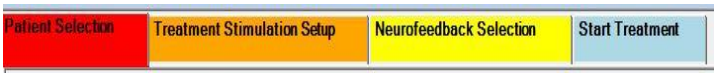
 Restore Database

 Software Ver / User Manual

Overview - NeuroField Tabular Interface

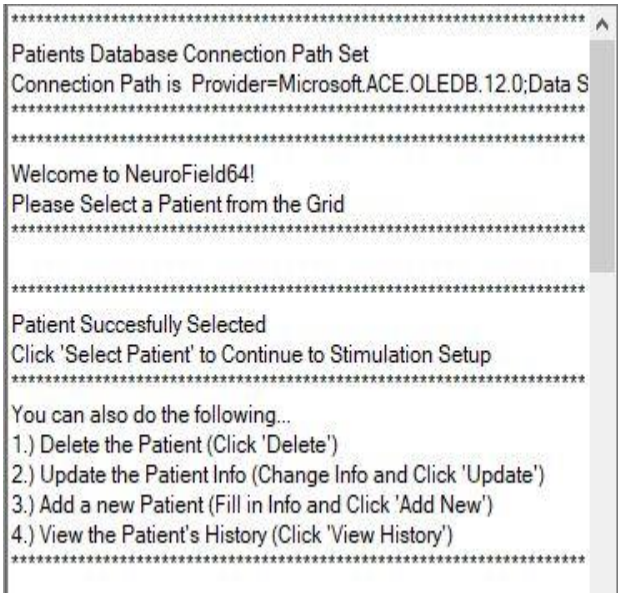
The NeuroField System software is designed with the clinician in mind:

- The tabs are designed in a logical progression with the purpose of guiding you through each part of the required steps to run a session. In other words, the tabs are displayed in "Task Order".

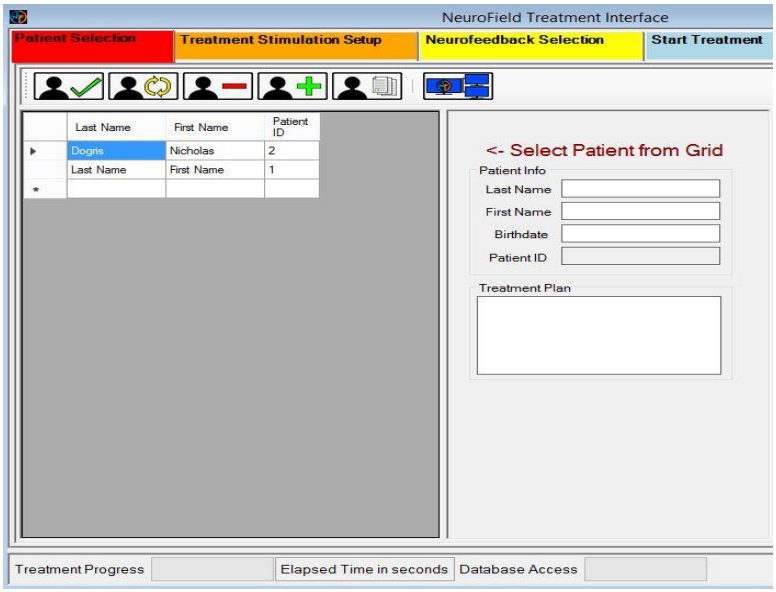


  As you complete a task, the next tab will automatically get activated, moving you step-by-step through the program and the required tasks. The "Patient Selection" tab is the first tab activated, allowing you to quickly setup your patient.
- There is a "Red Alert" area in each window that will blink and alert you to what you are supposed to do next.

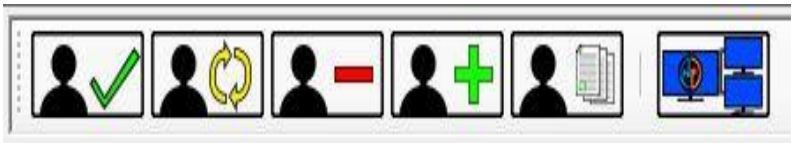
- On the right side of the window you will see an Information Pane. This is designed to give you real-time information about what steps to take and additional options available.



Using the "Patient Selection" Tab



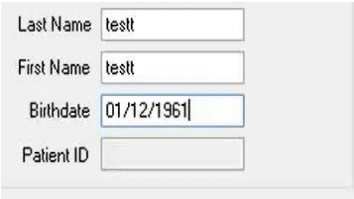
Once inside the program, the "Patient Selection" tab will automatically become activated, and the Patient Selection screen will appear. NeuroField64 was designed to help you store patient data quickly and efficiently AND to be paperless. So, to begin treatment, you will need to first "Add" a new patient into the database. You can then use any one of the following button choices to access your Patient:



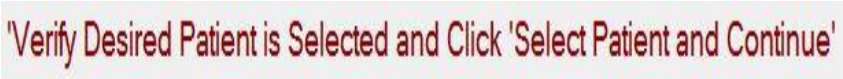
Select **Update** **Delete** **Add** **History** **Network**

To Enter a New Patient:

1. You will see a Patient Info area on the screen.



2. Fill in the "Last Name" and "First Name" fields for your patient.
3. Fill in the "Birthdate" in xx/xx/xxxx format. Most date formats should work. **Note:** The Patient ID is automatically created when the patient is added into the Patient Database, so leave this field blank.
4. Fill in the "Treatment Plan" information you may want to store what it is you are currently doing for that patient. Populate this field with for example: tDCS: 1 mA, F3 Anode, and F8 Cathode. pEMF: F3, F4, C3, C4 for 25 minutes for 15 sessions. The benefit of doing this is if there are more than one technician running sessions, this ensures that when you have multiple people treating a patient, everyone knows what to do and they are all doing the same thing.
5. Click on the  button to Add your Patient and their treatment plan into the database.
6. Click on "Ok" in the "Patient was added successfully" alert window and the patient's name will appear in the "Patient Grid".
7. Notice that a new "Red Alert" has appeared telling you what to do next.

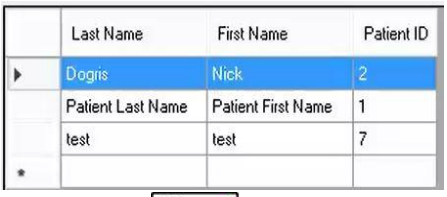


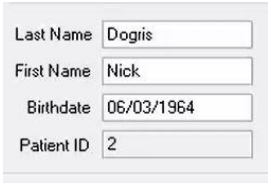
8. Proceed to Step 2 in the next section to proceed and select your newly added Patient.

To Select an Existing Patient for Treatment:

1. Notice that the Patient Info area is blank and "Red Alert" says:

2. In the "Patient List" window, click to the left of your patient's name to Select them. Their name will highlight in blue and their information will auto-populate the Patient Info area and "Treatment Plan" field.





3. Click on the  button and the program will automatically move to and activate the next tab, the "Treatment Stimulation Setup" tab. You are now ready to Setup the Stim information for your Patient's session and the software advances to the orange "Treatment Stimulation Setup" tab.

To Update or Delete an Existing Patient or view Patient History:

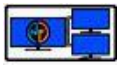
1. Select your patient from the "Select Patient Grid".

2. If you want to Delete the patient click on the  button.
3. To Update a Patient's info, make any changes needed in the appropriate field, and Click on the  button,
4. Click on the  button to view History/previous treatment data for an existing patient.

To Use Network Database:

If you do not have a Network setup with Shared drives, then your Patient Database is set automatically for you during the installation process as C:\NeuroField64\NeuroFieldData\PatientData. You do not have to make any changes to these settings. NeuroField will automatically store your patient data at this location on your local hard drive. **Note:** This means that if you are running multiple rooms, each machine will have a separate database and your patient information can only be accessed from the room and the machine where it is stored.

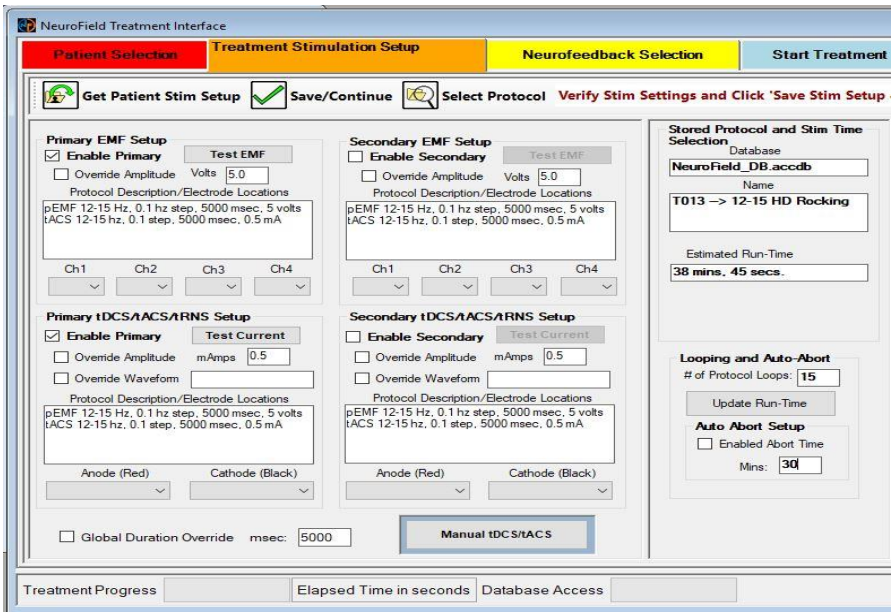
However, if you are running a network setup with shared drives for multiple machines each running separate versions of NeuroField, you can use the "Network Database" feature. Here you can set where the patient database is located and have all the versions of NeuroField, no matter what machine is being used, point to that database. With your patient either newly created or currently selected, do the following:

1. Click on the following icon to set your network path.
    and the DB path icon will appear
   

2. Enter the pathname to where your Patient Database resides.

   Now any machine will be able to access your patient's information. This is great if you are running multiple training rooms. It won't matter which room the patient goes into, because their information can be accessed from any room.

Using the "Treatment Stimulation Setup" Tab



Once you have selected your patient, the "Treatment Stimulation Setup" tab will automatically become activated, and the Stim Setup screen will appear allowing you to now setup your Stim units. **Note:** Again, with NeuroField64 you can setup a maximum of 2 Magnetic Stim units and 2 Current Stim units at one time. Each of the protocols provided with the NeuroField64 are setup to run 4 units, however you can use these protocols to run any combination of 1, 2, 3, or 4 units.

Overview:

When using the "Treatment Stimulation Setup" tab for the Stim-Only procedure, you will do the following:

- Select your Stim Units from the "Treatment Selection Setup" tab.
- Set the electrode and/or coil sites
- Select a Protocol
- Set the number of loops for an estimated run-time
- Enable Auto Abort to stop at exactly at 30 minutes
- Save your Stim Settings and you are ready to start a treatment

To Select Stim Units:

Now you need to tell NeuroField which units you want to use. Here you will "Enable" the ones you want to use. To do this:

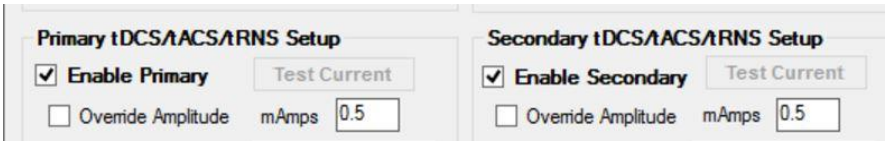
1. Notice that a new "Red Alert" has appeared telling you what to do next; to make and then verify your stim setup selections.

2. Say you have two X3000 units and two Z3 units. With the "EMF Setup" tab activated, click on the "Enable Primary" check box in the "Primary EMF Setup" area of the window. This will activate the first X3000 as a stim unit for your client's session.

3. In the “Secondary EMF Setup” area, click on the “Enable Secondary” check box. This will activate the second X3000 as a stim unit for your client’s session. Your screen should look like this:

Note: If you only have 1 EMF unit hooked up, you would simply not enable the Secondary Stim unit. You can enable a maximum of 4 units total – 2 magnetic and 2 current.

4. In the “Primary tDCS/tACS/tRNS area, click on the “Enable Primary” check box. This will activate the primary (or first) tDCS unit for your client’s session.
5. In the “Secondary tDCS/tACS/tRNS area, click on the “Enable Secondary” check box. This will activate the secondary (or second) tDCS unit for your client’s session. Your tDCS/tACS/tRNS setup should look like this.



Again, if you only have 1 current unit hooked up, you would simply not check the “Enable the Secondary” box.

To Set Coil and/or Electrode Sites:

Now you will need to select the Coil Placements for the Magnetic Stim unit(s) and the electrode placements for the Current Stim unit(s). **Note:** It is not mandatory that you select your sites. However, if you do so the site information will then be saved in your patient’s history to reference for subsequent sessions. Also, it will auto-load the next time you setup your patient’s treatment.

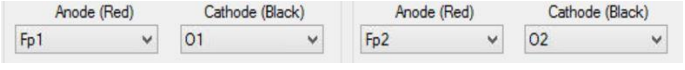
Magnetic Stim (pEMF) unit setup:

For this example, let’s say you want setup an “Iron Cross” coil configuration using stacked coils with 2 X3000 units. To do this:

1. Go to the “Primary EMF Setup” area of the window. In the “Coil Placement” section, click on the drop-down menu to select your coil placements. Select Ch1 = FZ, Ch2 = PZ, Ch3 = C3, and Ch4 = C4.
2. Follow the same steps for the “Secondary EMF Setup” unit.

Current Stim (tDCS/tACS/tRNS) unit(s) setup:

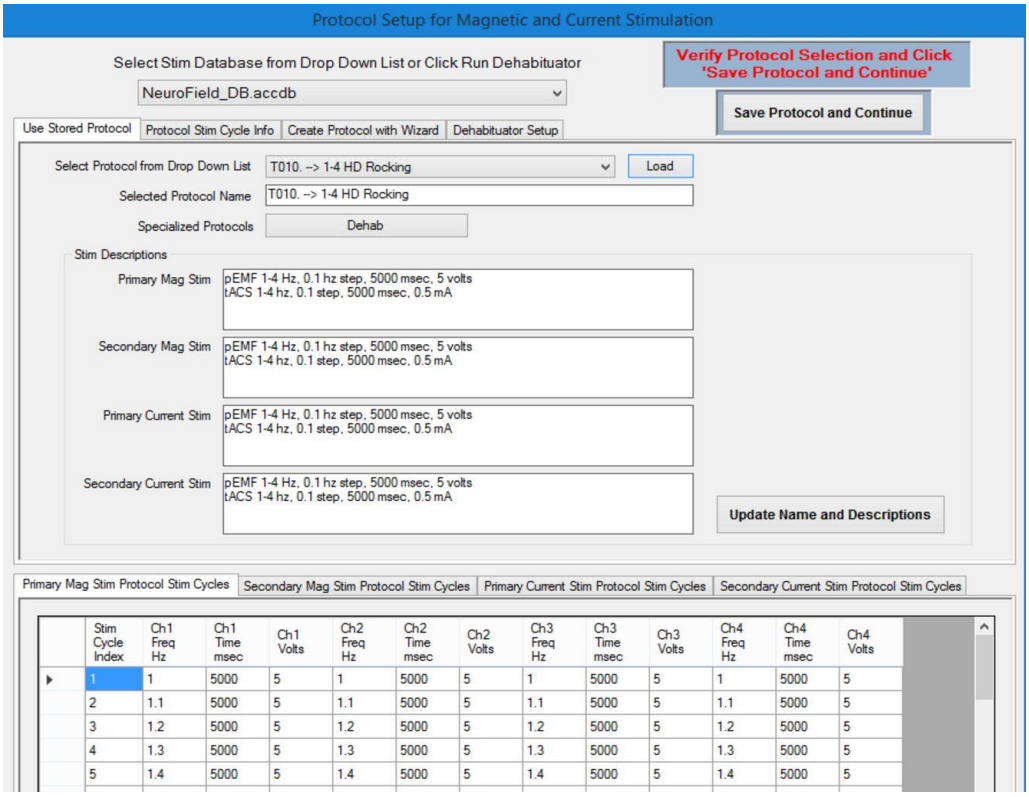
For this example, let’s say you want to use two tDCS units to regulate the long tracks in the Rich Club running front to back in both hemispheres. To do this:



1. Go to the “Primary tDCS/tACS/tRNS Setup” area of the window. In the “Anode” and “Cathode” area, click on the drop-down menu to select your electrode sites as Anode = Fp1, Cathode = O1.

2. Go to the “Secondary tDCS/tACS/tRNS” area of the window and in the “Anode” and “Cathode” area, click on the drop-down menu to select your electrode sites as Anode = Fp2, Cathode = O2.
3. Verify your setup and click on the “Select Treatment Protocol” button and the “Protocol Setup Screen will appear.
4. If you haven’t already attached the coils or the electrodes to your patient, do the following:
    a. If using Current Stim, place the electrodes on the patient at the sites designated above. You are now ready to select your protocol. **Note:** It is advisable to cut up small squares of paper towels and place them over the electrode. This will keep the paste from spreading and help protect the Velcro Cap.
    And/or
    b. If using Magnetic Stim, place the Velcro cap on the patient’s head (over the electrodes if they are there) and attach the coils to the cap at the designated locations.

To Select a Stored Protocol – NeuroField Database:



A note about NeuuroField64 Protocols:

The software has been designed to individualize the training strategy by unit. You can now either select a separate protocol for each unit or design a custom protocol that programs each one of the units to do a separate task - each unit will run independently of the other unit. So, it is important to know what you want each unit to do for any given session or for building a custom protocol. For example, you could build a custom protocol that runs:

- Random Noise – tRNS ramping from .5 to 2.5 mA then switches to
- Direct Current – tDCS ramping from .1 to 2.5 mA and then runs

- pEMF – Coils giving 1 – 4 HD stepping by .1 while at the same time giving
- Alternating Current – tACS 1 – 4 HD

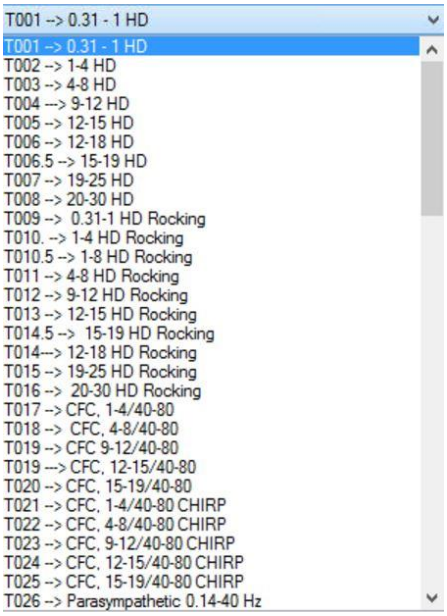
Protocol selection is based on the QEEG data and requires training to do this correctly. And remember, it is important that you assess sensitivity and reactivity to make the best decisions regarding treatment selections. Sensitive clients may need adjustments to the stored protocols. When selecting and or adjusting protocols please note:

- **Magnetic Stim Protocol**: The lower the amplitude (e.g. 1 volt versus 5 volts), the weaker the pEMF emitted from the coils.
- **Current Stim protocol**: The lower the mA the weaker the current emitted from the electrodes (e.g. .01 vs .05 mA).
- **Either Magnetic or Current Stim Protocols**: Regarding duration, the longer the duration (msec) of the stim the more intense the treatment.

With the coils and/or electrodes placed on your patient, you are now ready to select a protocol.

1. Click on the "Select Protocol" button. 

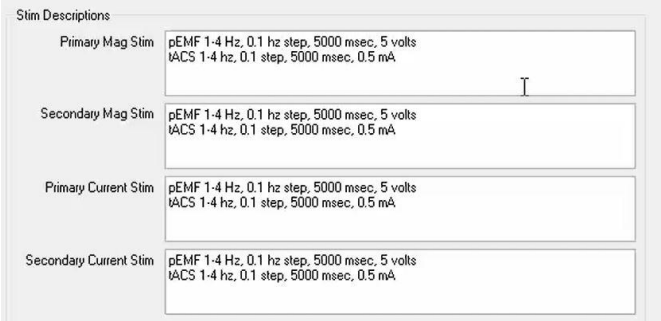
and the Protocol window will appear.
2. With the "Use Stored Protocol" tab selected by default, scroll through the list and you will see all the available protocols:
    - HD Protocols
    - Rocking Protocols
    - CFC Protocols
    - CHIRP Protocols
    - Parasympathetic with Nogier Protocols
    - Triad Protocols



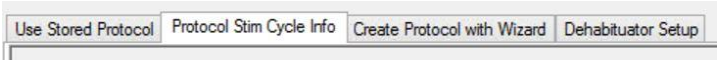
As you can see there are several options for protocol selection. For example, you can setup a custom Delta (1 – 4 HD) on the head for a portion of the session and then put Nogier low B on

the belly with another set of coils for the remainder of the session. You do not need to run Delta from one database and then stop and switch to run Nogier from another database.

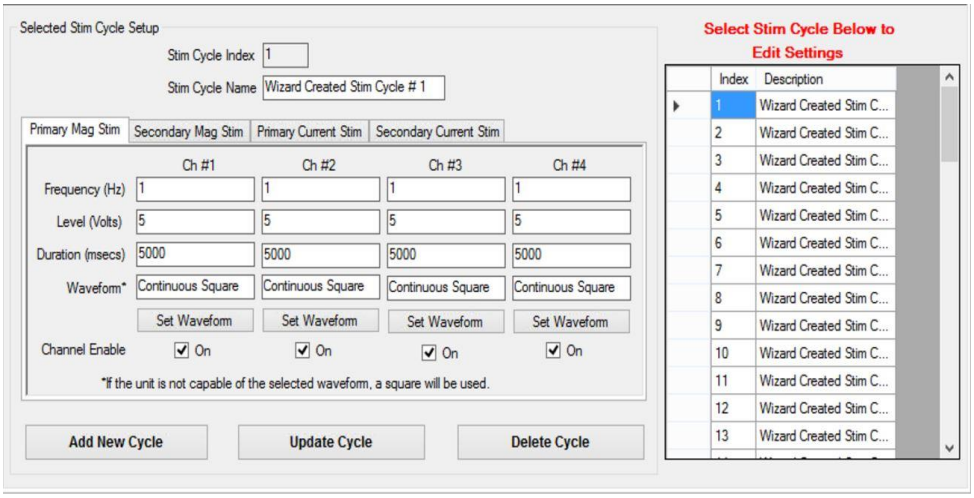
3. Go to the “Select Protocol from Drop Down list”, select your protocol and click on the “Load” button. In the “Stim/Description” area of the screen, you will see a description of what the protocol is going to do for each unit. For this example, 1 – 4 HD is selected, and you would see:



The “Protocol Stim Cycle Info” Tab:



1. Click on the “Protocol Stim Cycle Info” tab and the Stim Cycle Setup information will appear.



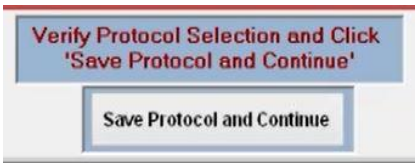
2. Notice the Stim Cycle Grid area of the screen. Here you can click through each cycle and see what it is going to do. In the screenshot above Stim cycle “1” is selected. For each cycle, you can also click on a tab for a specific unit, i.e. “Secondary Mag Stim” or “Primary Current Stim” and see what the Magnetic stims are going to do versus the Current stim.

The “Dehabituator Setup and “Create Custom Protocol” Tabs:

The “Dehabituator Setup” tab and the “Create Custom Protocol tabs are described later in this Manual.

To Save a Protocol Selection:

1. Click on the “Save Protocol and Continue” button.



You are now ready to set any Overrides you may want and Set the loops/estimated run-time.

To Set the Overrides:

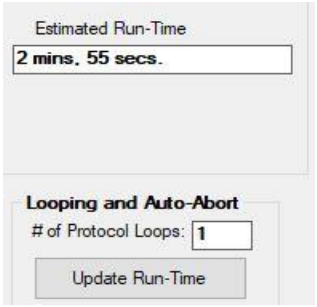
You can set several Overrides as follows:

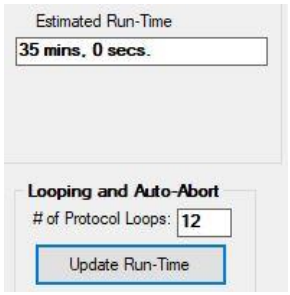
- **Amplitude** for any one of the protocols/units by clicking on the "Override Amplitude" box and updating the number of mA.
- **Waveform** for the tDCS unit by clicking on the "Override Waveform" box and selecting a new waveform.
- **Global Duration** to override the stimulation duration and updating the number of msec. This is often used with the "RTZ" procedure to give a longer stim, say set at 30 seconds or 30000 msecs. It will override the # of milliseconds coded into each protocol. You can shorten or lengthen the duration of the stim without having to re-write the protocol.

To Set the Loops, Estimated Run-Time & Auto-Abort:

Set Loops and Estimated Run-Time:

Set Loops allows you to designate approximately how long you want the session to run. To do this:





1. Go to "Stored Protocol and Stim Time Selection" area of the window and notice the Estimated Run-time is automatically populated with the time to run 1 loop as seen in the above image on the left.
2. If you want the session to go longer or shorter, go to the "Looping and Auto-Abort" area of the window, and in the "# of Protocol Loops" set the number of loops you want to run during your session and click on the "Update Run-Time" button.
3. Notice the "Estimated Run Time" has automatically updated as seen in the above image on the right. The adjusted time it will take to run your session based on the number of loops you have chosen is displayed. Increasing the loops will extend the run time. If you want the session shorter, decrease the number of loops.

Note: The estimated run-time is less than the actual run-time. For example, if you see 34 min and 10 sec for the estimated run-time, more than likely it will run for at least 5 minutes longer. This is because there is a period of time between each stimulation that is given, thus the actual run-time is extended. If you want to be conservative and only want a session to be 30 minutes, set the number of loops so the estimated run-time is less than 30 minutes, say 27 minutes, or use the "Auto Abort" feature as described below.

Set the Auto Abort:

Auto Abort allows you to stop a session after a specific amount of time. To do this:

1. Check the "Enable Abort Time" check box
2. Enter in the number of minutes you want the session to run and the system will automatically stop once the designated number of minutes.

This is useful if you simply want to make sure you give exactly a 30 minute session. It is also helpful during an RTZ session when the system sticks with a specific frequency over and over instead of continuing to cycle through the frequency range and complete the loop.

To Save Stim Setup:

1. Click on the "Save and Continue" button. 

The program automatically advances to the next yellow tab, "Neurofeedback Selection".

To "Get" a Patient Stim Setup:

You may have already setup up your Stim units, selected a protocol, and saved the settings for a specific client, and now you want to run another treatment using the same settings for that client. In this case, you do not have to go through the process of setting everything up again. All the information for the patient is saved, so all you need to do is load your previous settings. To do this:

1. Launch the NeuroField Program and in the "Patient Selection" tab, select you patient.
2. Click on the "Select Patient and Continue" button and you will be taken to the "Treatment Selection Setup" tab where are the setup information fields will be empty.
3. Click on the "Get Patient Stim Setup" button. This will setup all the units you previously used for that client session, populate the sites, and load the same protocol with the same number of loops.
4. Click on the "Save Stim Setup and Continue" button. The program automatically advances to the next tab, "Neurofeedback Selection".

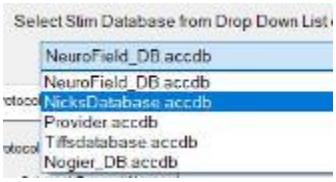
Note: You can use "Get Patient Stim Setup" to not only run the same Stim-Only setup as a previous treatment, but you can also add another training mode to this setup, i.e. Stim-Only synchronized with EEG. For instructions to do this, go to the appropriate heading later in this document.

To Select a Stored Protocol – Additional Databases:

With the coils and/or electrodes placed on your patient, you are now ready to select a protocol.

1. With the “Treatment Stimulation Setup” active, click on the “Select Protocol” button.

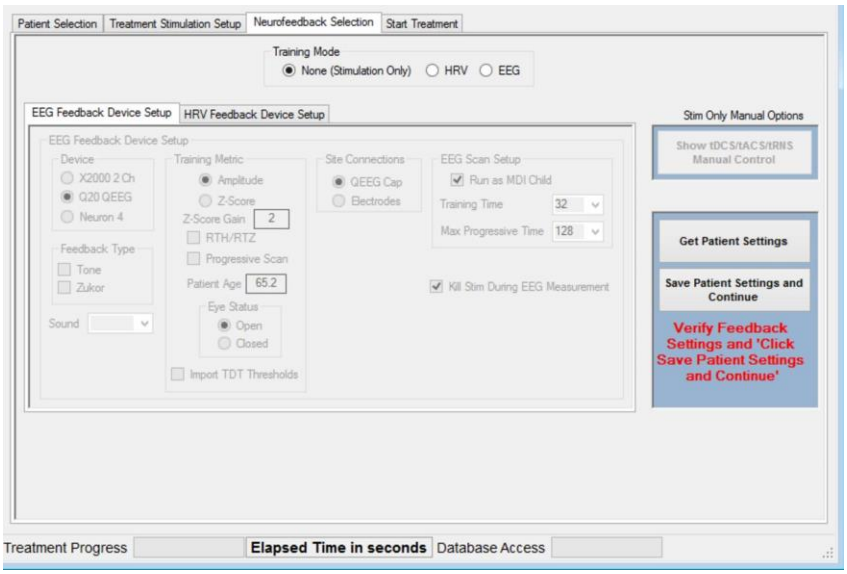

and the “Protocol Setup” window will appear.
2. Notice at the top of the “Protocol Setup” window and you will see an option to select a Stim database.



The NeuroField System provides you with additional databases for selecting protocols. An overview of these databases are as follows: **Note:** Again, it is recommended to attend a BootCamp to learn why and when to select a specific protocol from these databases.

- **Nicks Database** = Dr. Dogris’ original database with custom protocols he developed that provide additional training options using known frequencies on the body to relieve specific symptoms.
- **Providers Database** = An empty database that provides a place for clinicians to create and store their own custom protocols
- **Tiffs Database** = Dr. Thompson’s database with custom protocols she developed that provide additional training options.
- **Nogier Database** = Contains protocols Nogier frequencies described in the HRV section of this manual.

Using the “Neurofeedback Selection” Tab – Stim-Only



Once you have chosen your stim units, selected your protocol, and saved the settings, the “Neurofeedback Selection” tab will automatically become activated, and the training screen will appear.

When using the “Neurofeedback Selection” tab for the Stim-Only procedure, you will simply do the following:

- Verify your Training Mode
- Save your Training Mode settings

Note: The “Neurofeedback Selection” tab is where you will also make your selections and setup your training for HRV and EEG. You can find detailed instructions for doing so under the appropriate heading later in this Section. The instructions here are for the Stim-Only procedure, thus the screenshot above shows additional features greyed-out.

To Select Your Training Mode – Stim Only:

Now you need to tell NeuroField what type of Neurofeedback training you want. To do this:

1. Notice that a new “Red Alert” has appeared telling you what to do next; to verify your Neurofeedback selections.

2. In the “Training Mode” area of the screen, “None (Stimulation Only)” is selected by default.

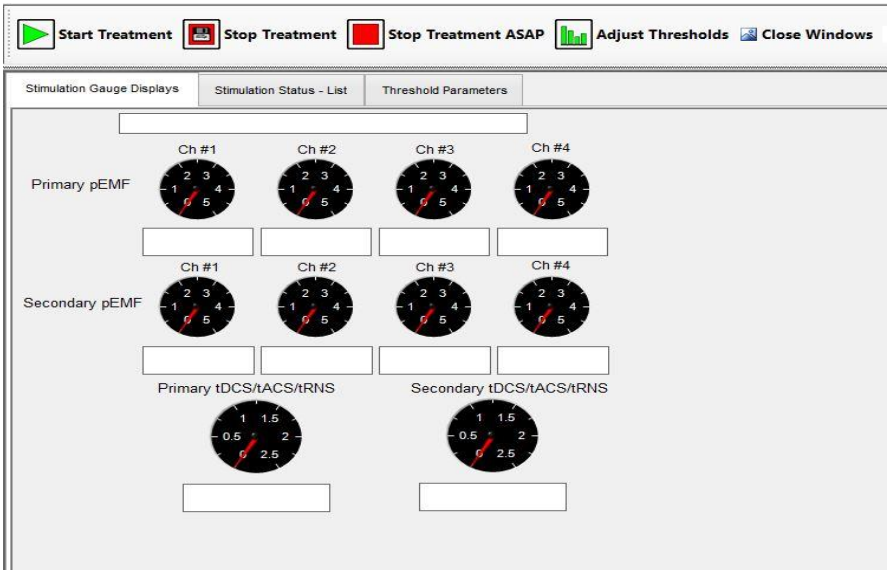
   

   Since this is a Stim-Only procedure, you will want to leave the default setting as “None”. Again, for instructions on using the “HRV” or “EEG” training modes, see the appropriate section later in this manual.

3. Click on the “Save/Continue” button. 

   The program automatically advances to the next tab, “Start Treatment”.

Using the “Start Treatment” Tab



Once you have chosen Stim-Only as your Neurofeedback selection, the “Start Treatment” tab will automatically become activated, and the Treatment Interface Screen will appear. You are now ready to go! You will simply do the following:

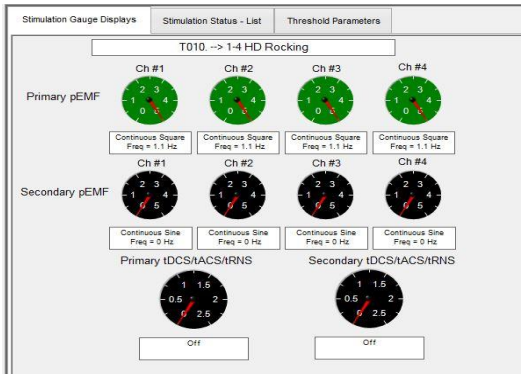
- Start the Treatment

To Start and Monitor a Treatment:

Now you need to tell NeuroField to start a treatment for the patient you have selected with the settings you have chosen. To do this:

1. Click on the "Start Treatment" button. 

NeuroField will take a few seconds to set itself up and the stimulation will begin.
2. Notice the "Stimulation Gauges".



- Top Rows = EMF gauges showing the waveform and frequency that is being given.
- Bottom Row = Current gauges showing what NeuroField is doing there.

To Stop a Treatment:

There are two ways to stop a treatment. You can click on either of the following buttons:

- "Stop Treatment" button 

NeuroField will complete the current stim cycle, then save the data and pop open the "History" window.
- "Stop Treatment ASAP" button 

NeuroField will stop immediately, without saving the history. This is basically the "Kill Switch" and is used most often when running HRV or EEG and you want to quickly stop the program.

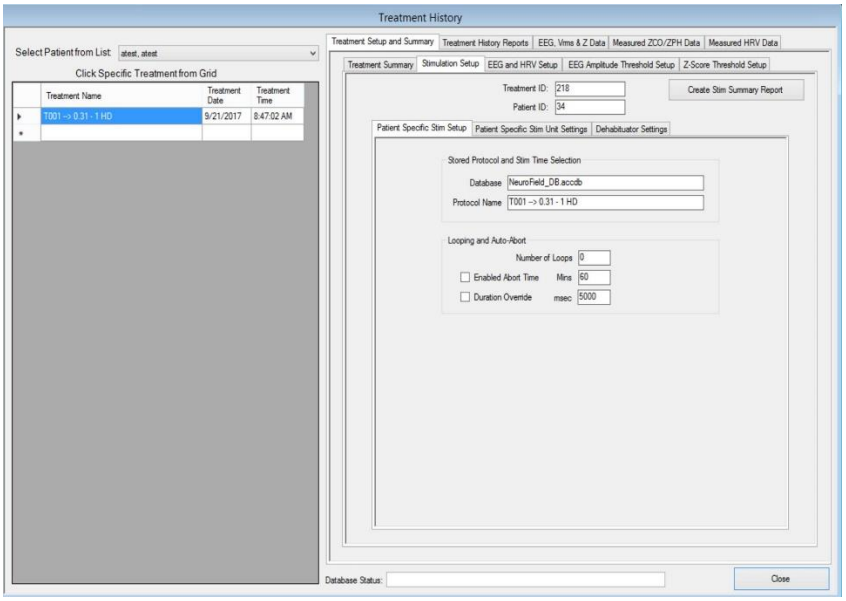
1. Click on the "Stop Treatment" button and the "Treatment Complete" window will appear.
2. Click anywhere on the screen to continue.

Reviewing Treatment History

Once you have completed a session you can review the history for any given session for a specific client.

To Review Session History – Stim Only:

Click on the  "History" button from the NeuroField64 Main Menu Sidebar and the "Treatment History" Screen will appear, showing exactly what you did in any given session.



The window opens into the "Treatment Setup and Summary" tab with the "Stimulation Setup" tab activated. These are the tabs we are interested in since the session was a Stim-Only session. However, there are several tabs within this window that give you different views into any session data for a particular client. Click on the appropriate tab to view the data you want to see or to print a report.

III. Software Run-Thru: Current Stim-Only

The Z3 unit gives you the ability to run a Current Stim-Only session. When simply giving DC, AC, and/or RNS as a stand-alone treatment, you can have more control over your treatment session by using the Manual Controls interface. **Note:** The only way to activate the Manual Controls is to first enable the stim units you want to use. This is required to tell the Manual Controls how to run.

Overview

Most of the procedures here have been described in detail earlier in this manual. If you need any further details on how to follow the instructions below, please refer to "Section 4 - II. Software Run Thru – Magnetic and Current Stim Only" for additional information on using the specific tabs and selection options. **Note:** Connect your devices and have them up and running before proceeding.

Once you launch the program and select your CANBus, the "Patient Selection" tab will automatically become activated, and the Patient screen will appear. To run a Current Stim-Only, you will simply do the following:

- Select your Patient
- Enable your Current Stim Units to activate the tDCS/tACS Manual Controls
- Launch Manual Controls and make the tDCS/tACS/tRNS treatment selections
- Start the Scan
- Monitor the Primary and/or Secondary Stim
- Stop Monitoring the Stim

- Stop the Scan

Activating and Using Manual Controls

To Launch Program & Select a Patient:

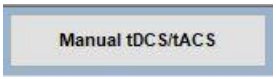
To Launch NeuroField and select a Patient for a Current Stim using Manual Controls, do the following:

1. Click on the NeuroField icon on your desktop and click on the appropriate “Use CANBus Adapter” button.
2. In the “Patient Selection” tab create or select your Patient
3. Click on the “Select Patient and Continue” button and NeuroField takes you to the “Treatment Stimulation Setup” screen.

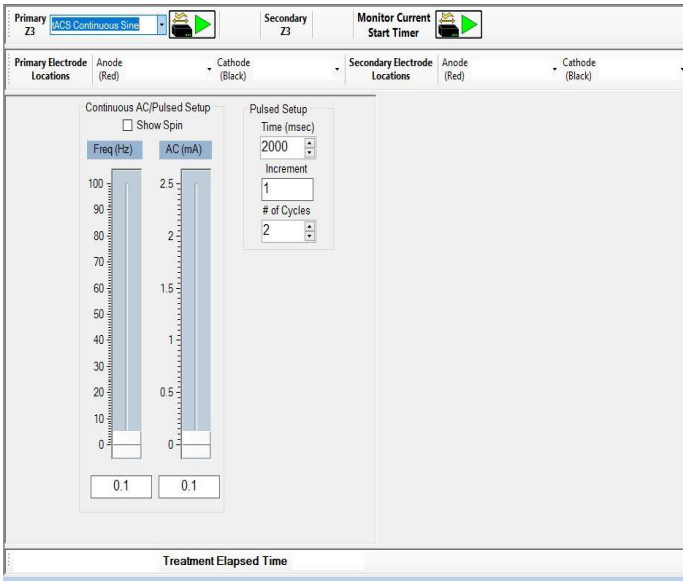
To Activate the Manual tDCS/tACS Button:

To access the Manual Controls, you will first need to enable your Current Stim units. When you do this, you will tell NeuroField which of the connected devices you want to use. If there are two tDCS/tACS units connected, NeuroField will know this, but it will not know if you want to use both units or just the Primary unit. So, you will need to enable the units you want to use. For this example, enable the Primary Stim Unit only. To continue and activate Manual Controls, do the following:

1. With the “Stimulation Setup Tab” activated, go to the “Current Stim” portion of the screen (bottom half of the screen) and for this example, check the “Enable Primary” option and leave “Enable Secondary” unchecked. **Note:** If you wanted to use them both for your training you would simply click on the Secondary as well.
2. Pick the sites you want to use. This is not mandatory.
3. Notice the “Manual tACS/tDCS” button at the bottom of the screen.



