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| 4   | NeuroPlot, Inc. |
I. Introduction

What Is NeuroField?

“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

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. Unlike rTMS, which forces a depolarization of the neuron, NeuroField pEMF stimulation is ‘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. The NeuroField X3000 Plus is a four channel frequency generator that is capable of generating...
pEMF frequencies ranging from 0.31 – 300,00Hz. The X300 Plus is capable of generating a low intensity electromagnetic pulse ranging from 1-400 milligauss which is 10,000,000 times weaker than an EMF pulse given by rTMS devices. 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 Q20 EEG a 19-channel DC coupled EEG amplifier. The Q20 EEG utilizes the Neuroguide (www.appliedneuroscience.com) Z-score normative database in order to determine the response of pEMF on the brain. In this way NeuroField is the only pEMF device in the world to use normative data in order to guide the brain to a more functional state. The Q20 EEG can also be used with the Neuroguide platform to run 19 channel surface and/or 19 channel LORETA Z-score neurofeedback.

The NeuroField system was initially evaluated by 10 beta testers around the United States in 2008. All of which are licensed health care professionals. It was determined that the system is safe and has clinical utility. Dr. Nicholas Dogris has written well over 50 experimental protocols for the system that have been rated by NeuroField users as having clinical value. The inflammation reduction protocol has been given the highest ratings with more than 30 NeuroField users confirming observed inflammation reduction in their clients. The XX3000\X2000 is currently in the process of obtaining electrical certification as a medical device from Underwriters Laboratories and is slated for FDA 510K registration in 2013.

References


II. Software Installation

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

**Note:** If you have already installed a previous version of the NeuroField software, **YOU WILL NEED TO FIRST BACKUP YOUR PATIENT DATABASE** before running the installation program. Proceed to the section below titled “Upgrading the Software” for step-by-step instructions on how to do this.

The minimum PC specifications for running the NeuroField 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 8
- Windows 7

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

- Apple Macintosh systems
- Apple PC emulators
- Windows XP
- Windows Vista

These instructions will walk you through installing the 7.x software for the first time and/or upgrading an existing 7.x installation to a more recent version. They will also guide you to the Yahoo Groups message board and show you how to generate “Keys” to run the NeuroField RTZ procedure.

**Requesting a Download Password**

NeuroField, Inc. operates under a ‘green’ standard and does not ship the system with software on CD’s. If you have purchased a NeuroField system, you must first obtain a password before you can fully download the software. Once you have received a password, you will be able to copy the .zip file to your computer and extract the software files. Full product releases and updates are posted on the “Downloads” tab from the NeuroField website main menu.

**To Obtain a Password:**

1. Send an email to [contact@neurofield.org](mailto:contact@neurofield.org) and request a password. A password will be sent to you via email.
2. Use this password in the instructions below: “To Download the Software.”

**Installing 7.x.x Software for the 1st Time**

The instructions in this section will walk you through the process of installing the NeuroField 7.x.x Software for the first time. If you have already installed the 7.x.x software and you simply want to upgrade it to the latest release, skip to the next section below titled, “Upgrading the 7.x.x Software”.

**Note:** If you are using an X3000 or Q20 EEG you must use version 7.0 or later. Previous versions of NeuroField will not work with this hardware.
To Download the Software:

1. Create a folder on your Computer and name it the NeuroField software version number you are downloading, i.e. NF714. This will be the Destination folder for your downloaded files.

2. Login to the NeuroField website at www.NeuroField.com

3. Click on the “Downloads” tab on the main NeuroField Menu Bar. “NeuroField Software Download Zip” link will appear.

4. Click on the “Download Zip” link and a prompt will appear:

5. Select “Save File” and Click “Ok”. Look at the upper right hand corner of your screen as the software begins to download. You will see the following:

   When the green arrow appears the software is done downloading. A .zip file named with the version number (NF7xx.zip e.g. NF714.zip) will automatically be added to the Downloads folder on your computer.

6. Navigate to and open both the Downloads folder on your computer and the Destination folder that you created in Step 1. Both folders should be open next to one another.

7. Drag or Copy/Paste the zip file (NF7xx.zip) from your Downloads folder to your Destination folder.
8. From your Destination Folder, double-Click the .zip file. A folder (NF7xx) that contains the NeuroField setup software will appear inside the WinZip package.

9. Drag and Drop or Copy and Paste this NF7xx folder from the .zip file to your Destination Folder. The password prompt will appear:

10. Enter the NeuroField password that was emailed to you as described in the section above. Click on “OK” and the NeuroField 7xx file folder with all its contents will be extracted into your Destination Folder.

**To Install the NeuroField Software:**

1. Double-Click on the NF7xx folder. This will display a list of files. **Note:** There is a “READ ME FIRST!! INSTALLATION INSTRUCTIONS” file in the folder content list that contains all of the installation instructions described below.

2. Double-Click on filename “RUNME” or RUNME.BAT. The NeuroField Installer will begin.

3. Follow the prompts within the Installer to download the NeuroField software and then Exit the Installer. The Ani .dll installer window will appear.

**To Install the ANI Z-Score DLL**

1. Click on the “Next” button to continue the installation process and install the z-score database for the NeuroField RTZ procedure. **Note:** The DLL requires a separate license that can be purchased through NeuroField, Inc. Simply call (760-872-4200) or email (contact@neurofield.org) the office to purchase the Z-score .dll license.

2. When done, click on the “Finish” button. The database Self-Extractor prompt install prompt will appear.

**To Install the NeuroField database**

1. Click on “OK” and the NeuroField database installation will begin.
2. Click on the “Start” button and click “OK” to extract the NeuroField database files.

![PowerZip Self-Extracting Archive](image)

3. Click on the “Start” button again at the next prompt and click “OK” to install the databases to C:\Program Files\NeuroField.

4. Click on the “Start” button again at the next prompt and the USB CanBus Driver Installer will appear.

To Install the USB CanBus Drivers

1. To begin the Canbus Driver Installation, click the “Next” button in the CanBus Installer screen, click on the “I agree to accept the license agreement” radio button, and click the “Next” buttons to continue through the installer. A screen prompt will appear to choose which CanBus drivers you want to install.