Click on the “Manual” button and the “Z3 User Interface” will appear with sliders.



4. Notice the “Primary Z3” area of the screen at the top.

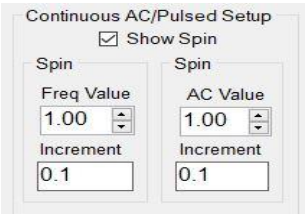
Choose a tACS waveform such as Continuous Sine.

5. Use the sliders to manually operate the "Frequency" and "Voltage" intensity of the stim unit. To do so simply adjust the slider to the Frequency and/or the Voltage you want to use.
   Note: If two units are hooked up, you can select the Frequency and Voltage independently for each unit.
6. In the "Pulsed Setup" section of the window, manually enter the "Time" in milliseconds for each cycle and the number of cycles you want the Stim to loop. Change the number in the "Increment" box to change the number that the Pulsed Setup increased by.

To Use Spin Controls:

Let's say however that you simply want to give 1Hz. You will find that it is difficult to set that Frequency using the slider, so you will want to open Spin Controls.

To do so:



1. Check the "Show Spin" check box and the Spin Controls window will appear. Here you can manually enter both the Frequency and the Voltage values you want to use.
2. Enter the Frequency Value you want to give, say 1Hz and click anywhere on the screen.

Note: When using the "Up Arrows" to set the Frequency value in the "Spin" area of the window, the "Increment" box defaults to increase the Frequency value by 0.1 each time you click on the Up Arrow. However, you can manually tell the system to increment by whatever value you choose. So, if you enter "5" as an Increment Value, when you click on the Up Arrow it will increment by 5 values at once.

To Use Manual Controls for AC:

Once you have your Frequency and Voltage set, you are ready to give a Stim-Only treatment using the Manual controls. To do this:

3. Click on the green "Play" icon at the top of the screen, and the Stim will start. The "Play" icon will switch to a red "Stop" icon and the word "Stim On" will flash red and green.

4. To view the stim and monitor the session, click on the "Monitor Current Start Timer" green "Play" button. A "Stop" button replaces the "Play" button and the "Measured Scan Plot" window appears. You can now monitor the scan being given.

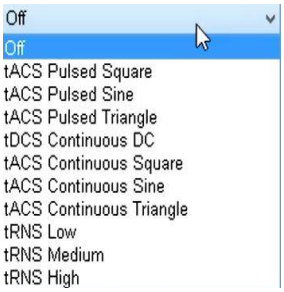
5. When you want to stop Monitoring the scan, simply click on the “Monitor Current - Stop” button. The button will return to a green “Play” button and the “Scan Plot” window will disappear. **Important!!!** This does NOT stop the Stim, it simple stops the ability to monitor the Stim.
6. Notice that the “Stim On” button is still flashing red and green. To stop the Stim, click on the red “Stim On” button. The button will return to a green “Play” button and the Stim will Stop.

You have now completed a tACS Stim-Only session using Manual Controls.

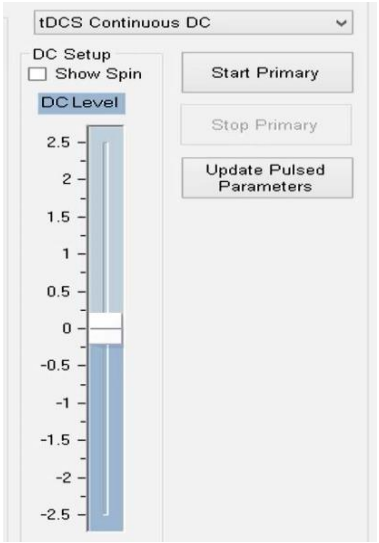
Using Manual Controls - DC

To Set Manual Controls for DC:

For this example, we will only setup and use the Primary Unit. Follow the instructions above for AC to select your unit.

1. With the “Z3 Interface”, click on the drop-down menu and select your mode for training (or waveform to use).
2. 

   For this example, select “tDCS Continuous DC”. As soon as you select a direct current, the DC slider activates so you can select the mA levels.



3. Notice that the slider is set to “0” meaning that it could be set to a negative or positive number. For this example, set it to 1 mA. **Note:** You only select mA because there is no frequency with DC.

To Use Manual Controls for DC:

4. Click on the green “Play” button.

5. Click on the “Start tDCS Scan” button. NeuroField will display a tDCS scan at 1 mA and the “Treatment Controls” will light up green saying “Running Primary Scan”.

Note: If you want, you can scan in real time by dragging the slider to change the voltage, say to 2 mA, and then looking at the scan. It will reflect the change in real-time.

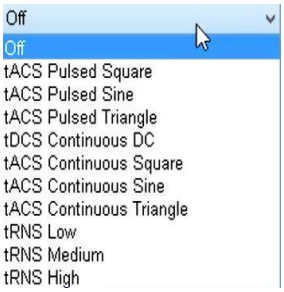
6. Click on “Stop Scan” to stop the scan.

Using Manual Controls – AC

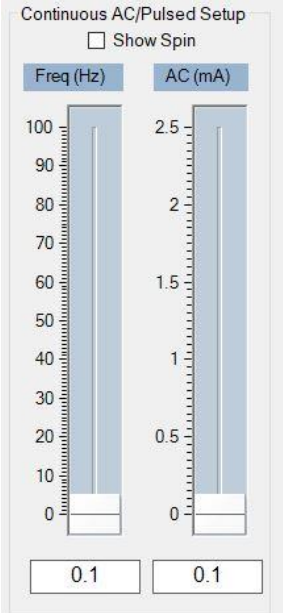
There is both a Primary and Secondary unit enabled, however these units can run independently of each other. For this example, we are only going to setup the Primary unit. **Note:** For detailed instructions on how to get to the “Primary tDCS/tACS Setup” tab, see “Activating Manual Controls” above for detailed instructions.

To Set Manual Controls for AC:

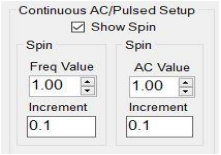
1. With the “Primary tDCS/tACS Setup” tab active, click on the drop-down menu and select your mode for training (or waveform to use).



For this example, select “tACS Continuous Sine”. As soon as you select an alternating current, the AC sliders activate so you can select the mA and frequency levels.

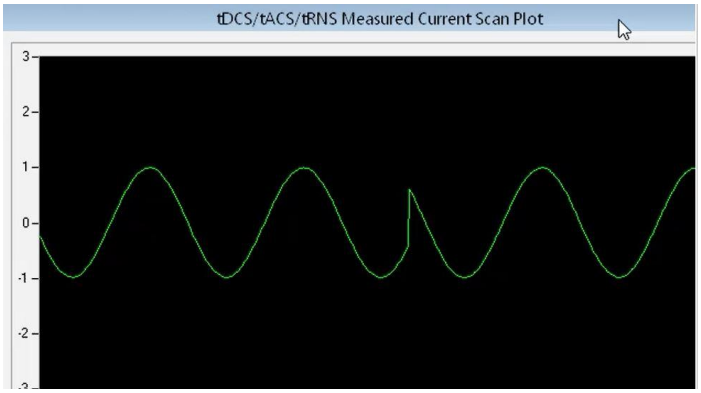


2. Select the frequency. For this example, we want to set it to 1 Hz which is hard to get to with the slider because the scale goes from 0 - 100, so click on the “Show Spin” check box.
3. When you click on it, and the Spin Controls window appears, and you can manually put in the number for what you want to use. Spin Controls tend to be more precise.

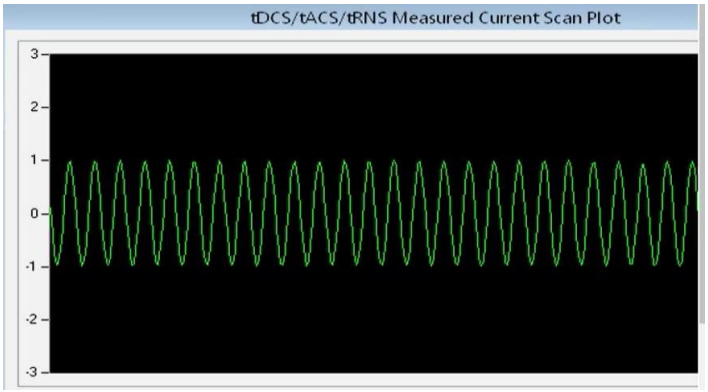


With the Spin Controls, you will get exactly the number you want to use. For this example, manually set the “Frequency Value” to “1” Hz.

4. Notice the “Increment” box. This setting assists in updating the frequency value here in this window. (It is not a “Step by”). The Spin values you enter here will increment by whatever this setting says. So, if you entered a frequency value of “1” and click on the Up-arrow, if the increment is set to the default of “0.1”, the frequency value will automatically increase to 1.1.
5. Click in the “AC Value” box and set it to 1 mA.
6. Click on the “Start Primary” button and it will Scan 1mA at 1Hz.



7. You can change the frequency on the fly by moving the slider or manually changing the frequency value while patient is training. So, say you move it from 1 Hz to 7 Hz, the waveform will change and you will start giving a stim of 7 Hz.



This gives you immediate control over the frequency and mA during a session.

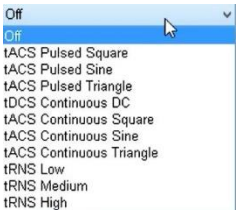
8. Click on the “Stop Primary” button and NeuroField will stop the Stim. **Note:** If you click on “Stop Scan” without clicking on the “Stop Primary” the waveform will go away, but NeuroField will still be giving a Stim. You must click on “Stop Primary” for the Stim to stop.

Using Manual Controls – AC Primary and Secondary

To Set Primary and Secondary Manual Controls for AC:

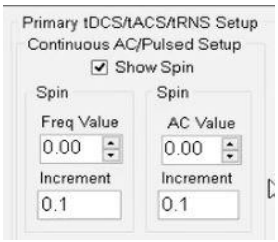
There is both a Primary and Secondary unit enabled, however these units can run independently of each other. For this example, we are only going to setup both the Primary and Secondary unit.

1. In Manual Controls with the “Primary tDCS/tACS Setup” tab active, click on the drop-down menu and select your mode for training (or waveform to use).



For this example, select “tACS Continuous AC”. As soon as you create an alternating current, the sliders will become active. You can now set both the frequency and the mA using the sliders.

2. Notice the “Show Spin” check box.



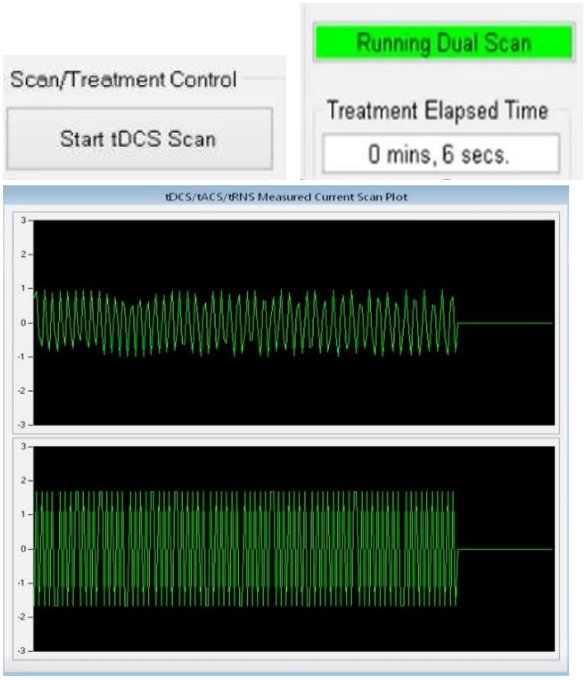
When you click on it, you can manually put in the number for what you want to do. The sliders are not as accurate. They will get close but with Spin Controls you will get exactly the number you want to use. For this example, make sure “Show Spin” is unchecked and use the Sliders.

3. Set the Frequency slider to 30 Hz and the voltage slider to 1 mA.

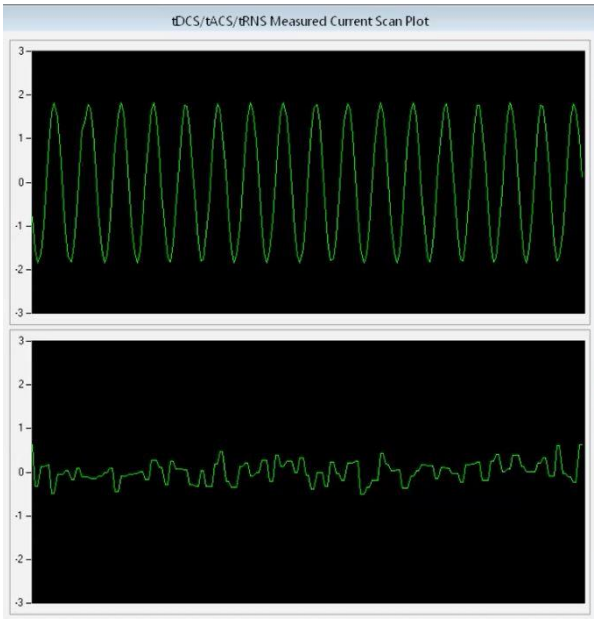
4. Click on the “Start Primary” button.
5. Click on the “Secondary tDCS/tACS Setup” tab, and from the drop-down menu select a waveform. You can setup and run each unit separately. For this example, select “tRNS High” to use a Square wave for Random Noise.
6. When the sliders become active, set your frequency and voltage. For this example, set the frequency to 20 Hz and the voltage to 1.5.
7. Click on the “Start Secondary” button.
   You are now ready to run a treatment.

To Start Dual Scan Treatment and Modify Settings:

1. Click on the “Start tDCS Scan” and “Running Dual Scan will light up in Green. Notice the waveforms.



   You can modify the settings on-the-fly.
2. As the training is going along, you can change the frequency and voltage for both units, as well as change the waveform. For this example:
   a. Move the sliders down and change the frequency to something slow like 2 Hz.
   b. Raise the voltage as well.
   c. Set the waveform to tRNS low on the secondary unit.
3. Click on the “Stop Scan” button and then on the “Start Scan” button and the settings will be reset.



To Stop Treatment:

1. The scan will keep on going until you tell it to stop. Click on the “Stop Secondary” button. **Note:** If you click on “Stop Scan” that is just going to stop the scan window, it is not going to stop the stimulation.
2. Go to the “Primary Current Stim” tab and click on the “Stop Primary” button.
3. Click on “Stop Scan” to close the window.

IV. The Dehabituator (Dehab)

The "Dehabituator" is a random number generator that allows you to give random frequencies simultaneously per stim cycle using a magnetic or current stim. The purpose of the Dehabituator is to cause the brain to engage in phase shift and decoupling. This allows the brain to re-calibrate itself to correct pathological brain states and/or puts the brain in a state where it can then be shown how to organize itself. The Dehabituator can be used as a stand-alone treatment or as a ‘priming’ tool to prepare the brain for EEG Neurofeedback.

When using the Dehabituator the:

- Number of Stim Cycles, Frequency, Duration, and Amplitude can all be set to:
    - Fixed Values or
    - Random Values
- Maximum amount of Stim cycles that can be randomized per session is 10,000.
- Frequency range is limited to .31-300,000Hz.
- Duration range is limited to 100-60,000 milliseconds.
- Amplitude range is limited to 0.0008-5 volts – Magnetic Dehab and 0.1 to 2.5 volts Current Dehab.

Note: The Dehabituator has many uses and settings. It is recommended that you attend a BootCamp to learn these treatment techniques. It is not suggested to start using Dehab with patients initially. You will need to fully understand how to use it and when to use it.

Setting up the Dehabituator

Most of the procedures here have been described in detail earlier in this manual. If you need any further details on how to follow the instructions below, please refer to "Section 4 II. Software Run Thru – Magnetic & Current Stim Only" for additional information on using the specific tabs and selection options.

Overview

Once you launch the program and select your CANBus, the "Patient Selection" tab will automatically become activated and the Patient screen will appear. To run the Dehabituator, you will simply do the following:

- Select your Patient
- Select your Stim Units and Coil/Electrode placements
- Select Dehab as a specialized Protocol
- Create a Protocol with Parameters for Magnetic and/or Current Dehab
- Save the Protocol
- Setup and Run your Dehab Treatment

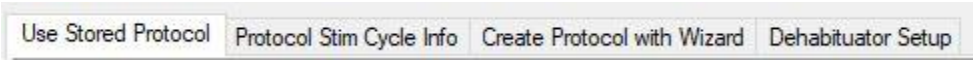
To Select a Patient:

To Launch NeuroField and select a Patient for a Dehab treatment, do the following:

1. Once you have launched the program and selected your CANBus, in the "Patient Selection" tab select your Patient and click on the "Select Patient and Continue" button.

To Setup Stim Units and Select Dehab Treatment

1. In the "Treatment Stimulation Setup" tab enable the stim units you want to use. **Note:** Dehab only has one table and will only store the last patient's data. So, do not use "Get" for the Dehabituator. Always go through the process of setting it up and then running it, or the last patient's treatment data will populate, not your current client's data. This means you can only use the "Get" command if you are running the same patient twice in a row which is rare. For this example, we have 2 EMF units and 2 Current units.
2. Setup your Coil and Electrode locations.
3. Click on the "Select Protocol" button. 

The "Protocol Setup for Magnetic and Current Stimulation" screen will appear with the "Use Stored Protocol" tab active by default.


4. Click on the "Dehab" button.


The "Dehabituator Setup" tab will activate and the "Dehabituator Wizard" window will appear. **Note:** If you simply click on the "Dehabituator Setup" tab directly, the Dehabituator will not properly launch and an alert will appear in the Dehab Wizard:

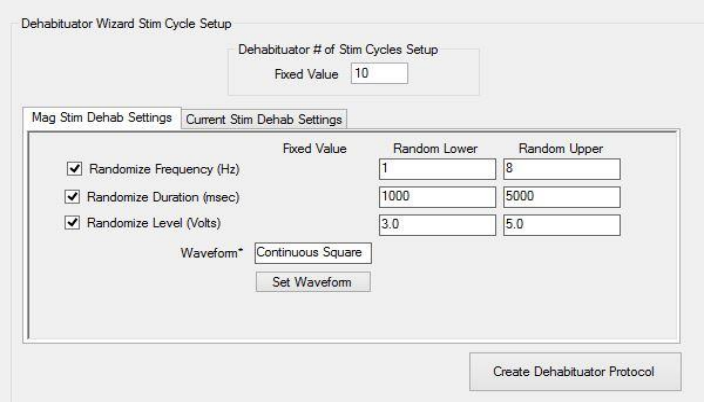
To Use Dehab Feature, Click on the Dehab button from Used Stored Protocol Tab

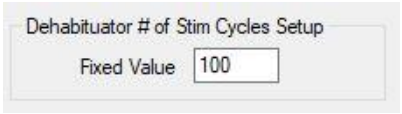
a. Simply click on the “Use Stored Protocol” tab and then click on the “Dehab” button and the wizard will now launch properly.

Creating & Saving a Dehab Protocol

You can create a Dehabituator protocol to use a magnetic stim (X1000, X2000, or X3000) and you also set it up to use Current stimulation as well. **Note:** If you are going to use Current, make sure that you don’t give stimulations that are too strong because that can be uncomfortable for a person. As always start with low voltage and shorter durations and build up.

To Create a Dehab Protocol:



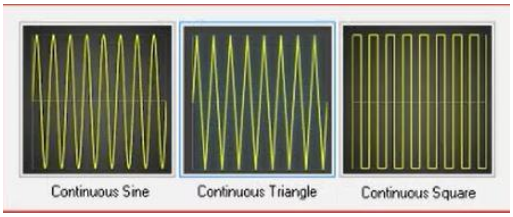


1. At the top of the screen, in the “Fixed Value” field, set the “Stim Cycle” to “100”. This will apply to both a Magnetic Stim and/or Current Stim Dehab. **Note:** 100 – 200 is most common number of Stim Cycles. The more cycles the longer the treatment runs.

Magnetic Stim Dehab

The “Mag Stim Dehab Settings” tab is automatically activated. Here you can setup the parameters you want for a Magnetic Stim Dehab session. The Dehab settings default to the most commonly used ranges, but any of the settings can be changed as needed. For this example:

2. Notice that NeuroField has automatically selected “Randomize” for Frequency, Duration, and Volts.
3. Leave the Randomized default settings set to:
    - Frequency = 1 to 8 or the Delta to Theta frequency bands. This range has been shown to have a good ability to decouple the system and relax a patient.
    - Duration = 1000 to 5000 msec or 100 to 500 seconds
    - Level = 3.0 to 5.0 volts
4. Set the preferred waveform



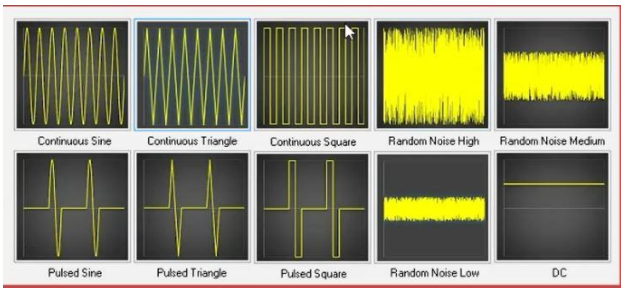
For this example, leave the waveform set to “Continuous Square”. With Dehab the brain needs a strong punch to decouple it from its habituated state, and a square wave is a good strong waveform to help do that.

Current Stim Dehab

If you don’t want to Dehab using a Current Stim, proceed to Step 9 below. You are ready to create your protocol! If you have a Current Stim unit setup, continue and follow the instructions below to set the Current parameters for your Dehab protocol.

5. Click on the “Current Stim Dehab Settings” tab.
6. Leave the Randomized settings set to:
    - Frequency = 1 to 8 or the Delta to Theta frequency bands
    - Duration = 1000 to 5000 msec or 100 to 500 seconds
7. Leave the Amplitude set to:
    - Upper Level = 1 mA
    - Level = 0.5

    Again, you don’t want to give too many mA. Current Stim Dehab at .5 to 1 mA has shown to be very effective, and you can increase it as needed, especially if your client is hardy.
8. Change the preferred Waveform after reading the “Note” and adjust settings as needed.



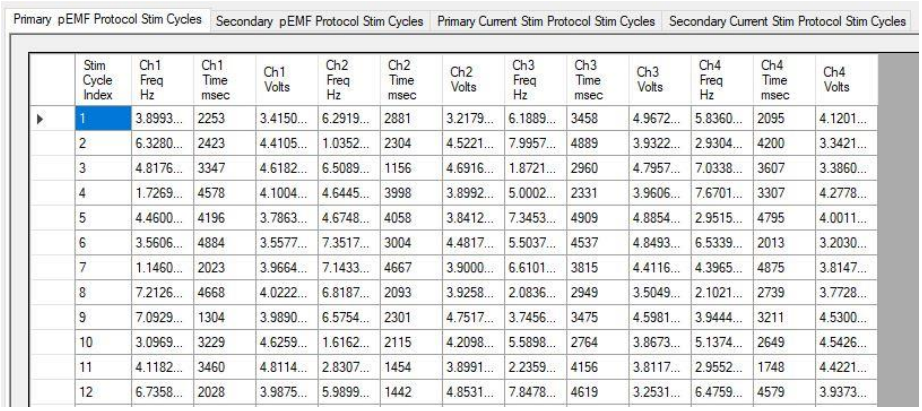
For this example, set it to “Continuous Square”. Here again you want to decouple the system and Square wave will do that. Sine wave is the gentlest waveform. You can also use the other waveforms and make the treatment more aggressive. **Note:** if you use DC, frequency options won’t matter. Again, this is where attending a BootCamp is critical to begin and learn how and when to use these settings. You are now ready to create your protocol!

9. Click on the “Create Dehabituator Protocol” button and click on “Yes” at the “Delete Table” prompt.

It will delete the existing table and create a new table with the protocol selections you made for each Stim unit. For example, there are 4 Stim Units so each one will be individually populated.

To View and Save a Dehab Protocol:

1. When NeuroField is done creating the new table, the "Primary pEMF Stim" tab will automatically be activated. Scroll down to the end and you will see the random frequencies for all 100 cycles.

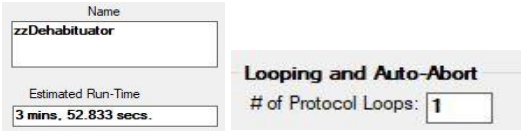


Primary pEMF Protocol Stim Cycles | Secondary pEMF Protocol Stim Cycles | Primary Current Stim Protocol Stim Cycles | Secondary Current Stim Protocol Stim Cycles

	Stim Cycle Index	Ch1 Freq Hz	Ch1 Time msec	Ch1 Volts	Ch2 Freq Hz	Ch2 Time msec	Ch2 Volts	Ch3 Freq Hz	Ch3 Time msec	Ch3 Volts	Ch4 Freq Hz	Ch4 Time msec	Ch4 Volts
▶	1	3.8993...	2253	3.4150...	6.2919...	2881	3.2179...	6.1889...	3458	4.9672...	5.8360...	2095	4.1201...
	2	6.3280...	2423	4.4105...	1.0352...	2304	4.5221...	7.9957...	4889	3.9322...	2.9304...	4200	3.3421...
	3	4.8176...	3347	4.6182...	6.5089...	1156	4.6916...	1.8721...	2960	4.7957...	7.0338...	3607	3.3860...
	4	1.7269...	4578	4.1004...	4.6445...	3998	3.8992...	5.0002...	2331	3.9606...	7.6701...	3307	4.2778...
	5	4.4600...	4196	3.7863...	4.6748...	4058	3.8412...	7.3453...	4909	4.8854...	2.9515...	4795	4.0011...
	6	3.5606...	4884	3.5577...	7.3517...	3004	4.4817...	5.5037...	4537	4.8493...	6.5339...	2013	3.2030...
	7	1.1460...	2023	3.9664...	7.1433...	4667	3.9000...	6.6101...	3815	4.4116...	4.3965...	4875	3.8147...
	8	7.2126...	4668	4.0222...	6.8187...	2093	3.9258...	2.0836...	2949	3.5049...	2.1021...	2739	3.7728...
	9	7.0929...	1304	3.9890...	6.5754...	2301	4.7517...	3.7456...	3475	4.5981...	3.9444...	3211	4.5300...
	10	3.0969...	3229	4.6259...	1.6162...	2115	4.2098...	5.5898...	2764	3.8673...	5.1374...	2649	4.5426...
	11	4.1182...	3460	4.8114...	2.8307...	1454	3.8991...	2.2359...	4156	3.8117...	2.9552...	1748	4.4221...
	12	6.7358...	2028	3.9875...	5.9899...	1442	4.8531...	7.8478...	4619	3.2531...	6.4759...	4579	3.9373...

2. Click through the additional tabs to view the Secondary pEMF Stim, and/or Primary and Secondary Current Stim protocol data.
3. Click on the "Save Protocol and Continue" button and you will return to the "Treatment Stimulation Setup" tab. You are now ready to setup and start a Dehab session using the Protocol you just created.

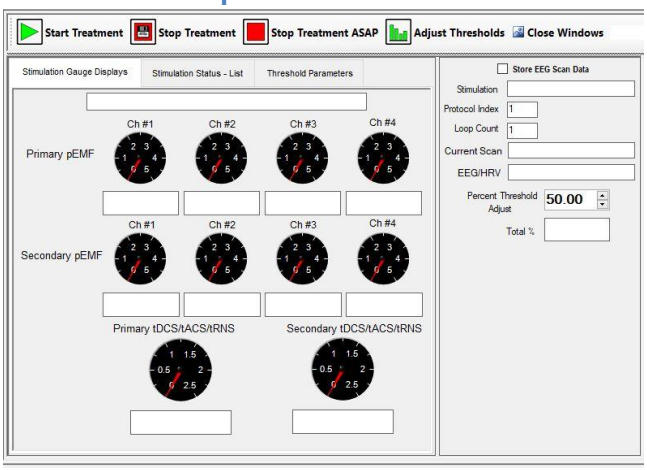
Setting up & Running a Dehab Session

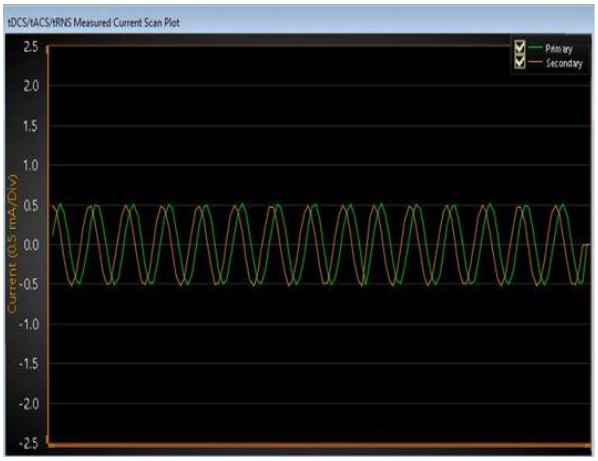


1. Notice that in the "Stored Protocol and Stim Time Selection" area of the window:
   - Name: Now lists "Dehabituator" and it has become the selected protocol.
   - Estimated Run Time: Now displays 3 mins 52 seconds which is the run-time for the 100 Stim Cycles of Dehab that was selected above.
2. In the "Looping and Auto-Abort" area of the window, set the "# of Protocol Loops" to change the estimated run-time to however long you want the session to run.
4. Click on the "Save/Continue" button.

   The "Neurofeedback Selection" tab will activate.
5. Notice that the "Training Mode" selection is "None'. Leave it as is. Dehab is a Stim-Only procedure without any EEG involved.
6. Click on the "Save/Continue" button and the "Start Treatment" tab will activate.

To Run and Stop a Treatment - Dehab:





With the “Start Treatment” tab activated, do the following:

1. Click on the “Start Treatment” button. 
   The Dehab treatment will start and give random frequencies.
2. Click on the “Stop Treatment” button. 
   The treatment will finish when the current stim cycle is over and the “Treatment Complete” button will appear.
3. Click anywhere on the “Treatment Complete” screen and you’ll return to the “Start Treatment widow.

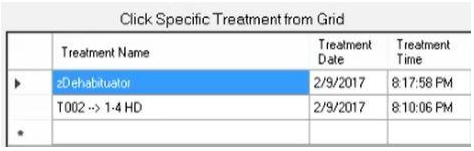
You have now completed a Dehab treatment and caused the brain to decouple itself. It is hard for the brain to remain in a hyper or hypo-coherent state while getting Dehabituated. You can now follow this up by giving a linear frequency like 1-4 HD, 4-8, 15-19 (based on the Brain Map) and showing the brain what to do or entrain the brain. Or, you could follow up the Dehab with a Stim-Only / EEG Combo treatment.

Viewing History of Dehab Treatment

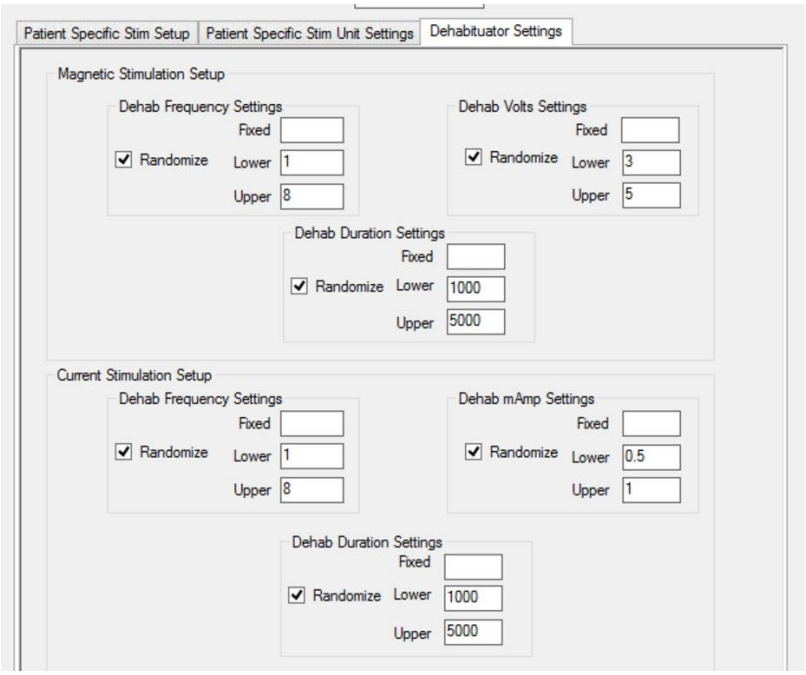
After a session or before the next session with a Patient, you can review the previous Dehab session.

To View Dehab History:

1. From the Main Menu Sidebar, click on the “History” button. The Patients History will appear.



2. Notice that the Dehabituator is listed as the last treatment



3. Click on the "Dehabituator Settings" Tab and you will see all of the settings that were used for the last Dehab treatment.

Running Dehab with Random Noise – The Ultimate Dehab

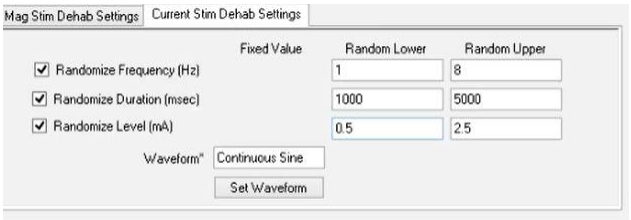
Note: It is not recommended to use this technique right away. Try this technique when you have tried other training and nothing is working. For example, you have someone who is hardy and you have done HEG or 19 channel Neuroguide LORETA and nothing moves them. You are not getting a response from the patient and/or they don't feel like anything has changed. Also, use it if you are not seeing any changes in the map. This would basically be a last stop to really try and shake up the system.

To Set Random Noise Dehab:

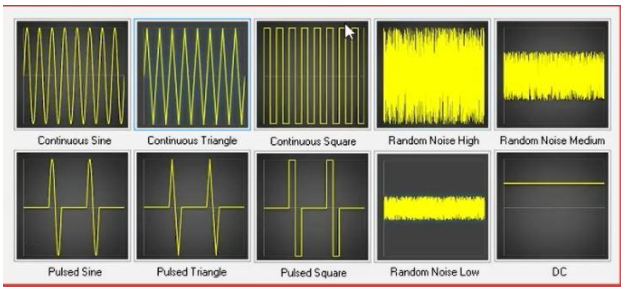
When setting up Dehab for Random Noise, you will only change the "Current Stim Dehab Settings". With your patient already selected do the following:

Current Stim Dehab – Random Noise

1. In "Stim Setup" click on the "Dehab" button.
2. Keep the pEMF values that same as described above for "Magnetic Stim Dehab"
3. Click on the "Current Stim Dehab Settings" tab.



4. Click on the "Set Waveform" button.
5. Click on "Random Noise Low"



6. Set the range to 100 on the upper end and tell it to run frequencies between 1 and 100 Hz. Now it will do Random Noise at different frequencies.
7. Click on the “Create Dehabituator Protocol” button and answer “Yes” to the “Delete Table” alert. NeuroField will create a new table for you.
8. Click on “Save Protocol and Continue” and “Save Stim Settings and Continue” and you will arrive at the “Start Treatment” page.
9. Click on the “Start Treatment” button. NeuroField will give random frequencies and you can also see in the waveforms what random noise looks like.

V. The HRV Procedure

Overview

Heart rate variability (HRV) is the variation in the time interval between heart beats and it is calculated by measuring the standard deviation from normal to normal beats (SDNN). It is theorized that the HRV system is measuring energy that the body wants, as evidenced by increases in the SDNN. Another way to look at the procedure is that you can use NeuroField HRV to muscle test the heart to identify the exact frequency/protocol the body wants. A pEMF or tACS frequency can be delivered and heart rate variability measured via either of the following NeuroField systems:

- tDCS/tACS/tRNS – Current Stim Only (usually on the body)
- X3000 unit and a stand-alone HRV unit – Magnetic Stim and HRV
- X2000 and Plus unit with HRV built-in – Magnetic Stim and HRV
- Neuron4 – Magnetic Stim and HRV

The HRV procedure is broken down into 3 Stages. The following is an overview (or summary) of each stage: **Note:** Step-by-Step instructions to setup HRV and run each Stage of the HRV procedure follows this overview. Also, your HRV unit should be setup and running. If not refer to "Hardware Setup – Basic Setup" in the previous Section for detailed instructions.

Stage 1 – Run Nogier "All Frequencies Low" to Find a Specific Nogier Protocol

Nogier frequencies respond to every major energy system in the body. So, for instance, if a client has a bad knee, coils are placed over the knee, a protocol containing all seven Nogier frequencies is run, and stims are given to the body for each frequency. After each stim cycle, NeuroField measures 4 seconds of HRV and then moves on to the next frequency. When all seven frequencies have been given, they are reviewed by the clinician, and the frequency with the highest variability is chosen as the frequency the body wants. That frequency is then matched to a corresponding protocol in the Nogier database and selected as the protocol to run for that client.

Stage 2 – Scan the Specific Nogier Protocol for "Hits"

Next, the selected Nogier protocol is fine-tuned even further and customized for the client by running it for just 1 loop to determine which of the specific frequencies within that selected Nogier protocol the body wants. NeuroField takes the first frequency, gives a stim and measures heart rate variability changes. If HRV goes up 10 milliseconds above baseline, then it is considered a "hit" or a "yes" response from the body. Then that frequency causing the variability change is put into a table, and NeuroField moves on to the next frequency. This process is repeated until the entire Nogier protocol is run for 1 loop and a table with all the hits is generated.

Stage 3 – Run the Nogier Protocol with only the "Hits"

Lastly, HRV is disabled and only the "hits" or the frequencies that the body responded to are given as a Stimulation treatment. The number of loops is set (depending on the number of frequencies included in the table} to as many loops as necessary to give a session for 30 – 50 minutes. **Note:** The HRV portion of

NeuroField is for working with the body only. And, it may be used on any part of the body *except for* the heart. Do not run NeuroField over the heart.

In addition, there are some people for whom HRV, even on the body, is not an appropriate modality. Clients with any type of heart condition, especially if they are wearing a pacemaker which is designed to take control of pacing the heart, should not receive an HRV treatment. You can work with clients who have high blood pressure, but don't put the coils over the heart. Work with the brain instead to bring down high beta which usually causes blood pressure to drop. With other clients who have very low blood pressure or have a weak heart, it may be difficult to get a heartbeat at all and HRV may not work for them. There are also some people with very thick skin, and the heartbeat will not break through. This is rare, but it does happen.

Setting up the HRV Procedure

Most of the instructions here have been described in detail earlier in this manual. If you need any further details on how to follow the instructions below, please refer to "Software Run-Thru – Magnetic and Current Stim Only" for additional information on using the specific tabs and selection options.

Overview:

When setting up to run the HRV procedure, you will do the following after you have attached the sensor/coils and launched the software:

- Select Patient
- Enable your Stim Units and Sites (Body is usually chosen for HRV stims)
- Select "Nogier All Frequencies low" as the initial protocol
- Leave Loops set to "1" and Save Stim Settings
- Set HRV as the Treatment option
- Verify the Heart Rate/Signal
- Calibrate the Sensor and Check Calibration
- Set the Scan Time (Sample Time)

To Ensure a Good Signal and Attach the Sensor/Coils:

There are a few hints and tricks you can follow when setting up the HRV Sensor to ensure that you will get a good signal.

1. Prep the client. The PPG sensor must be able to permeate the skin. Oil or lotion will prevent the sensor from picking up a good signal. With some clients, you will get a heart rate very easily and with others you won't, so to ensure a good signal you should:
    - Clean the Finger or Ear before attaching the sensor.
    - If using the finger sensor, put it on snugly but not too tight because it will squeeze the finger and prevent blood from getting in.
    - Rub the ear or finger a bit to get the circulation going.
    - Avoid putting the ear sensor directly over a pierced hole on the ear, move it up a bit towards the ear opening. Moving it up a bit is also a good idea even if there are no piercings and you want to get a better signal.

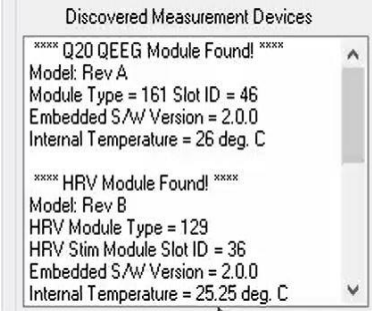
- Make sure the sensor is clean.

2. Place the PPG sensor on the ear or finger (depending on which one you use)
3. There are different options for placing the coils. You can place all four coils over the gut, two coils over the gut and two coils over the knees, or place the coils on the area of complaint. If they have a bad knee, place them on the knee or stomach problems, place them on the gut. If they have a bad back, place the coils on the area of discomfort.

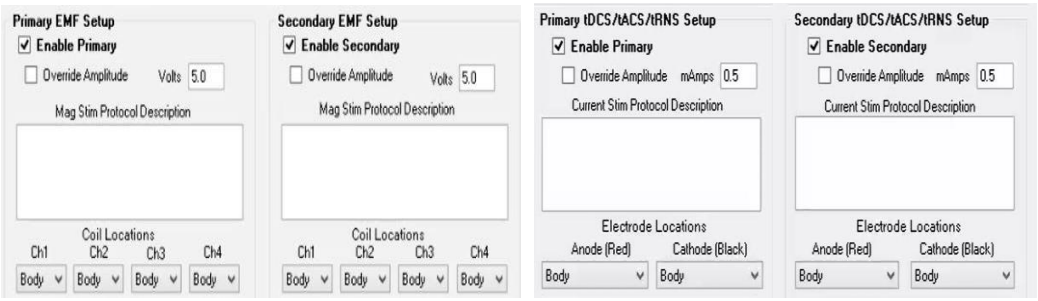
To Launch Program, Select a Patient, & Setup Stim Units:

To Launch NeuroField and then setup a Patient and the desired units for a treatment, do the following:

1. Click on the NeuroField icon on your desktop and notice that the HRV unit will now be listed in the "CANBus Query" window as a "Discovered Measurement Device":



2. Click on the appropriate "Use CANBus Adapter" button.
3. In the "Patient Selection" tab select your Patient and click on the "Select Patient" button.  NeuroField will advance to the "Treatment Stimulation Setup" tab.
4. Click on the "Enable" check box next to the units you want to use. You can use one or all the units, either the magnetic or current. For this example, there are two X3000 units (magnetic stim) and two tACS (current stim) units enabled. **Note:** NeuroField will automatically use the HRV unit when HRV is selected as the Training Mode in the "Neurofeedback Selection" screen.
5. Select the Coil and Electrode locations you want to use. HRV is typically a body treatment, so select "Body" in the drop-down menu. For this example, your setup will look like the example below.



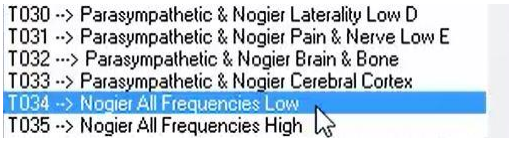
Note: All your settings here will be stored in the Patient's database file.

6. Once you have your Stim units setup, click on the "Select Protocol" button.  The "Protocol Setup" window will appear.

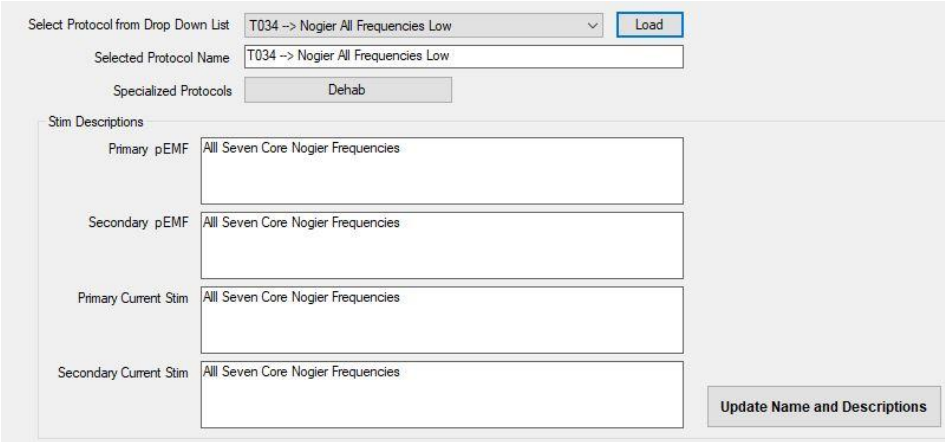
To Select a Nogier Protocol and Enable HRV:

1. In the “Select Protocol from Drop-Down List” scroll down and notice the list of protocols from the Nogier database:

   The Parasympathetic and Nogier protocols have been combined, and you can give them simultaneously.
2. Select the “Nogier All Frequencies Low” protocol.



   There are 7 frequencies in this protocol which will be described in detail below.
3. Click on the “Load” button and the Protocol will load.



4. Click on the “Save Protocol and Continue” button and you will return to the “Treatment Stimulation Setup” screen.
5. Leave the # of loops set to 1.
6. You are all setup so click on the “Save/Continue” button. 

   NeuroField will take you to the “Neurofeedback Selection” window.
7. In the “Neurofeedback Selection” window, click on the HRV radio button to enable HRV.

   The “Selected Mode” field will populate with “HRV”.
8. Click on the HRV Feedback Device Setup Tab. Notice the “HRV Feedback Device Setup” area of the screen.
   Note: If you have X2000 HRV or Neuron4 select that radio button.

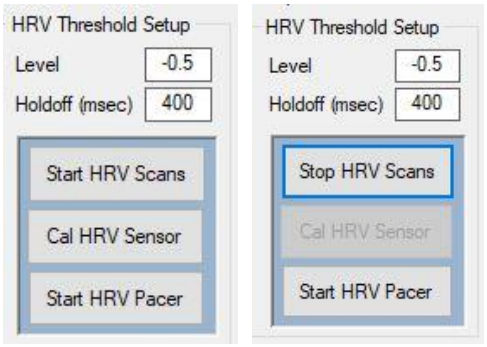
   - “HRV “is selected by default and the default “Training Metric” is “SDNN”. **Note:** You can train Amplitude as well. In the original Nogier procedure, Paul Nogier used to use pulse to figure out

what frequency the body wanted. You can do that by selecting “Amplitude”. Most often SDNN is used which looks at the variability of the heart. Both options are effective.

- “Baseline Thresholds” for both “SDNN” and “Level” defaults to “10”. Leave these numbers as they are as they have been found to work well.

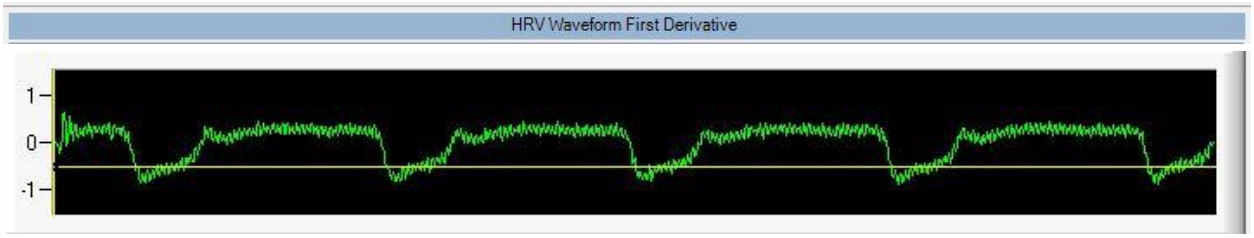
To Verify You Are Getting a Good Signal/Heart Rate

1. With the sensor attached, click on the “Start HRV Scans” button from the “HRV Threshold Setup” area of the screen.



The button will switch to “Stop HRV Scan” and NeuroField will start to scan the heartbeat and display it on the screen.

2. Notice the heartbeat on the screen.



You want to be sure that you have enough of a heartbeat to calibrate, and that the heart beat catches an edge across the yellow threshold line. During this portion of the procedure, make sure the patient doesn’t talk, is breathing normally, and is not holding their breath. Often it is advised to have them close their eyes.

If you are not getting a good heart rate signal:

- Move the sensor around on the finger or ear until a heart rate appears.
- Sometimes there is noise from computers, monitors, iPhones etc. Move the client away.
- Put an EEG ear electrode on the client and plug it into the Ground slot on the back of the Q20 breakout box or X3000 NeuroField device.
- Use a small amount of NuPrep and clean the surface of the ear.

Note: This does not have to be perfect as, again, this process is not HRV variability training. You are simply using the heart as a muscle testing tool. If there is enough heart beat to catch the edge it is good.

3. When you see that NeuroField is picking up a good signal, click on the “Stop HRV Scan” button, and you are ready to continue with the HRV procedure. NeuroField will finish its last scan and then stop the scan.

To Calibrate the Sensor - Automatically

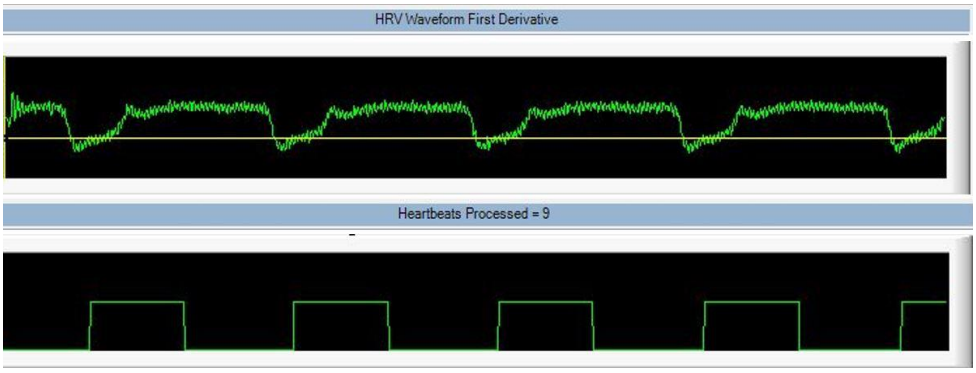
Before running a session, the PPG sensor needs to be calibrated. This ensures that the heart beats are being captured correctly. You can either run a calibration automatically, letting the program determine the control settings, or you can run it manually. Again, instruct the client to close their eyes and breathe normal. They should remain still, and not talk, hold their breathe or meditate. You want them calm, quiet and alert and to breath normally. This helps to prevent artifact from skewing the calibration process. The calibration process takes 32 seconds.

1. Click on the "Cal HRV Sensor" button right under the “Start Scan” button. The HRV unit will begin to display the heart rate and the collected data.
2. Notice the “HRV Waveform 1st Derivative”. If you are not getting a good signal as shown in the screenshot above, try to eliminate noise from the environment. The PPG sensor is very sensitive to room noise and light which can cause the heart rate signal to become distorted and difficult to calibrate. Low room light helps, but if you continue to see distortion you can:
    - Have the Client cover their ear during the calibration process.
    - Place one hand on the Client and the other hand on the Computer to create a ground.
    - Purchase an Electro-Static Discharge Band (ESD Band). Then rest the metal piece on the client’s skin and attach the alligator clip to a piece of metal like the computer box. This will act as a ground and remove the noise, turning a “dirty” HRV signal into a “clean” HRV signal and greatly improving the functionality of NeuroField HRV. An ESD Band can be purchased at Radio Shack or any electronics store.

Note: Be careful not to continually remove and insert the plug as this could harm the unit.

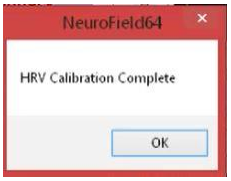
During the Calibration process the sensor calibration will take several scans to ensure that NeuroField is catching the heartbeat:

- First Pass: The data is thrown out.
- Second Pass: Sets the threshold bar. NeuroField calculates where the threshold should be and the threshold bar will automatically move to capture the edge of the heartbeat. The “First Derivative” window will show the heartbeat and threshold level.
    - The yellow line is your threshold bar
    - The vertical edges are the heartbeat. They mirror the heart rate in the box above it.
    - The horizontal squiggly lines are the heart rate signal or the “noise”.



- Third Pass: Captures the heartbeat. When a vertical edge crosses the threshold, it is recognized as a heartbeat and is captured by the computer. In the “Heartbeats Processed” window, a little rectangle box shape will appear when the heart beat is captured correctly. One will pop up for each heart beat and they will line up evenly spaced. This is called the “picket fence”. When you see the picket fence spaced out evenly like it is in the image above, with the start of each rectangle lined up with an edge of the heartbeat, then you have a good calibration. This means you are calculating the heart correctly. **Note:** If you are missing pickets then it is not catching the edge. As a result, you don’t have a good calibration and you will have to do it manually. Read the “Calibrating HRV Manually” later in this Section.
- Fourth Pass: Sets the “Hold Off”. On the last pass, it will start to calculate a hold-off time. This tells the computer how long to wait before looking for another edge. When NeuroField captures an edge, it holds off looking for another beat for a few milliseconds until the rectangle is complete to prevent artifact. It will wait to detect a heartbeat. The Hold Off can be set manually as well. You want a heartbeat between 750 – 1000 milliseconds typically, but it varies.

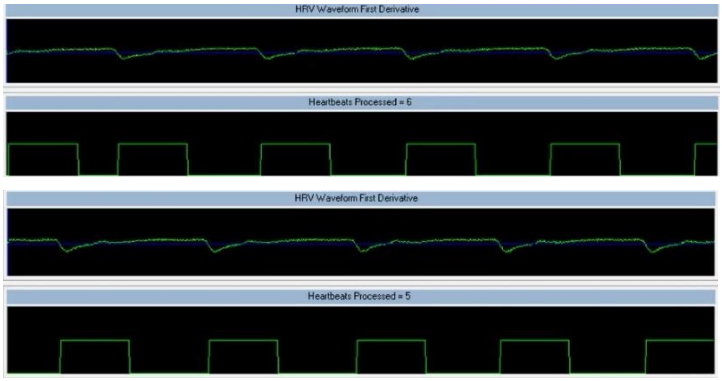
3. When the calibration is over, Click “OK” in the “HRV Calibration Complete” message window.



Note: This doesn’t mean that the calibration is correct. It just means the calibration is done, next you must visually check to be sure the calibration is good.

To Check the Calibration:

1. Notice the "Heartbeats Processed" graph:
    - Again, if you see the threshold just below the signal, all the vertical edges crossing the threshold, and the picket fence lined up with each edge of the heartbeat, then the calibration is good. Most importantly, none of the “pickets” should be misaligned with the heartbeat edge, as pictured below where NeuroField caught a bad edge when the calibration started. Notice the 1st Picket below where the 1st edge is cut-off:



Bad Edge

Good Edge

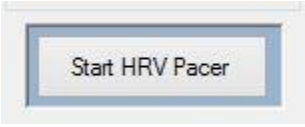
- The picket fences should have no missing pickets and should be lined up evenly one after the other. If not, it means that NeuroField wasn't tracking the heart successfully.

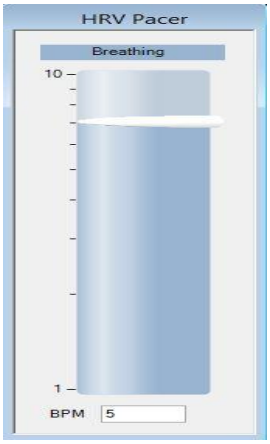
2. Notice that the "Level' and "Holdoff (msec)" boxes in the "HRV Threshold Setup" area of the screen have been automatically populated with the appropriate settings once the calibration has completed:
    a. Threshold Level is a negative number
    b. Holdoff Time is between 400 – 500 msec

    If this is not the case or you are having trouble getting a good calibration, again, the numbers can be set manually as detailed in "Calibrating HRV Manually" below. **Note:** As a general rule, it is suggested to read "Calibrating HRV Manually" below to get a better understanding of the HRV settings and calibration process.

To Open the Pacer and Detach the Windows

1. Click on the "Start HRV Pacer" button and the HRV Pacer will open. You can use this pacer to help your client synchronize their breathing with the pacer.





2. Uncheck the "Run as MDI Child" checkbox to detach the HRV screens. When you do so, they become "floating" windows. You can then resize them and/or move them to a separate monitor.

To Set the HRV Sample Time and Save Settings

The Pre-Stim and Post-Stim is the amount of time that HRV is taken.

Typically, you can run 4 seconds for each. However, if you want to populate the full power spectrum with relevant data you need to take longer scans. This will give you higher resolution spectrums.

1. Click on the drop-down menu for "Pre and Post Stim" and set the amount of sec you want to use. It is recommended to set the Pre and Post-Stim at 64 seconds and the Inter-Stim at 4 seconds. For this example, we will leave all entries at the default of 4 secs.
2. Click on the "Save Patient Settings and Continue" Button. The "Start Treatment" screen appears and you are now ready to go!

Running the HRV Procedure – Part 1

You are now all setup and ready to run the HRV procedure. **Note:** The following assumes you have already completed the instructions above for "Setting up the HRV Procedure". If you have not done so, stop now, and complete the preceding instructions.

Overview:

Again, you will run the HRV procedure in three stages. Part 1 and Part 2 are investigative stages to muscle test the heart and use that information to create a "Patient Specific" protocol for your treatment. In HRV Part 3 you will remove the HRV sensor and run a treatment using the custom Protocol you created with the frequencies that your patient's body responded to the most.

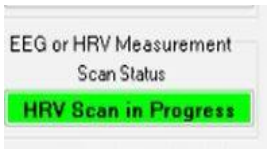
In the HRV Procedure – Part 1 you will:

- Run Nogier All Frequencies Low protocol for 1 loop
- Determine which 1 of the 7 Nogier frequencies the body liked the most
- Note the Frequencies that were a Hit(s)
- Select the corresponding Nogier protocol that was designed for Nogier Frequencies 1 – 7.

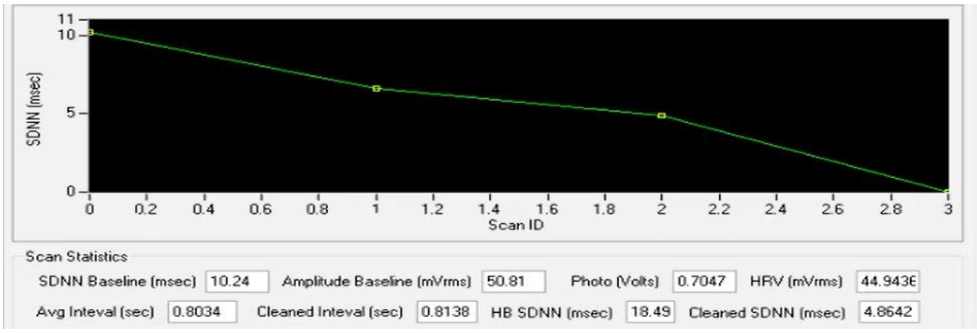
To Run the "Nogier All Frequencies Low" Protocol

Once the sensor has been calibrated and your HRV settings have been saved, you can go ahead and run the Nogier All Frequencies low to determine which frequency your patient's body likes the most. In this portion of the process you will give the client a full set of all 7 Nogier frequencies for 1 loop, and let the heart make the choice for which specific Nogier frequency they need.

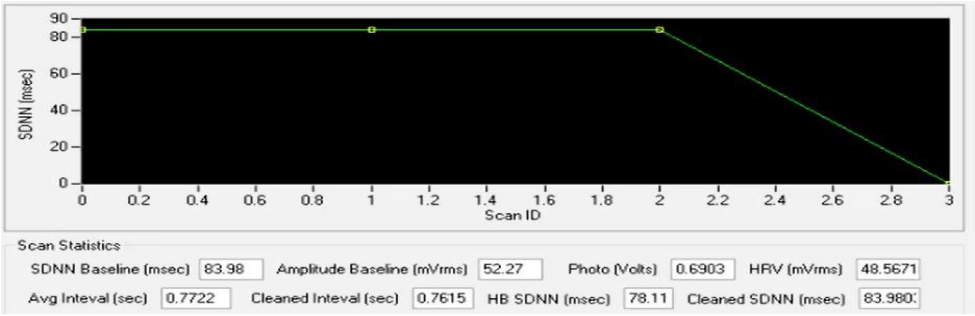
1. Place the coils on the gut or on any other area of concern. With the sensor still on the ear, have the client close their eyes and breathe normally.
2. With NeuroField set for 1 loop click on the "Start Treatment" button. The HRV will start running the protocol and plotting the SDNN data for you. "HRV Scan in Progress" will light up green.



3. The first thing NeuroField will do is take a baseline for 4 seconds and place the baseline number in the "Scan Statistics" area of the "HRV Spectrum" window. Check the "Picket Fence" and the SDNN Baseline to be sure NeuroField hasn't caught a bad edge when the program starts. Again, just as with calibration, here you want to see that all edges of the heartbeat and the Picket Fence are visible and lined up, and the SDNN baseline number is a decent number.

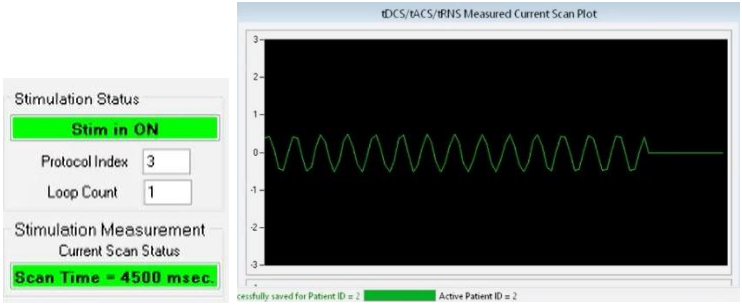


You Should see a baseline in an acceptable range such as the one in the screen shot above at 10.24.

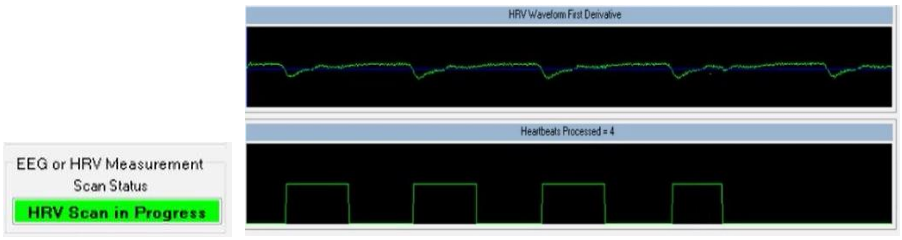


If the SDNN Baseline is exceptionally high as in the screenshot above, that is also suggests NeuroField caught a bad edge when it started. Here, the baseline came up to 83.95 which is indicative of an error. If this is the case or you are unsure, then abort the Scan and start again.

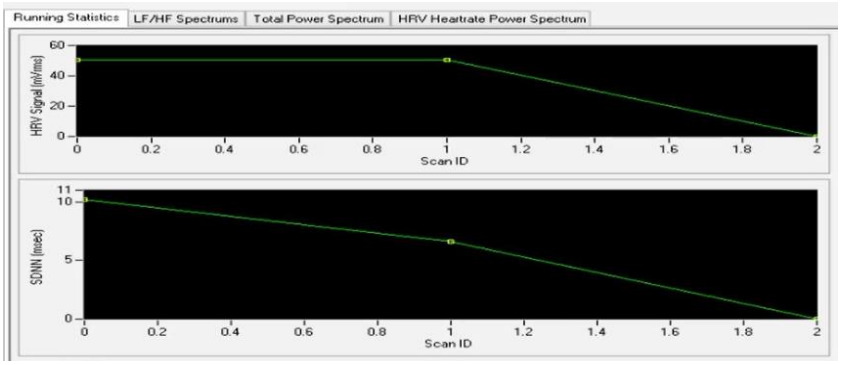
4. Continue and let the HRV procedure run for 1 loop. After the baseline is read, NeuroField will:
   - Give a Stim using the first frequency in the protocol.



   - Measure the heart rate post Stim.



- Plot the results of each measurement in the SDNN and RMS windows.

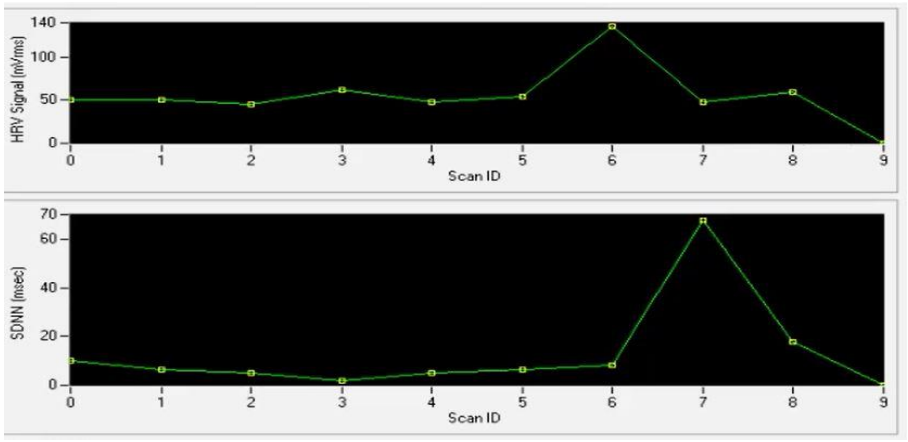


- Continue to the next frequency, give the 2nd Stim and measure etc. It will do this for all 7 frequencies, each time plotting the results, until the protocol is complete.
- NeuroField will then do a Post-Test or run a final scan for one final measurement.

To Determine which of the 7 Frequencies the Body Responded & Note the Hits:

At this point have the client open their eyes while you go ahead and review the results.

1. Once 1 loop has finished, evaluate the data in the "Running Statistics" screen:
    - 1st Plot shows the RMS or the Amplitude or strength of the pulse. Is it weak or does it get stronger?
    - 2nd Plot shows the SDNN or Standard Deviation from Normal to Normal heartbeat variability.

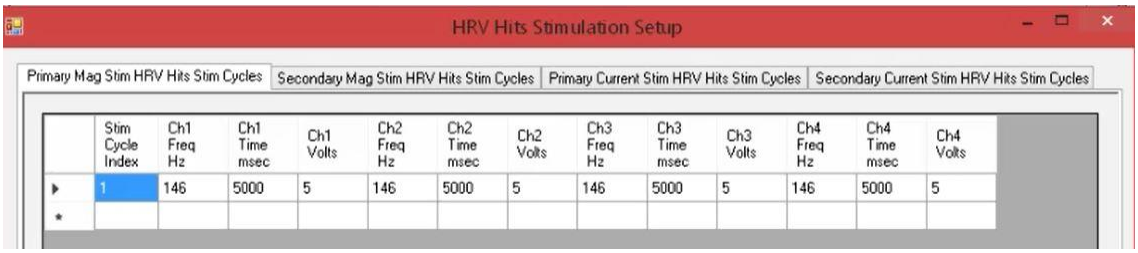


To read these plots:

- 0 = The Baseline
- 1 – 8 = All the Frequencies that were given.
- 9 = The post test.

In the example above, the Amplitude in the first box #6 was very high, and way above the 50 baseline. If you chose "Amplitude" as your HRV "Training Mode" selection, you could work with this metric. However, for this example "SDNN" was selected as the training mode.

2. Look to see which frequency had the greatest variability denoted by the highest point on the plot for each of the stim cycles. Jot down or make a mental note of this number. This is the frequency the body responded to the most. As you can see in the second box above, the SDNN at #7 is the highest, around 60 or 70, which is also significantly above baseline.



3. Also, when the loop completed, the "HRV Hits Stimulation Setup" window appeared. Notice the data. NeuroField determined that there was 1 Hit at 146 Hz. Jot down or make a mental note of this frequency, 146Hz. To determine the Hits, NeuroField captures the baseline then:
    - Adds 10 msec to the baseline
    - If the measured SDNN goes above that (baseline + 10 msec) it is considered a hit.
    - In this example, the baseline is 10.24. If you add 10 msec to 10.24 it will equal 20.24. Anything subsequently measured above 20.24 is considered a Hit and will get posted in the HRV Hits table.

Note: If the client did not respond well to the "Low Frequencies all" and none of the frequencies came in at 10msec above baseline, there are two options:

- Run this process again this time selecting the "High Frequencies all" protocol described above.
- Lengthen the duration of each stim which will give a longer period for the body to figure out what it is getting and the heart to determine how it will respond. Instead of giving a 4 second Stim you can use give a 10 second Stim instead.

To Choose the Nogier Protocol:

You are now ready to choose the specific Nogier protocol which corresponds the frequency that you noted above and that registered the greatest degree of variability. Here too is where your clinical expertise can influence this decision. If number 7 had the greatest variability, but the client is complaining of back pain, you can choose 6 instead of 7, especially if it was included in the "Hits Table". **Note:** In the NeuroField Documents folder placed on your desktop during the installation process, there is a document named "Nogier Frequencies". You can review this document for a description of Nogiers' work and his explanation of each of the Nogier protocols/frequencies.

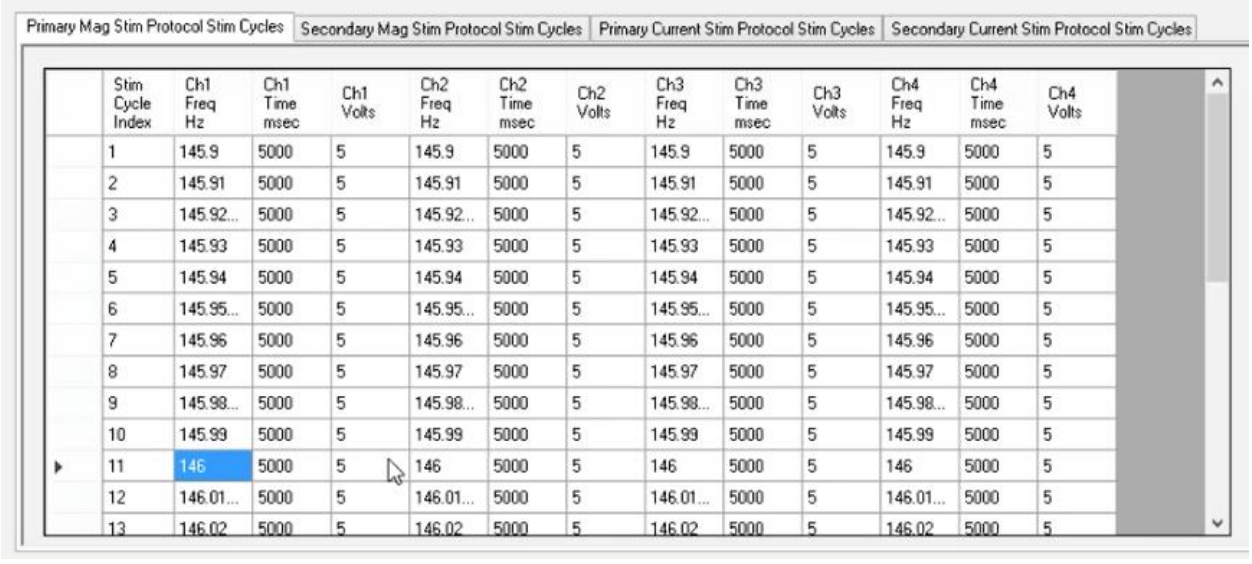
1. Click on the "Select Protocol" drop-down menu and scroll down until you see a list of Parasympathetic & Nogier Protocols with their corresponding letters.

T026 --> Parasympathetic 0.14-40 Hz
T027 --> Parasympathetic & Nogier Tissues Low A
T028 --> Parasympathetic & Nogier Gastro Low B
T029 --> Parasympathetic & Nogier Locomotor Low C
T030 --> Parasympathetic & Nogier Laterality Low D
T031 --> Parasympathetic & Nogier Pain & Nerve Low E
T032 --> Parasympathetic & Nogier Brain & Bone
T033 --> Parasympathetic & Nogier Cerebral Cortex
T034 --> Nogier All Frequencies Low
T035 --> Nogier All Frequencies High

The Nogier Protocols are listed from A – G. Using the information jotted down above, pick the Nogier Protocol that corresponds to that frequency number. To do this, match the frequency and protocol as follows:

- 1 = A tissues
- 2 = B gastrointestinal and metabolic
- 3 = C locomotor
- 4 = D laterality
- 5 = E pain and nerve
- 6 = F brain and bone
- 7 = G cerebral cortex

2. For this example, 7 was noted as Stim Cycle in the "Nogier All Frequencies Low" protocol with the greatest variability. 7 matches with "G Cerebral Cortex", thus, select "Parasympathetic & Nogier Cerebral Cortex" as your protocol to 'Load."
3. Click on the "Load" button and the selected Protocol data will appear with the "Primary Mag Stim Protocol Stim Cycles" tab active.



Stim Cycle Index	Ch1 Freq Hz	Ch1 Time msec	Ch1 Volts	Ch2 Freq Hz	Ch2 Time msec	Ch2 Volts	Ch3 Freq Hz	Ch3 Time msec	Ch3 Volts	Ch4 Freq Hz	Ch4 Time msec	Ch4 Volts
1	145.9	5000	5	145.9	5000	5	145.9	5000	5	145.9	5000	5
2	145.91	5000	5	145.91	5000	5	145.91	5000	5	145.91	5000	5
3	145.92...	5000	5	145.92...	5000	5	145.92...	5000	5	145.92...	5000	5
4	145.93	5000	5	145.93	5000	5	145.93	5000	5	145.93	5000	5
5	145.94	5000	5	145.94	5000	5	145.94	5000	5	145.94	5000	5
6	145.95...	5000	5	145.95...	5000	5	145.95...	5000	5	145.95...	5000	5
7	145.96	5000	5	145.96	5000	5	145.96	5000	5	145.96	5000	5
8	145.97	5000	5	145.97	5000	5	145.97	5000	5	145.97	5000	5
9	145.98...	5000	5	145.98...	5000	5	145.98...	5000	5	145.98...	5000	5
10	145.99	5000	5	145.99	5000	5	145.99	5000	5	145.99	5000	5
11	146	5000	5	146	5000	5	146	5000	5	146	5000	5
12	146.01...	5000	5	146.01...	5000	5	146.01...	5000	5	146.01...	5000	5
13	146.02	5000	5	146.02	5000	5	146.02	5000	5	146.02	5000	5

4. Notice the Stim Cycles and Frequencies in the protocol you chose. For this example, the "Cerebral Cortex" protocol starts at 145.9, stim cycle 11 includes the 146 Hz frequency noted above, and it ends at 146.16.
5. Click on the "Save Protocol and Continue" button and NeuroField takes you to the "Treatment Stimulation Setup" tab.
6. Click on "Save Setup and Continue" as it is already setup for you. The "Neurofeedback Selection" selection screen appears.

7. Click on “Save Patient Settings and Continue” as your patient settings are already setup. However, you do have the option to change anything in these screens if you want. You are now ready to go to Part 2 of the HRV Procedure.

Running the HRV Procedure – Part 2

You have picked the Nogier Protocol specific to your client. Now, in Part 2 of the HRV Procedure, you will drill-down into that selected protocol and customize the treatment even further. Nogier believed there is variability in every human and not everybody is going to hit for example, 146 exactly. The range will vary 30% above or below. So here you will perform a finer resolution scan to determine the exact frequency or frequencies within the specific protocol that will work best for the patient. Nogier felt, “you have to find the lock and key.” Everybody is going to have a different response and you want to find where there is going to be the best response for that person.

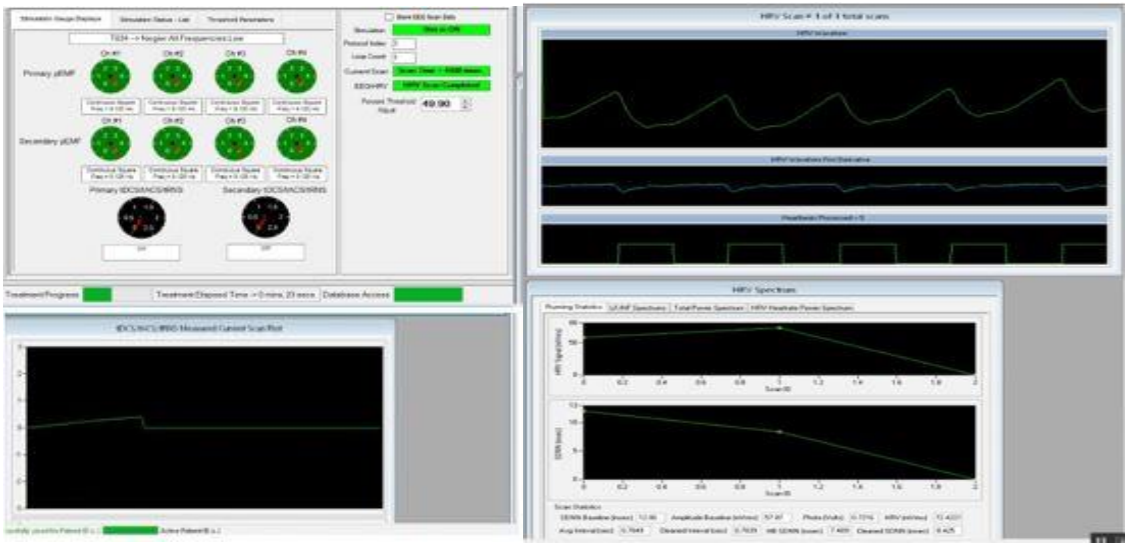
Overview:

To run a finer resolution screening, you will expose the body to the different frequencies in the selected protocol and see which ones it selects. To do this you will:

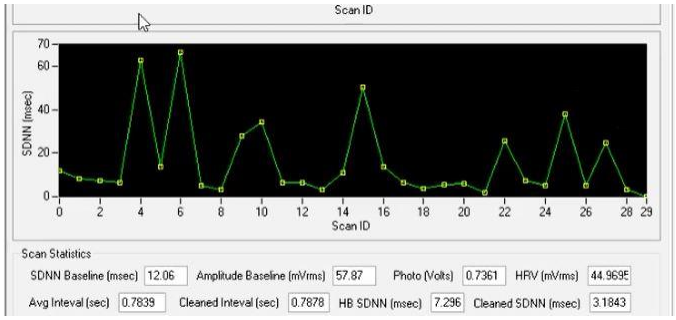
- Run 1 loop of the Nogier protocol chosen in Part 1.
- Note which frequencies within that protocol the body liked the most and were registered as Hits.

To Scan the Nogier Protocol and Find the Hits:

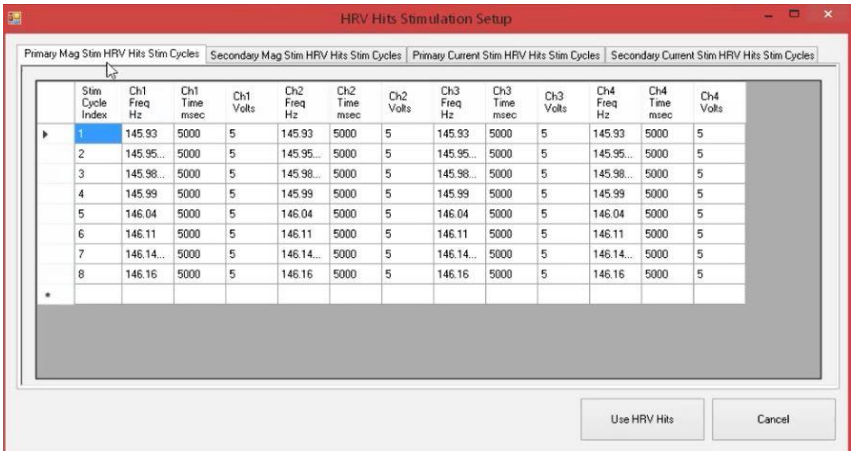
1. With the HRV Sensor still attached and HRV setup instruct the client to close their eyes to reduce external distractions. Click on “Start Treatment”.
2. Make sure “Loop Count” is set to “1” for the chosen Nogier Protocol. NeuroField will take a baseline and then step through each of the frequencies in the protocol and give them one at a time and measure the HRV. Make a note of the baseline, say 12.06.