2. Click on the first checkbox labeled “PCAN-USB, PCAN-USB Hub” and click the “Next” buttons to continue through to the Windows Security prompt.

3. At the “Windows Security Prompt” click on the “Install” button to continue with the driver installation process. “The Drivers have successfully been installed” message screen will appear.

4. Click the “Finish” button to exit the installation. A NeuroField Shortcut icon and a NeuroField documentation folder will appear on your desktop.

Accessing the NeuroField Message Board

As part of the software installation process, it is important to become a member of the NeuroField Message Board.

1. Go to NeuroField.com and Click on the “Message Board” tab on the NeuroField website main menu. This will take you to the Yahoo Groups screen.
2. Sign in to Yahoo Groups
   a. If you are already a member of Yahoo Groups, Click on “Sign In” and enter your Username and Password. You will now have access to NeuroField Conversations, Photos, Files and More.
   b. If you are not currently a member of Yahoo Groups, Click on “+ Join Group” and Click on the “Create an Account” button. Create an account then Sign In to access NeuroField Conversations, Photos, Files and More.

Generating the License Activation Key

In order to use the ANI Z-Score Dll for RTZ training in NeuroField using the Q20 or X2000 plus (no other amps will work with the ANI Z-score DLL), you have to have both purchased the license from NeuroField and you have to obtain a license key from Neuroguide. To do this you will generate a “A” Key from your computer, send it to Neuroguide, and a “B” key will be emailed to you.

You can apply the license you bought from NeuroField to two computers only. However, an A key has to be generated separately for each computer. The B keys you are given from Neuroguide are married to the A key you sent in and cannot be mixed and matched between computers. **Note:** The steps below are “Quick Steps” for a ‘mock” session only in order to generate the prompt for a B Key. To setup and run an actual full RTZ Go to Section IV “Software Basics” and VI “Real Time Z-scores” later in this document.

To setup a mock session in order to generate an A Key, from the main NeuroField Standard Treatment page, do the following:
1. Enable EEG
2. Enable Z-Score
3. Enable RTZ
4. Click on “Select Z Score Thresholds” button
5. Select a Threshold for 2 sites and Click on “Load ZAP Thresholds” button.
6. Select a Protocol set to the default of 1 loop.
7. Click the “Start Standard Treatment” button to run the mock session. **Note:** You need to actually start an RTZ session so that you can generate the prompt to Create an A Key
8. Click on “I agree” at the License Agreement prompt and the “Create A Key” window will appear.
9. Click on the “Create a Key” button and an A Key will be generated.
10. Send an email as directed in the prompt.
11. Once you received the “B” key from Neuroguide, follow steps 1 – 8 above and enter the “B” key code and click “Ok”.

Next, you will need to setup your X3000/Q20 hardware. Proceed to the “Hardware Setup” Chapter and “Setting up X3000 or Q20 Device” section of this manual.

### Upgrading the Software

The instructions in this section pertain only if you have already installed a previous 7.x.x version of NeuroField, and you want to now upgrade to the latest release from say, “NeuroField 7.0.0” to “NeuroField 7.1.4”. **Note:** If this is your first time installing NeuroField software, go to the Section above titled, “Installing the 7.x.x Software for the 1st Time”.

To upgrade to a new version, you will need to:
- Backup and store your existing patient database
- Uninstall the current version on your desktop
- Install the latest version of the software
- Transfer your existing Patient History to the new database.
  **Note:** When upgrading to 7.x.x, you will not need to install the canbus drivers and you will not always need to install a new version of the Z-Score DLL file as you have previously installed it. You will simply exit out of the installation at this point. If there is a change to the .DLL file and a new installation is required, it will be included in the Upgrade .zip package.

### To Back Up and Store Existing Patient Database:

1. Launch the current version of the NeuroField software you have been using.
2. Click on the “Backup Databases” button on the left side bar. Should something go wrong with the upgrade process, this will save a copy of your patient database.
3. Answer “Yes” at the “Database Backup” prompt and your patients’ database will be copied.
4. If you launched NeuroField in Step 1 of these instructions using version 6.x or earlier, you will need to rename then move your patient database backup file to a new folder. To do this follow steps 4a – h below. If you have already upgraded to 7.x.x and launched NeuroField using 7.0.x or later in Step 1 above, continue on to Step 5.

**If currently using NeuroField 6.x or earlier:**

- a. Navigate to C:\NFDBBackup. The database backup from version 6.x is stored here. Check this folder for an existing “PatientsOld” file from a previous upgrade. You can only have one at a time, so if one exists either delete it or move it to a new folder.
- b. Right click on “Patients.mdb” (you may or may not see the extension mdb. If you don’t that is ok, proceed with the instructions).
- c. Choose “Rename” and type in “PatientsOld
d. Press enter to store your patient database under a new name.
e. Right-Click on the file “patientsold.mdb file you just renamed and Select “Copy”
f. Navigate to C:\NeuroField\NeuroFieldData\PatientData\g. Right-Click in the “PatientData” folder and paste patientsold.mdb
h. Proceed to the next section titled “To Uninstall” the software.

5. If currently using NeuroField 7.0 or later:
   a. Browse to C:\NeuroField\NeuroFieldData\PatientData\ The Patient.mdb database is located in this folder. The database backup from Step 3 is here. Check this folder for an existing “PatientsOld” file from a previous upgrade. You can only have 1, so if one exists either delete it or move it to a new folder.
   b. Right click on “Patients.mdb” (you may or may not see the extension mdb. If you don’t that is ok, proceed with the instructions).
   c. Choose “Rename” and type in “PatientsOld” to change the current Patient database name.
   d. Press enter to store your patient database under a new name and proceed to uninstall.

To Uninstall the Existing 7.x.x Full Version:
   1. From the Windows Start Menu, Select “Control Panel”
   2. From the Control Panel, Select “Program and Features.”
   3. Double-Click on the NeuroField Icon
   4. Answer “Yes”, when prompted “Are you sure you want to completely remove NeuroField and all of its components?”
      Note: If you see a message alerting you to “Remove Shared Files”, answer, “Remove None”.