3. Notice when NeuroField has gone through the entire scan you can see the Stims that measured above baseline and registered as Hits.



You can see them visually in the plotted graph as points in this example above Baseline of 12.06.



The hits are also put into a table for you to review as well. Here you can see that there are separate tabs for Primary and Secondary Magnetic stim Hits as well as Primary and Secondary Current stim hits. All the frequencies that are measured by the different units, up to a max of 4 units, are placed in their respective tables.

4. Click on each of the Primary and Secondary tabs. Notice that the:
    - Frequencies given through the Magnetic stims were the actual Nogier frequencies.
    - Frequencies given through the tACS with Current stim were the Parasympathetic frequencies from .14 to .4 Hz.

    In this table, you can see which Nogier and Parasympathetic frequencies measured above the baseline and registered Hits.

Running the HRV Procedure – Part 3

Now that you have determined what frequencies the body liked within the specific Nogier Frequency, you will now run a full session using only the frequencies within the Nogier protocol that are “Hits”. It is recommended to run a session of at least 20 – 30 minutes but you can go up to 45 minutes if you have the time.

Overview:

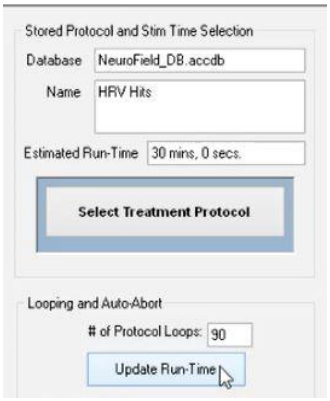
To run a full session with only the Hits, you will:

- Tell NeuroField to use the HRV Hits that were found.

- Remove HRV Sensor and make sure coils are in place.
- With HRV Hits Protocol selected, set the number of loops for desired run time.
- Confirm you are setup to run Stim-Only.
- Start the treatment

To Run the Nogier Protocol – Hits Only Full Session:

1. You now have your treatment protocol and you are done with the HRV measurement process. You have muscle tested the heart and pulled the frequencies you want out of the protocol. With the coils placed on the body you are now ready to run a session, giving only the frequencies that were ”Hits”. Click on the “Use HRV Hits” button on the “HRV Hits” screen.
2. NeuroField will take you back to the Stim Setup Page.



Notice here that the HRV Hits Protocol has automatically been selected from the NeuroField database. This protocol contains only the Stim Cycles that were registered as a Hit or a “Yes” response from muscle testing the heart. These are all the frequencies that the body wanted.

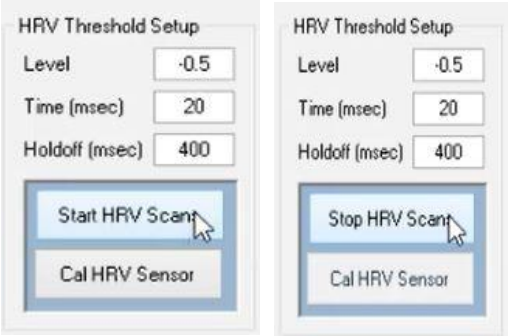
3. Notice that the “Number of Protocol Loop” is set to the default of “1” and the “Estimated Run-Time” displays how long it will take to run through 1 loop of the protocol.
4. Increase the number of loops and click on the “Update Run-Time” button. Continue to add loops until the run-time is equal to the amount of time you’d like for the session, at least 30 minutes. **Note:** Remember the estimated run-time is always less than the actual run-time, so you want to make the estimated run-time a little over the desired session time.
5. Click on the “Save Stim Setup and Continue” button and NeuroField will take you to the “Neurofeedback Session” screen.
6. Notice the “Training Mode:” area of the Treatment Screen.

Be sure “None” (Stimulation-Only) is selected.

7. Click on the “Save/Continue” button and NeuroField will take you to the “Start Treatment” screen.
8. Click on the “Start Treatment” button and NeuroField will deliver those frequencies that were Hits to the patient for time that you set.

Calibrating HRV Manually

If automatic calibration has trouble getting a good calibration, you can run the calibration manually.



In the "HRV Threshold Setup" area of the "Neurofeedback Selection" screen, the numbers correspond as follows:

- "Level" = Yellow Threshold bar in the "First Derivative" window.
- "Holdoff (msec)" = "Heartbeats Processed" window.

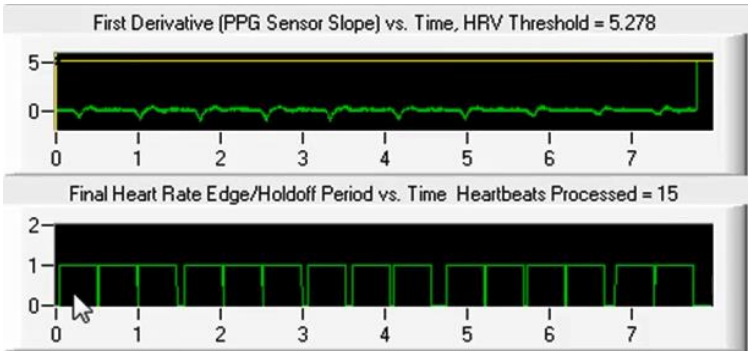
About Level

The number in the "Level" box should always be set to a negative number. The value set here:

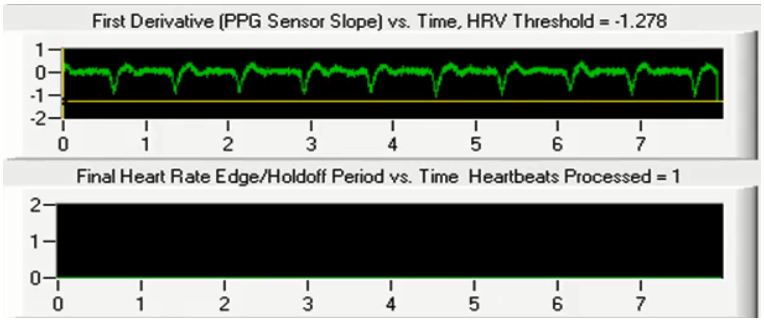
- Determines the position of Yellow Threshold bar on the vertical axis in the "First Derivative" window.
- Lowers the Threshold bar when set to a higher negative number.
- Raises the Threshold bar when set to a number closer to zero or a lower negative number.

The closer the bar is set to zero, the closer it is to the "noise" associated with the heart. You only want to capture the peak of every heartbeat which is where SDNN is measured. So, the Threshold Level should be set where the bar is just below the main signal (noise) and the vertical edge of the heartbeat just crosses over the bar. If the Threshold Level is set either too high or too low you will not get a correct calibration. **Note:** Again, the Threshold Level must always be set to a negative number. If set:

- Too high the Threshold Bar will get raised so far into the heart rate signal that NeuroField will not be able to see the difference between the heartbeat edge and the actual signal of the heart, making calibration impossible. If this happens you will see all the boxes lined up right next to one another, side by side as shown below:



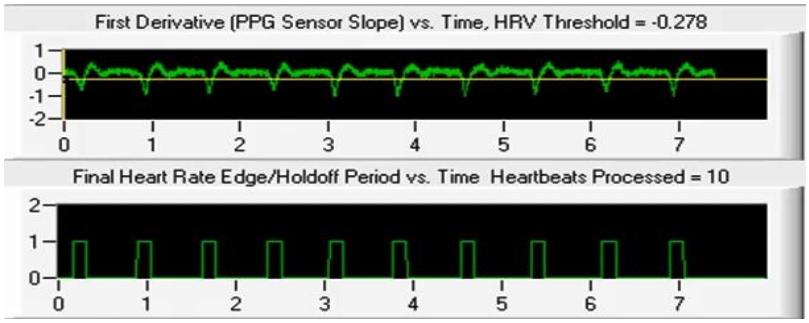
- Too low, the Threshold Bar will get lowered below the heart rate signal and NeuroField will not be able to see the edge or pick up any heartbeats at all. If this happens you will not see any boxes as show below;



About Holdoff (msec)

The Holdoff time is usually set between 400 – 500 msec. The number in the "Holdoff Time" box:

- Tells the computer how long to wait before it looks for another heartbeat edge and prevents NeuroField from looking for another heartbeat until done with the current one.
- Narrows the width of the boxes when set to a lower number and thus waits for a shorter amount of time. For example, if you change the value from say 468 to 156 msec the boxes in the "Final Heart Rate Edge/Holdoff" window will appear narrow.



- Widens the width of the boxes when set to a higher number and increases the wait time.
- Reduces errors and gets the computer to accurately measure heart rate variability when set correctly.

To Calibrate Manually:

To begin the manual calibration process, you want the threshold bar to drop below where NeuroField can see a signal so you can gradually raise it into a good range and capture the heartbeat.

1. Set the Number in the "Level" box to a higher negative number, for example from -0.5 to -0.7.
2. Click in the "Time (msec)" box to get the computer to accept the new setting and then click on the "Start HRV Scan" button. In the "NeuroField Measurement Device Data" screen:
    - The Yellow Threshold bar will drop to the value you set in Step 1 above, -0.7 and rest below the heartbeat edge.

    Note: NeuroField will continue to scan the Heart Rate Variability until you select the "Stop Scans".
3. Start raising the bar:

a. Lower the negative number in the “Level” box, for example, from -0.5 to -0.2.
b. Click in the “Threshold Time” box to accept the new setting and notice the Yellow Threshold bar in the “First Derivative” window. When it gets to the end of the scan, it will check for the value in the “Level” box and the Threshold bar will raise up to -0.2c on the vertical axis. As NeuroField continues to scan, the Threshold can be changed “on the fly”.
c. Continue to lower the “Threshold Level” number to raise the bar until NeuroField captures the heartbeat when the vertical edges cross over the threshold and boxes begin to appear in the “Final Heart Rate Edge” window. For example, set it to -1.277 and then to -0.277.

4. Click in the “Hold-Off Time” box to change the number here to be between 400-500 msec.
5. You should now have Picket Fence” appearing with the pickets spaced appropriately. When it gets to the end of a scan, NeuroField will abort and you are ready to run a session.

Calibration should not take more than 2 or 3 minutes. If it is taking longer than that, then something is wrong. Either, there is too much noise in the room, the client is not grounded correctly, there is debris on the finger or the ear, or you may have a person who is not appropriate for HRV.
the finger or the ear, or you may have a person who is not appropriate for HRV.

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VI. NeuroField 19 Channel EEG Acquisition

With the NeuroField64 system you can acquire 19 Channels of EEG data. Using the Q20/Q21 Amplifier to acquire EEG data in NeuroField, the Data is saved in the EDF format directly into the Patient's folder. When acquiring data into other applications such as Neuroguide or Brain Avatar, the data can be saved in EDF or European Data Format, is a standard file format designed to easily store and exchange medical data. Once you have created an EDF file, the data can then be imported into other programs that support the EDF file format such as Neuroguide. NeuroField also supports the EDF+ format.

Acquiring EEG

Most of the procedures here have been described in detail earlier in this manual. If you need any further details on how to follow the instructions below, please refer to "I. Software Run Thru: Current and Magnetic Stim-Only" for additional information on using the specific tabs and selection options.

Overview

Once you launch the program and select your CANBus, the "Patient Selection" tab will automatically become activated, and the Patient screen will appear. To run the 19 Channel Acquisition procedure, you will simply do the following:

- Select your Patient
- Select the Q20 or Q21
- Set the EDF Format and Recording Time
- Start and Monitor the Recording

Prepping the Patient for Data Acquisition:

To Launch Program & Select a Patient:

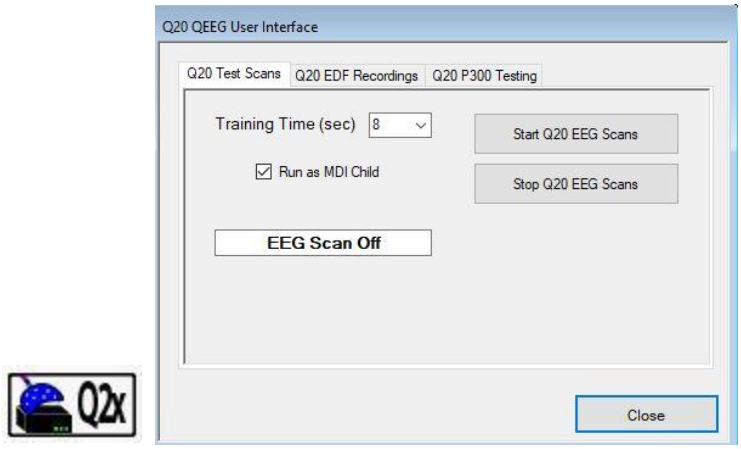
To Launch NeuroField and select a Patient for 19 Channel Acquisition, do the following:

1. Click on the NeuroField icon on your desktop and click on the appropriate "Use CANBus Adapter" button.
2. In the "Patient Selection" tab create or select your Patient and make a note or jot down their Patient ID number as you will need it later to retrieve their EDF file. **Note:** Again, once the EDF file is created NeuroField will save it directly into the Patient's folder by Patient ID, so it is critical to select the correct patient when acquiring EEG.
3. Click on the "Select Patient and Continue" button.

To Setup the Q20 and Start Acquisition:

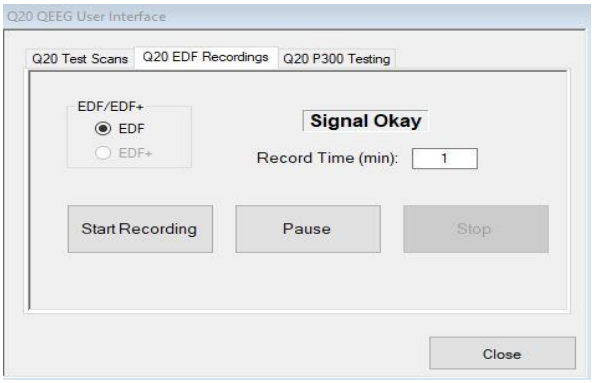
Once you have selected your Patient, NeuroField will automatically move to the "Treatment Stimulation Setup" tab. Since you will not be running a stimulation, you will not need to select any stim units from this screen. You will simply be setting up the Q20. To do so:

1. On the Main Menu Sidebar, click on the "Q2x" button.



The “Q20 QEEG User Interface” will open. This is where you can start and stop your scans.

2. Click on the “Q20 EDF Recordings” tab.

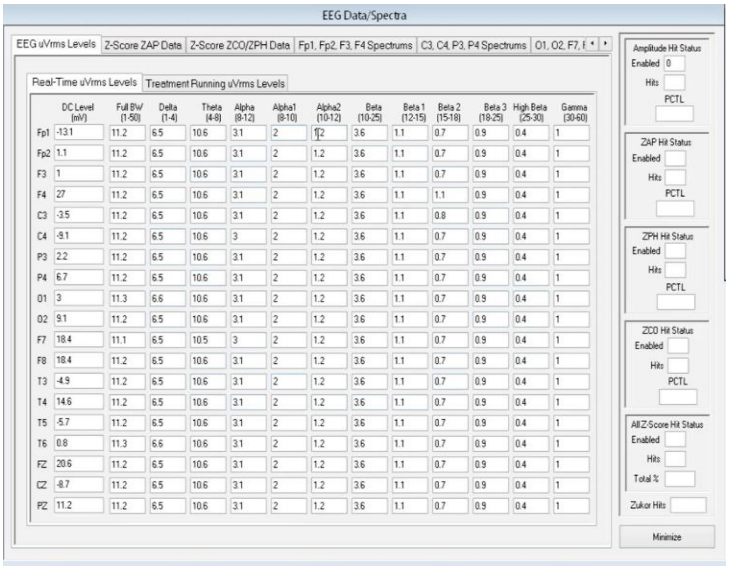


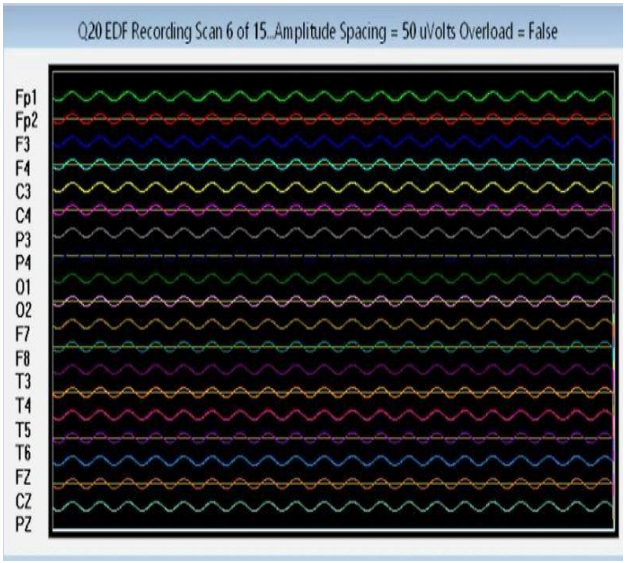
Here you can set your options for acquiring 19 Channels of EEG data by telling NeuroField how many minutes you want to record.

3. Notice that “EDF” is selected by default. For this example, leave that as your selected format.
4. In the “Recording Time” field, enter the number of minutes you would like to acquire EEG. The time defaults to 1 minute.

   Note: With EDF file format, you do not need to designate EO or EC. Simply name your file “EO” if recording eyes open, and when importing into Neuroguide you will designation the Eye Condition there.
5. Click on the “Start Recording” button. NeuroField will open and automatically start to acquire data. “Signal Okay” will switch to “Recording” and the “EEG Data” window will appear.

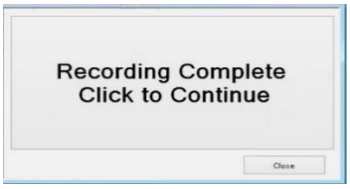
Monitoring the Acquisition





To View the Data in Real-Time:

1. Notice the numbers on the screen. NeuroField will generate the data in real-time which you can monitor.
2. Also notice the text on the top of the running EEG Screen. It will tell you how many scans have completed. It takes 15 scans for 1 minute of data. So, for example it would read, “Q20 EDF Recording Scan 4 of 15”.
3. Notice when the recording is complete an alert/button will appear.



4. Click on the “Click to Continue” area of the alert, and you are done with the acquisition.

Locating the EDF File

To Navigate to the EDF File:

The EDF file is stored in your Patient’s folder. To locate it:

1. Go to C: Drive
2. Go to NeuroField64 folder
3. Go to NeuroFieldData/PatientData
4. The EDF file will be stored in a folder named with the Patient ID.

If your Patient was ID “8”, the EDF file folder would be named PID00008“, and the EDF file would be named 19ChEEG00008”. **Note**: Due to HIPPA regulations, file is stored as ID only.

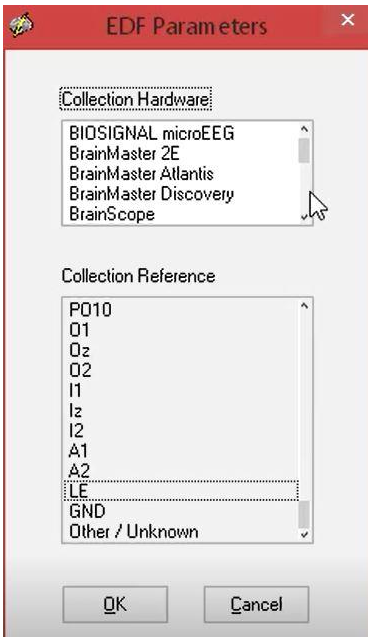
You now know where the 19 Channel Acquisition data is stored, and you can navigate to this location when importing the file into other software programs such as Neuroguide to generate a QEEG Map.

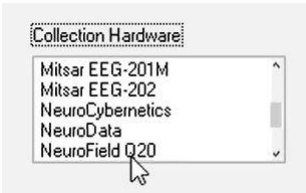
Opening the EDF File in Neuroguide

Once you have your EDF file, you can launch Neuroguide and open the file EDF file with your acquired data.

To Load the EDF File:

1. Launch Neuroguide
2. Click on File/Open from the Main Menu Bar
3. Scroll down the list to the bottom and select “EDF”.
4. Navigate to the NeuroField patient folder where the file is located.
5. Double click on the file to load it and the EDF Parameters window will appear in Neuroguide.





6. Tell Neuroguide what hardware you used to collect the data. Select “NeuroField Q20” and leave the “Collection Reference” set to the default of “LE” or “Linked Ears”.
7. Click on the “Ok” button and the “Patient Information” window will appear along with your data. Here you can enter Patient Information, including “Eyes Open” condition, and you can go through the recording and check everything.

VII. NeuroField EEG: Stim + Z-Scores + Zukor

Using Stim & Q20/Q21 - 19 Channels Op Conditioning

Another innovation in the NeuroField toolset is the NeuroStimulation/Neurofeedback combination. The power of this procedure lies in the fact that you can use Z3 Stimulation Technologies with Q20/Q21 and up to 19 channels of EEG Z-Score Neurofeedback to effectively combine pEMF, tACS, and/or tDCS with Operant Conditioning. Not only do these two types of training occur close to simultaneously, but the Stimulation portion of the training is also automatically guided by real-time Neurofeedback responses.

RTH vs RTZ

There are two Options for training: RTH or "Real-Time Hits" and RTZ or "Real-Time Z-Scores". They both use the same methodology, however the difference is RTZ uses Z-Scores and RTH uses Amplitude frequency to train to. For instance, if you want to train Theta you would use:

- **RTH** (Amplitude Training) to simply **Down Train** or **Up Train** Theta at specific sites.
- **RTZ** (Z-Score Training) to train Theta into a given Z-score range, say **1 to -1**, at specific sites.

This section of the manual describes using RTZ. Detailed instructions using Amplitude training (RTH) rather than Z-Score training (RTZ) are described later in this manual.

Overview

The EEG – RTZ feature is a norm-referenced neurofeedback procedure in which a Magnetic and/or Current stim is given, EEG is trained, and Z-Score data is generated. NeuroField uses the Neuroguide database to generate norm referenced data. The DLL used in the EEG procedure requires a separate license that can be purchased through NeuroField, Inc. Simply call or email the office to purchase a Z-Score license. If you have already purchased a license, you must activate it with a License Key.
Note: Refer to the "Section 3 – I. NeuroField64 Software Installation – Installing the NeuroField Support Software/To Install the ANI Z-Score DLL" for further instructions.

A summary of how it works is….. NeuroField will:

1. Give a stim for 30 seconds, showing the brain what frequency it needs to replicate/to entrain to, and then shut off.
2. Run Neurofeedback Z-Score training for 1 minute, reinforcing the training with feedback/rewards using either a Tone and/or Zukor Media Player.
3. Read the Z-Score data.
    - If the training frequency dropped in range – Give the same frequency again
    - If training frequency did not drop in range – Modulate to the next frequency
4. Repeat Steps 1 – 3 for the duration of the session.

Instructions on how to perform the above sequence are detailed below. It is strongly recommended that you participate in a NeuroField BootCamp before using this technique. Again, Dr. Dogris uses the Neuroguide Brain Atlas (www.appliedneuroscience.com) to determine which sites in the brain are deregulated. Neuroguide uses a normative database that generates Z-Score data QEEG brain maps. Through clinical analysis and the acquisition of both neurophysiological and clinical data, a set of

hypotheses can be formed to determine which areas of the brain to work on. Dr. Dogris & Dr. Thompson offer several trainings per year in different locations around the United States & abroad. They also offer online consultations and mentoring to learn these skills and procedures.

Prepping for EEG – 19 Channel & Setting Up Stimulation

The RTZ procedure begins at the "NeuroFeedback Selections Tab", however prior to running RTZ you must have your client properly prepped and your stimulation instructions setup. This section will walk you through this. For this example, use the following scenario where you will:

- Prep and setup a session to train RTZ for a client who has excess Theta running down the Cingulate from Anterior to Posterior.
- Set Neurofeedback training sites to be F3, F4, Fz, Cz, Pz
- Set Neurofeedback thresholds to train Theta to be within 1 to –1 Z-Score range
- Set Stimulation sites to be Fz and Pz – Electrodes and along the Cingulate - Coils
- Stim using 15 – 19 HD protocol to help speed up his brain a bit and improve his Theta/Beta ratios.

Note: Again, when prepping a patient for EEG you will use an Electro Cap. It is important that you have purchased the correct cap and ear electrodes. See "Section 3 – VI. Hardware Setup – Accessories & Prep" earlier in this manual to ensure you have an approved cap.

To Attach the QEEG Cap, the NeuroField Cap, Coils, and or Electrodes:

Note: The process below assumes the coils and/or electrodes are attached to the units and the units are up and running. If not refer to the "Section 3 – VI. Hardware Setup – Accessories & Prep" for details and thorough prepping procedures. To continue:

1. Clean the scalp at the 10/20 sites you want to train and place the Silver-Silver Chloride electrodes on the cleaned scalp. This is if you are using Current stimulation with the Z3 unit. For this example, you are training Theta along the Cingulate, so place the electrodes at Fz and Pz.
2. Place the Cap on the head over the electrodes. Attach the ear electrodes using gel, and apply the electro gel at the Ground electrode. For this example, you will train 5 sites, so you only need to also gel those specific sites on your cap once you have the ears and ground electrodes setup. The sites you will gel for this example are: F3, F4, Fz, Cz and Pz.
3. Cover the 19 channel QEEG Cap with a surgical cap.
4. Place the NeuroField black Velcro cap supplied with your NeuroField kit on the client's head over the surgical cap.
5. Attach the Coils to the Velcro strips on the black NeuroField cap at the 10/20 sites you want to train. This is if are using Magnetic stimulation with the X3000. For this example, we will be giving a magnetic Stim as well as a current stim along the Cingulate, so place the coils in what is known as the "Clam Shell" configuration:
    a. F3/F4 touching at Fz
    b. C3/C4 touching at Cz
    c. P3/P4 touching at Pz
    d. 01/02 touching at Oz

Your client is well prepped, and you are now ready to setup the Stimulation Treatment.

To Setup Stimulation Treatment:

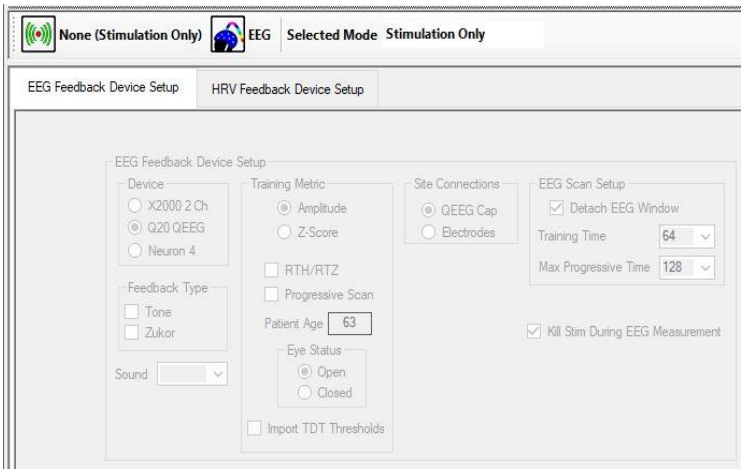
Note: The instructions in this section refer to the "Stimulation Treatment" tab.

To continue you must a Q20/Q21 setup and powered on. For this example, you will setup the training scenario as follows:

- Select your Patient
- Setup the Stim Units = 1 x3000 and 1 tACS
- Set the Global Duration Override = 30000 msec or 30 seconds Stim
- Selected your Protocol = 15 to 19 HD
- Set the number of Loops = 10
- Saved your Stim Setup and Continue

The "Neurofeedback Selection" tab will appear. For help with any of the above tasks refer to "Section 4 - II. Software Run-Thru: Magnetic and Current Stim-Only" earlier in this manual. There you will find instructions on how to move through the preceding steps and accomplish each of the above tasks.

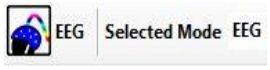
Using the Neurofeedback Selections Tab – RTZ Training



You are now ready to setup and run an RTZ session using Zukor as the "Feedback Type". When you click on "Save and Continue" from the "Treatment Stimulation Setup" tab, the program automatically advances to the "Neurofeedback Selection" tab with the "Stimulation Only" mode selected by default.

To Select the Training Mode and EEG Setup:

Note: you must have a Q20/Q21 unit hooked up to your system and powered on.

1. In the "Training Mode" area of the screen, click on the "EEG" icon because for this procedure you are going to do EEG Neurofeedback. 

   "Selected Mode" will list "EEG", and all the options to setup EEG training options will become activated.
2. In the "EEG Feedback Device Setup" area of the screen, notice the unit you are using (Q20 or Q21) will be auto-selected.

To Select the Feedback Type:

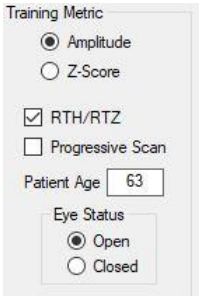
You can use a Tone, the Zukor feedback, or both. The Tone alone is effective for running an "Eyes Closed" treatment. For this example, you will use Zukor.

Zukor Feedback:

1. In the "Feedback Type" area of the screen, click on the "Zukor" check box. **Note:** Selecting Zukor feedback requires the purchase of the Zukor software. Contact the NeuroField office if you decide to do so.

To Select the Training Metric:

Here you can select either Amplitude training (default) or Z-Score Training, as well as additional options for training your patient.



When deciding on your Training Metric, you will either select:

- **"Amplitude"** if you want to give a standard Neurofeedback Amplitude treatment, for example when you simply want to train say Theta Up or train Theta Down.
- **"Z-Score"** if you want to run a standard Neurofeedback treatment using Z-Scores say to train Theta into a 1 to -1 Z-score range.

1. For this example, click on the "Z-Score" checkbox as you will be running Z-Score Neurofeedback session. For instructions on selecting and running "Amplitude" Neurofeedback, refer to "NeuroField EEG: Amplitude Training" later in this Section of the manual for detailed instructions.

Note: Again, to run the Z-Score training you must purchase and activate the Applied Neuroscience 19 Channel dll. If you haven't purchased the .dll, an alert / license agreement will appear. Call the NeuroField office to purchase it.

RTH/RTZ vs Progressive Scan:

"RTH/RTZ" and "Progressive Scan" are customized NeuroField procedures. A good rule of thumb is to start with RTH/RTZ and then move to Progressive scan. If you choose to select either one of these options, the following will happen:

- **RTH/RTZ** (Real-Time Hits/Real-Time Z-Score procedure) - This method was developed for EEG training. When selected, NeuroField64 will find a specific stimulation (frequency) that the brain liked and continue to give that stimulation as long as the threshold is met. For this example:
  - A stimulation will be given at 15 Hz for 30 seconds because you have setup the stimulation to use the 15 – 19 HD protocol and set the Global Duration Override to 300000 or 30 seconds.
  - EEG is measured for the time designated as the "Training Time". For this example, the "Training Time" will be 64 seconds of Neurofeedback training. (See "EEG Setup" below for more information on training time.)
  - The EEG measured during the designated training time is averaged and thresholds are evaluated.
  - If the brain has met the threshold criteria that you set for the threshold, then NeuroField will give the same frequency (15 Hz) over again.
  - If the threshold criteria aren't met, then NeuroField will advance to the next Stim cycle (modulate to the next frequency) and give that frequency, for instance 15.1 Hz, to see if it will cause the brain to move into a normative state and the Z-Scores to meet the threshold criteria.

  With RTH/RTZ the client will always get a stim at the end of every segment, in this case every 64 seconds they will get a stimulation for 30 seconds. It may not be the same stimulation if the threshold criteria are not met, but a stimulation is always given.
- **Progressive Scan** – This method is a more advanced form of training for the patient. This is like "taking the training wheels off". Here, if the brain meets the threshold criteria, the client does not get another stimulation. NeuroField simply doubles the training time without stimulation as a primer. **Note:** If the brain can't hold the threshold then the program will go ahead and cut the training time in half and give another stimulation.

  This feature was designed to put more of the pressure on the brain to hold an ideal state for a longer amount of time without a boost, or with minimal boost, of NeuroField64 stimulation as a primer. To summarize: RTH/RTZ is designed for beginners. As the client gets better and better and stronger and stronger, you can move them to Progressive Scan and ween them off stimulation. Progressive Scan allows the client to create the desired state themselves, leaning more towards the operant conditioning learning model and away from the neuro stimulation model. For this example NeuroField would:
  - Give a stimulation = 15 hz
  - Read the EEG or the set "Training Time" = 64 seconds or 1 minute**.**
  - If the threshold criteria is met, NeuroField will not give another stimulation, it will simply double the time of the EEG training to 128 seconds or 2 minutes.

- If the threshold is not met, then NeuroField stops, will divide the current EEG training time by 2, and then give another stimulation.

1. For this example, click on the “RTH/RTZ” check box.

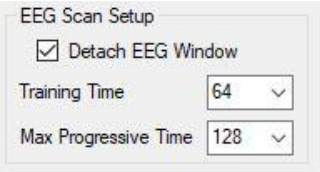
Age and Eye Status:

1. Notice that the patient’s age has auto-populated from the Patient setup information.
2. Select the “Eye Status”, either “Open” or “Closed” depending on what you want to use for your treatment. For this example, select “Open”.

Site Connection:

1. Notice the “Site Connection” options. In this area of the window you will select either of the following:
   - **QEEG Cap** - If you are doing full 19 channel EEG with an Electro-Cap & you want to gel the specific sites to train.
   - **Electrode** – If you are doing 4 channel EEG with the break-out box & you want to set individual electrodes for the specific sites to train.
2. Select the “Site Connection” you are using for treatment. For this example, select “QEEG Cap”.

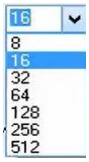
EEG Scan Setup:



Training Time:

This is the amount of time your client will actually train using the operant conditioning/Neurofeedback methodology.

1. Notice the “EEG Scan Setup” options. Here you can setup the following:
   - **Training Time** – The default is 64 seconds, but you can set it to any of the following:



This option sets the amount of time your client will actual train using the operant conditioning training model. 64 seconds or a little over 1 minute is the preferred selection, however you can set an alternate training time depending on whether you want to train for a shorter or longer period.

Max Progressive Time:

If you are running Progressive Scan, here you can set the maximum amount of time the patient can achieve to maintain threshold

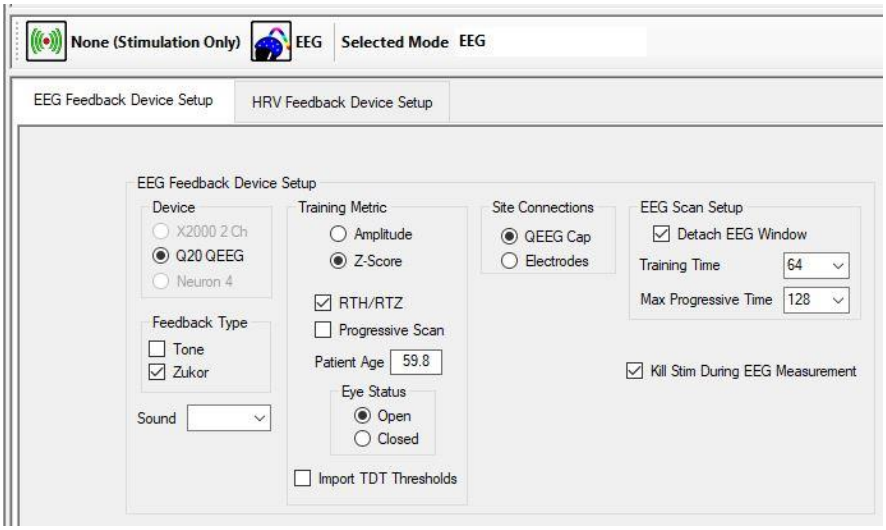
- **Max Progressive Time** –. The setting defaults to 128 which is double the default of 64 seconds initial training time. .

2. Make your EEG Scan Setup" "selections. For this example, set the "Training Time" to 64 and leave "Max Progressive Time" at the default.

Kill Stim During EEG Measurement:

If you uncheck this box, it means that the stimulation will continue while the EEG is running. If you are running really slow frequencies, this is good. It's important to attend a training to understand more about how to use this. For this example, leave it checked to "Kill Stim during EEG Measurement".

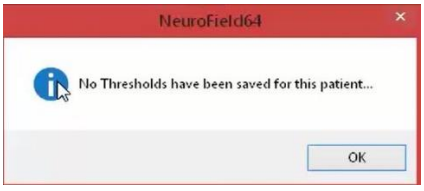
Your screen settings should look like the screenshot below:



To Save Neurofeedback Selections:

Once you get have your Neurofeedback selections setup the way you want:

1. Click on the "Save/Continue" button. NeuroField will look for thresholds and an Alert box will appear. In this case it is a new patient and there are no thresholds for them.



2. Click on "Ok" and the Threshold Setup screen will appear.

Setting EEG Thresholds - Overview

After you have saved your Neurofeedback selections, you must now setup your Threshold Selections. There are two different ways you can setup thresholds:

- **Manual Threshold Setup:** You can set them up manually by using the drop-down menus in the “Threshold Setup” screen to pick your thresholds or create custom ones. For detailed instructions to setup thresholds manually, skip to the next section directly below. You can do this for Z-Scores/Amplitude, Phase and Coherence Pairs.
- **Auto Import Threshold Setup:** You can bypass the “Threshold Setup” screen in NeuroField64 and import your clients Neuroguide.tdt selection data. NeuroField64 will automatically setup and use the Neuroguide Selection data as your thresholds. For detailed instructions on how to do so, proceed to the section titled “Setting EEG Thresholds – Auto Import from Neuroguide”.

Setting EEG Thresholds - Manually

To Setup EEG Thresholds Manually

Overview:

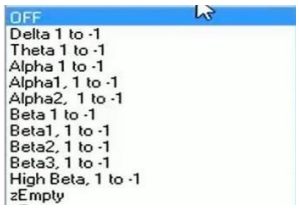
When setting up Thresholds NeuroField will walk you through each of the Threshold tabs in task order. When setting up Thresholds you will do the following:

- Pick 10/20 sites for training and Frequency/Threshold for each site. For this example, you will set F3, F4, Fz, Cz, Pz to threshold Theta/1 to - 1
- Pick Coherence/Phase 10/20 Site Pairs to Train
- Set Thresholds for each Coherence/Phase Pair
- Pick Percentage Hits = Leave as default of 50%

Z-Score Threshold Setup:

In the "Threshold Setup" screen you will setup the Z-Score Thresholds for the sites you want to train. To do this:

1. Click on the dropdown menu next to the site you want to train. You will see a list of canned Thresholds. Note: you can create custom thresholds following the instructions below.



2. Select the Frequency and Threshold for each site you want to train. For this example, the first site you are going to be training is F3/Theta so select the F3 drop-down and select "Theta 1 to -1" to threshold on Theta. Continue until all five sites are selected. You can select any threshold at any site and completely customize the setup for a patient. These setups are saved in the Patients file so the next you run NeuroField, these thresholds will be auto-loaded. For this example, we are wanting to reduce Theta at F3, F4, Fz, Cz, Pz, so the setup would look this this:

If you are satisfied with your threshold settings go to Step 3. However, you may want to create a custom Threshold setup that is not listed say "Theta 1 to -6" rather than the listed option of "1 to -1." If so, skip Step #3 and go to the next section "To Create Custom Thresholds".

3. Click on the “Next Button”.

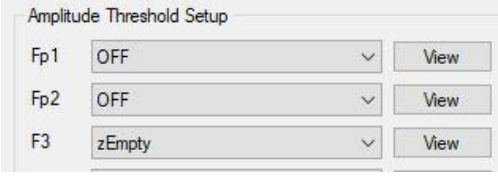
NeuroField will move to the “Coherence/Phase Pair Selection” tab where you can select and setup additional thresholds. Proceed to the Section below titled “To Make Coherence/Phase Pairs Selections”.

To Create Custom Thresholds

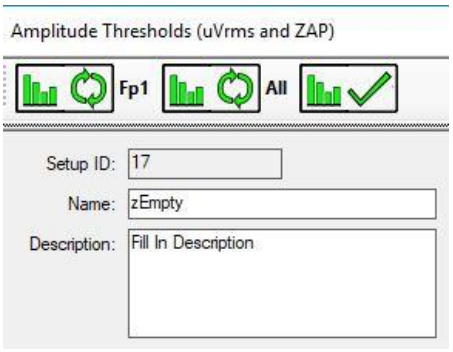
There may be times that you want to prevent the system’s ability to up or down train a specific frequency, say for this example the client has too much Theta. If he comes in range on the bottom end and it is only set for “-1”, the software may begin to train Theta up. To prevent this, you can create a custom threshold that “drops out the bottom” and prevents this from happening. For this example, you do not want the system to up train Theta, so you will create a custom “Theta 1 to -6” threshold for Z-Score training. When set to “-6” it is a sure bet the brain will not reach this and the system will not start training Theta up.

To create a custom threshold, do the following:

1. Click on the drop-down menu next to the first site you want to threshold. For this example, select the F3 drop-down menu and select the “zEmpty” option.



2. Click on the “View” button next to the “F3 zEmpty” selection, and the “Amplitude Threshold” window will appear.



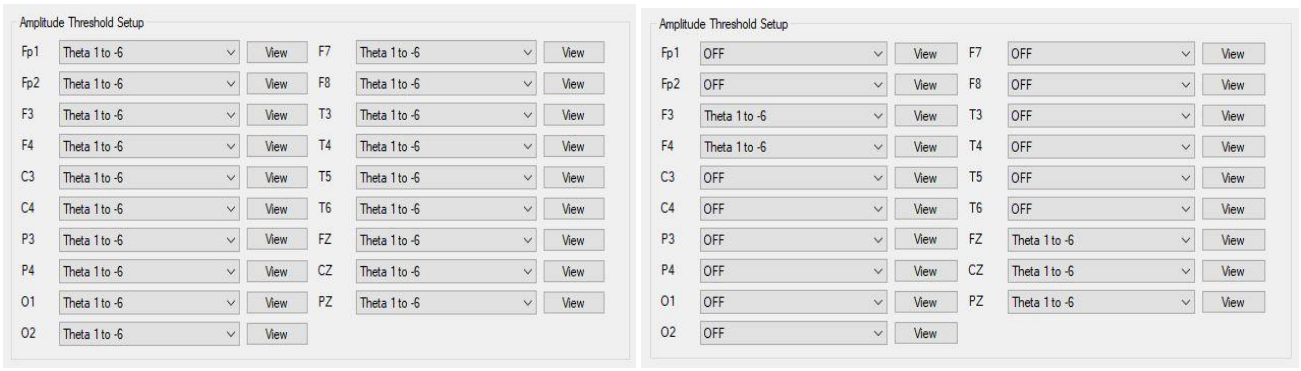
Notice that the:

- "Name" and "Description" fields are empty
- Frequencies are all disabled
- Amplitude Training radio buttons are all set to the default
- The "ZAP Limits" are all set to "0"

3. In the "Name:" field enter a name for your Threshold i.e. "Theta 1 to -6" and in the "Description" field enter a description.

4. Enable the Theta frequency and in the "ZAP Limits" section of the screen, set your new Z-Score Threshold range. For this example, you are creating a Theta 1 to -6 so click Box to "Enable" Theta and enter "1 to -6" in the empty boxes "ZAP Limits" for the Theta frequency. **Note:** the software gives you the ability to enable all frequencies and train all the way up to Gamma. And, since you are training Z-Score you only need to set the ZAP Limits. Leave the "Amplitude Training" set to the defaults. These are only set when you have selected "Amplitude" as your training mode, in which case the system will train the Amplitude Up or Down for the given frequency.
5. Click on the 

"Update All" button and the system will internally reset all sites to your new custom Threshold, however they will not be reset on your screen yet.
6. Click on the  "Close Threshold" button. All 19 channels Z-Score Thresholds will be reset to "Theta 1 to -6" on your screen as seen in the Image below on the left. This new threshold setting will also now be saved and listed as an option under each channel for use in the future.

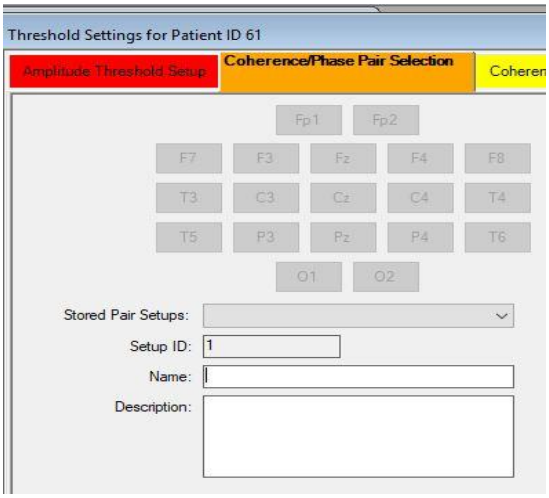


However, for this training example, you only want to set 5 sites to your custom Threshold. You can now go through and set the sites you don't want to train to "OFF" and your screen should look like the image above on the right. Your Threshold Setup is now saved in the software and you can load it up for future sessions without having to create a new one each time.

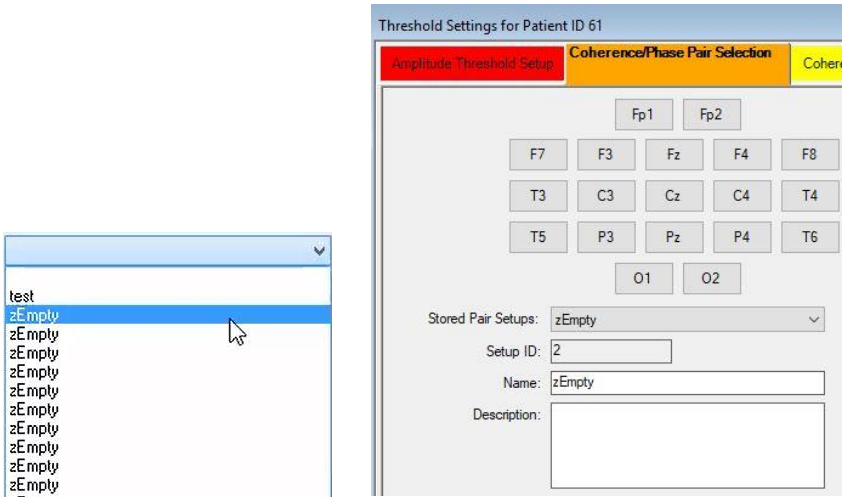
7. Click on the "Verify Thresholds and Click Next – 'Next'" button.

NeuroField will move to the "Coherence/Phase Pair Selection" tab where you can select and setup additional thresholds for Coherence and Phase pairs.

To Make Coherence/Phase Pair Selections



1. Notice that the pairs are all greyed out. Click on the drop-down menu for "Stored Pair Setups" and choose an "Empty" table.



As soon as you do, all 10/20 sites become activated.

2. Name the Pair Setup. For example, you can name it the name of the patient and NeuroField will know where to get this information for your patient next time you run a treatment.
3. Click on each one of the pairs you want to train. **Note:** It is important to pick these pairs specifically based on the QEEG map. As they are selected, the pairs will appear in the window to the right. For this example:

You can set up and train up to ten pairs of coherence and/or ten pairs of phase.

4. When you have selected the Pairs you want to train, click on the “Next” button. It will take you to the next tab: “Coherence/Phase Threshold Setup” to assign thresholds to the pairs.

To Setup Coherence/Phase Thresholds Manually

1. Notice that the pairs you have selected are auto-populate in the Setup window.

2. Pick Thresholds for each one of your pairs. For this example, select Theta 1 to -1.

You don't have to enable everything. You can setup thresholds as shown above. You can also setup Custom Thresholds here by following the same instructions detailed in the section "To Create Custom Thresholds" above.

3. Once you have the thresholds all setup the way you want, go to the "Verify Thresholds and Click Next" area of the screen and click the "Next" button and it will take you to the next screen to setup your logic mode.

To Set Percentage Hits

Here you can choose:

- **Percent** = The designated percentage must be met to get a reward.

1. In the "Percentage Hits Required" option, leave the default set to "50" as the Percentage to use. This means that for each of the sites and thresholds set, the client must get a 50% Hit percentage to get a reward. So if you are training 10 sites 5 of the sites must come into the Z-Score Threshold range to receive a reward. **Note:** This number can be adjusted on the fly while the program is running the session.
2. Click on the "Save Patient Threshold Settings and Continue" button. You are now ready to run a treatment. This will take you to the "Start" screen.

Setting EEG Thresholds – Auto Import from Neuroguide

One of the features in NeuroField64 is the ability to use Neuroguide Zscore Data to automatically set your thresholds when running the NeuroField64 RTZ procedure. This feature simplifies the overall RTZ setup and allows you to get up-and-running a lot faster. After you save your NeuroFeedback selections in NeuroField64, to use this feature you will have to first run through a few simple steps in Neuroguide to generate the threshold data file (.tdt file) for import in NF64.

Overview:

Create and Save the Threshold Selection Data in Neuroguide

When generating the Threshold selection data in Neuroguide you will follow 3 easy steps once you have loaded your artifacted .ng file in Neuroguide. You will:

- Create and Save specific "Report Selections"
- Run an Analysis Report using those Selections
- Save data as a .tdt file

Import the .tdt file into NeuroField64

At the "Threshold Setup" screen in NeuroField64, instead of manually entering your thresholds for Amplitude, Coherence, and Phase, you will import the selection data saved in Neuroguide. To do this you will:

- Scroll through the NF64 "Threshold Setup" tabs and "Save Settings" without making any selections.
- Adjust your Thresholds settings from the "Start Treatment" tab.
- Import TDT file from the "EEG Live Threshold Adjust" window / "Z-Score Live Theshold from TDT File tab"

Adjust the Number of Training Metrics

Once you have imported the Selection data from Neuroguide into NF64, you may have too many metrics. At this point you can adjust the overall Zscore standard deviation from the norm to focus more on just the outliers and/or adjust the number and location of the metrics for training. The metrics that will used for training are ready to be loaded for use in the Live training.

Load the Thresholds

Once you click on the "Start Treatment" button and finalize your Zukor settings, the training will begin. However, at this point if you will now need to Load the Threholds into the Live training.
The following are detailed instructions for how to execute each of these steps.

To Create and Save "Report Selections"

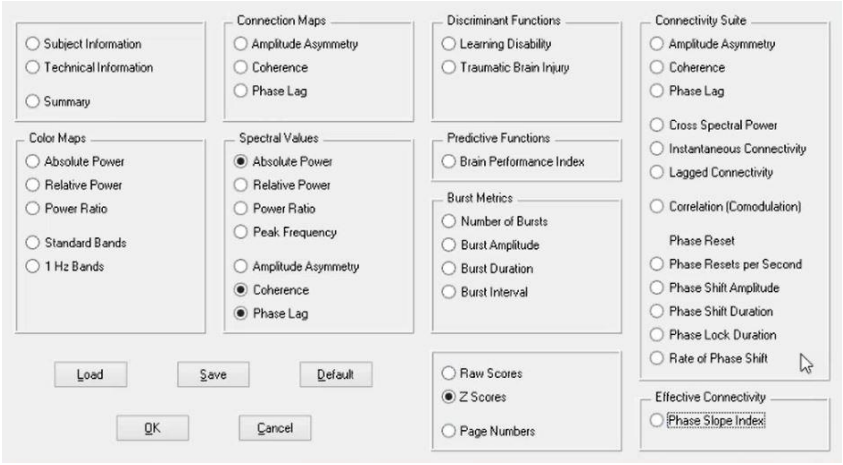
Once you have acquired your client's EEG and artifacted the data, do the following using the Neuroguide software:

1. Leave your NeuroField64 "Threshold Setup" window open, and in a separate window double-click on your client's artifacted Neuroguide (.ng) file to load it. Neuroguide will Open. **Note:** You can follow these steps ahead of time and have your .tdt file ready for when you need it in NeuroField64 to set your thresholds. If you already have the .tdt file, skip down to the "To Import the Threshold Selections" section below.
2. In Neuroguide, go to "Reports/Report Selections.

The default report selection options will appear.

3. De-select all radio button options except for:
    - Absolute Power
    - Coherence
    - Phase Lag
    - ZScores

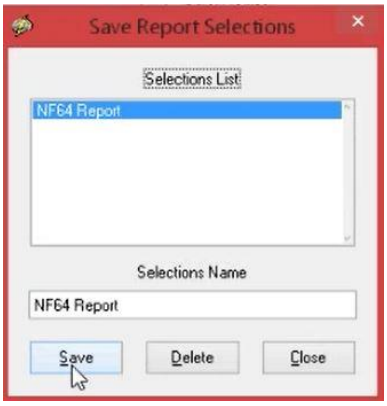
When done you selections will look like this:



This is the specific set of data you are going to want to generate in your analysis report and the specific data that NeuroField64 uses for thresholding. Again, you just need:

- 3 Spectral Values – Absolute Power, Coherence, Phase Lag
  and
- ZScores

4. Name and Save this set of selection criteria for use again. When you want to create and save threshold data for another client, you don't have to go through the process of de-selecting and setup everything. You can simply load this file containing the pre-selected options and you are good to go. To do so:
    a. Click on the "Save" button.



The "Save Report Selections" window appears.

b. Name your report i.e. "NF64 Report" and in the "Save Report Selections" window, click on the "Save" button. The "Report Selections" window with your saved options will appear.

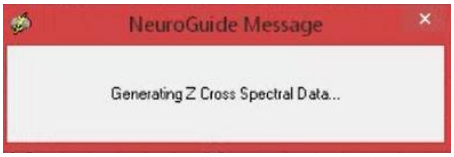
Note: The next time you want to access these same selections, go to Report/Report Selections and simply click on the "Load" button and pick the saved Report from the list. Neuroguide will load the specific data NeuroField64 uses for thresholding.

5. Click on the "Ok" button in the "Report Selections" window. You are now ready to generate analysis.

To Generate a Report Analysis and Save the .tdt File

Once you have made your Report selections you can now generate the Report Analysis and then save the Report in the ".tdt" format. To do so:

1. From the Main Neuroguide menu click on "Report/Generate Analysis".



The "Generating …. Data" alert will appear and a very simple Report will get generated that contains data based on your specific Report selections.

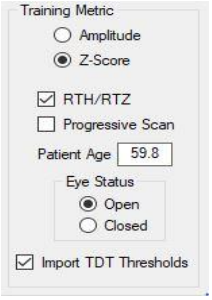
2. Go to "File/Save and choose the "Tab Delimited Text…" option. The directory window will appear.
3. Name and Save the file in your client's folder. **Note:** It is a good idea to include "tdt" in the name of the file for easy search and load. It will save with the .tdt extension which is not always visible in the list of filenames.

   You now have your Neuroguide .tdt file with all the metrics required for thresholding in NF64.

To Import the Threshold Selections

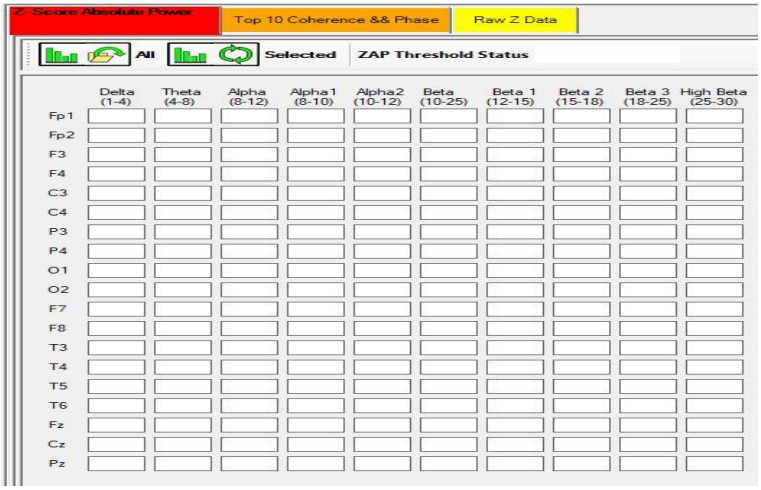
With your Patient selected, and your Treatment Stimulation Setup complete, go to the "Neurofeedback Selection" tab do the following:

1. Make your EEG Neurofeedback selections, including clicking on the check box next to "Import TDT Thresholds"



2. Click on the “Save/Continue” button. The system will proceed to the “Start Treatment” tab and the “EEG Live Threshold Adjust” window appears.

3. Before you start the treatment, you need to load in your tdt file. To do so, Click on the yellow “Z-Score Live Thresholds from TDT File“ tab to activate the TDT import screen if it isn’t already active. Notice in the screenshot below that the “Absolute Power tab is activated by default and the table is empty.



4. Click on the “TDT” button

and the Windows Explorer will appear asking where the file is you want to load.

5. Navigate to where you saved your client’s TDT file, highlight it, and click on “Open”. The data will automatically load into NeuroField64 and populate the empty table for Absolute Power, Coherence and Phase tabs. You now have custom thresholds based on your clients specified data that have been automatically set.

	Delta (1-4)	Theta (4-8)	Alpha (8-12)	Alpha1 (8-10)	Alpha2 (10-12)	Beta (10-25)	Beta 1 (12-15)	Beta 2 (15-18)	Beta 3 (18-25)	High Beta (25-30)
Fp1	1.26	2.64	2.46	1.96	0.19	2.54	2.48	3.1	2.02	1.22
Fp2	1.06	2.05	2.19	1.57	0.19	2.24	2.24	2.35	1.6	1.03
F3	1.26	2.52	2.53	2.12	0.69	2.55	2.57	3.13	1.91	1.39
F4	1.46	2.58	2.55	2.24	1	2.56	2.64	3.1	1.96	1.58
C3	1.37	2.56	2.56	2.12	1.18	2.6	2.6	2.68	1.87	1.66
C4	1.74	2.57	2.57	2.18	1.1	2.58	2.66	2.75	1.94	1.7
P3	1.08	2.23	2.13	2.18	1.29	2.07	2.28	2.63	1.95	1.79
P4	1.39	2.3	2.07	2.2	1.42	1.98	2.24	2.56	1.96	1.82
O1	0.99	2.25	1.73	2	0.62	1.64	1.86	2.35	1.78	1.57
O2	1.19	2.2	1.72	2.1	1.43	1.78	1.74	2.24	2.13	1.85
F7	1	2.79	2.71	2.51	1.09	2.91	2.56	3.27	2.7	1.92
F8	1.72	2.92	2.81	2.41	1.23	2.93	2.82	3.16	2.3	1.97
T3	0.8	2.43	2.79	1.87	0.68	2.98	2.64	2.83	1.86	1.35
T4	2.43	2.74	3.11	1.85	0.63	2.91	3.05	2.64	1.91	1.41
T5	1	2.24	2.17	2.28	0.92	2.12	2.33	2.83	1.98	1.89
T6	1.3	2.27	1.88	2.23	1.51	1.93	1.94	2.49	2.18	1.98
FZ	1.25	2.23	2.37	2.08	1.08	2.38	2.43	2.92	1.8	1.49
CZ	1.41	2.39	2.49	2.1	1.01	2.48	2.54	2.69	1.87	1.54
PZ	1.27	2.24	2.05	2.05	1.18	2	2.17	2.42	1.78	1.68

The “Absolute Power” tab is still activated by default. All this Red data in each of these cells in the above table for Absolute Power is potentially training metrics that could be used for your client.

To Adjust the Training Metrics – Absolute Power

In the “EEG Live Threshold Adjust” window, the ZScore Training Standard Deviation range that determines the number of metrics for training is set at “1.0” by default.

This may be too many metrics, and/or you may want to go after more of the outliers only. The “1.0” selection shows a lot of Red representing the selections metrics. This truly is a lot of metrics to train all at once, however you can adjust it as needed. To do so:

1. In the “Pos and Neg Training Std Devs” drop down menu portion of the screen, set the Zscore number higher to select less metrics. For this example, set the Zscore to “2.0” or only train the sites that are 2.0 and above.
2. Click on the “Refresh” button and the new set of metrics will appear.

	Delta (1-4)	Theta (4-8)	Alpha (8-12)	Alpha1 (8-10)	Alpha2 (10-12)	Beta (10-25)	Beta 1 (12-15)	Beta 2 (15-18)	Beta 3 (18-25)	High Beta (25-30)
Fp1	1.26	2.64	2.46	1.96	0.19	2.54	2.48	3.1	2.02	1.22
Fp2	1.06	2.05	2.19	1.57	0.19	2.24	2.24	2.35	1.6	1.03
F3	1.26	2.52	2.53	2.12	0.69	2.55	2.57	3.13	1.91	1.39
F4	1.46	2.58	2.55	2.24	1	2.56	2.64	3.1	1.96	1.58
C3	1.37	2.56	2.56	2.12	1.18	2.6	2.6	2.68	1.87	1.66
C4	1.74	2.57	2.57	2.18	1.1	2.58	2.66	2.75	1.94	1.7
P3	1.08	2.23	2.13	2.18	1.29	2.07	2.28	2.63	1.95	1.79
P4	1.39	2.3	2.07	2.2	1.42	1.98	2.24	2.56	1.96	1.82
O1	0.99	2.25	1.73	2	0.62	1.64	1.86	2.35	1.78	1.57
O2	1.19	2.2	1.72	2.1	1.43	1.78	1.74	2.24	2.13	1.85
F7	1	2.79	2.71	2.51	1.09	2.91	2.56	3.27	2.7	1.92
F8	1.72	2.92	2.81	2.41	1.23	2.93	2.82	3.16	2.3	1.97
T3	0.8	2.43	2.79	1.87	0.68	2.98	2.64	2.83	1.86	1.35
T4	2.43	2.74	3.11	1.85	0.63	2.91	3.05	2.64	1.91	1.41
T5	1	2.24	2.17	2.28	0.92	2.12	2.33	2.83	1.98	1.89
T6	1.3	2.27	1.88	2.23	1.51	1.93	1.94	2.49	2.18	1.98
FZ	1.25	2.23	2.37	2.08	1.08	2.38	2.43	2.92	1.8	1.49
CZ	1.41	2.39	2.49	2.1	1.01	2.48	2.54	2.69	1.87	1.54
PZ	1.27	2.24	2.05	2.05	1.18	2	2.17	2.42	1.78	1.68

You can see in the image above on the left that only those sites/frequencies that are “2.0” Scores or higher are highlighted/selected for training.

Raise the ZScore – Really Target Outliers

If you want to narrow this down even further to really go after the biggest outliers, you can set the “Std Dev” ZScore even higher to say “2.5” and hit the “Refresh” button. The sites selected for training is narrowed down even more and only the sites/frequencies at 2.5 or above are selected for training as you can see in the image above on the right. Often it is a good practice to go after the biggest outliers initially and then open it up over time to include a wider range of ZScores.

Fine-Tune the Zscore Selection

If “2.5” is too high and you want a few more metrics, you can adjust the number a bit lower say to “2.2” and hit the “Refresh” button. The number of metrics will adjust accordingly and the sites/frequencies that are 2.2 Z-Scores or higher will be included in training.

Hand-Select Metrics

If you want to hand-pick cells to include as your metrics during training, you can click on the specific cell representing that site/frequency to include it. For example, say you want to include Alpha1 at C4 to be trained. If you click on it, the cell will turn grey which means it is selected. You can click the grey cell again, and it will turn white which means it is deselected.

Note: It is important to remember that just because a particular metric is selected, it doesn’t mean you have to train it. There may be compensatory systems the brain has setup and it is important to match the client symptoms with the presenting data. For instance, if someone has anxiety you may want to train down the High Beta, however if the client has had a head injury, the High Beta could be a compensatory mechanism. So you want to make sure that you are selecting metrics that make sense for the particular client.

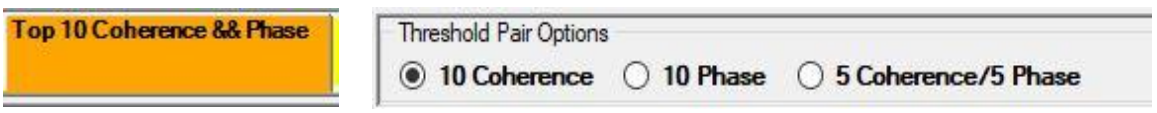
Selecting Metrics – On-the-Fly

Remember that at any time during training you can select and deselect metrics on-the-fly. You may want to only target the sites you believe are contributing to your client’s anxiety. You could only select those specific sites for a portion of the training to further localize the training.

To Adjust the Training Metrics – Coherence and Phase

In the “EEG Live Threshold Adjust” window, do the following:

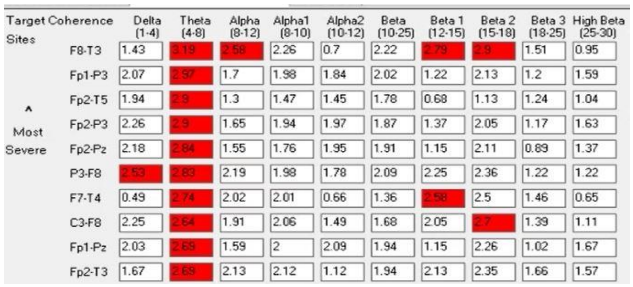
1. Click on the “Top Ten Coherences & Phase” tab to activate the Coherence/Phase Thresholds selection window. Unlike Absolute Power, Coherence and Phase gives you 3 “Threshold Pair Options” for selecting the training criteria in addition to simply setting the ZScore Standard Deviation.



They are described as follows:

10 Coherence

1. By default NeuroField64 will be set to display the 10 Coherence pairs you imported from the TDT file. Leave the default settings, and you will see all the Coherence pairs within the set ZScore Std Dev range that are selected for training – up to 10 pairs.



Target Coherence Sites		Delta (1-4)	Theta (4-8)	Alpha (8-12)	Alpha1 (8-10)	Alpha2 (10-12)	Beta (10-25)	Beta 1 (12-15)	Beta 2 (15-18)	Beta 3 (18-25)	High Beta (25-30)
	F8-T3	1.43	3.19	2.58	2.26	0.7	2.22	2.79	2.9	1.51	0.95
	Fp1-P3	2.07	2.97	1.7	1.98	1.84	2.02	1.22	2.13	1.2	1.59
^	Fp2-T5	1.94	2.9	1.3	1.47	1.45	1.78	0.68	1.13	1.24	1.04
Most	Fp2-P3	2.26	2.9	1.65	1.94	1.97	1.87	1.37	2.05	1.17	1.63
Severe	Fp2-Pz	2.18	2.84	1.55	1.76	1.95	1.91	1.15	2.11	0.89	1.37
	P3-F8	2.53	2.83	2.19	1.98	1.78	2.09	2.25	2.36	1.22	1.22
	F7-T4	0.49	2.74	2.02	2.01	0.66	1.36	2.58	2.5	1.46	0.65
	C3-F8	2.25	2.64	1.91	2.06	1.49	1.68	2.05	2.7	1.39	1.11
	Fp1-Pz	2.03	2.69	1.59	2	2.09	1.94	1.15	2.26	1.02	1.67
	Fp2-T3	1.67	2.69	2.13	2.12	1.12	1.94	2.13	2.35	1.66	1.57

10 Phase

If you'd rather train 10 Phase pairs,

1. Click on the "10 Phase" radio button and click on the "Update" button.

NeuroField64 will show you all the Phase pairs within the set ZScore Std Dev range that are selected for training – up to 10 pairs. **Note:** Currently the Phase Pairs are the bottom 10.

Target Phase Sites											
	F7-T6	-0.09	-0.5	-2.4	-1.28	-0.93	-1.55	-5.94	-1.68	-1.32	-1.64
	F7-T4	-0.66	-0.37	-3.82	-1.48	-0.06	-3.5	-2.46	-1.42	-0.79	-2.92
	F8-T5	-0.05	-0.57	-0.86	-0.81	-1.27	-0.28	-3.75	-0.58	-1.66	-1.35
^	Fp1-T6	-0.22	-0.48	-1.01	-0.63	-0.53	-0.38	-3.34	-0.38	-1.31	-0.35
Most	C4-F7	-0.57	-0.05	-2.47	-0.67	0.45	3.24	-1.2	-0.7	0.05	-1.46
Severe	Fp2-T5	-0.11	-0.44	-0.73	-0.43	-0.02	-0.19	-3.13	-0.48	-0.36	-0.69
	F3-T4	-1.2	0.63	-3.07	-0.71	0.31	-2.37	-1.29	-0.48	-0.65	-0.19
	T4-T5	-0.02	0.26	-0.99	-1.53	-1.04	-0.12	-0.64	-2.97	-2.23	-0.03
	Fp2-T6	-0.65	-0.93	-1.02	-0.36	0.2	-0.25	-2.95	-0.27	-1.03	-0.12
	P4-F8	-0.97	-1.53	-0.42	-0.11	0.61	-0.02	-2.87	-0.25	-0.58	-1.05

5 Coherence 5 Phase

If you'd rather train 5 of each Coherence and Phase:

1. Click on the "5 Coherence5 Phase" radio button and click on the "Update" button.

NeuroField64 will show you all the Coherence pairs and all the Phase pairs within the set ZScore Std Dev range that are selected for training – up to 5 pairs each. **Note:** Currently the Phase Pairs are the bottom 5.

Target Coherence Sites		Delta (1-4)	Theta (4-8)	Alpha (8-12)	Alpha1 (8-10)	Alpha2 (10-12)	Beta (10-25)	Beta 1 (12-15)	Beta 2 (15-18)	Beta 3 (18-25)	High Beta (25-30)
^ Most Severe	F8-T3	1.43	3.15	3.6	2.26	0.7	2.22	2.75	3	1.51	0.95
	Fp1-P3	2.07	2.97	1.7	1.98	1.84	2.02	1.22	2.13	1.2	1.59
	Fp2-T5	1.94	2.9	1.3	1.47	1.45	1.78	0.68	1.13	1.24	1.04
	Fp2-P3	2.26	2.9	1.65	1.94	1.97	1.87	1.37	2.05	1.17	1.63
	Fp2-Pz	2.18	2.84	1.55	1.76	1.95	1.91	1.15	2.11	0.89	1.37
	F7-T6	0.63	1.31	-0.25	0.53	-0.12	-0.34	0.18	0.82	-0.06	-0.34
	F7-T4	0.49	2.74	2.02	2.01	0.66	1.36	2.58	2.5	1.46	0.65
	F8-T5	1.98	2.55	1.19	0.73	0.98	1.65	0.75	0.8	0.23	0
	Fp1-T6	1.77	1.91	-0.02	1.3	0.38	-0.04	0.21	1.5	0.63	0.1
	C4-F7	1.25	2.24	1.71	1.71	1.87	1.65	1.57	2.14	0.91	1.29
Target Phase Sites											
^ Most Severe	F8-T3	-0.48	-0.79	-0.66	-1.59	-0.88	-0.22	-2.18	-2.39	-1.33	-1.88
	Fp1-P3	0.48	-1.13	-0.48	-0.56	0.13	-0.25	-1.9	-0.77	0.1	-1.91
	Fp2-T5	-0.11	-0.44	-0.73	-0.43	-0.02	-0.19	-3.13	-0.48	-0.36	-0.69
	Fp2-P3	-0.22	-0.55	-0.67	-0.2	0.14	-0.17	-1.65	-0.36	0.17	-1.16
	Fp2-Pz	-0.31	-2.21	-0.76	-0.07	0.38	-0.31	-2.07	-0.49	0.14	-0.27
	F7-T6	-0.09	-0.5	-2.4	-1.28	-0.93	-1.55	-5.94	-1.68	-1.32	-1.64
	F7-T4	-0.66	-0.37	-3.82	-1.48	-0.06	-3.5	-2.46	-1.42	-0.79	-2.92
	F8-T5	-0.05	-0.57	-0.86	-0.81	-1.27	-0.28	-3.75	-0.58	-1.66	-1.35
	Fp1-T6	-0.22	-0.48	-1.01	-0.63	-0.53	-0.38	-3.34	-0.38	-1.31	-0.35
	C4-F7	-0.57	-0.05	-2.47	-0.67	0.45	-3.24	-1.2	-0.7	0.05	-1.46

You have now completed the process for importing Neuroguide Report Selections into NeuroField64 to automatically setup your EEG Thresholds for training. **Important!!!!!!** Keep this "EEG Live Threshold Adjust" window open, as you will need to use it to load your thresholds. You are ready to start the treatment, setup Zukor to begin training, and then load the Thresholds into the Live training.

Using the "Start Treatment" Tab – Z-Score Training

You are now ready to go! You should now have the patient setup as follows:

- tACS electrodes setup at Fz Cz
- QEEG Cap on with gel at Grnd, F3, F4, Fz, Cz, Pz
- NF Cap over QEEG Cap
- Coils setup in the "Clam Shell"
- Z3 & X3000 Units, 15 – 19 Protocols selected & Duration Override set to 30000
- Z-Score selected & Training time set to 64 seconds
- Thresholds setup either automatically or manually

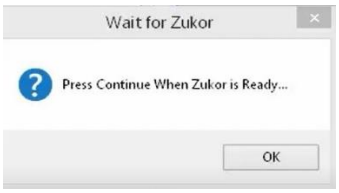
1. Click on the "Start Treatment" button.

When "Zukor Feedback" is selected as the feedback type in the "Neurofeedback Selection" tab, the "Zukor Launcher" will appear once you hit the "Start Treatment" button. You will need to create a "NeuroField Modality" before running your treatment. Eventually it will become part of the Zukor Installation process, but for now you will need to create an event using the settings as described below.
Note: Again, NeuroField is a re-seller of Zukor products. If you do not own this product and want to make a purchase, you can call or email the office.

To Start a Zukor Session:

1. Click on “Zukor Media Player” / “Click to Start” to launch the product. It will open to the Profile screen in a separate window. Also, notice that if everything is setup properly “Connected to NeuroField” will be displayed on the bottom of your screen.

2. Notice that in the NeuroField window, there will be an Alert, “Wait for Zukor”. Do not click “OK”.



Note: As soon as you click on the “Ok” button here, NeuroField will start a treatment. So, be sure not click on “Ok” until you have completed the following instructions to setup Zukor.

3. In Zukor “Profiles”, select an existing Profile or create and select a new one for your patient. The “Start New Session?” alert will appear.
4. At the “Do you want to start a new session?” prompt, click on the “Yes” button, and the “Modality” window will appear.

To Create and/or Select a Modality:

First Time – Create a Modality:

If this is the first time using the Zukor Media Player with NeuroField, you will need to create a "NeuroField Modality". If it is not your first time, proceed the "Subsequent Session - Select Modality" instructions below to select your existing modality. You will only need to create a NeuroField modality one time, and then it will always be available to select for subsequent sessions. Again, eventually the NeuroField Modality will be installed with the Zukor Player. To create a modality:

1. From the "Modality" window, click on the "Modality Editor" button and the "Modality Editor" window will appear.
2. Click on the "New" button.
3. In the "Name" field, name it "NeuroField". NeuroField will now be listed in the "Presets" field.
4. Click on the "Event 1" check box to enable it. **Note:** You will only need to setup one of the Events, "Event 1", when using "Zukor Feedback" with NeuroField. Leave all other "Events" inactive in the Zukor Player.

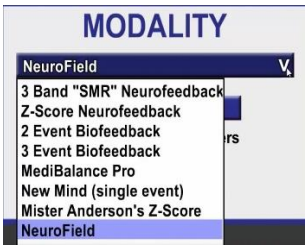
5. From the drop-down menu for each option, make the following selections:
    a. Effect = **Global**
    b. Source = **One**
    c. Feedback Type = **Proportional**
    d. True When = **Above Threshold**
6. Click on the "Save" button and the "X" to exit out of the Modality Editor. The "Modality" window will appear with "NeuroField" set as the Modality selected.

7. Click on the "OK" button. The Zukor "Main Menu" will appear showing that Zukor is connected to NeuroField and is using the NeuroField modality.

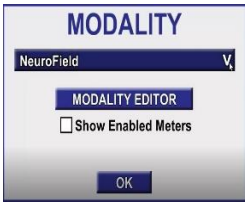
You are ready to select your Media.

Subsequent Session – Select a Modality:

Follow these instructions if you have already created your "NeuroField Modality".



1. In the “Modality” window, click on the down arrow in the drop-down menu. A list of previously created modalities will appear.
2. Select the “NeuroField” modality from the drop-down list and it will appear in the window.

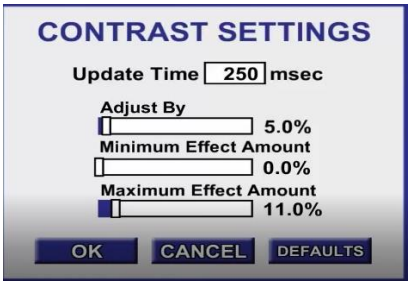


3. Click on the “OK” button. The Zukor “Main Menu” will appear showing that Zukor is connected to NeuroField and is using the NeuroField modality.

You are ready to select your Media.

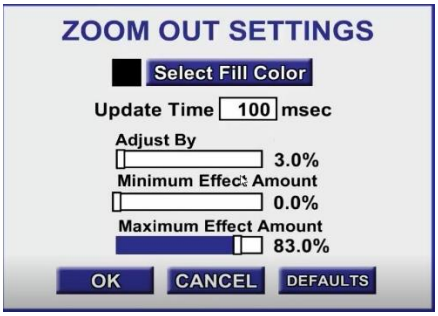
To Select Effects:

1. In the Zukor “Main Menu”, click on the “Effects” button and the “Effects” window will appear. Click on the Effects that you want to use. You can experiment with different effects as there are some great one. The ones commonly used are “Contrast” and “Zoom Out”.
2. Set “Contrast” as follows:



Adjust by: 5.0%, Min Effect Amount: 0.0%, and Max Effect: 11.0%

3. Set the “Zoom Out” as follows:

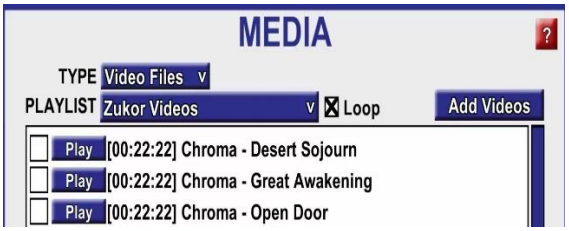


Update Time: 100 msec, Adjust by: 3.0%, Min Effect Amount: 0.0%, and Max Effect: 83.0%

To Select and Play Media in Zukor:

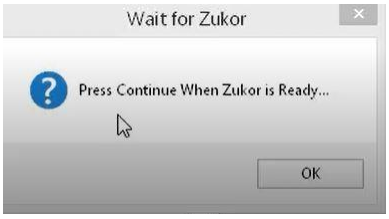
Zukor has a lot of options for media. You can choose Video files, Dvd etc. If you have more than one room, it's a good idea to setup one computer as a server, rip DVD's to the server and run DVD's with Zukor from the server into each training room.

1. In the Zukor "Main Menu", click on the "Media" button and the "Media" window will appear.



2. From here you can select:
    - Type of Media you want to use
    - Playlists if you have created one
    - Looping options to ensure the video runs for the duration of the session
    - Add Video to update the list of videos

   For this example, "Video Files" is selected and "Open Door" as the Video to play.
3. Click on the "Ok" button and in the Zukor "Main Menu" click on "Ready" and the Media will play in a separate window. **Note:** If need be, minimize the window so you can have it running side-by-side with NeuroField, or drag it over to a separate monitor for patient training.
4. Zukor is now "Ready"!