To Download the Latest Software:
   1. Create a folder on your Computer and name it the NeuroField software version number you are downloading, i.e. NF714. This will be the Destination folder for your downloaded files.
   2. Login to the NeuroField website at www.NeuroField.com
   3. Click on the “Downloads” tab on the main NeuroField Menu Bar. “NeuroField Software Download Zip” link will appear.
   4. Click on the “Download Zip” link and a prompt will appear:
5. Select “Save File” and Click “Ok”. Look at the upper right hand corner of your screen as the software begins to download. You will see the following:

When the green arrow appears the software is done downloading. A .zip file named with the version number (NF7xx.zip e.g. NF714.zip) will automatically be added to the Downloads folder on your computer.

6. Navigate to and open both the Downloads folder on your computer and the Destination folder that you created in Step 1. Both folders should be open next to one another.

7. Drag or Copy/Paste the zip file (NF7xx.zip) from your Downloads folder to your Destination folder.

8. From your Destination Folder, double-Click the .zip file. A folder (NF7xx) that contains the NeuroField setup software will appear inside the WinZip package.

9. Drag and Drop or Copy and Paste this NF7xx folder from the .zip file to your Destination Folder. The password prompt will appear:

10. Enter the NeuroField password. To obtain a password send an email to contact@neurofield.org and a password will be sent to you via email.

11. Click on “Ok”. The NeuroField 7xx file folder with all its contents will be extracted into your Destination Folder.
To Install the Upgrade:

4. Double-Click on the NF7xx folder. This will display a list of files.
5. Double-Click on filename “RUNME” or RUNME.BAT. The NeuroField Installer will begin.
6. Follow the prompts within the Installer to download the NeuroField software and then Exit the Installer. Note: if the upgrade version requires a new .dll, the Ani .dll installer window will appear. Follow the instructions on the screen to install the new .dll.

Since this is an upgrade, you will not need to install the NeuroField database or to install the ANI .dll files. Simply exit out of the installation and transfer your patient database.

To Transfer Patient History to the New Database:

1. Start the NeuroField program and on the Main Menu bar Click on “Help”.
2. Choose “Database Updater” from the Help options, and the Updater Program will open and load your database information.
3. Click on the “Transfer to New Database” button. Your patient data will be transferred to your new database. Then click on the “Close” button.
4. Click on “Select Patient” button on the left side bar. Verify that your patient data is there. If it is then you are done with the update process.
5. Click on “Backup Databases” button on the left side bar to save your new database.

Technical Assistance

NeuroField, Inc. provides technical assistance for installation and hardware problems. New NeuroField users receive two technical support sessions for free upon the purchase of an X3000 or Q20 systems for the purpose if installing and/or troubleshooting the NeuroField software. Technical support is available through the NeuroField, Inc. website message board. Technical support can also be purchased by the ½ hour for $75.00. To schedule a technical support session call the NeuroField office at 760-872-4200 and make an appointment.

All new users are encouraged to become members of the NeuroField Yahoo Group. To become a member of the Yahoo Group send a request via email to Dr. Dogris at nicholasdogris@verizon.net.
III. Hardware Setup

The X3000 NeuroField System kit includes:
- X3000 Device
- RJ45 Ethernet Cable
- CANBus USB Adapter
- Velcro cap
- 200 Wind Coils
- D25 Connector Cable
- Medical Grade Power Supply

The Q20 NeuroField System kit includes:
- Q20 Device
- RJ45 Ethernet Cable
- CANBus USB Adapter (if purchased without the X3000 device)
- Medical Grade Power Supply

EEG electrodes, Nu-Prep, 10-20 electro-paste and EEG sensors are not included with either the X3000 or Q20 system. An electrocap from electrocap international is required to run full cap EEG. The cap must have drop reference and be lexicor/brainmaster 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.

Pictured below Q20 and X3000 Plus Systems:

Setting up X3000 and Q20 Devices

The following instructions guide you through the process of hooking up the CanBus Adapter and installing the CANBus USB drivers that came in your software download package. Then you will need to connect the Q20 to the X3000 device (and HRV device if you ‘ve purchased one), connect a cap, plug-in the power supply and turn on the power switch. There are a few things to note when connecting or “daisy chaining” these devices:
The Q20 on its own is not a Stim Unit and will not be recognized in NeuroField without the X3000 attached. However, you can use it as a stand-alone amp in Neuroguide to collect EEG data. See Section titled “Using the Q20 in Neuroguide” later in this document.

When using the Q20 as an Amp for acquisition only, the X3000 should be turned off.

When you connect a Q20 to the X3000 (and HRV if you have it/or X2000 and Plus unit), you have what is called a “daisy chain,” where multiple devices are wired together in sequence. As a result, it is recommended to plug the Canbus into the Q20 and turn on the devices in this order:

- Q20 first
- X3000 second
- HRV third (if purchased)

This will ensure proper communication with the units when launching the NeuroField software.

**To Connect CANBus USB Adapter**

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

2. If hooking up a single device:
   a. Plug the other end of the RJ45 cable into either port of the NeuroField Q20 or the X3000 plus. There are two RJ45 input ports, and you can select either port to plug in the device as pictured below:

   ![Q20 EEG](image1)
   ![X3000 Plus](image2)

   If connecting multiple devices together:
   a. Plug the RJ45 cable into the Q20 rather than the X3000. This way it is ready to use as a stand-alone acquisition device **Note:** If you are using the Q20 and the X3000 plus
To Connect the Q20 and the X3000 Plus

If you want to use the Q20 and the X3000 together for RTZ training, you will need to connect them with the additional 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. To do this:

1. Plug one end of the RJ45 jack into the back of the NeuroField X3000 Plus unit where designated, “CANBus”.
2. Plug the other end of the RJ45 jack into the back of the NeuroField Q20 unit where designated “CANBus.” The units are now connected and can be used for pEMF and Z-Score training together.

**NOTE:** When using the Q20 and the X3000 plus together for Stim and RTZ, CONNECT ONLY 1 CANBus USB adapter!!!! See picture below to the right which also shows the HRV unit connection and single CanBus adapter.

### Q20 EEG and X3000

### Q20 EEG, X3000 Plus, and HRV

### To Connect the Coils

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

### Q20 EEG and X3000
Using and Connecting a Cap

NeuroField supports the use of a cap for 19-Channel training and uses the Lexicor/Brainmaster D25 pinout on the Q20 units. If you own those caps with that connector, they will work! **Note:** EEG amps all have different pinouts on the D25 connector. Any caps other than the Electro-Cap noted below, which is approved for use with the Q20 amp, must be evaluated and approved for use. Please contact NeuroField, Inc. for further information on cap evaluation and approval.