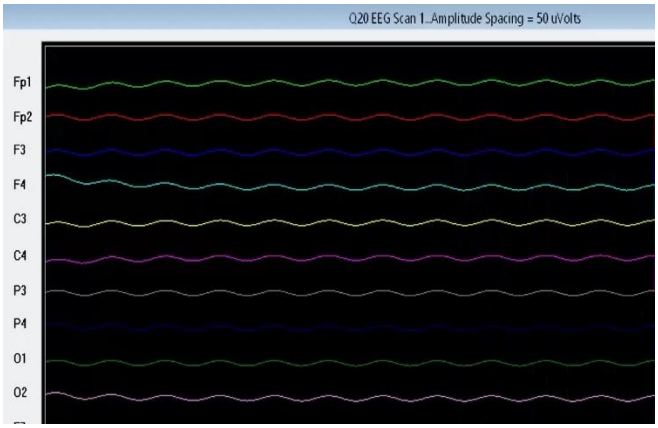
Click on the "OK" button in the "Wait for Zukor" alert, and the Treatment will begin.

Running a Treatment – Stim & Z-Score with Zukor

NeuroField sessions typically run anywhere between 20 – 30 minutes. The process is very taxing on the patient, and you want to make sure that you don't over stimulate them, especially on the first few sessions. Generally, the first few sessions will run for 20 minutes and then increase up to 25 – 30 minutes per session and patients will respond very nicely without getting too tired.

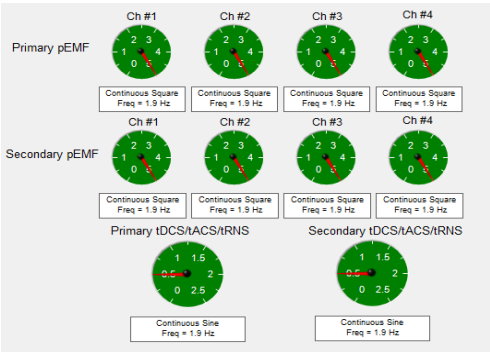
For each treatment, the patient will be given a combination of a Stim-Only (Magnetic and/or Current) and an EEG training per the specific settings you selected. Once a treatment has started, NeuroField will begin with an EEG training by taking a 30 second pre-test measurement (or whatever you set for the "Training Time" in the "Neurofeedback Selection" tab) to use as a baseline and then the Stim and EEG training will begin. For the example, the "Training Time" is set to 64 seconds.

During the pre-test measurement, the EEG will appear in color.



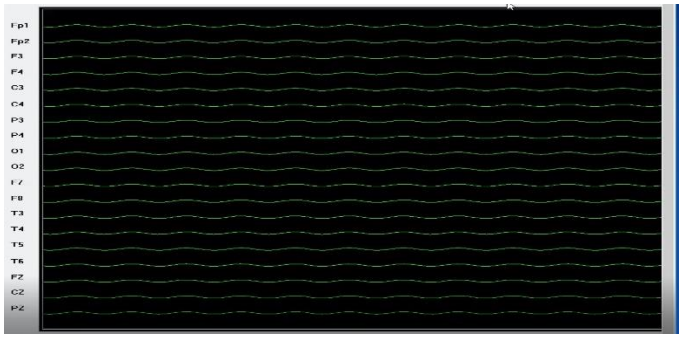
You will know that either an EEG Training or a Stim-Only is in progress by looking at "Start Treatment" tab in the "NeuroField Treatment Interface" window. When a Stim begins the:

- The Stimulation Gauges will activate.



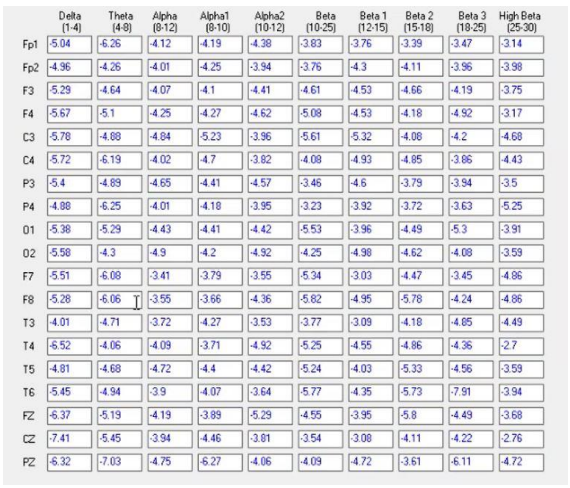
When an EEG training begins:

- "Scan Status" area of the screen will display the Scan Status
- EEG will stream across the EEG window



To Load EEG Thresholds:

	Delta (1-4)	Theta (4-8)	Alpha (8-12)	Alpha1 (8-10)	Alpha2 (10-12)	Beta (10-25)	Beta 1 (12-15)	Beta 2 (15-18)	Beta 3 (18-25)	High Beta (25-30)
Fp1	-0.48	0.56	-4.8	-5.1	-5.2	-6.04	-6.13	-5.85	-5.99	-5.64
Fp2	-0.54	0.54	-4.53	-4.36	-5.2	-4.63	-5.48	-4.62	-5.56	-4.9
F3	-0.58	0.44	-5	-6.52	-5.89	-8.86	-5.46	-7.13	-5.7	-5.71
F4	-0.67	0.44	-7.39	-5.01	-6.5	-5.03	-6.12	-5.05	-6.06	-5.7
C3	-0.54	0.52	-4.93	-3.97	-5.16	-5.71	-5.64	-4.66	-5.3	-4.36
C4	-1.68	0.48	-5.2	-4.05	-6.04	-5.43	-6.19	-5.6	-4.08	-4.73
P3	-0.51	0.59	-4.94	-3.97	-5.77	-5.43	-5.74	-5.91	-5.46	-5.15
P4	-0.82	0.53	-6.35	-4.4	-5.69	-4.81	-5.92	-5.61	-4.41	-5.46
O1	-1.06	0.6	-6.68	-4.34	-5.38	-8.57	-5.6	-4.43	-5.33	-5.41
O2	-1.17	0.63	-4.52	-3.95	-5.02	-4.88	-5.95	-5.39	-4.71	-4.35
F7	-1.01	0.74	-5.1	-4.03	-6.01	-5.27	-5.77	-5.05	-5.89	-3.9
F8	-0.56	0.76	-4.82	-6.82	-4.78	-5.43	-5.41	-5.81	-5.72	-4.36
T3	-0.69	0.91	-5.33	-3.89	-6.99	-4.92	-5.5	-5.72	-4.3	-4.61
T4	-0.46	1.08	-5.92	-3.64	-5.21	-8.73	-5.21	-5.39	-5.15	-5.86
T5	-0.6	0.74	-4.55	-5.41	-4.76	-5.18	-5.04	-6.36	-4.28	-4.38
T6	-1.17	0.82	-5.39	-4.32	-4.88	-5.9	-6.46	-5.75	-5.1	-5.11
FZ	-0.48	0.33	-5.4	-4.84	-5.81	-5.02	-5.36	-5.45	-5.18	-4.95
CZ	-0.51	0.5	-5.66	-4.48	-5.37	-6.2	-4.92	-5.54	-5.68	-5.07
PZ	-0.52	0.35	-5.78	-4.59	-4.68	-5.73	-5.49	-5.74	-6.8	-5.33



	Delta (1-4)	Theta (4-8)	Alpha (8-12)	Alpha1 (8-10)	Alpha2 (10-12)	Beta (10-25)	Beta 1 (12-15)	Beta 2 (15-18)	Beta 3 (18-25)	High Beta (25-30)
Fp1	-5.04	-6.26	-4.12	-4.19	-4.38	-3.83	-3.76	-3.39	-3.47	-3.14
Fp2	-4.96	-4.26	-4.01	-4.25	-3.94	-3.76	-4.3	-4.11	-3.96	-3.98
F3	-5.29	-4.64	-4.07	-4.1	-4.41	-4.61	-4.53	-4.66	-4.19	-3.75
F4	-5.67	-5.1	-4.25	-4.27	-4.62	-5.08	-4.53	-4.18	-4.92	-3.17
C3	-5.78	-4.88	-4.84	-5.23	-3.96	-5.61	-5.32	-4.08	-4.2	-4.68
C4	-5.72	-6.19	-4.02	-4.7	-3.82	-4.08	-4.93	-4.85	-3.86	-4.43
P3	-5.4	-4.89	-4.65	-4.41	-4.57	-3.46	-4.6	-3.79	-3.94	-3.5
P4	-4.88	-6.25	-4.01	-4.18	-3.95	-3.23	-3.92	-3.72	-3.63	-5.25
O1	-5.38	-5.29	-4.43	-4.41	-4.42	-5.53	-3.96	-4.49	-5.3	-3.91
O2	-5.58	-4.3	-4.9	-4.2	-4.92	-4.25	-4.98	-4.62	-4.08	-3.59
F7	-5.51	-6.08	-3.41	-3.79	-3.55	-5.34	-3.03	-4.47	-3.45	-4.86
F8	-5.28	-6.06	-3.55	-3.66	-4.36	-5.82	-4.95	-5.78	-4.24	-4.86
T3	-4.01	-4.71	-3.72	-4.27	-3.53	-3.77	-3.09	-4.18	-4.85	-4.49
T4	-5.52	-4.06	-4.09	-3.71	-4.92	-5.25	-4.55	-4.86	-4.36	-2.7
T5	-4.81	-4.68	-4.72	-4.4	-4.42	-5.24	-4.03	-5.33	-4.56	-3.59
T6	-5.45	-4.94	-3.9	-4.07	-3.64	-5.77	-4.35	-5.73	-7.91	-3.94
FZ	-5.37	-5.19	-4.19	-3.89	-5.29	-4.55	-3.95	-5.8	-4.49	-3.68
CZ	-7.41	-5.45	-3.94	-4.46	-3.81	-3.54	-3.08	-4.11	-4.22	-2.76
PZ	-6.32	-7.03	-4.75	-6.27	-4.06	-4.09	-4.72	-3.61	-6.11	-4.72

Manual Threshold Settings

Imported Threshold Settings

1. Notice the two screenshots above showing the “EEG Data Spectra” windows with the “Z-Score ZAP Data” tab and the “Real-Time ZAP Values” tab activated:
    - **Manual Threshold Settings** – If you set your thresholds manually, you will notice in the screenshot above on the left, that the thresholds are selected and running as part of the live training.
    - **Imported Threshold Settings** – If you imported your threshold selections from Neuroguide in a TDT file, you will notice in the screenshot above on the right, that the thresholds are not selected and are not running as part of the live training because you have to load them in.
2. If you manually set your thresholds, proceed to “Step 3”. If you imported your Thresholds settings from Neuroguide you will now need to load them in, so continue with the instructions here. To load your imported Threshold settings, do the following:
    a. Go to the “EEG Live Threshold Adjust” window. This window should still be open on your desktop. If not:
        i. Go to the main “NeuroField Treatment Interface” window
        ii. Click on the “Start Treatment” tab
        iii. Click on the “Adjust Threshold ” button and the window will appear.
    b. Make sure the “Z-Score Live Threshold from TDT file” and “ZScore Absolute Power” tabs are activated and click on the “Load All” button.

All the thresholds that were imported from Neuroguide are now loaded in grey. They are active thresholds in the NeuroField64 program and running in the live training.

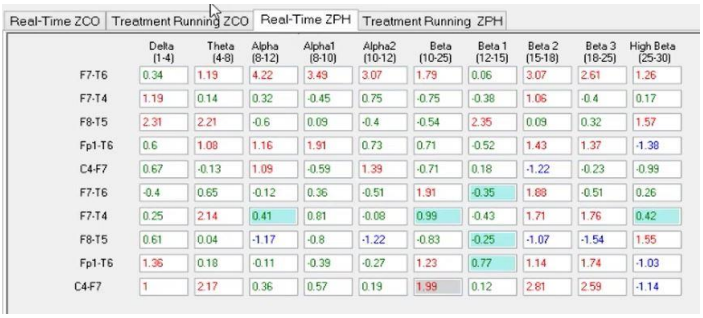
	Delta (1-4)	Theta (4-8)	Alpha (8-12)	Alpha1 (8-10)	Alpha2 (10-12)	Beta (10-25)	Beta 1 (12-15)	Beta 2 (15-18)	Beta 3 (18-25)	High Beta (25-30)
Fp1	-4.85	-4.85	-5.76	-4.1	-4.04	-3.91	-5.15	-4.12	-4.99	-4.01
Fp2	-5.31	-6.17	-5.09	-5.19	-5.81	-4.73	-3.97	-3.8	-5.66	-3.83
F3	-5.08	-7.16	-7.25	-4.71	-4.51	-6.27	-4.22	-4.06	-3.87	-4.47
F4	-5	-7.24	-5.32	-5.62	-4.38	-5.48	-3.34	-5.3	-4.24	-4.08
C3	-7.07	-5.13	-4.3	-5.37	-3.45	-5.81	-4.64	-3.52	-4.29	-3.98
C4	-6.14	-5.33	-4.68	-4.47	-4.48	-4.14	-6.2	-4.41	-4.19	-5.45
P3	-5.99	-5.02	-4.47	-4.35	-3.76	-3.53	-3.84	-3.64	-4.13	-3.66
P4	-5.46	-5.06	-4.85	-3.85	-4.41	-4.13	-3.5	-5.76	-3.69	-4.56
O1	-7.23	-5.5	-3.92	-3.83	-4.29	-4.24	-4.63	-3.83	-4.88	-3.31
O2	-7.52	-5.07	-4.02	-4.26	-3.88	-3.77	-3.88	-3.48	-4.32	-3.75
F7	-4.61	-4.61	-3.63	-3.64	-3.75	-3.24	-4.27	-4.3	-3.43	-3.12
F8	-4.9	-4.47	-6.11	-4.65	-4.03	-3.34	-3.93	-4	-4.02	-3.55
T3	-5.49	-4.67	-4.74	-3.73	-5.5	-5.63	-4.13	-3.9	-3.16	-2.76
T4	-4.57	-4.35	-3.66	-3.88	-3.8	-3.97	-4.42	-4.96	-3.74	-3.89
T5	-6.09	-6.4	-4.71	-4.15	-5.46	-4.98	-3.95	-3.67	-4.09	-3.61
T6	-6.86	-4.2	-3.91	-3.78	-4.96	-5.67	-4.18	-4.29	-5.29	-4.03
FZ	-5.46	-5.74	-7.3	-7.49	-4.97	-4.32	-6.12	-4.33	-3.82	-4.05
CZ	-6.96	-5.06	-4.6	-5.74	-4.13	-4.59	-3.48	-5.47	-3.59	-3.84
PZ	-6.29	-5.79	-4.88	-4.63	-5.22	-5.25	-4.58	-4.99	-3.73	-4.94

Note: Again, you can remove and add thresholds on-the-fly as needed by simply selecting or de-selecting the cell representing the specific site/frequency for training.

c. Repeat steps above for Coherence and Phase thresholds by clicking on the “Top 10 Coherence and Phase” and clicking on the “Load All Thresholds” button.

Real-Time ZCO | Treatment Running ZCO | Real-Time ZPH | Treatment Running ZPH

	Delta (1-4)	Theta (4-8)	Alpha (8-12)	Alpha1 (8-10)	Alpha2 (10-12)	Beta (10-25)	Beta 1 (12-15)	Beta 2 (15-18)	Beta 3 (18-25)	High Beta (25-30)
F7-T6	-2.04	0.03	-2.97	-2.09	0.6	-2.05	0.56	-1.98	0	-1.2
F7-T4	-0.53	-2.7	-2.02	-0.66	-0.45	-1.73	0.2	-2.44	-1.29	-1.93
F8-T5	-1.11	-1.36	-2.2	0.59	0.07	-1.11	0.71	-0.01	-1.34	-0.1
Fp1-T6	-1.05	-2.08	-0.98	-2.1	-1.02	-0.64	-0.46	0.27	1.62	-1.07
C4-F7	-1.27	-0.69	0.56	-0.17	0.36	-0.64	-1.91	-0.78	1.53	1.21
F7-T6	1.29	1.4	0.1	1.3	-0.42	-0.98	0.04	0.87	-1.18	-1.36
F7-T4	-1.61	0.73	0.65	0.43	1.11	-1.2	-1.56	-1.02	-0.57	0.99
F8-T5	-0.77	-0.5	0.97	0.61	-0.67	-0.37	-0.48	-1.51	-0.39	-1.08
Fp1-T6	0.82	-1.4	1.93	1.19	0.32	-0.85	0.79	1.21	-0.87	0.34
C4-F7	0.75	0.21	-0.13	0.66	-0.17	-1.37	-2.31	-1.13	-1.43	-1.51



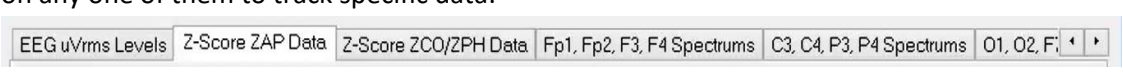
Real-Time ZCO | Treatment Running ZCO | Real-Time ZPH | Treatment Running ZPH

	Delta (1-4)	Theta (4-8)	Alpha (8-12)	Alpha1 (8-10)	Alpha2 (10-12)	Beta (10-25)	Beta 1 (12-15)	Beta 2 (15-18)	Beta 3 (18-25)	High Beta (25-30)
F7-T6	0.34	1.19	4.22	3.49	3.07	1.79	0.06	3.07	2.61	1.26
F7-T4	1.19	0.14	0.32	-0.45	0.75	-0.75	-0.38	1.06	-0.4	0.17
F8-T5	2.31	2.21	-0.6	0.09	-0.4	-0.54	2.35	0.09	0.32	1.57
Fp1-T6	0.6	1.08	1.16	1.91	0.73	0.71	-0.52	1.43	1.37	-1.38
C4-F7	0.67	-0.13	1.09	-0.59	1.39	-0.71	0.18	-1.22	-0.23	-0.99
F7-T6	-0.4	0.65	-0.12	0.36	-0.51	1.91	-0.35	1.88	-0.51	0.26
F7-T4	0.25	2.14	0.41	0.81	-0.08	0.99	-0.43	1.71	1.76	0.42
F8-T5	0.61	0.04	-1.17	-0.8	-1.22	-0.83	-0.25	-1.07	-1.54	1.55
Fp1-T6	1.36	0.18	-0.11	-0.39	-0.27	1.23	0.77	1.14	1.74	-1.03
C4-F7	1	2.17	0.36	0.57	0.19	1.99	0.12	2.81	2.59	-1.14

Note: To get rid of the “EEG Live Threshold” window, click on the “Minimize” button at the bottom of the screen. To bring it back click on the “Start Treatment” tab and then click on the “Adjust Threshold Settings” button.

To Track EEG Thresholds/Data:

1. Across the top of the “19 Channel EEG Power Spectrum” window there are a series of tabs. Click on any one of them to track specific data:



- EEG vMms Levels = EEG Amplitudes in microvolts

- Z-Score ZAP Data = Z-Score Absolute Power
- Z-Score ZCO/ZPH = Z-Score Coherence and Phase
- Specific Site Spectrums

Z-Score ZAP Data:

1. Click on the "Z-Score ZAP Data" tab.
2. Notice across the right side of the screen is the "Hit Status".
   Here you can see how many hits or the percentage of hits that are accumulating in real-time based on what you selected in the "Thresholds Setup" window.
3. Notice the "Percent Hits" field, "PCTL". Since for this example, "Percentage Hits" was selected to = 50%, in the Threshold Setup, if the field contains say, "78.9", this means that the treatment setup is too easy, as the patient can get a hit 79% of the time. We want to make it a little harder or the brain will get bored and not train as effectively.

Z-Score ZCOH/ZPH Data:

1. Click on the "Z-Score ZCOH/ZPH Data" tab. You can see all the data in real-time. Look at the Thresholds and see the Hits Status.

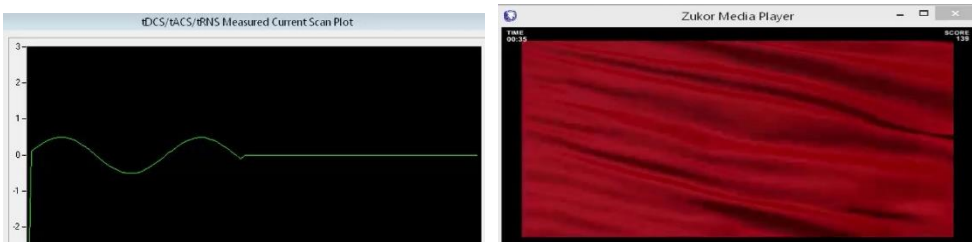
	Delta (1-4)	Theta (4-8)	Alpha (8-12)	Alpha1 (8-10)	Alpha2 (10-12)	Beta (10-25)	Beta 1 (12-15)	Beta 2 (15-18)	Beta 3 (18-25)	High Beta (25-30)
Fp1-Fp2	-0.97	-0.9	-0.61	-0.35	1.18	-0.94	-0.67	-0.36	1.76	-0.77
F7-F8	-1.01	-0.92	1.46	-0.66	3.42	-0.84	-0.27	-0.18	-0.02	1
Pair 3 ZPH	-1.01	-1.06	1.06	0.21	-0.38	-0.51	1.35	1.26	0.4	-0.7
Pair 4 ZPH	-1.11	-1.13	-0.59	-0.46	-0.96	-0.81	-1.04	-0.77	-1.17	-0.5
Pair 5 ZPH	-1.31	-1.22	-1.24	-0.85	-1.1	-1.29	-0.61	-0.59	0.05	1.26
Pair 6 ZPH	-1.2	-1.34	1.48	-1.1	0.07	-0.26	-0.6	-0.42	0.7	0.15
Pair 7 ZPH	-1.23	-1.38	-0.59	-1.27	-1.09	0.01	0.15	-0.78	-1.18	-1.29
Pair 8 ZPH	-1.36	-1.5	0.38	-0.06	-0.97	-0.62	0.61	0.01	0.45	0.1
Pair 9 ZPH	-1.37	-1.54	0.42	-0.71	-0.4	-1.31	-1.57	-0.84	0.62	0.13
Pair 10 ZPH	-1.22	-0.94	3.37	-0.14	1.43	-0.31	-0.6	0.58	0.43	2.66

You can look at both the Real-Time Coherence and the Real-Time Phase.

To Monitor Hits and Adjust the Percentage Threshold in Real-Time:

During an EEG session, it is important to monitor the Hits and adjust the threshold as needed to maintain a Hit accumulation of around 50% and maintain effective "Even" visual and/or audio feedback. You don't want the video and/or sound always full and loud, and you don't want the video and/or sound gone too long. Finding a threshold setting where the video and/or sound is increasing and decreasing in a smooth flow is optimal.

Monitoring Hits:



When a patient gets a Stim, Zukor is going to read 100% Hits and the Media Window will size to full screen as seen above. If using "Tone" as the only "Feedback Type" the sound will play at full volume.

When a patient is not getting a Stim and the EEG training is in progress, the Zukor Media Window should begin sizing larger and smaller in a smooth constant flow as depicted below.

When watching the Zukor Media Window to monitor the "Proportional" feedback:

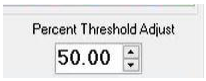
- Constant Full Video Window = Too easy / too many Hits
- Constant Tiny Video Window = Too hard / not enough Hits.

If using "Tone" as the only "Feedback Type" the sound should begin increasing and decreasing in volume in a smooth flow.

- Constant Full Sound = Too easy / too many Hits
- Constant No Sound = Too hard / not enough Hits

Adjusting the Threshold On-the-Fly:

If a session is too easy the brain will get bored and not train effectively. If the session is too hard the brain will struggle to get a reward and get tired or give up. In either case, you need to either raise or lower the threshold so the Hits accumulate to around 50 percent:



- **Too many hits/Session too easy**: Increase the threshold/raise the level
- **Not enough hits/Session too hard**: Decrease the threshold/lower the level

In the "NeuroField Treatment Interface" window is the "Percent Threshold Adjust" setting. Here you can change the Threshold on-the-fly/in real-time during the session. The default setting is 50 percent.

1. While the EEG session is underway, click inside the "Percent Threshold Adjust" field and type the number you want, or click on the up or down arrows.

2. Notice the Zukor Media Window and continue adjusting until you arrive at a setting where the Zukor Media Window starts responding with feedback and begins resizing in a smooth flow. This signifies that you have reached an effective challenge level. If using “Tone” as the only feedback, continue adjusting until you hear the sound increasing and decreasing in a smooth flow.

To Monitor Z-Score ZAP Data:

	Delta (1-4)	Theta (4-8)	Alpha (8-12)	Alpha1 (8-10)	Alpha2 (10-12)	Beta (10-25)	Beta 1 (12-15)	Beta 2 (15-18)	Beta 3 (18-25)	High Beta (25-30)
Fp1	-0.5	0.54	-7.13	-4.21	-5.64	-6.4	-5.76	-5.73	-4.85	-4.07
Fp2	-0.52	0.54	-6.07	-5.2	-6.75	-4.68	-5.42	-4.85	-6.57	-4.09
F3	-0.58	0.45	-6.68	-4.21	-6.55	-5.27	-5.6	-7.41	-5.23	-4.17
F4	-0.66	0.43	-5.55	-4.37	-5.55	-6.55	-7.08	-5.46	-5.53	-8.49
C3	-0.54	0.51	-4.9	-4.7	-5.11	-5.58	-5.11	-5.04	-4.83	-4.83
C4	-1.67	0.49	-5.47	-4.23	-5.19	-5.64	-5.06	-5.52	-6.18	-5.38
P3	-0.51	0.59	-4.52	-3.49	-4.54	-5.13	-5.24	-5.65	-6.19	-3.72
P4	-0.82	0.55	-6.39	-4.14	-4.57	-5.33	-6.81	-5.36	-5.17	-4.15
O1	-1.06	0.6	-5.21	-4.57	-5.84	-5.43	-6.38	-4.87	-5.01	-4.24

In addition to monitoring the Zukor feedback, you can also monitor the real-time Z-Score data in NeuroField. As the EEG session progresses, you can watch the Z-Score values for both Absolute Power, Coherence and Phase. The data will present with a specific color code as follows:

- Green = Hit.
- Blue = Too Low
- Red = Too High

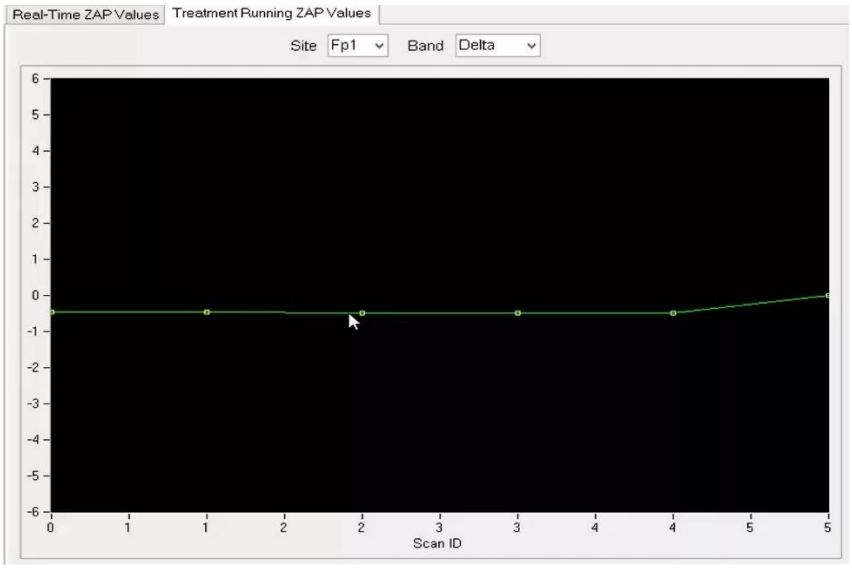
Real-Time ZAP Values:

Here you can view all sites and frequency bands you are currently training in simple data format. To do this:

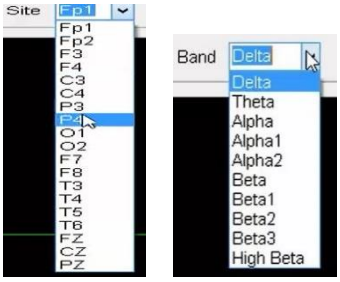
1. Click on the “Z-Score ZAP Data” tab and the “Real-Time ZAP Values” sub-tab if they aren’t already selected and you will see the Z-Score Absolute Power data for each site and frequency band. The data will be color coded as described above.

Running ZAP Values:

Here you can view all the sites and frequency bands you are running plotted by stim cycle or “Scan ID”.



1. Click on the "Treatment Running ZAP Values" tab and you will see the data values plotted by stim cycle.
2. Notice the X Axis contains the Sim Cycle or "Scan ID" and the Y Axis contains the data values.
3. Click on the "Site" drop-down and/or the "Band" drop-down menus.

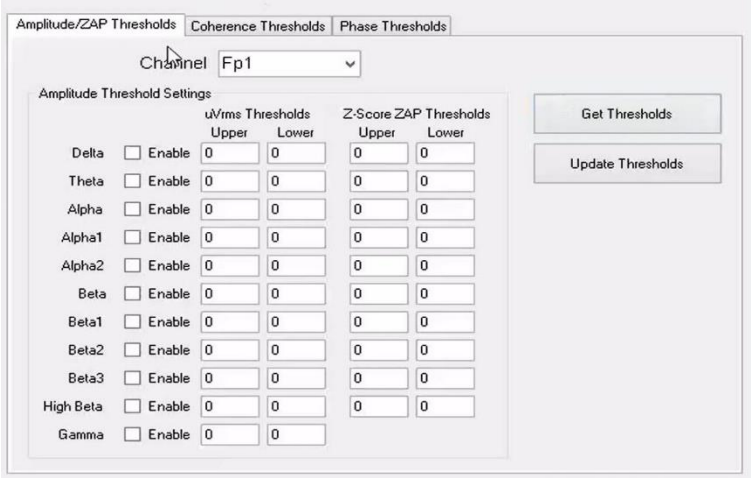


This allows you to look at any other site or frequency band and the plotted data will change accordingly. This gives you additional and very valuable information on the status of training.

To Adjust EEG Thresholds in Real-Time:

If you are monitoring the Z-Score data and notice that a specific site, say Fp1 is continually in range, you may want to try another site for the training to be more effective. The NeuroField program allows you to adjust the EEG Thresholds on-the-fly, just like you can with the Percentage Thresholds as described earlier. To do this:

1. From the "NeuroField Treatment Interface" window, click on the "Adjust Threshold Settings" button. The "Threshold Adjust" window will appear.



Here you will see Amplitude ZAP Thresholds as well as Coherence and Phase Thresholds.

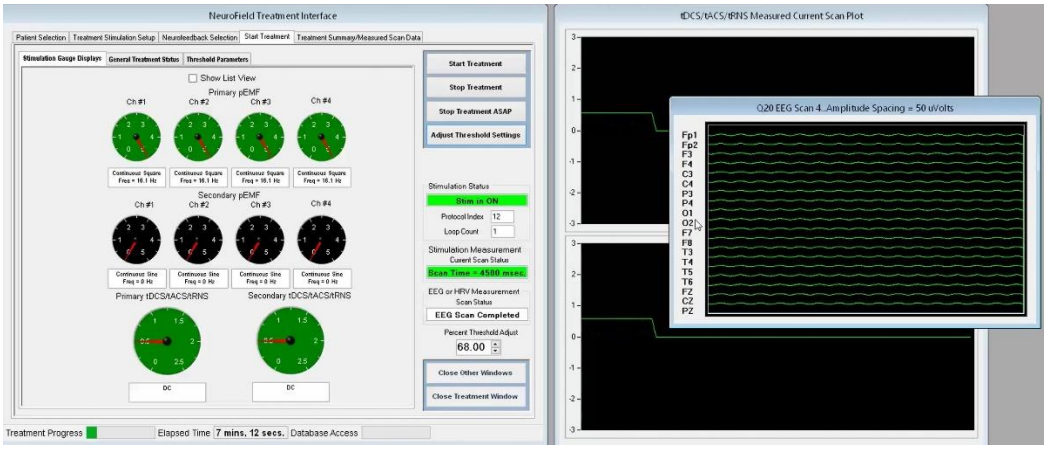
1. From the "Channel" drop-down menu, pick the channel that you want. For this example, pick "Fp1".
2. Enable the Frequency that you want. Here we enabled "Beta3".

3. Enter the Zscore Thresholds for the frequency band you want to train. You can set Amplitude (uVms) Thresholds or Zscore Thresholds. For this example, set Zscore (ZAP) to Upper = "1" and Lower "-1". **Note:** If you use this feature to adjust Thresholds on-the-fly, the program will not save them. If you are happy with your settings once the session is over, you will need to:
    a. Go to the "Neurfeedback Selections" tab
    b. Click on the "Get Patients Settings' button
    c. Change and Save the Thresholds in the "Threshold Setup" window.
4. Click on the "Close" button.

To Adjust EEG Window:

The EEG window can be moved around on-the-fly and adjusted to different sizes to fit best fit on your monitor. It can also zoomed in an out as needed.

1. Grab the corner of the window, drag it down to a size you like, and move it to a location you'd like. **Note:** A Stim is in progress in the screenshot below.



2. Double-click on the EEG window to Zoom it. Every time you click on the window it will zoom in and get closer and closer, and eventually after several clicks it will automatically zoom out again.

To Show List:

List View provides you with written content for what each session is doing. You can look at:

- Gauges Tab - Stims (Magnetic & Current) that were given
- Threshold Status Tab – What Stims have completed and what is actively in progress
- Threshold Parameters Tab – What Thresholds were set and trained to for each EEG Channel

1. Click on the “Show List View” check box and the text content will appear.
2. Click on either the “Threshold Status” or “Threshold Parameters” tab and scroll through the list to view additional information.

To Stop the Treatment:

Again, there are two ways to stop the treatment:

- **Stop Treatment** Button– Saves all the data before quitting
- **Stop ASAP** Button – Does not save the data before quitting

1. Make sure the “Gauge Display” window is open and click on the appropriate “Stop” button. The Program will complete the post-stim scan and the “History” window will appear.
2. Exit Zukor Program and you are ready to view the History.

To View History:

Once you are done with a session you can look at the History to see:

- Treatment Summary - What it is you completed during the treatment
- Z-Score Thresholds - What Thresholds you used
- Measured Amplitude Data – What data values were returned.

Running a Subsequent Treatment – Stim & Z-Score with Zukor

NeuroField is designed to not only save your Patient’s treatment setup, but to also access their settings and quickly start a subsequent session.

To Run a Subsequent Session – Stim & Z-Score with Zukor:

Once you have setup and saved a Patient's settings for their initial session, if you want to give the same Stim and EEG treatment again, the following are steps to easily get your patient up and running:

1. Launch NeuroField.
2. "Patient Selection" tab - Pick your Patient from the list and click on "Select Patient and Continue" button.
3. "Treatment Stimulation Setup" tab – Click on the "Get Patient Stim Setup" button (all the Stim settings will populate in the appropriate fields) and click on the "Save Stim Setup and Continue" button
4. "Treatment Selection" tab – Click on the "Get Patient Settings" button (all the EEG settings will populate in the appropriate fields) and click on the "Save Patient Settings and Continue" button.
5. "Threshold Setup" window – All previous set Thresholds will appear in the appropriate fields. Click on the "Save Patient Threshold Settings and Continue" button.
6. "Start Treatment" tab – Click on the "Start Treatment" button.
7. Zukor Window – Click on "Click to Start" button.
8. "Wait for Zukor" prompt – Click on "Ok" and you are up and running!

VIII. NeuroField EEG: Amplitude Training

With the NeuroField System Software you can not only run EEG Neurofeedback Z-Score sessions with your patient, but you can run straight Amplitude training as well. You can use both "Zukor" and or "Tone" as your feedback as described previously for Z-Score Training, and you can also use the Auto-Thresholding and Auto-Adjust features.

The instructions for NeuroField EEG Amplitude training begin at the "Neurofeedback Selections" tab. To continue you must have already:

- Selected your Patient
- Setup the Stim Units and Coil/Electrode sites
- Selected your Protocol
- Set the mA and/or Volts
- Set the number of Loops
- Saved your Stim Setup

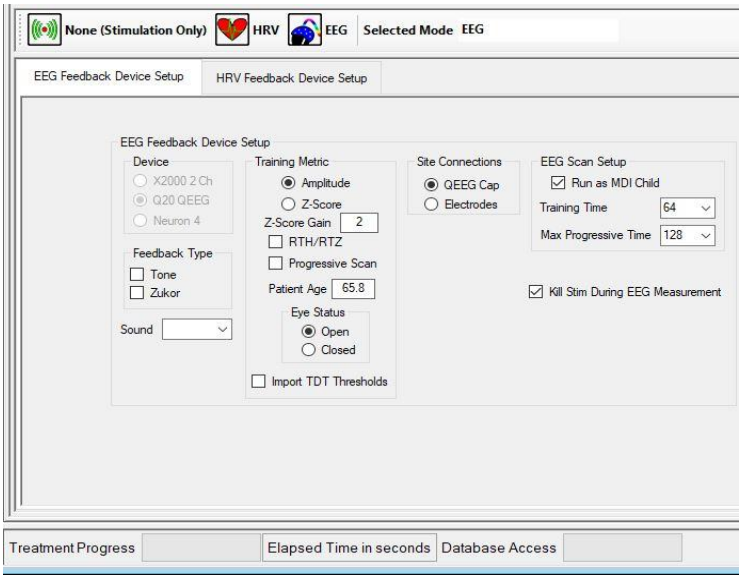
For help with any of the above tasks refer to "Section 4 - I. Software Run-Thru: Magnetic and Current Stim-Only" earlier in this manual. There you will find instructions on how to move through the preceding tabs and accomplish each of these tasks. The following will instruct you how to setup and run a NeuroField EEG Treatment –Amplitude Training.

Overview

Once you launch the program and have selected your CANBus, your Patient, enabled your Stim units and made your Protocol selections, you are ready to run Amplitude training. You will simply do the following: **Note:** Instructions for each step are detailed below.

- Go to the "Neurofeedback Selections" tab, and Setup for EEG Neurofeedback, using:
  - Tone
  - Amplitude Training with RTH
  - QEEG Cap
  - 64 Training Time
- Enable the Frequency Bands you want to target and tell the system whether you want to Up Train or Down Train
- Copy that Setup to All Bands if desired and Save the Setup.
- Set the Amplitude Levels for all Channels/Frequencies by using the Auto-Adjust Feature
- Establish the Offset level above or below the Current Amplitude to set the Threshold level.
- Monitor the levels and feedback and make adjustments on-the-fly as needed.

Using the Neurofeedback Selections Tab – Amplitude Training



To Select the Training Mode and EEG Device:

1. In the "Training Mode" area of the screen, select "EEG" because for this procedure you are going to do EEG Amplitude Neurofeedback. The entire area at the bottom of the screen will become activated.
2. In the "EEG Device Setup" area of the screen, notice the unit you are using will be auto-selected. In this case "Q20" is selected.

To Select the Feedback Type:

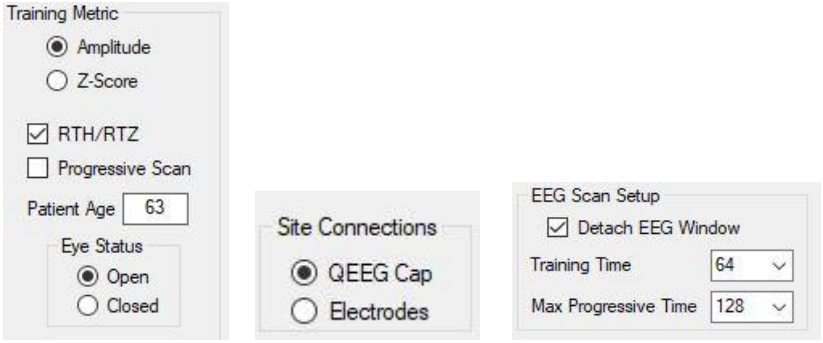
You can use a Tone, the Zukor Media feedback, or both. **Note:** The instructions here will use a Tone. For detailed instructions on using NeuroField EEG Neurofeedback with Zukor, go to "NeuroField EEG – Z-Score Neurofeedback" for details.

Tone:

1. In the "Feedback Type" area of the screen, click on the "Tone" check box.
2. From the "Sound" drop-down box, select the tone you would like. A sample sound will play so you know what it is. For this example, select "ZHit".

To Select the Training Metrics:

Here is where you will tell the system to run Amplitude training rather than Z-Score Training by leaving the "Training Metric" set to the default "Amplitude" **Note:** When running a Amplitude training, you can use RTH/RTZ and monitor "Hits" just like you would with Z-Scores. For this example, do the following.



1. Make sure "Amplitude" radio button is selected.
2. Click on the "RTH/RTZ" checkbox.
3. Leave "Eye Status" set to "Open".
4. Leave "Site Connection" set to "QEEG Cap".
5. Leave the "Training Time" set to "64" seconds.
6. Select "Save and Continue" and the "Threshold Setup" window will appear.

Set Threshold Settings

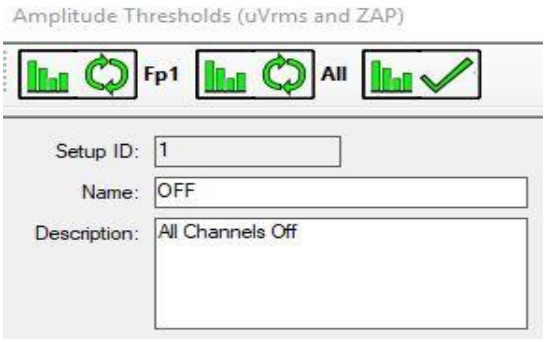
To Get Previous Settings

1. "Treatment Selection" tab – Click on the "Get Patient Settings" button (all the EEG settings will populate in the appropriate fields) and click on the "Save Patient Settings and Continue" button.
2. "Threshold Setup" window – All previous set Thresholds will appear in the appropriate fields. Click on the "Save Patient Threshold Settings and Continue" button.

Clear Previous Thresholds:

If you don't have saved settings to "Get", the settings will still be selected from your previous session. It is a good idea to clear the previous patient's settings by doing the following:

1. Click on the first drop-down menu at “Fp1” and select “Off”.
2. Click on the “View” button next to the “Fp1 OFF” button and the “Amplitude Threshold” window will appear.



3. Click on the 

“Update All” button and the system will internally reset all thresholds to “Off”, however they will not be displayed on your screen yet.
4. Click on the  “Close Threshold” button. All 19 channels Amplitude Thresholds will be now be reset to “Off” on your screen.

You now have a clean slate to select existing thresholds or create you own thresholds.

To Select Existing Thresholds:

1. Click on the first drop-down menu at “Fp1” and select the Frequency you want to down train.
2. Click on the “View” button next to the frequency you selected and the “Amplitude Threshold” window will appear.
3. Set the type of training you want to perform i.e. to Up Train or Down Train.
4. Click on the 

“Update All” button and the system will internally reset all thresholds to the setup you just selected, however they will not be reset on your screen yet.

5. Click on the  "Close Threshold" button. All 19 channels Amplitude Thresholds will be now be reset to the designated Setup on your screen.
6. Click on the "Verify Thresholds and Click Next – 'Next'" button.

The software moves to the blue tab, "Logic Mode Return to Treatment.

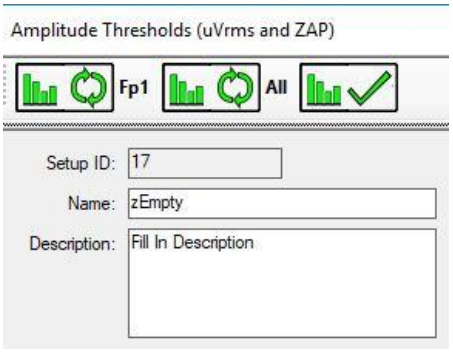
7. Leave the "Percent Hits Required" set to "50" and click on "Save Settings and Return to Treatment Setup" button.

The "Start Treatment" tab will appear.

To Create Custom Thresholds

For this example, you will create a "Theta Down" threshold for Amplitude training.

1. Click on the first drop-down menu at "Fp1" and select zEmpty option.
2. Click on the "View" button next to the "Fp1 zEmpty" button and the "Amplitude Threshold" window will appear.



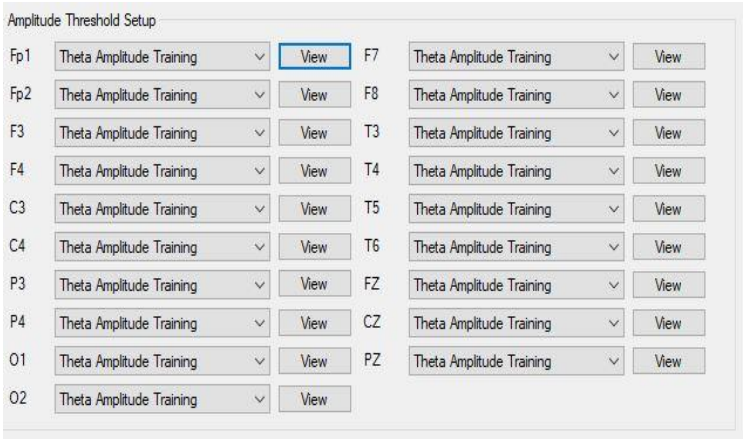
Notice that the:

- "Name" and "Description" fields are empty
- Frequencies are all disabled
- Amplitude Training radio buttons are all set to the default
- The "ZAP Limits" are all set to "0"

3. In the "Name:" field enter a name for your Threshold i.e. "Theta Amplitude Training" and in the "Description" field enter a description.

4. Enable the Theta frequency and in the "Amplitude Training" column make sure the radio button is set to "Down". For this example, you are creating a Theta Down setup, but the software gives you the ability to enable all frequencies and train all the way up to Gamma.
   Note: Since you are training Amplitude you only need to tell the system to Down or Up train a specific frequency. Leave the "ZAP Limits" set to "0". These are only set when you have selected "Z-scores" as your training mode, and the system will train the Z-score Absolute Power (ZAP) within the set limits.
5. Click on the 

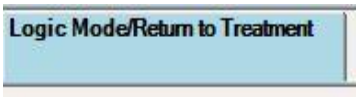
"Update All" button and the system will internally reset all thresholds to your custom Threshold, however they will not be reset on your screen yet.
6. Click on the  "Close Threshold" button. All 19 channels Amplitude Thresholds will be now be reset to "Theta Amplitude Training" on your screen.



Your Threshold Setup is now saved in the software and you can load it up for future sessions without having to create a new one each time.

7. Click on the "Verify Thresholds and Click Next – 'Next'" button.

The software moves to the blue tab, "Logic Mode Return to Treatment.



8. Leave the "Percent Hits Required" set to "50" and click on "Save Settings and Return to Treatment Setup" button. **Note:** Since you are training Amplitude, you will not need to set Coherence and Phase Thresholds.

The "Start Treatment" tab will appear, and you are ready to go. **Note:** If you selected "Zukor" as your "Feedback Type" you will need to setup Zukor before proceeding. See Section 4 – "VII. NeuroField EEG Z-Score Neurofeedback + Zukor" for details.

9. Click on the "Start Treatment" tab and the session will start.

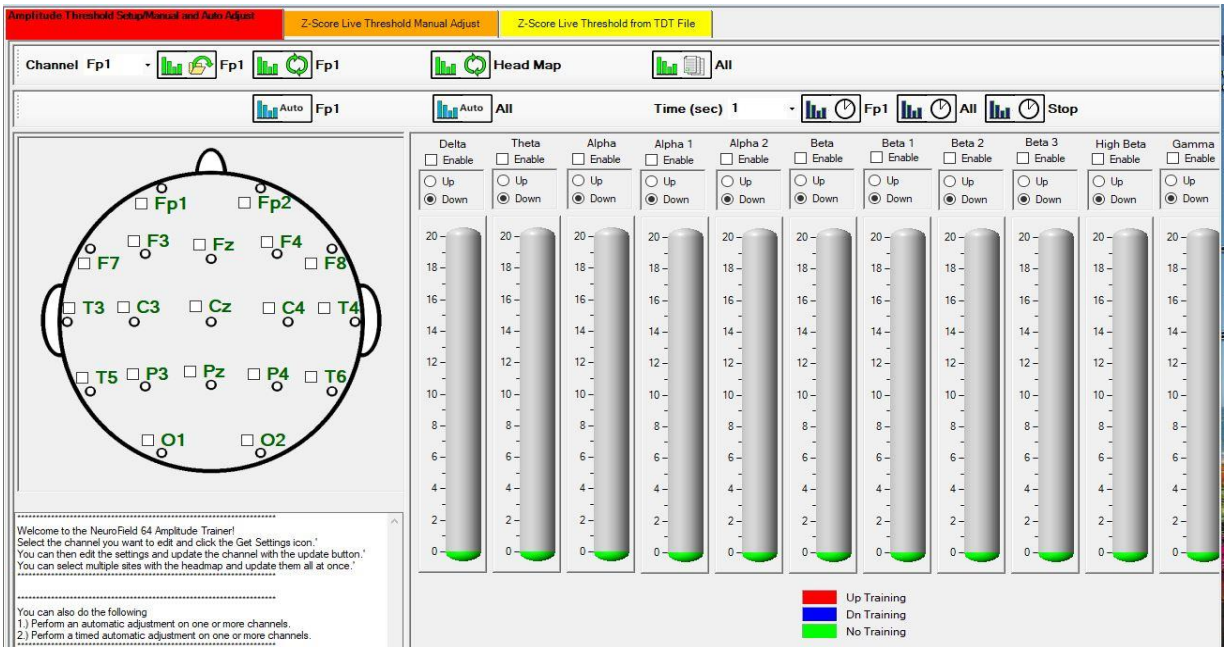
Setting Threshold Levels

Once you have started your treatment, you are now Amplitude training however you will now need to set the Threshold Levels.

To Set Threshold Levels:

1. From the "Start Treatment" screen, click on "Adjust Threshold Settings" button.

The "EEG Live Threshold Adjust" window will open.



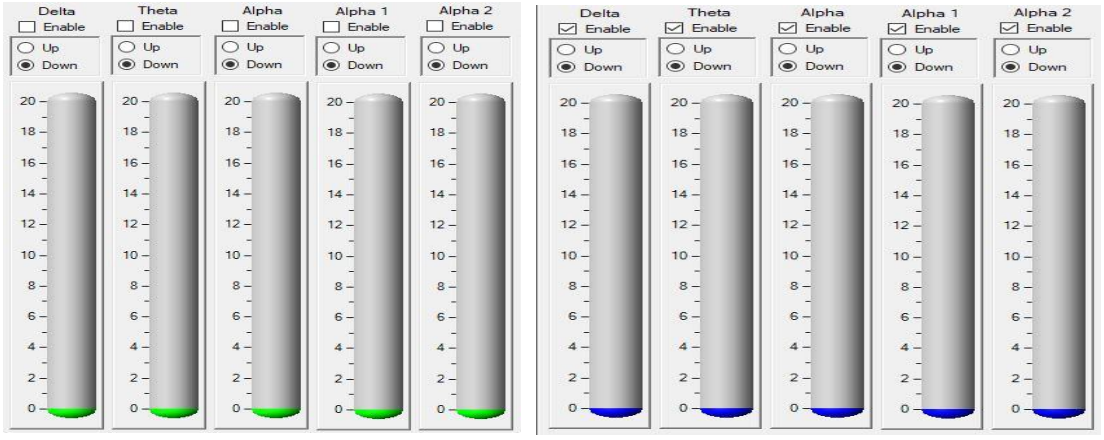
Here you can set and/or change the Threshold Levels several different ways. You can set them by either using the:

- "Channel" drop-down menu in the upper left corner
- Selecting the Sites by clicking on the Head Map
- "All" button to set all channels with 1 click
- "Auto All" Threshold button

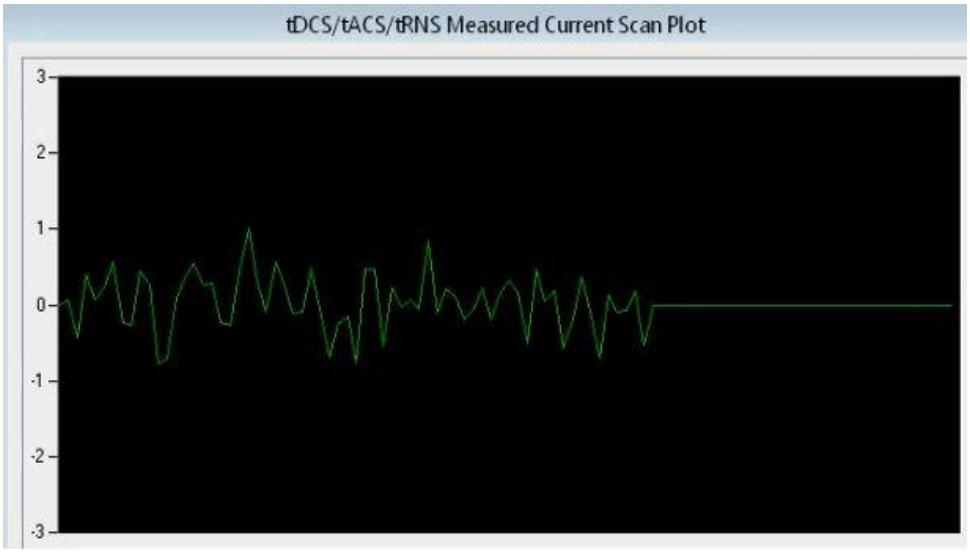
No matter what method you use, if you have selected to "Down" train in "Threshold Setup", it will grab the numbers you are generating at that moment and that will be your baseline. If you are Down Training, it will set the levels slightly below wherever you are currently training to at that moment. If you are Up Training, it will set the levels slightly above to encourage the site to move up.

About % Hits: Here you are simply setting the levels, but the "Percent Hits Required" is set to hit "50 %" so all channels would have to hit 50% of the time to get a reward. You could set it to 75% and you would have to get 75% of all channels within range to get a reward, so it would make it harder. If you set it to 0% you would get 100% reward all the time. In this condition you are not being trained.

2. Notice when the specific sites/frequencies are "Enabled" for the desired bands from Delta through Gamma, the color coding will change to Blue = Down Training or Red = Up Training. For this example, we are down training. **Note:** Screenshot below only shows Delta – Alpha 2 but continue to enable all bands.



3. Notice in a separate window, that while you are selecting the Thresholds, a Stim is being given.



To use the "Copy All"

Delta (1-4)	Theta (4-8)	Alpha (8-12)	Alpha1 (8-10)	Alpha2 (10-12)	Beta (10-25)	Beta 1 (12-15)	Beta 2 (15-18)	Beta 3 (18-25)	High Beta (25-30)	Gamma (30-60)
7.3	12	23.5	14.4	22.6	18.9	10.7	5.1	5.5	2.2	5.1

Once Fp1 is set for each Frequency Band, you can now copy these levels for all 10/20 sites.

1. Click on the "All" button.

Delta (1-4)	Theta (4-8)	Alpha (8-12)	Alpha1 (8-10)	Alpha2 (10-12)	Beta (10-25)	Beta 1 (12-15)	Beta 2 (15-18)	Beta 3 (18-25)	High Beta (25-30)	Gamma (30-60)
7.2	11.9	23.5	14.3	22.7	19	10.8	5.2	5.6	2.3	5.2
7.2	11.9	23.9	14.4	22.9	18.9	10.4	4.9	5.4	2.1	5
7.2	11.9	23.9	14.4	22.9	18.9	10.4	4.9	5.4	2.1	5
7.2	11.9	23.9	14.4	22.9	18.9	10.5	5	5.4	2.1	5
7.2	11.9	23.9	14.4	22.9	18.9	10.5	5.2	5.4	2.1	5
7.1	11.9	23.8	14.3	22.8	18.8	10.4	4.9	5.4	2.1	5
7.2	12	24	14.4	22.9	18.9	10.5	5	5.4	2.1	5
7.2	11.9	23.9	14.4	22.8	18.9	10.4	4.9	5.4	2.1	5
7.2	12	24	14.5	23	19	10.5	5	5.5	2.2	5.1
7.2	12	24	14.4	22.9	18.9	10.5	5	5.4	2.1	5
7.1	11.8	23.7	14.3	22.7	18.8	10.4	4.9	5.4	2.1	5
7.2	12	24	14.4	22.9	18.9	10.5	5	5.5	2.1	5
7.2	12	24	14.4	22.9	18.9	10.5	5	5.5	2.1	5
7.1	11.9	23.9	14.4	22.8	18.8	10.4	4.9	5.4	2.1	5
7.1	11.9	23.9	14.4	22.8	18.8	10.4	4.9	5.4	2.1	5
7.2	12	24	14.5	23	19	10.5	5	5.5	2.2	5.1
7.2	11.9	23.9	14.4	22.9	18.9	10.4	4.9	5.4	2.1	5
7.2	12	24	14.4	22.9	18.9	10.5	4.9	5.4	2.1	5
7.2	11.9	23.9	14.4	22.8	18.9	10.4	4.9	5.4	2.1	5

You have now enabled each Frequency Band for all 19 Channels of EEG .

Setting up Amplitude Levels – Auto-Adjust

The Auto-Adjust feature is a "Fine-Tuning" tool that allows you to find the current Amplitude level of the Patient and set the Threshold right under it or right above it.

To Use the Auto-Adjust Feature:

1. Click on the “Auto All” button.

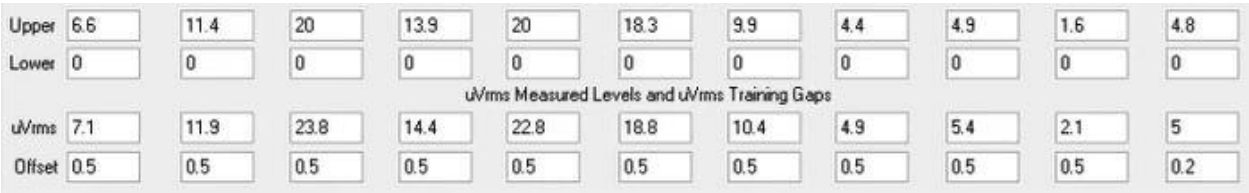
   This will automatically set the Amplitude levels for the Patient’s running EEG.
2. Notice the sliders. NeuroField has read the Amplitude values, set the sliders accordingly. This tells you where the real-time amplitudes are for your client for any given frequency.
3. Click on the “Auto All” button again, and the NeuroField will set the Amplitude levels again. **Note:** This is a fixed value. It won’t change unless you click on the “Auto All” button again. You can Auto-Adjust for all the Channels or for just one channel.

Setting up Threshold Levels – Timed Auto-Adjust & Offset

Using the “Timed-Auto-Adjust” feature will tell NeuroField to read and adjust the Amplitude levels every x number of seconds, (based on the number of seconds that you set). The Threshold can then be set above or below the new Amplitude reading based whatever number is entered as the Offset.

To Use the Timed Auto-Adjust and Offset Features:

1. In the “Timed Auto-Adjust” area of the “Live Threshold Adjust” screen, set the “Time” in seconds for NeuroField to make an adjustment. For this example, leave it set to “1 Sec”.
2. Wait for a Stim to finish if one is running, and when the EEG starts streaming again you will see the Amplitude values start to slowly change.
3. Notice the “uVMS Thresholds” and “uVms Measured Levels and uVMS Training Gaps” area of the screen. The “uVms” numbers tells you what the current Amplitude reading is, so you can decide how much above or below it you want to place your Threshold bar.



   The rows in this table function as follows:

   - **Upper** = Upper Threshold Setting based on the “Offset”. (See below for details)
   - **Lower** = Lower Threshold setting = Set value of 0.
   - **uVms** = The current Amplitude = 7.1 from the Auto-Adjust reading.
   - **Offset** = The Threshold setting, or how far above or below the current amplitude reading you want to it to be. For this example, leave it set at “0.5.”

To Down-Train or Up-Train:

If you want to decrease a specific Frequency Band or All Frequency Bands you would leave NeuroField set to “Down”. If you want to increase a specific Frequency Band or All Frequency Bands, you would select the “Up” radio button. Making this change will affect how the Offset functions as follows:

Down-Training:

- If you select “Down” to down-train, NeuroField will **subtract** the “Offset” from the current Amplitude reading of say, “7.1” to set the Threshold **below that value** to train the frequencies down. For this example, NeuroField took the Amplitude Reading of “7.1” (last Amplitude value) and subtracted the offset of 0.5. This sets the Threshold at 6.6 which is just below the Amplitude reading to train it down.

Up-Training:

- If you select “Up” to up-train, NeuroField will **add** the “Offset” to the current Amplitude reading of say, “7.1” to set the Threshold **above that value** to train the frequencies up. So, an Offset of 0.5 with an Amplitude reading of 7.1 will set the Threshold at 7. 6 which is just above the Amplitude reading to train it up.

To Change the Offset:

While a treatment is underway you can change the Offset to whatever you want. To Do this:

1. In the “Offset” field change the “0.5” to another number. For this example, change it to “2” for the Delta and Theta Frequency bands.

2. Click on the “Auto-Adjust All” button.

With “Down” selected and a new Offset of 2:

b. NeuroField is going to reset the “Upper” Threshold number by **subtracting** the new Offset value. In the screenshot above, you can see that an Amplitude uVms value of “7.1” with an Offset of “2” will now set the Threshold to 5.1 which will be 2mV below the current Amplitude reading and will train down Delta and Theta.

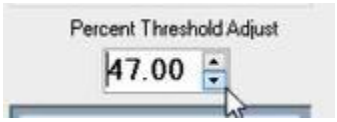
With “Up” selected and a new Offset of 2:

c. NeuroField is going to reset the “Upper” Threshold number by **adding** the new Offset value. Using the same numbers in the screenshot above, an Amplitude of “7.1” with an Offset of “2” will now set the Threshold to “9.1” which will be 2mV above the current Amplitude reading and will train up Delta and Theta.

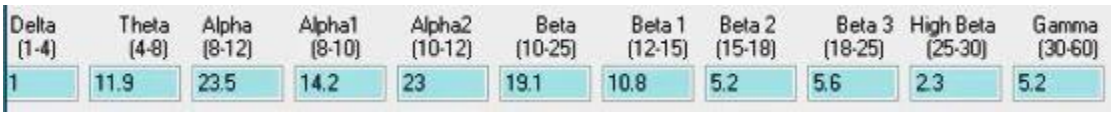
Changing the Threshold On-the-Fly

If NeuroField is not registering a “Hit” or the feedback tone is either sounding too often or not often enough, you can adjust the “Percentage” on-the-fly. To do this:

1. On the “Start Treatment” screen, go to the “Percent Threshold Adjust” area of the window.



2. Adjust the Percentage down if not getting enough Hits (or up is getting too many) until the feedback is smooth and consistent.
3. Click on “Auto-Adjust” again to update the Amplitude readings.
4. You can also manually lower the slider levels until the threshold comes into the range where you start generating a Hit. For this example, you can see that “Gamma” at “Fp1” is running at approximately “5.2”. Click on “Stop Auto-Adjust”



5. Manually move the sliders to set a level where running data starts lighting up green signifying a Hit.

6. Click on the “Copy to All” button and it will apply the new levels to all 19 Channels, and NeuroField will start to send out the “Tone” feedback.

IX. The Protocol Creation Wizard

With the NeuroField System Software you can not only pick from an expansive list of stored protocols, you can create a custom protocol from scratch using the Protocol Creation Wizard.

Note: The following assumes you have launched the NeuroField software and you have a good working knowledge of the tabular interface. If you need detailed instructions on software navigation refer to the "Software Run-Thru: Magnetic and Current Stim-Only" earlier in this Section.

Overview

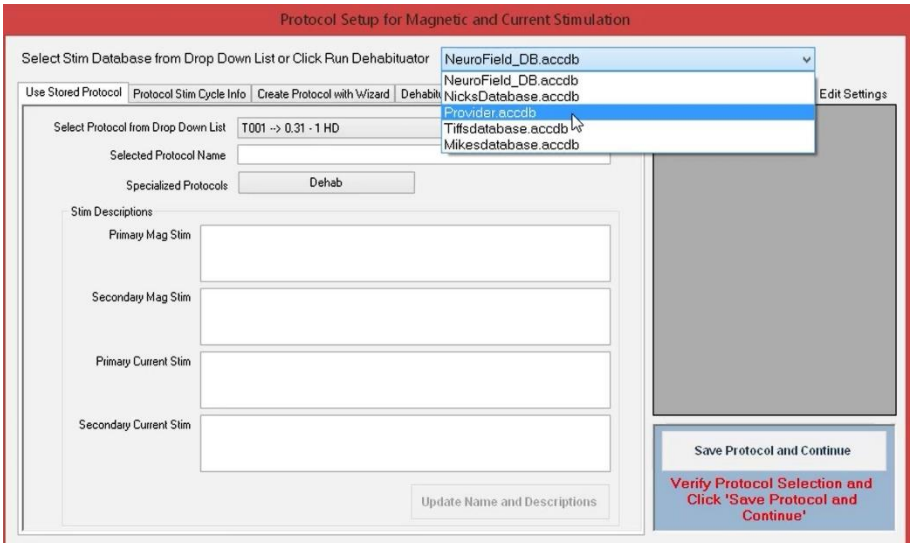
With the Protocol Wizard, you can build single Hz protocols, ramping protocols, and/or rocking protocols. Once you launch the program and select your CANBus, the "Patient Selection" tab will automatically become activated and the Patient screen will appear. To run the Protocol Creation Wizard, you will simply do the following:

- Go to the "Treatment Stimulation" tab; Click on the "Select Treatment Protocol" button.
- Select the Provider Database.
- Open a new "Empty Table".
- Enter Name and Descriptions and Update new table to the Database/Protocol list.
- Select and Load your new Protocol.
- Build in instructions for what you want the protocol to do.
- Save and Run your Protocol.

Creating a Single Hz Protocol

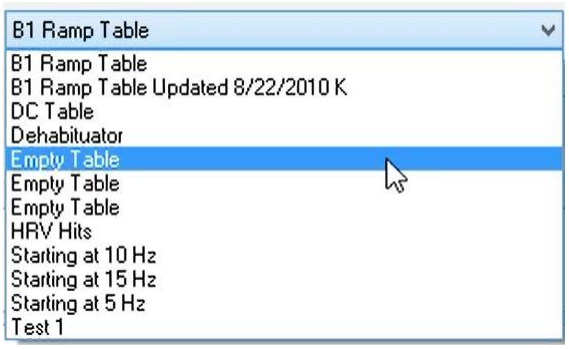
To Open, Name and Load a New Protocol:

1. In the "Treatment Stimulation Setup" tab click on the "Select Treatment Protocol" button. The "Protocol Setup for Magnetic and Current Stimulation" screen will appear with the "Used Stored Protocol" tab active by default.

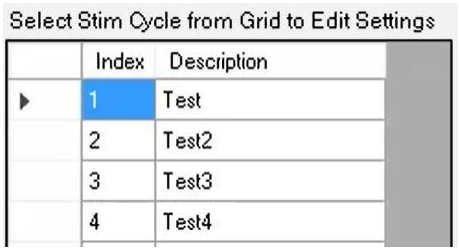


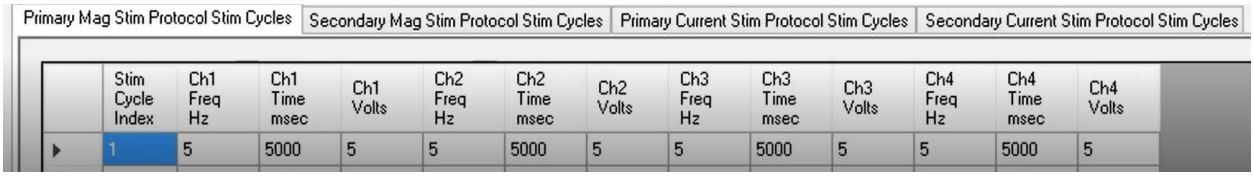
2. Go to the "Select Stim Database" at the top of the screen and from drop-down List, select the "Provider" database.

3. Go to the 'Select Protocol" area of the screen and from the drop-down menu, select "Empty Table".



4. Click on the "Load" button.





The "Stim Cycle Grid "and "Magnetic and Current Stim Cycle" table will appear with "Empty Table" as the name of the protocol and standard descriptions for each unit is displayed.

5. Enter the name of the Protocol using the naming convention of:
    a. T001→ 528 Hz HD
6. Enter the "Descriptions" for each unit as follows:
    a. **Primary Mag Stim** = pEMF 582 Hz, 5000msec, 5v
    b. **Secondary Mag Stim** = **Note:** Same as above so copy and paste it into this field
    c. **Primary Current Stim** = tACS 582 Hz, 1000msec, 0.5mA
    d. **Secondary Current Stim** = **Note:** Same as above so copy and paste it into this field
7. Click on the "Update Name and Description" button to update the name and descriptions for your protocol.

Note: This is important because as of now, NeuroField thinks you only have open an empty table. Your new Protocol will now be added to the Protocol List in the drop-down menu.

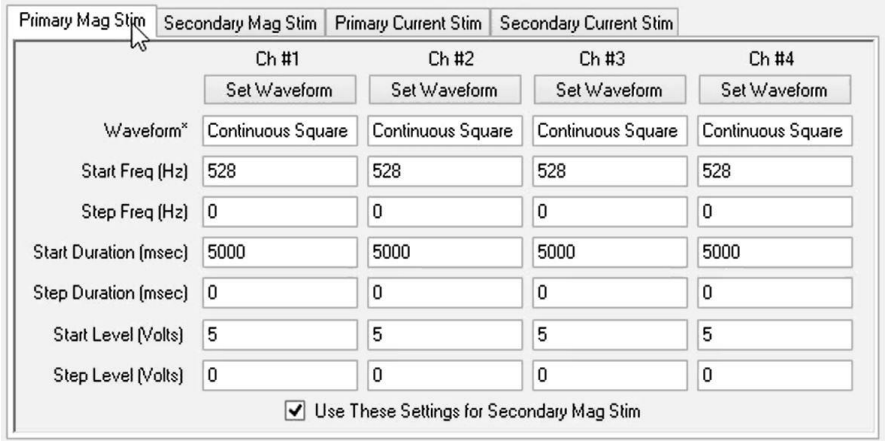
8. Notice the "Select Protocol" area of the screen, and you will see that the very first protocol in the drop-down menu appears in this field.
9. Scroll down the list until you see your new protocol and click on it to select it.

10. Click on the “Load” button to load your new protocol. **Important!!!!!** Do not forget to “Load” your new Protocol. This replaces the “Empty Table” and sets you up with your custom-named table where you can enter data points.
11. Click on the “Create Protocol with Wizard” tab. Here you can build in the instructions for what you want your new protocol to do.

To Build a Single Hz Protocol – Primary Magnetic Stim:

Notice the Field names listed on the left side of the “Create Protocol with Wizard” screen. These are the options you have for building your protocol. You can build in specific instructions for 1 – 4 Stimulation units both Magnetic and/or Current for the Primary and Secondary units. For this example, we will build a 528 Hz HD protocol. To do this:

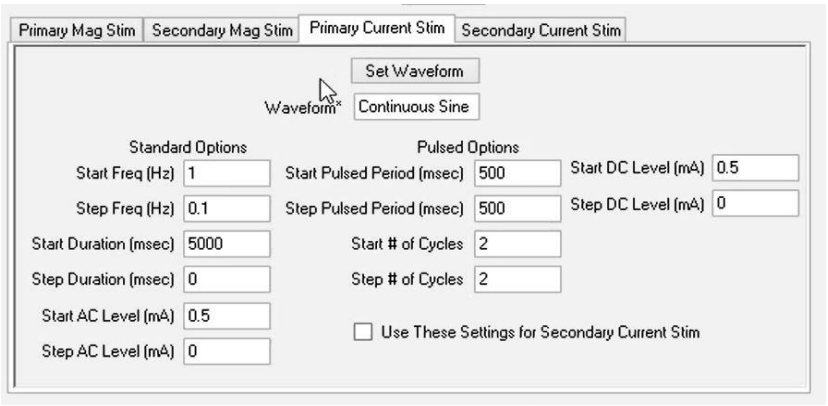
1. Notice that the ‘Waveform” is set to “Continuous Square” by default. Select the “Waveform” you want to use. For this example, select “Continuous Square”.
1. Notice that the “Primary Mag Stim” tab is set by default, so each column, “Ch #1 – Ch#4, represents each one of the Magnetic Stim Coils. Here you will make data entries for your X3000 or X2000 units.
2. In the “Start Frequency (Hz)” area of the Wizard, enter the frequency for each Channel (Coil) you want to give. For this example, enter “528” for all for 4 Coils.
3. Notice the “Step Frequency (Hz)” is set to a default of “0.1”. This means that your protocol would give 528 Hz and then go up by one step to 528.1 and then to 528.2 etc. to give a set of frequencies within the 528 Hz range. However, if you do not want to step through the frequency range, set the “Step Frequency” to “0”. For this example, you do not want to Step, so set all 4 Channels to “O”.
4. Go to the “Start Duration (msec)” area of the Wizard. Here you will set the duration of the stim. Remember 1000 msec = 1 second, 500 msec – ½ second. NeuroField defaults to 5000 msec or 5 seconds. You can change this number to whatever you want. For this example, leave it set to ”5000”.
5. Notice the “Step Duration (msec)” field. This determines how long you want each step to be. This can be a positive or negative number to increase or decrease the duration. You can make this 1000 msec or 100 msec. For this example, leave it set to “0”.
6. In the “Start Level (Volts)” you can choose a number between 0 – 5 volts for Magnetic Stim. **Note:** 5 Volts is the max intensity for a pEMF or Magnetic stim. For this example, set the Volts to “5”.
7. You can also Step the Volts and make the protocol “Ramp up” in intensity. Notice the “Step Level (Volts)” area of the Wizard. The default is set to “O”. For this example, leave it at “0”.
8. Check the “Use These Settings for Secondary Mag Stim” box. This will copy all the settings from the Primary Mag unit you just setup to your Secondary Mag unit. Note: You can have 2 pEMF units doing 2 separate things if you’d like. However, it is most common to have both the Primary and Secondary units doing the same thing.
9. Your screen should now look like this:



Note: You do not need to enter "Secondary Mag Stim" data since by checking the "Use These Settings for Secondary Mag Stim" box, you have copied all your Primary Mag Stim entries to the Secondary Stim unit. You are now ready to add data points for you Current Stim units.

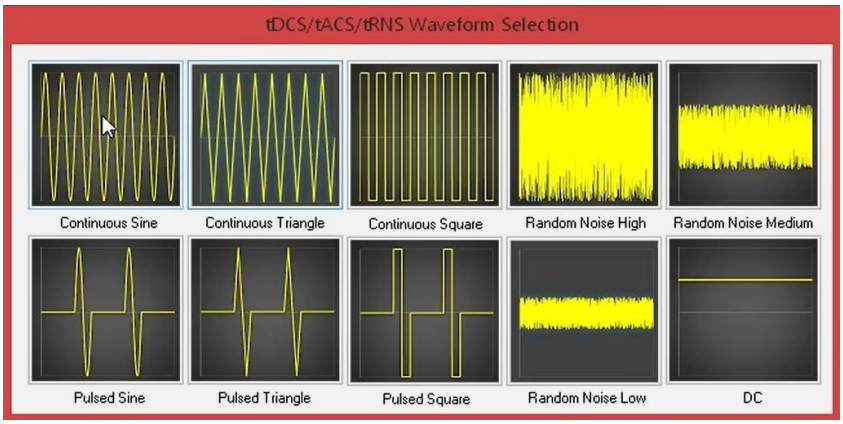
To Build a Single Hz Protocol – Primary Current Stim:

1. Click on the "Primary Current Stim" tab to activate the data entry points for a Current stim.



You are now ready to make selections for the tACS/tDCS/tRNS unit.

2. Notice that the waveform is set to "Continuous Sine" by default. Click on the "Set Waveform" button and the "tDCS/tACS/tRNS Waveform Selection" screen appear.



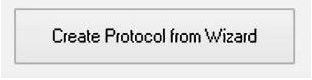
Here you can select the waveform you want to use. You can select "Random Noise" or "DC" if you want to add a punch or shake/up the brain while giving a magnetic stim. You can select any

other options as well. For this example, leave it set to “Continuous Sine” which is the most traditional selection when making protocols.

3. Fill in the “Standard Options” area of the wizard. To do this you will fill in the following: **Note:** See Primary Mag Stim for a bit more detailed instructions, and note too that when applicable you will match these Current Stim settings with the Magnetic Stim settings you entered previously.
    a. Start Freq (Hz) = 528
    b. Step Freq (Hz) = 0 or no steps
    c. Start Duration (msec) = 5000 or 5 seconds to match the Primary Mag Stim.
    d. Step Duration (msec) = 0
    e. Start AC Level (mA) = 0.5 is a good natural starting place that isn’t too intense for your patient. Here you could start really low and easy at .01 or really hit hard with the max at 2.5 volts.
4. Notice the “Pulsed Options” area of the screen. You can use these settings if you want to add in Gamma bursts. **Note:** If you set “Pulsed” options, you would have to choose a Pulsed waveform, such as Pulsed Sine or Pulsed Square et. For this example we will not use the “Pulsed Options”.
5. Notice the “Start DC Levels” and “Stop DC Levels” area of the screen. If you had set your waveform to DC, the AC levels would inactivate and the DC Levels would become active for data entry.

For this example, keep the waveform at “Continuous Sine” so “AC Levels” are active.

6. Click on the “Use These Settings for Secondary Current Stim” box and your settings will be copied over to the Secondary unit if you have one hooked up.
7. Notice the area of the screen showing “Number of Stim Cycles”. This is important for doing a stepping protocol say you want to go from 1 – 4 Hz or 4 – 8 Hz. For this example, leave the Stim Cycles set at the default of “10” since we are giving just 1 frequency.
8. Click on the “Create Protocol from Wizard” button.



9. Answer “Yes” to the “Custom Delete” alert message. The “Stim Cycles” area at the bottom of the screen will populate with your data.

	Stim Cycle Index	Waveform Code	Freq Hz	Time msec	AC mAmps	Pulsed Mode Period (msec)	Pulsed Mode Num Cycles	DC mAmps
▶	1	6	528	5000	0.5	500	2	0.5
	2	6	528	5000	0.5	1000	4	0.5
	3	6	528	5000	0.5	1500	6	0.5
	4	6	528	5000	0.5	2000	8	0.5

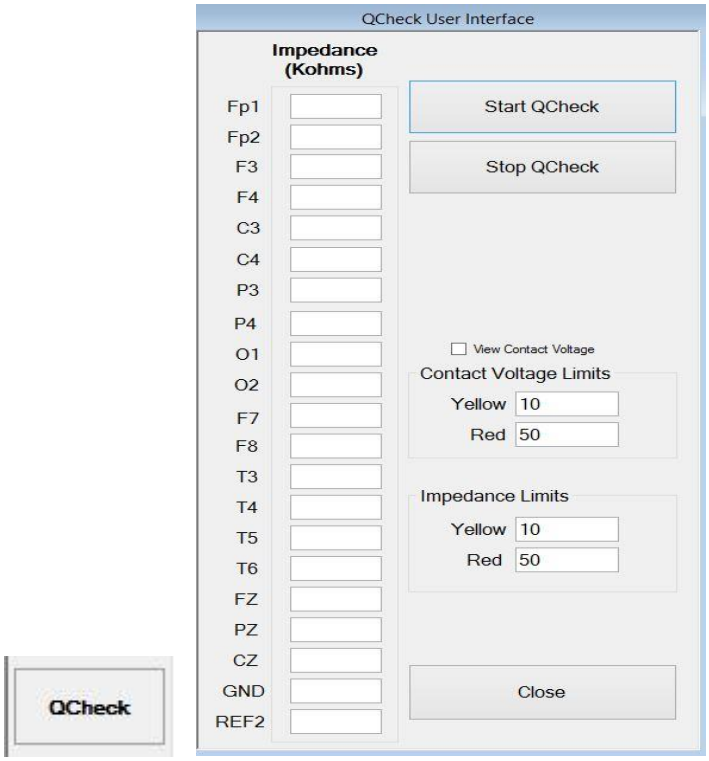
10. Click on the “Save Protocol and Continue” button. You have just completed building a single Hz Protocol!