To Order a Cap and Ear Electrodes


1. When ordering you must ask for a specific type of cap and ear electrodes. The caps and ear electrodes that work with the Q20 are coded as:
   - Cap Code# = E1-LEX-L,M, or S. The L, M or S designates the size of the cap so you need to choose one of those letters for each cap size you order.
   - Ear Electrodes Code# = E5 9S-DROPS. These are very short “drop-down” ear electrodes and are important to order over the longer ones as they help to minimize noise.

   **Note:** If you own a Deymed Cap, Electro-Cap will make a Converter for you so you do not have to buy all new caps.

To Connect the Cap

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

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 beginning of Section III Hardware Setup.

To Power on the Q20 only:

1. Plug in the Q20 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.
To Power on the Q20 and X3000 (And HRV if purchased)
When these devices are all connected together, they form a “daisy chain”, and it is important to power them on in sequence:

1. Turn on Q20 First. Plug in the Q20 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.
2. Turn on the X3000 Second. 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.
3. If you have an HRV device, Power it on Third.

You are now ready to launch the NeuroField Software!
IV. Software Basics

This section is meant to teach you the basic information that is needed to use the NeuroField software. However, it is necessary to attend a formal training by Dr. Nicholas Dogris in order to learn how to use the system for clinical purposes.

Starting the Program

In order to run 19 channel training you must have a Q20 EEG device and a X3000 Plus or X2000/X1000 with a Plus unit. All the units must be properly connected. Turn on the X3000/Q20 by flipping the switch on the power supply before starting the program. If the unit has been disconnected or is not on when starting the program, you must power up your NeuroField device and be sure your CanBus adapter is plugged into the device before proceeding. See “Section III Hardware Setup” for further details.

When you are ready to start the program, you will need to select a database, ensure the unit is found, and then start the main program.

To Launch NeuroField, Select a Database and Start the Program:

1. Click on the NeuroField icon located on your desktop to start NeuroField. The main NeuroField 7.0 screen will appear.
**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” section make sure the “Run this program as Administrator.”

2. Select your desired database from the following options: **Note:** The “NeuroField Database” option is selected by default.
   - NeuroField Database: The official database for the NeuroField System
   - Provider Database: An empty set of tables that allow you to create your own user protocols.
   - Other Database: Allows you to Browse to the Database of your choice

   ![Stimulation Database Options](image)

3. Click on the “Start Program” button and the following will occur:
   - An initialization process will query the system to see if the NeuroField hardware is connected to the computer, a “Compatible Stim Unit Found!” message will be displayed, and the “Stim Launch Pad” appears.
   - The Stim Launch Pad window will appear.

**Troubleshooting**

If the Unit was not detected an error message will appear:

![Error Message](image)

1. Check to be sure that the:
   a. Hardware is powered on and connected to the computer correctly
   b. USB CANBus adapter is plugged in and the drivers were installed correctly.
   c. NeuroField was connected and powered up when the program was started up.

**Note:** If the X3000/Q20 is not powered on and connected to the PC, then the program will present an error message and will not allow you to enter the program. It’s a good idea to exit the program once the issue is fixed and reload the program.
**Entering and Selecting a Patient**

NeuroField was designed to store patient data quickly and efficiently AND to be paperless. The data is stored in the Patient.mdb database located in the NeuroField folder. **Note:** Remember to Backup your data at least once a month by clicking on the “Backup Databases” button. This will save a copy of your database in a folder called C:\DBBackup.

To begin treatment, you will need to first Enter the new patient into the database, and then Select that patient from your list.

**To Enter a New Patient:**
1. On the left side of the screen you will see a set of buttons. Click on “Select Patient” to enter a person’s name into the database.
2. Click on the “Add New Patient” button to enter a new patient name.
3. Enter the first and last name of the person in the designated boxes.
4. Once their name has been added, you can enter comments about them in the “Comments Box”.
5. Click on the “Update Patient Info” button. This will store the data in the database and you will see the patient name on the list. Names are stored in alphabetical order.

**To Select a Patient for Treatment:**
1. Click on the small box to the left of the patient name and an arrow icon will appear to show it has been activated.
2. Click on the “Select Patient and Close Window” button. The patient ID number will be displayed at the top of the screen and your patient is ready for treatment. After a treatment all of the patient information will be stored under this ID number. **Note:** if you want to view previous treatment data, Click on the “Select Patient and Show Treatment History” button.

**Using the Stim Launch Pad**

The “Stim Launch Pad” is where you will work most of the time.
On this page you can run a number of different types of treatments: Standard Treatment, Sweep Treatment, HRV Treatment, and EEG & RTZ Treatments (HRV/EEG/RTZ). At the bottom of the Treatment Page you will see seven buttons: Standard, Dehab, SDNN Hit, EEG Hit, Z-Score Hit, Start Standard Treatment, and Close. You can navigate to any part of the program using these buttons.

To Select a Protocol and Run Standard Treatment:
A Standard Treatment can be run without any EEG and/or HRV connected to the person. To do this you simply:

1. Place the Velcro cap on the patient’s head and attach the coils to the Velcro strips.
2. Click on the “Select Protocol/Treatment Setup Button” on the Stim Launch Pad. The “Protocol Selection” screen will appear.
3. Select the protocol that you want to use for your treatment. These protocols are selected based on the QEEG data and requires training in order to do this correctly. For example, if you client’s presenting symptoms are Anxiety and the QEEG data confirms that, you will want to run a slow wave protocol i.e. “1 – 4 HD” or “1 – 4 HD Rocking”.

Note: When selecting a protocol, you will see information as to the amplitude, duration and amount of stim cycles. The lower the amplitude (e.g. 1 volt versus 5 volts), the weaker the EMF emitted from the coils. For sensitive clients it is important that you assess sensitivity and reactivity so as to make a determination regarding treatment amplitude.
4. Set the number of loops. In the “Looping Setup” section of the Protocol Selection screen, enter the number of Loops you want to run during your session. The “Total Protocol Run Time:” automatically calculates and displays the time it will take to run one loop, and the “Total Treatment Time:” automatically calculates and displays the amount of time it will take to run the full designated number of loops. If need be, adjust the number of loops so the “Total Treatment Time:” is equal to the desired length of time the session.

5. If you are using the Q20 and running an RTZ session, you have the option of using the “Auto Abort Time:” section of the Protocol Selection screen. When enabled this tells the system to abort after the designated period of time. This is useful during an RTZ session when the system sticks with a specific frequency instead of continuing to cycle through the frequency range and completing the loop. When checked, it will now automatically abort after a certain period of time without you having to manually hit the “Abort Process” button.

6. Press the “Select and Close” button and you will return to the Stim Launch Pad.

7. Press the “Start Standard Treatment” button. The protocol will start to run and you will see the “On/Off” status ‘light up’ green each time a Stim Cycle is run.
8. Proceed to the following sections of this manual to learn more about setting up the software for RTZ or Stim-Only NeuroField sessions. If you want to run a:
   a. Stim Only session using either the X3000 or X2000, proceed to Section V
   b. 19 Channel RTZ session using the Q20, proceed to Section VI
   c. 1 to 4 Channel RTZ session using the Q20, proceed to Section VII
   d. 2 Channel RTZ Session using the X2000, proceed to Section VIII

To Abort a Protocol:
1. Click on the “Abort Process” button on the lower right hand corner of the screen.
Note: The abort process will not always happen immediately. The protocol will be aborted as soon as the current stim cycle that was in process when the button was clicked is completed.

To Exit the Program:
1. Click on the “Exit Program” button on the lower right hand corner of the screen.

Using Sweep Control
In the Protocol Selection Screen, you will see a section called “Sweep Control”. Here you can apply a dithering or sweep effect to the frequencies for protocols located in any NeuroField database. For example, a sweep of 5Hz applied to a fixed protocol number of 10 Hz would result in NeuroField sweeping through the fixed frequency, making 10Hz the median number in the sweep and giving stims beginning at 8Hz and ending at 12Hz.

In addition, the Sweep Controls can be a nice short cut to change the amplitude and duration values of pre-set protocols in NeuroField. This saves an enormous amount of time and makes giving specific patient-oriented treatments efficient. Values entered here will override the pre-set protocol settings, so protocols can be adapted on-the-fly to the needs of the patient. For example, if there is a protocol you want to use that is pre-set to 5 volts (i.e. “T001 --> 0.31 - 1 Hz, 5 v, step 0.01”) and your patient is showing signs of sensitivity, you can change the Amplitude to 2.5 volts in the sweep controls and a 5 volt protocol now becomes a 2.5 volt protocol.

To Use Sweep Controls:
1. From the Stim Launch Pad, click on the “Select Protocol/Treatment Setup” button and the Protocol Selection screen appears.
2. In the “Sweep Control” section of the Protocol Selection screen, click on the “Enable” radio button and the controls will become visible.
3. Enter the “Total Sweep” value you would like to use and the protocol will sweep through additional frequencies. In almost all cases the most you would want to sweep will be between 3-5 Hz. You can also leave the frequency value at zero for the purpose of simply customizing preset protocols. **Note:** The Total Sweep is hardly ever used since the HD protocols do such a good job, but it is there if you want it.
4. Enter the “Duration”. This can be between 100 msec to 60000 msec. Values must be entered in milliseconds. **Note:** 1,000 msec equals one second.
5. Enter the “Voltage”. This can be between .00008 (800 microvolts) to 5 volts. **Note:** The higher the voltage the stronger the EMF produced in the NeuroField coils.

**To Customize a Pre-Set Protocol:**
The Sweep Controls can be used to easily customize NeuroField’s pre-set protocols to adapt to the needs of the patient receiving the treatment. To modify a pre-set protocol on-the-fly for your patient:
1. Click on the “Enable” radio button and the controls will become visible.
2. Leave “Total Sweep” at 0.
3. Change “Duration” to a new Stim time. For example, when using a preset protocol with a 1 second stim, change the “Duration” to 3,000 msec to make it a 3 sec Stim protocol.
4. And/Or Change the “Voltage” to what better suits your patient.

The values changed here will override the preset values in the protocol you are using. Also, NeuroField will give you an error if you go below the minimum capabilities of the system. If you give it a 5hz sweep on .311hz protocol, you will get an error message. If you are going to sweep through something make sure the room is there to be able to do it.

**Using the Main Program Side Bar**
There are several buttons on the side bar on the left side of the main program screen.

**View History Button:**
Once your protocol has finished running, you can then open the Patient History page and view the session, write comments about your client and/or the session, or print a hard copy.
1. Click on the “View History” button after the protocol is complete and the Treatment History page pops up. Here you will see all the treatment history for every person you have treated with NeuroField. The patient ID, date, time and protocol will be displayed.
2. Highlight any treatment listed and in the “Special Comments for Selected Treatment” area of the page write any notes that may pertain to the client or the session.
3. Click on the “Update Treatment Data” button. This will save the note and link it with the specific patient and session. When you review the treatment history all of this information will be instantly available to you.
4. Click on the “Print Window” button and the selected patient history will print out.

**The “Load Database” Button:**
This allows you to load different databases including the Provider and other user databases. To load a database:
1. Click on the “Close” button located on the lower right corner of the Standard Page and it will Close.
2. Click on the “Load Database” button on the side bar. A message box will open instructing you to close all open windows.
3. Click “Ok” and the “Database Selection” window will open.
4. Select the database that you want to use and Click Ok. The database will load and take you back to the Standard Page.

**The “Backup and Restore Database” Buttons:**
Allow you to save your provider and patient databases into a folder called NFDBBackup on your hard drive located at C:\NFDBbackup. This is for backup purposes only. Should you lose your databases you can restore them back into your working NeuroField folder by selecting restore database. However, in order for this function to work you must first backup the databases.

**The Remaining Buttons:**
The Cal/Test HRV, View HRV, Stim and HRV, HRV Only, Stim Only and Detailed Spectrum Buttons open different NeuroField interfaces in an arranged fashion. This is for the purpose of viewing data quickly and easily.