X. The Q Check

To Use the Q Check

After you have connected an approved cap to the QCheck device and your unit is powered on, you can now check impedances.

1. Click on the “QCheck” button from the NeuroField Main Program Side Bar and the “NeuroField Impedance Meter” screen will appear.



2. Click on the “Start QCheck” button and the software will read the Impedance in Kohms by default for each site/electrode on the cap. The impedance will tell you the level of noise between the electrode and the scalp.
3. Notice the color for each site. Check your REF and GND first because if those numbers are off the rest of the numbers don’t matter. If the REF is high give a squeeze on each ear and the numbers should drop. When those numbers drop the rest of the numbers should drop as well. The color coding is as follows:
    - Green = < 10 ohms
    - Yellow = < 15 ohms
    - Red = > 15 ohms

    Ideally, you want all the impedance numbers to be similar, usually an impedance at 10 ohms or less (especially for research). It is a good rule of thumb to get as many sites to turn green as possible within reason. Make adjustments as needed for a given electrode until you are happy with the reading.
4. When the numbers/colors are to your liking, click on the “Stop QCheck” button. You are now assured that you have good connections at all the required 10/20 sites. **Note**: If your cap starts

to age and the wires start to come loose, what is going to happen is the you will see an impedance that tends to go up and down. If this is the case proceed to Step 5 below.

5. Notice that there is another option for displaying QCheck data
   You can click on the "View Contact Voltage" checkbox to switch the measurement values to read in mVolts rather than Kohms. This will tell you the contact potential levels for each electrode and is useful in two ways:
   - If you have completed a standard Impedance Check in Kohms and you were having trouble correcting a specific site, say you get a value that is very high i.e. over 30 impedance, you could not turn a level from red to yellow or green, or your impedance levels continue to go up and down. Looking at the contact voltage levels will show you whether there's a number that is deviant from the group, signifying that there may be a bad or broken wire in that particular electrode. If this is the case you can send the cap in to have it refurbished.
     or
   - You may simply be interested looking at the contact potential levels for each electrode as well as contact impedance levels. Checking this box will give you a quick reading to determine if the numbers are relatively the same or if one is beginning to deviate. You can keep your eye on that electrode as it may be going bad.
6. Click on the "Close" button when done.
7. Flip the power switch on side of your QCheck device to the "Off" position. **Important!!!!!:** This is a crucial step! You want to be careful not to run-down the battery inside the QCheck unit.

   You are now ready to acquire data/run a session.

SECTION 5

Combo Techniques

I. NeuroField Stim / Neuroguide Combo

In addition to blending Stimulation Technology with NeuroField EEG as discussed in the previous Section, NeuroField is also incredibly effective when used in combination with 19 Channel LORETA Z-Score from within the Neuroguide software program.

When running the NeuroField/Neuroguide Combo Techniques it is highly recommended to use the LORETA Progress Report Application (LPR) to sort and view your client's data while building Neuroguide protocols using the Symptom Checklist (SCL). For more information and/or purchase the software go to http://www.nftools.org. The LPR program aids you in making treatment decisions by allowing you to sort the data in a way that effectively incorporates the best of what Neuroguide has to offer. When you fuse data from the LPR together with data generated by the Neuroguide SCL, you can easily match the client's presenting symptoms with their most deregulated networks and get a targeted protocol for training.

System Requirements

To run the NeuroField / Neuroguide Combo, you must have as a minimum requirement: **Note:** NeuroField supports up to 4 units as the maximum.

- 1 Stim unit (either Magnetic or Current)
  and
- 1 Q20 /Q21

You also must have 2 CANBus USB adapters that are each connected to an empty USB slot on your computer with:

- 1 CANBus directed only to the Q20
- 1 CANBus directed only to the Stim Unit

For the Combo to work, it requires two independent connections to operate both the Q20 in Neuroguide and the Stim unit in NeuroField. If you simply attach only 1 CANBus and Daisy Chain everything together, it is not going to work, as the Q20 must be physically hooked up and communicating with NeuroField from a separate CANBus adapters/drivers than the Stim units. **Note:** If this procedure is not setup correctly you will get errors. Refer to "Section 3: Hardware Setup" and go to "V. Hardware Setup – 2 CANBus" for detailed instructions on how to correctly setup your system to run the "Combo", especially if using more than 1 stim unit.

Important!!!! When running NeuroField Stim / Neuroguide Combo, it is Important to startup the software programs and connect to the hardware in the correct order:

- First you will launch the Neuroguide software and be sure it has established a connection with the Q20 using one CANBus adapter/driver.
- Next you will launch the NeuroField software and establish a connection with the Stim unit(s) using the other CANBus adapter/driver.

The following instructions will then set you up to run as an example, a NeuroField Stim Session along with an Operant Conditioning session in Neuroguide using the Default Mode Network to target the Rich Club. **Note:** These instructions assume a working knowledge of both the NeuroField and Neuroguide software. For NeuroField details refer to the previous Section in this manual. For Neuroguide details, refer to the Neuroguide manual.

Setting up Neuroguide and Building a Fusion Protocol

Again, it is important when using a Combo session to setup the Neuroguide software first before running NeuroField. So, if the NeuroField software is running, close it before proceeding to launch Neuroguide and connect to the Q20 amplifier. Once you have established a connection with the Q20, the following instructions will guide you through the process of setting up a Fusion protocol using the SCL Default Mode Network in Neuroguide and the client data from the LORETA Progress Report (LPR www.Nftools.org.) The instructions below will then guide you to setup your "Session Rounds" to run a Combo session. **Note:** A working knowledge of all software is assumed.

To Connect Neuroguide with the Q20

1. With both a Magnetic and/or Current Stim unit and the Q20 powered up and the NeuroField application closed, launch the Neuroguide software program and go to "Collection" and then "Hardware Selection". Make sure that "NeuroField Q20" is selected as the amplifier to use.
2. Go to Collection "Setup and Monitor" and Neuroguide will now look for the Q20 amplifier and establish a connection with it.

Note: When you see the Neuroguide "Collection Parameters" screen it means that Neuroguide is communicating correctly with the Q20 amplifier and has taken control of one of the drivers on one of the CANBus. If you do not see this screen, and cannot make a connection go to "Hardware Setup – 2 CANBus" earlier in this manual and follow instructions in "NeuroField/Neuroguide Combo Setup" to ensure your system is setup properly.

3. Click on the "OK" button once you have selected your parameters.
4. Choose your Patient and the Eye Condition and click on "OK".

To Setup a Fusion Protocol

1. Go to "Collection" and choose "Neurofeedback/LORETA Neurofeedback" as your training module, and setup your protocol. The instructions below will use the "LORETA Neurofeedback" option and assume a working knowledge of both Neuroguide and the LPR. For details please see the Neuroguide Manual and/or www.neftools.org. To setup your protocol:
    a. Click on "Symptom Checklist" button and grab the SCL and load it.
    b. Go to the Networks tab and select a Network, for this example select the Default Mode Network. Look at the Brodmann Areas Neuroguide grabbed to train. If you have purchased the LPR compare the selections to the FFT data and the JTFA data, specifically Coherence in the "Rich Club". **Note:** This assumes a working knowledge of Network Hubs and the "Rich Club". Refer to "Software Overview" in the previous Section for details. In this case for example, make a mental note that Neuroguide grabbed:
        - BMA's 10 and 11, both Rich Club areas, but BMA 9 is noted in the LPR and is not in the SCL selection.
        - BMA's 19, 29, 30, 31 which are good matches to Rich Club selections
        - JTFA Coherence BMA's looking for Front BMA 9, 10 and Back BMA 19, inclusions.
    c. Click on Ok and view the number of metrics Neuroguide grabbed. For instance, if 134 metrics were grabbed that is a good amount to train.
2. Begin the Fusion process:
    a. With the "Protocol" Tab active in Neuroguide, Open the LPR application and load the FFT data (.LOR file). Check for BMA's that were not grabbed by the SCL and add them in, taking into consideration your mental notes from above. So, for example, if the LPR FFT data shows BMA's not selected as metrics in the SCL protocol, or you saw something in the QEEG, say there is excess HBeta on the right side, and the LPR picks it up as well, manually add all of these Areas into the protocol. For example. you may add:
        - BMA 19 R HB frequency since it is noted in the Q but wasn't chosen or
        - BMA 9 Delta Theta since those BMA and LPR frequencies weren't included in the SCL metrics.
        - BMA's 13 and 24 Delta and Theta are Rich Club, in the LPR, but also not selected.
    b. Check the JTFA data for BMA's (both Absolute Power, Coherence, and Phase) that are above the LPR threshold and not grabbed by Neuroguide SCL, and add them in. **Note:** Specifically look for Coherences going from the back of the head to the front of the head, for example BMA 10 (Front) BMA 19 (Back). These are Rich Club areas that if deregulated should be included in the protocol.

When building a Fusion protocol like this remember, with Z-Scores, you are training towards Z = zero. So, if you add a BMA and it isn't showing up as deregulated, that's ok, as it will simply train to a normal range. **Note:** There is a limit of using 24 BMA's. If you hit the limit, run what you have and then pull out consistently regulated sites and add new BMA's as you go.

Your protocol is complete, and you are now ready to setup your Session Rounds.

To Setup Session Rounds and Display:

1. Click on the "Session Rounds" tab in Neuroguide and setup the number and length of rounds for your Neuroguide session. Here you will determine how you want your "Combo" session to run. The idea being that you will want to interchange short rounds of Neuroguide operant conditioning with short NeuroField Stim cycles. There are several ways to set this up depending on your client. Try different methods to see which method causes your client to optimally respond. You can mix them however you see fits best. Several options that have shown to be effective are:
    - 5 minute Rounds followed by 5 minute Stim
    - 3 minute Rounds followed by 3 minute Stim or 2 minute Stim
    - 2 minute Rounds followed by 2 minute Stim
    - 1 minute Rounds followed by 1 minute Stim

   Everyone is different. For some people they may require more of a Stim to get the brain to respond. For other people, less is more. Just a little bit of a Stim goes a long way, and with just a minute or 2 of priming the system, you can see their brain respond well during the subsequent round of Neuroguide. **Note:** You can start the session with a Stim cycle first if desired.
2. Set "Restart Method" to "Manual". This gives you more flexibility than setting up a delay between rounds and "Automatically" starting the next round. There may be instances where you will want to give another short Stim before running the next round of operant conditioning. Setting to "Manual" allows you to control when the next round will begin. Remember though, when it is time to start the next Neuroguide Round, you have to go into the 'Session Rounds" tab and Click on the "Start Round" button.
3. Go to the "Protocol" tab and setup your Display Method. If using DVD, setup your Audio controls, but not hit "Apply" until you are ready to run the Neuroguide session.

Setting up NeuroField

Setting up NeuroField to prepare for a Combo session is just like setting up for a Stim-Only session. You will select your Patient, Setup your Stim Unit(s), select your Protocol, and set the number of loops. The only difference is your number of loops will be much smaller and will depend on the Session Rounds/Stim Option you chose as described above.

To Setup a NeuroField Stim:

1. With Neuroguide setup and running as described above, start the NeuroField software, select your CANBus and then select your Patient. **Note:** Neuroguide owns one of the CANBus now, so only 1 CANBus is available for Stim Units to be discovered. For this example, Neuroguide owns "CANBus #1", so it will be empty because there is nothing to grab there.
2. On the "Treatment Stimulation Setup" tab setup your Stim Units and you are ready to select your Protocol
3. Click on the "Select Treatment Protocol" button and scroll down the list of Protocols to select your Protocol. For this example, select 1-4/40-80 CHIRP
4. Click on the "Load" button and the Protocol with Description will load.
5. Click on the "Save Protocol and Continue" button.
6. Set the number of loops to equal the length of Stim you want between Neuroguide Session Rounds, and you are ready to run a NeuroField / Neuroguide Combo session.

7. Place the Coils and/or Electrodes based on the Brain Map and you are ready to run a Combo Session.

Running a Neuroguide / NeuroField Combo Session

Minimize both NeuroField and Neuroguide so you can see everything running on the screen at the same time. You can switch back and forth between each program by clicking on the screens and bringing either program into focus. This Setup is Neurofeedback Gold!

There are two methods you can use to run a Combo Session:

- Run a Neuroguide Session Round and Stim with NeuroField between Rounds
- Run a Neuroguide Session Round and Stim with NeuroField during the Round

Note: Running a Stim has a direct effect on the EEG. Running a Stim between rounds is a cleaner way to run the training if you want to look at pure data, and you don't want the Stim effect on it. However, running a Stim during a round allows you watch the effect of the Stim and see what the brain does in real time. The Instructions below will go over both methods.

To Run a Combo Session – NeuroField Stim Between Rounds:

1. Start a Stim with NeuroField.
2. Notice the EEG Streaming in Neuroguide. What you see may look muddy, but what you are actually seeing is the cross frequency coupling (CFC). It is harder to see with the scale set small.
3. Set the scale in Neuroguide to 150 to zoom out and get a better view of what is going on in the EEG as each Stim occurs.
4. Look at the data and you can see the:
    - Gamma oscillations and the slow frequency oscillations occurring at the same time.
    - Brain responding to each frequency Stim differently. For example, if you look at NeuroField, you can see that when giving a 1hz stimulation paring gamma to it, the EEG has a particular form. When it goes to the next frequency, say 2 Hz, the oscillation response changes, and you can see the fast frequency that is coupled to it as well. You can see in real-time how the brain responds at 5 Hz and 10hz vs 15 Hz etc.

    The only reason this can happen is because the CFC protocols have Phase/Amplitude matched each frequency with the gamma harmonic. It is an exact phase match. The amplitude is the same even though the brain may respond to it differently. **Note:** The faster the frequency the quicker you will run through the Gamma range because it is going to jump by multiples of the frequency. So at 13 Hz it will make 13 Hz jumps from 40 – 80 Hz because it has to stay harmonically matched. For more information see "Software Overview" in the previous Section, and go to "Training the Rich Club and Network Hubs".

To Run a Combo Session – Neuroguide Round:

1. Once NeuroField Stim has completed, tell the client they are now training and to listen for the reward tone and/or visual que, as it will tell them that their brain is doing what it is supposed to do. As with all Neurofeedback sessions, tell the client to get out of their own way. Let their brain do the work.
2. In the "Protocol" tab, click on the "Apply" button to activate your Display method and/or audio controls.

3. Click on the “Begin Session” button and start the first round of Neuroguide.
4. Go to the Progress tab and look at how your client is doing.
5. Set the Threshold and Check trend line:
    a. Bring the threshold down to make the training challenging if it is set too high and scoring too much. Bring it down just below the trend line so it is not too hard or too easy. As you make it harder, this will reduce the number of rewards.
    b. Run your cursor over trend line to see where the z-scores are resting. Note the outliers you see. **Note**: It takes 10 sec for Neuroguide to calculate the slope of the Z-score.
6. Look at the Real-time Z-Scores. Check the Absolute Power numbers and the Coherences to see where the deregulations are.
7. When the Round is complete run a NeuroField Stim again. When done, click on the “Start Session” button to run the next Neuroguide round.
8. As your Rounds progress, see what changes you notice from the Stim. The idea is to use the CFC Stim as a priming affect and see as you go from round to round how the brain is following the Stim and starting to regulate itself. Look at the:
    - Rewards and see if there is an increase.
    - Phase and Coherence data that were deregulated to see if it is now generating nice numbers.
    - Changes in the Trend line during the Neuroguide Round. Oftentimes changes are immediately noticeable.
    - Numbers rolling in real-time to see if they are coming in the normative range. **Note:** If numbers consistently come in the normal range, you can choose to pull them out and start to add JTFA data and Fuse the to facilitate a bit more movement
9. Repeat this process to equal approximately a 15 minute session. Or, follow the directions below to run a NeuroField Stim during the last few minutes of a Neuroguide Round.

To Run a Combo Session – NeuroField Stim During Rounds:

1. During the last few minutes of a Neuroguide round, say minute 3 of a 5 minute session round, give the client a Stim while Neuroguide is running.
2. Look at the numbers and see how the Stim is affecting the training. **Note:** The Stim will change the numbers.
3. Let the client know when you start the Stim, so they will know that the feedback and reward will be affected.
4. Give 2 minutes of Stim, and if necessary abort NeuroField if your loops go longer.
5. Let the client know that the Stim has stopped and they are now training again. Run the next Neuroguide round for the first 2 minutes without NeuroField running and at 3 minutes, start the Stim again while the Neuroguide Round is running. Each time you do this, you will see the system respond.
6. When the Round has completed, look at the Avg Z-Score per second and you can see during min 3 to 5 where you gave the stim how it was affected.
7. Run this process for a total of approximately 15 minutes of Neuroguide/NeuroField rounds.

Again, you can mix the Neuroguide / NeuroField Combo Stim/Rounds to be what you think would work best for your client. Because Neuroguide is in Manual mode, you can simply start the round when you are done with the Stim and you are ready to go with whatever method you choose.

II. NeuroField tACS 0.1Hz & 14Hz / Neuroguide Combo

To run a NeuroField tACS 0.1 Hz Combo session with Neuroguide, you must have two CANBus connected to your computer, one from the Q20 for use with Neuroguide and one from the tDCS/tACS unit for use with NeuroField. For detailed instructions on how to connect the hardware, see "Section 3: Hardware Setup – 2 CANBus" and go to "NeuroField/Neuroguide Combo Setup" earlier in this document. The NeuroField tACS / Neuroguide Combo setup is the same as using the NeuroField X3000 / Neuroguide Combo, you will just be setting up the tDCS/tACS unit instead of the X3000.

Overview

In this Combo, you will:

- Set NeuroField tACS to run at 0.1Hz during a round of Neuroguide. Neuroguide's low threshold only detects down to 0.5Hz. Thus, you will be able to run the tACS session at the same time as Neuroguide without affecting the operant conditioning.
- Set NeuroField tACS to run at 14Hz in between rounds of Neuroguide. The 14Hz is given without Neuroguide running since 14Hz would affect the operant conditioning. This strategy is based off the research on "Calcium Theory" and if it is accurate, what this is doing is firing up the Glial layer. For further information contact the NeuroField office to obtain this and other important studies.

  Note: The NeuroField Q20 amp is designed to handle this amount of electrical input. It is not known how other amps will handle it, so if you are running this technique with another amplifier, be aware of this and do so "at your own risk."

Important!!! The Startup must be done in this order:

- Step 1 – Activate Neuroguide and the Q20: Startup the Neuroguide software program so it is connected to the CANBus/Q20 and the active EEG is displayed. At this point Neuroguide has control of the Q20.
- Step 2 – Activate the Z3 unit: Startup the NeuroField software program and it will connect to the 2nd CANBus. NeuroField will now have control of the Z3 unit

Once you have completed Step 1 and 2 above, you are ready to run the Neuroguide/NeuroField tACS Combo technique. The process is summarized as follows: (Detailed instructions are listed later in this Section.)

- Manually Start Round 1 of Neuroguide
- Run NeuroField tACS at 0.1 Hz simultaneously with Neuroguide
- Monitor the NeuroField session live during the Neuroguide Session
- Post Round 1, change the NeuroField tACS frequency to 14Hz and run for 2 minutes
- Change the Frequency back to 0.1Hz and Run NeuroField
- Manually Start Round 2 of Neuroguide with NeuroField running in the background

- Repeat 14Hz for 2 minutes then Change Frequency back to 0.1Hz and lower the voltage to 2.5 mA. This prevents habituation and gives the brain a chance to learn on its own
- Manually Start Round 3 of Neuroguide with NeuroField running in the background
- Repeat as long as needed

It is recommended that you attend a NeuroField BootCamp to run a combo technique. The instructions below assume a good working knowledge of both the NeuroField system and Neuroguide.

Using tACS 0.1Hz with Neuroguide

To Startup Neuroguide

With CANBus #1 connected between the Q20 and your computer, do the following:

1. Cap your client as you would normally.
2. Click on "Collection/Hardware Selection" and be sure that the Q20 is selected.
3. Click on "Setup and Monitor" and this will tell Neuroguide to "Find my Q20". When it finds the Q20 the "Q20 Collection Parameters" screen will appear. This means that Neuroguide took control of one of the CANBus and is controlling the Q20 exclusively. NeuroField is no longer able to grab that CANBus/Q20 because that Bus/Driver is controlled by Neuroguide.
4. Once Neuroguide has found the Q20, select your Patient, and Eye Condition and you are ready to run Neuroguide. Do not start the session yet.
5. Go to NeuroField and startup the program.

To Run NeuroField tACS at 0.1Hz

With CANBus #2 connected between the Z3 unit and your computer, do the following: **Note:** The instructions here assume a working knowledge of NeuroField64.

1. Attach the Gel Sensors using Mastoid to Mastoid placement, going straight across hemispheres between those two areas.
2. Click on the NeuroField icon on your desktop and select your Patient, setup your Current Stim Unit(s) and now you are ready to run NeuroField.
3. In the "Neurofeedback Selection" tab, click on the "Show tDCS/tACS/tRNS Manual Control" button. The Manual Controls will open.
4. Click on the drop-down arrow and select "tACS Continuous Sine" from the list of waveforms.
5. Check the "Show Spin" checkbox to manually enter your values. For the "Frequency Value", set the "Frequency (Hz) to "0.1 Hz" and AC Value at "0.5 mA". **Note:** If your patient is sensitive you can start at 0.1 mA and work up to 0.5 mA. It has been found that 0.5 mA is a good place to start and can be tolerated fairly well. For some people, it is too much for them in one way or another and you can start low and work your way up to 0.5 mA.
6. Set "Scan Time" to 10000 msec or 10 sec.
7. Click on the "Start tDCS/ACS" button to get NeuroField Running. While it is running in the background, you will now run Neuroguide.

To Run Neuroguide Round 1

1. Go to Collection/Neurofeedback/LORETA Neurofeedback.
2. In the "Protocol" tab, click on "Symptom Checklist" and open the SCL file.

3. Go to “Networks” tab and select the Network appropriate for your patient based on their Map and/or the LORETA Progress Report (LPR).
4. Set the Method to be “All or None” and Set the Threshold and Sound for training.
5. Click on the “Session Rounds” tab and set the number of rounds, ideally 4 or 5
6. Set “Restart Method” to “Manual” after you set your rounds. **This is important!!!!!!** If set to “Manual”, when Neuroguide finishes a Round, it won’t automatically go to the next round. This allows you to check in with the client to see how they are doing, and to change the Frequency in NeuroField to 14 Hz. You will want to ask:
    - How are you feeling
    - Are you getting the “boat” effect i.e. that rocking queasy feeling

   You can then manually click on “Start Round” and control when Neuroguide starts the next round.
7. Click on the “Progress” tab and set “Display Type” to “Min/Max”.
8. Click on the “Protocol” tab and click on the “Apply” button.
9. Click on “Begin Session” and adjust Threshold to find the “Sweet Spot” usually between 60 to 80% reward.

To Monitor NeuroField Waveform Live

1. Bring the NeuroField software window forward.
2. There is Live Monitoring with the Z3 unit. Notice what the frequency of the waveform looks like when the tACS is running. If a client wasn’t hooked up or a waveform wasn’t being given then you wouldn’t see the waveform moving. So, you know that the current is actually going through. Since it is only at 0.1 Hz the waveform is making a gentle slope down and then back up. It is making a slow, 10 second, sine wave. **Note:** The frequency is set to 0.1 which is below the 0.5 low Threshold that Neuroguide will see. As a result, you can run them both simultaneously without affecting the operant conditioning rewards in Neuroguide.
3. Notice the voltage of the waveform. It is set at 0.5 mA so you can see it going up to .5 above and below the 0 line on the Vertical axis.

Using tACS 14Hz with Neuroguide

To Run NeuroField tACS at 14Hz and Reset to 0.1Hz

1. Go to “Manual Controls” and change the Frequency to 14Hz. Leave it set to 0.5mA
2. Start NeuroField.
3. Look at the signal and see the 14hz Sine wave getting passed through the system at .5mA. During the combo, you hit the system at 0.1 cycles per second for one 5 minute round, now you are giving 14Hz for 2 minutes.
4. Check the Scan Timer in NeuroField. Make sure you don’t go too long, i.e. go for approximately 2 minutes. Be sure not to walk away.
5. Look at the EEG signal coming from Neuroguide. You can see how the 14Hz is affecting it. It is overloading the Amp, but the Q20 is designed to handle it. It can tolerate that amount of input of electricity. **Note:** Again, it is not known if other amplifiers are equipped to handle this. So performing this technique with another amp is “at your own risk”. It shouldn’t be a problem but there is the potential to blow out the amp.
6. Stop the NeuroField 14Hz session and notice how the EEG signal returns to normal.

Repeating tACS 0.1Hz & 14Hz with Neuroguide Rounds

You will now repeat alternating using 0.1 Hz during Neuroguide Round 2 and Round 3 with 14Hz being given in between Rounds. However, once you get to Neuroguide Round 3, you will now lower the mA in NeuroField from 0.5 to 0.25. There are two theories for this; one is that the brain has habituated to .5mA and will respond to something different, either higher or lower, and it reduces fatigue. The other theory is that by giving the 14Hz in between Rounds, the calcium ion channels have met their electrical potential, so the brain may not need as much of a "kick" and can start to work more on its own.

This process can be repeated for Round 4 and 5 or if the patient can tolerate it.

To Repeat NeuroField 0.1Hz Session

1. In NeuroField "Manual Control" change the frequency back to 0.1Hz and leave it at 0.5mA.
2. Start NeuroField.

To Run Neuroguide Round 2 and Repeat NeuroField 14Hz

1. Bring Neuroguide forward and manually start Round 2 with NeuroField running in the background.
2. Notice the Inter-Session data for Round 2. In most cases, you will see in "Real-Time" that the outliers are getting better and the "in-range" numbers are holding firm.
3. When Round 2 is done, Neuroguide will automatically stop and you can change NeuroField from 0.1 Hz back to 14Hz at 0.5mA.
4. Run 14Hz for another 2 minutes and Abort the NeuroField Session.

To Reset NeuroField 0.1Hz at 2.5mA and Run Neuroguide Round 3

1. In NeuroField "Manual Controls" change the frequency back to 0.1Hz but this time set it to .25mA.
2. Start NeuroField.
3. Bring Neuroguide forward and manually start Round 2 with NeuroField running in the background at only .25mA.
4. Repeat. Alternate giving 14Hz .25mA between Rounds and running NeuroField at 0.1Hz 2.5mA during Round 4 and 5 or as long as the client can tolerate it.
5. Check the rewards and the outliers during the session to notice the changes.

III. NeuroField / Neuroguide Combo - Interval Training

The theory behind this procedure is to run 1 round of Neuroguide/Operant Conditioning, pause in between rounds and Stim the patient while they are performing a specific task related to the area of concern. For this example, say the patient suffers from anxiety and must give a speech in front of a classroom full of peers. You can run an Anxiety Network protocol in Neuroguide, pause the training after 1 round and tell NeuroField to give a short magnetic and/or current stim over the area of excess High Beta while they practice their speech out-loud for 3 – 5 minutes.

Note: The instructions here assume a working knowledge of both Neuroguide and NeuroField. For detailed instructions refer to the Neuroguide User Manual and/or refer to "Software Run-Thru: Magnetic and Current Stim-Only" earlier in this NeuroField manual. It also assumes your hardware is setup and ready to go. Refer to "Section 3: Hardware Setup" earlier in this NeuroField User Manual for detailed instructions. **Important!!!!** You MUST have two CANBus connected to your computer, one from the Q20 for use with Neuroguide and one from the Magnetic and/or Current Stim unit for use with NeuroField.

The Hardware and Software startup **MUST** be done in this order:

- Step 1 – Activate Neuroguide and the Q20: Startup the Neuroguide software program so it is connected to the CANBus/Q20 and the active EEG is displayed. At this point Neuroguide has control of the Q20 and CANBus #1
- Step 2 – Activate the Magnetic and/or Current Stim units: Startup the NeuroField software program and it will connect to the 2nd CANBus. NeuroField will now have control of the units you want to use

To Startup Neuroguide and NeuroField for Interval Training:

Neuroguide

1. Launch Neuroguide and from the Neuroguide main menu click on Collection/Hardware Selection and choose the NeuroField Q20.
2. Click on Collection/Setup and Monitor and the "NeuroField Q20 Collection Parameters" window appears. Once this screen is visible, it means that Neuroguide has taken control of one of the CANBus to run Neuroguide using the Q20.
3. Click on "OK" and do the following:
    a. Select your Patient
    b. Select "Eyes Open" or "Eyes Close" condition
    c. Click on "OK" and the EEG will stream across the screen.

    You are now ready to launch NeuroField and have it take over the 2nd CANBus. **Note**: DO NOT select your protocol or start the neurofeedback yet!

NeuroField

1. Leave Neuroguide running and launch NeuroField.

2. Your Magnetic and/or Current Stim devices will be listed. Click on the appropriate "Use CANBus" button.
3. The Patient Selection screen will appear. To setup for NeuroField training do the following: **Note:** For details on the following steps, go to "Software Run-Thru: NeuroField Magnetic and Current Stim-Only" in the previous Section.
    a. Select your Patient
    b. Enable the Stim Units you want to use
    c. Select your Coil and/or Electrode locations.
    d. Select your Protocol and set the number of loops to equal 3 to 5 minutes. For this example, 1 – 4 HD Rocking will be selected.
    e. Save Stim setup and Continue. The "Neurofeedback Selection" screen appears.
4. Leave "Training Mode" set to "None". You will be simply running a Stim-Only session in combination with your Neuroguide session.
5. Click on the "Save Patient Settings and Continue" button. The "Start Treatment" screen will appear. NeuroField is now ready to go as well! DO NOT start a treatment yet.

To Cap Your Client:

Before you begin training you must place both a QEEG cap, Electrodes, and/or a NeuroField cap and Coils. Do so in this order: **Note:** Instructions below are for running both Magnetic and Current Stim in combination with Neuroguide Interval training. Skip either the Coils or Electrode step if it doesn't apply to your Stim unit setup.

1. Place the Electrodes on the client.
2. Place the QEEG Cap on their head, gel, and check impedances.
3. Place the NeuroField cap over the QEEG cap.
4. Place the Coils onto the NeuroField Cap.

You are now ready to start your Interval training.

To Setup the Neuroguide Protocol and Run 1 Round:

You now have both Neuroguide and NeuroField started up and ready to go. To begin Interval training you will begin by running 1 round of Neuroguide. To do this:

1. Click on the Neuroguide window to make it active.
2. Select Collection/Neurofeedback/LORETA Neurofeedback.
3. Load your Protocol and setup your session as you would normally with one caveat: YOU MUST set Neuroguide to manually restart between rounds. To do this:
    a. Click on the "Session Rounds" tab.
    b. Click on the drop-down menu for "Restart Method"
    c. Set it to "Manual". Neuroguide will stop after 1 round and will not restart again until you tell it to.
4. Click on the "Begin Session" button and run 1 round of Neuroguide. For this example, we are running 1 round of the Anxiety Network protocol.
5. When Neuroguide stops, you are ready to run NeuroField and begin Interval Training.

To Start NeuroField and Perform a Task:

1. Click on the NeuroField window to make it active.
2. Click on the “Start Treatment” button to begin the Stimulation.
3. Have your client perform a task while they are getting a Stim. For this example, they will read their speech aloud will getting 1 – 4 HD Rocking to help curb their anxiety. If you have a Parkinson’s patient, you could have them lift an arm and steady it. Or, if you have someone with poor short term memory skills, you could read a Digit Span sequence and have them repeat after you while they are getting a stim.
4. Continue with the task for the designated number of “Loops/Estimated Run-Time”.

To Manually Start Neuroguide and Run Round 2:

Once the Stim is complete, you must manually tell Neuroguide to start another round. To do this:

1. Click on the Neuroguide window to make it active.
2. Click on the “Session Rounds” tab and in the “Current Round Number” area of the screen, click on the “Start Round” button. Neuroguide will start another round.
3. Notice the inter-session data. It is very common to see outliers begin to regulate after the brain has received a NeuroField stim.
4. Once the round has ended, repeat the process, giving another NeuroField Stim between Rounds 2 and 3.

Repeat the process for 3 or 4 rounds. Check in on your patient as the process is very taxing on the brain.

SECTION 6

Appendix

I. NeuroField Contraindications

Most people who use NeuroField have no side effects. Since 2008 over 50 licensed health care professionals have evaluated the NeuroField effect which has resulted in the following list of indications and contraindications for treatment:

1. The most common reported effect from NeuroField is a person becoming 'wired' or 'tired.' A person may feel an abundance of energy or may feel compelled to sleep after a treatment. It is important that the person is informed of this potential side effect and that they do not operate heavy machinery or drive a motor vehicle immediately after a treatment. Most people who have this side effect feel it within an hour after treatment. This effect is usually short lived and resolves itself in one to two hours.
2. NeuroField can cause capillary dilation which can feel like a headache. This effect usually resolves itself within one to two hours after a treatment. However, if it does not do so then a person is directed to take over-the-counter pain reliever such as Tylenol. This effect has not been reported to occur longer than 24-72 hours. Should this occur longer than 72 hours then the person should be directed to see their physician.
3. As a rule, beginning NeuroField users should NOT give treatment to people diagnosed with seizure disorder unless they have clinical supervision with an experienced NeuroField provider and have attended an advanced training. You can use NeuroField on people with seizure but you MUST NOT give stims less than 10 Hz otherwise you may trigger a seizure. The 15-100 or 10-100 protocols work best with this population.
4. Do NOT use NeuroField on pregnant women.
5. Do NOT use NeuroField on people with Pacemakers.
6. Do NOT use NeuroField on people who have any metal attached to or inserted on or in the head.
7. Do NOT use NeuroField on children less than 3 years of age until you have practiced with the system on clients for at least one year and have attended one basic and advanced training along with seeking professional supervision with an experienced NeuroField provider.
8. Do NOT use NeuroField on anyone if they have the flu, a cold or any type of acute bacterial infection.
9. Be mindful of people who are taking medications. NeuroField can have an impact on medication effectiveness making them stronger and more potent. Most people who take medication respond with no problems to NeuroField treatment. However, it has been reported that people who take blood thinners have experienced a more potent effect from the medication.
10. People who have a history of PTSD may have an abreaction. Make sure to assess this and be ready to intervene should the need arise. This may require a referral to a licensed therapist who is trained in EMDR or similar traumatic disorder treatment.
11. People with significant personality disorders may respond to NeuroField with intense mood changes. This may require a referral to a licensed therapist who is trained in EMDR or similar traumatic disorder treatment.
12. Do NOT give NeuroField for more than 50 minutes per day on the head. You can use it on other parts of the body up to three times a day.

13. Do NOT ***EVER*** attach the NeuroField cap to the scalp with electro paste. You will inject electricity into the person with the potential of causing harm.

II. Legal

NeuroField is not a medical device. NeuroField is not intended to be used for the diagnosis of medical problems and does not diagnose medical problems. NeuroField is intended for the use of stress reduction and relaxation. NeuroField, Inc. does not make any claims that this device can cure, heal, or medically treat disease. It is critical that you DO NOT ATTACH THE CAP TO ANYONE USING CONDUCTIVE PASTE, ELECTRO GEL, OR BY ANY OTHER MEANS. Attaching the cap to a person using conductive paste could cause serious harm to the person and may damage the NeuroField System. Attaching the cap will result in your warranty being invalidated and is not supported in any fashion by NeuroField, Inc. Using NeuroField outside of the methods explained in this manual may result in a suspension of the license granting usage of the NeuroField system.

There is limited testing completed on this device and it should be considered experimental with clients signing an informed consent form indicating that they understand the experimental status of NeuroField. People who have pacemakers should not be treated with the NeuroField System. NeuroField is only made available to licensed professionals for experimental use.

III. License Agreement

LICENSE AGREEMENT

By installing and/or using NeuroField64 (the "Software"), you agree to be bound by the terms of this license agreement. If you do not agree to the terms and conditions of this license agreement, you may not install or use the Software. This agreement is between you ("you") and NeuroField, Inc. (the "author").

This license agreement may be altered or changed at any time by the author without prior notice.

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No advice or information, whether oral or written, obtained by you from the author or any other party involved with the production, creation, distribution, sale, or development of this Software shall create any warranty not expressly stated herein.

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You hereby acknowledge that you have read and understand the foregoing license agreement and agree that the action of installing or using the Software is an acknowledgment of your agreement to be bound by the terms and conditions of the license agreement contained herein.

IV. Shipping Policy

GOODS WITHIN THE U.S.A. – All goods posted within the U.S.A. are delivered to you via Federal Express 2-Day Air, unless otherwise specified.

All goods are SECURELY packaged to minimize the risk of damage. Any damage that does occur is the responsibility of Federal Express, and you can contact Federal Express for satisfaction concerning the cost involved.

GOODS SHIPPED INTERNATIONALLY – In 2004, the European Parliament passed the Restriction of the Use of Certain Hazardous Substances (RoHS) directive to “protect human health and the environment by restricting the use of certain hazardous substances in new equipment” and to complement the Waste Electrical and Electronic Equipment (WEEE) regulations. This Directive bans the placing on the EU market of new electrical and electronic equipment containing more than agreed levels of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants.

NeuroField X1000 is completely RoHS compliant and therefore can be sold both nationally and overseas to (EU) European Union customers.

V. Warranty/RMA Policy

NeuroField, Inc. uses FedEx as the primary shipment carrier. If your system was damaged in transit or is missing components please notify NeuroField, Inc. immediately. Failure to do so will result in the customer paying for parts, repairs, and/or damages.

Shipping Coverage

NeuroField, Inc. offers replacement on damaged or non-functional items within thirty (30) days of purchase provided that damage was caused by either freight transport or factory defect. There is a service/repair charge for items returned after thirty (30) days of purchase.

Equipment Coverage

NeuroField systems have a one (1) year warranty from the time of purchase. This warranty covers factory defects only and does not cover damage caused by the customer. Any damage incurred can be repaired by NeuroField, Inc., charge estimates dependent on inspection of damaged hardware.

Battery Coverage

Specialized Batteries (Internal batteries and Field Replaceable Smart Batteries) from NeuroField, Inc. carry a three (3) month warranty through NeuroField, Inc. against factory defects.

Misc

There are no review periods upon purchase of the NeuroField system. All sales are FINAL. No refunds will be offered regardless of the request.

Return/Repair Procedures and Policies

All returns must be accompanied by a return merchandise authorization number (RMA#). The RMA number may be obtained by contacting NeuroField either via e-mail or by calling our office. We will provide you with return instructions.

1. NeuroField, Inc. is not responsible for any packages sent back without an RMA#.
2. The customer is responsible for paying for the return shipping.
3. We recommend sending any return items to NeuroField, Inc. via a traceable source.
4. Please insure your return packages for any package losses or any damages in shipping. NeuroField, Inc.is not responsible for any damages incurred in shipping.

5. Please legibly write the RMA# on the outside of the returned package. Please provide return address and telephone number in the package.
6. Ship all RMA's to:
   NeuroField Inc.
   RMA#
   386 West Line St.
   Bishop, CA 93514
7. Original shipping charges are non-refundable.
8. NeuroField, Inc. cannot accept returns on any consumable products, electrodes, or cables.
9. Please allow 7-10 business days for repair.
10. If the system is being repaired on warranty the customer is not responsible for return shipping. If the system is being repaired/upgraded outside of warranty the customer must pay for return shipping.
11. NeuroField, Inc. is not responsible for any loss of revenue on the part of the customer as a result of conducting repairs.
12. Should the customer wish to expedite repair and/or return shipping an additional fee will be charged.

VI. Contact Information & Troubleshooting

Contact Info:

Email: Contact@NeuroField.org

Mailing Address:

Nicholas Dogris, Ph.D.
NeuroField, Inc.
PO Box 506
Bishop, CA 93515

Physical Address:

NeuroField, Inc.
386 W. Line Street
Bishop, CA 93514
Phone 760-872-4200
Fax 760-873-8007

Official NeuroField Product Website: www.NeuroField.org