The HRV Summary, EEG Summary, Z Score Summary, EEG Hit List and Z Score Interface buttons maximize and minimize each of these windows. Each of the windows will be minimized when the EEG or HRV functions are used.

**Using the Dehabituator**
The "Dehabituator" is a random number generator that allows you to give four random frequencies simultaneously per stim cycle. The purpose of the Dehabituator is to disentrain deregulated absolute power, coherence and phase in the brain. This allows the brain to re-calibrate itself in an effort to correct pathological brain states. 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.

**Note:** The Dehabituator has many uses and settings. It is recommended that you attend an advanced training to learn these advanced treatment techniques.

**To Start the Dehabituator – Using Fixed Values:**
1. Click on the “Dehab” button on the Standard Page and the Dehabituator Page will appear. It contains:
- Boxes at the top of the screen with 2 columns labeled:
  - “Fixed Value”
  - “Check to Randomize”.

  **Note:** The page loads in Fixed Value mode with the “Fixed Value” column set by default.

2. Enter the values you wish to give in the boxes at the top of the screen. Try it! Using the “Fixed Value” default settings, click the “Start Dehabituator Treatment” button at the bottom of the page. A table will be created using those values as pictured below.

To Start the Dehabituator – Using Random Values:
2. Decide which values you want to randomize. You can randomize either one or all of the settings for the Number of Stim Cycles, Frequency, Duration or Amplitude.
3. In the “Check to Randomize” column at the top of the Dehabituator Page, check the box next to the setting you would like to Randomize. For example, to randomize only the frequency, check the box next to “Frequency” and leave the rest of the random settings unchecked, thus Fixed.
The “Frequency” box will disappear from the “Fixed Value” column and will re-appear under the “Random Lower Limit” and Random Upper Limit” columns. Once any one of the settings in the Randomize column has been activated, “Random Lower Limit” and “Random Upper Limit” boxes will appear on the upper right side of the page for that setting, as pictured below.

Note: the Optimal Randomized Setting is as follows:

- Keep the “Stim Cycle Fixed (do not click on the Randomize check box) and enter a value between 100 – 1000 cycles.
- Randomize “Frequency” by clicking on its check box.
- Set the Frequency Lower Limit to 1 and the Upper Limit to 100 (or 1000).
- Randomize the “Duration” by clicking on its check box.
- Set the Duration Lower Limit to 500 and the Upper Limit to 1000.
- Set the Amplitude Lower Limit to 2.5 and the Upper Limit to 5.

Again, it is recommended that you attend an advanced training to learn these advanced treatment techniques.
Using the Q20 in Neuroguide
The NeuroField Q20 device can be used in conjunction with the Neuroguide software Version 2.7.7 or later to generate a QEEG. To Setup the Q20 in Neuroguide:

1. Launch Neuroguide and it will Open to the default Neuroguide window.
2. Click on “Collection” from the Main Neuroguide menu.
3. Go to “Hardware Selection”.
4. Select the “NeuroField Q20” amplifier. The menu will close and the Q20 is now available to use.
5. Continue in Neuroguide and Click on “Collection” from the Main Menu.
6. Select “Setup and Monitor”. If the Q20 is connected correctly you will see the following screen:
V. NeuroField Stim-Only

NeuroField Stim-Only can be run using both the X3000 Plus or the X2000 or X1000 with a Plus Unit. Stim-Only allows you to run a protocol as a standalone treatment by giving a stim without using the RTZ EEG measurements. You simply load up the proper protocol and loop it multiple times to drive the brain at a specific frequency. This can be done without engaging the client in operant conditioning, as the brain will mimic the pEMF frequency and begin running at that speed. In other words, if the brain is given an EMF of 1 Hz, it will start to run or oscillate at 1 Hz. Thus, the pEMF itself is a form of entrainment.

For example, if you have a client with excessive high beta and they are given stims in the low frequency range such as at 0.31–1hz or using the 1–4 HD Rocking protocol, it can reduce anxiety dramatically on its own without running Neurofeedback. Or, in the case of ADHD kids, giving the 15-19 HD protocol looped over the regions where the QEEG indicates excessive slow wave activity will make a big impact very quickly. **Note:** In many situations it is also important that learning take place, so pairing this treatment with LORETA Neurofeedback using 19 channel and the Q20 or 1–4 Channel and the Q20 with a Breakout Box can be even more effective. Knowing when to do so is crucial, and it is strongly recommended that you participate in a training class before using the Stim-Only or any of the NeuroField techniques.

Please remember one simple rule with this procedure. This process takes a lot of energy from the body 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 this treatment. It is important to encourage people to eat healthy protein and drink plenty of water pre and post sessions. This gives the brain the energy it needs to stabilize itself.

**Reviewing the QEEG**

It is important to know that acquisition of the QEEG data is essential in making this process work correctly. Having the brain map and knowing where the excess and deficiencies are is crucial in determining which areas of the brain to work on, and it makes all the difference in treatment results. Dr. Dogris offers several trainings per year in different locations around the United States. He also offers online consultations and mentoring to learn these skills and procedures. Dr. Dogris uses the Neuroguide QEEG software to acquire, edit and analyze EEG data. You can learn more about Neuroguide by going to the [www.appliedneuroscience.com](http://www.appliedneuroscience.com) website.

So, once you have received the proper training, 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, and for the purpose of this exercise, we will use the Z Scored Summary page and the Z-Scored FFT Absolute Power 1Hz Bin maps to identify the treatment area. Also, as an example, we will be using a client with the presenting symptom of severe anxiety and a brain map with excessive high beta.
To Choose Frequencies and Coil Placement:

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 – 30hz 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 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.
**Attaching the Coils and Starting NeuroField**

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.

**To Attach the 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.

**To Start NeuroField:**
1. Launch NeuroField and choose your database.
2. Click on the “Start Program” button and the “Stim Launch Pad” window will appear.
3. Select your patient.  
   **Note:** For detailed instructions on starting NeuroField and selecting a patient, go to “IV Software Basics - Starting the Program.”

**Selecting the Protocol and Setting Loops**

When selecting a protocol, choose one that lists the frequencies you want to train. You can click on the “View Protocol” button to see a list of frequencies included in the protocol.

In addition, when using NeuroField - Stim-Only, you are going to need to decide how many loops to run in order to complete the session and effectively drive the brain. Loops tell NeuroField to continuously repeat the protocol until the designated number of loops is reached.
To Select a Protocol:


2. Select the protocol that you want to use for your treatment from the drop down list. These protocols are selected based on the QEEG data and requires training in order to do this correctly. For example, if you client’s presenting symptoms are Anxiety and the QEEG data confirms that, you will want to run a slow wave protocol i.e. “1 – 4 Rocking” or “1 – 4 HD Rocking”.

   Note: When selecting a protocol, you will see information as to the amplitude, duration and amount of stim cycles. The lower the amplitude (e.g. 1 volt versus 5 volts), the weaker the EMF emitted from the coils. For sensitive clients it is important that you assess sensitivity and reactivity so as to make a determination regarding treatment amplitude. As a rule use short durations with sensitive clients.

3. The description lists the pre-set duration for that protocol. If you want to change the duration for each stim in your protocol, follow the procedures in “IV Software Basics - Using Sweep Control”. It is important to give enough EMF to drive the brain, but to be careful not to over drive the system, so setting the duration is key. Again, it is a good idea to participate in a NeuroField training.

To Set the # of Loops:

1. In the “Looping Setup” section of the “Protocol Selection” screen, when you select a Protocol, the “Total Protocol Run Time” field will automatically populate with how long the selected protocol will take to run through 1 cycle. Determine the length of time you want your session to run.

2. Change the number of loops to reflect the length of time you want for your session. The “Total Treatment Time;” automatically calculates and displays the amount of time it will take to run the full designated number of loops. If need be, adjust the number of loops so the “Total Treatment Time;” is equal to the desired length of time the session. In order to:
- Reduce Anxiety - You will select a lower frequency protocol such as “1-4 HD” to drive the brain in that direction, away from higher frequencies over the treatment area.
- Improve Attention - You will select a higher frequency protocol such as “15-19 HD” to drive the brain in that direction, away from slower frequencies over the treatment area.

In this example, there is a great deal of High Beta, so we will select the “0.31 – 1Hz 5v step 0.01” (ultra slow) protocol to lower high beta. You can also use 1 - 4 HD Rocking protocol. Again, to get a good working knowledge of the NeuroField protocols, it is a good idea to participate in a NeuroField training.

**Important Note:** DO NOT USE OR DELETE the DeHabituation Protocol. You will never need to select the DeHabituation protocol. It is in there only because it is required in order to use the DeHabituation itself and store the random number. You run the DeHabituation only from the DeHabituation tab.

3. Notice that you can enable the “Sweep Controls” here for your session. For step by step instructions for Using the Sweep Controls go to “IV Software Basics - Using Sweep Controls” earlier in this manual.

4. Once you have selected your Protocols and set the number of loops, click on the “Select and Close” button and you will return to the Stim Launch Pad.

5. Click on the “View Protocol” button. This will show you the number of frequencies and the exact details on each stim per channel. **Note:** When a Protocol Name contains a “step” description such as “step 0.1” or “step 0.01”, this tells NeuroField to step through each frequency by 0.1 or 0.01 increments when giving a stim. The screenshot below shows the “1 - 3 HD” protocol with 21 frequencies and a step of 0.1.
**Running the Stim-Only Session**

When the protocol has been selected, and the number of loops has been calculated, the protocol is ready to go.

**To Run Stim-Only:**

1. Click on the “Start Standard Treatment” button. The Stim cycle begins and you can view the status of each stim. NeuroField tells you:
   - What Stim Cycle you are on.
   - The time you started the Protocol.
   - How many seconds have elapsed since you started the protocol.
   - The “Running Protocol Loop Number” will list the current loop number and the “Present Loop Number” box will also reflect current loop for the session.

2. When the Protocol is over, the NeuroField Stim status indicators will disappear. You can then Click on the “View History” button on the Menu Sidebar to see your treatment details and patient information which is saved electronically. You can also add session notes.
VI. Real Time Z-Scores (RTZ) using Q20 - 19 Channels

The newest innovation in the NeuroField toolset is called the Real Time Z-Score (RTZ) procedure using a combination of 19 channels of EEG with the Q20 and pEMF frequencies generated from the X3000 or X2000/1000 with a Plus unit. The RTZ procedure is a norm-referenced, pEMF biofeedback procedure in which a pEMF frequency is given, EEG is measured, and Z-Score data is generated. If the Z-Score falls within the Z-Score range set by the user, then the same pEMF is given again until the Z-Score no longer meets the Z-Score previously set. In essence, the RTZ procedure guides the brain to a regulated level of functioning using norm referenced Z-Score data. The RTZ 19 channel training can be used with any of the NeuroField protocols. Note: NeuroField uses the Neuroguide database to generate norm referenced data.

The DLL used in the RTZ 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. Refer to Chapter II “Software Installation”. There you will find a section titled “Generating the License Key”.

This procedure is an advanced skill that requires training and experience to conduct. It is strongly recommended that you participate in a NeuroField training before using this technique. 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 offers several trainings per year in different locations around the United States. He also offers online consultations and mentoring to learn these skills and procedures. However, there are also many other skilled professionals who also offer similar services and can be found at www.ISNR.org or www.AAPB.org as well.

Prepping for RTZ – 19 Channel

When prepping a patient for RTZ you will use a QEEG Cap. It is important that you have purchased the correct cap and ear electrodes. See “III Hardware Setup – Using and Connecting a Cap” earlier in this manual to ensure you have an approved cap. It is also suggested that you attend a training to learn the proper procedures to Gel a cap and to ensure there are good connections (impedances). Note: Individual 19 channel surface electrode connectors have been omitted on the Q20. Go to “VII Q20 RTZ – 1 to 4 Channels” for surface electrode details and instructions.

To Attach the QEEG Cap and the NeuroField Cap/Coils:

1. Plug the D25 Din connector on the cap into the Front of the Q20 unit where the pin connector is marked “Cap.”
2. Place the Cap on the head along with ear electrodes and apply the gel.
3. Cover the 19 channel QEEG Cap with a surgical cap.
4. Plug the coils into the front of the X3000 or X2000 plus unit where it is marked “Coil Drive”.
5. Place the NeuroField black Velcro cap supplied with your NeuroField kit on the client’s head over the surgical cap.
6. Attach the Coils to the Velcro strips on the black NeuroField cap at the 10/20 sites you want to train with your NeuroField Protocols.

**Setting Up the RTZ Session - 19 Channels**

There are just a few preliminary steps necessary in order to complete your protocol setup and run an RTZ session for 19 Channels. **Note:** See the “IV Software Basics” section earlier in this manual for more in depth instructions on how to follow the procedures below.

**To enter RTZ mode:**
1. Select a patient.
2. Select a database.
3. Start the Program.
4. Select a protocol (i.e. 1 – 4 HD Rocking). **Note:** These protocols are selected based on the QEEG data and requires training in order to do this correctly.
5. Click on Enable EEG. The EEG Measurement options appear.
6. Click on the “Enable Z-score” box. The Sensor Placement options/ Select Threshold button appear.
7. Click on the “Enable RTZ” box.
   **Note:** All of the Options in Steps 5-7 above must be selected in order to run the RTZ procedure.
8. Enter the patient age into the “Patient Age” box.
9. Click on the “Eye Status” drop down menu and select the Eye Status condition, i.e. Open or Closed. For slow wave protocols, they are typically run with Eyes Closed.
10. Select type of Sensor Placement by using the default, “QEEG Cap” for 19 channels. **Note:** Individual Electrodes for 4 Channel RTZ can also be used with a Breakout Box. See “VII RTZ Q20 - 1 to 4” section of this manual for details.
Setting-up Thresholds

NeuroField provides a number of “Canned Thresholds” for you to easily “Select and Go!” When setting up the Z-Score thresholds, you can choose to use the provided Preset Threshold setups from the drop down menu list. Or, you can customize your own setups.

To Use a Pre-Set Threshold:

1. With 19 channels of EEG connected to the scalp and the QEEG Cap selected, click on the “Set Z-score Thresholds” button and “Z-Score Threshold Setup” window appears.

2. Click on the drop down arrow next to the site you want to train. You will see a list of “Canned Thresholds”. NeuroField defaults to the Threshold Setup “OFF” selection.

3. In the drop down list, pick the threshold that specifies both the frequency band and the Z-Score value you want to train. This should always be based on your QEEG brain map analysis. **Note:** See “Assessing Your Client” later in this Section of the manual for further details on looking at your clients Z-Scores in real-time to guide the threshold selection process. For this example select F4 Theta 1 to -1. During training the system will look for Theta at F4 to fall between 1 to -1. **Note:** If the setup you want is not listed, you will need to follow the steps in the “Assessing Your Client” section below to create a custom threshold.

4. Continue to select additional Site thresholds i.e. C4 Theta 1 to -1 and F3 Delta 1 to -1. You can set this up any way you want.

5. Click on the “View” button next to one of your chosen Site Thresholds and you can examine that the proper selection criteria is set. Check the settings to be sure that the:
   a. Frequency bands you selected are the only ones enabled.
   b. The Upper and Lower Limits are set to what you expected. For example, 1 and -1.
6. Click on the “Update Threshold Setting” and “Return to Threshold Selection” button to go back to the “Threshold Setup” screen.

**To Set the Logic Mode:**

1. In the “Threshold Logic Mode” section of the “Threshold Setup” screen, select your logic mode. 
   **Note:** The program defaults to the “OR” logic mode. How this works is that after an EMF stimulation is given, the EEG is recorded and Z-scores are generated for all 19 sites. The system then determines which, if any, of the sites achieve the designated threshold. In the example above, with the three thresholds set to F4 Theta 1 to -1, C4 Theta 1 to -1 and F3 Delta 1 to -1, you have two choices for your threshold logic:
   a. “OR” meaning that any one of the Z-Scores at the selected sites can come within threshold range to create a “Hit”. For example, if F3 Delta does not fall within 1 to -1, then the next site F4 is examined for Theta 1 to -1 and then to C4 Theta 1 to -1. If any one of these sites achieves the threshold then NeuroField will count it as a “Hit”. This says, if F3 Delta, or F4 Theta, or C4 Theta is 1 to -1, give it a hit.
   b. “AND” meaning that all of the Z-Scores at the selected sites must come within threshold range simultaneously in order for a hit to occur. This is a more stringent threshold as it requires that all of the chosen sites/frequency bands Z-Scores must achieve whatever threshold values you chose. This says, if F3 Delta and F4 Theta and C4 Theta is 1 – 1, give it a hit.

2. Click on the “Load ZAP Thresholds” button and the Window will close.
3. You are now ready to start a session. Continue to the section below titled, “Running an RTZ Session.”

It is important to monitor your session and determine if your Preset Threshold setup is effective. If you notice that the patient is finding it very difficult to (or may never) meet the Threshold criteria and get a Hit, your preset threshold is too low (or too hard). For example, if the preset Theta threshold is set to 1 to -1 limits but during the session your client consistently hits Theta of say 2.5 in the upper range, you’ll need to follow the steps in this next section to assess your clients Z-scores, create a custom threshold for F4 Theta, and raise the limits to, say 2 and -2.

**Assessing Your Client**

Before setting up the Z-Score Thresholds, it is a good idea to first scan the EEG and assess your client. This will allow you to get a real-time Z-Score reading and assess the client’s Z-score range for better Threshold control during the session. To do this you will run a Scan.

**To Run a Scan:**

1. On the NeuroField Main Menu, Click on “NeuroField Interfaces” and Select “NeuroField EEG Interface” and “NeuroField 20-Channel.
2. Click on the “Scan” in the top right corner of the screen. The Z-Score 19-channel tabular will appear and EEG will be measured. All 19 channels will populate with Z-score data. For more information on the Z-Score tabular.
   
   * Every 8 seconds NeuroField scans another round of EEG until you abort the process.
Because the data is overwritten with each scan, you can see the changes in real-time. This allows you to find a consistent pattern of Z-Score outliers in a particular frequency band and make an estimation of the current Z-Score frequency band(s) you wish to threshold.

**To Determine Which Frequency Band(s) and Z-Score Range to use:**
1. In the Z-Score Tabular window, find the Frequencies with the most deviant Z-Scores, either Red (excessive) or Blue (deficient).
2. Within those frequency bands find the Z-Scores that are the largest outliers (highest numbers either + or -).
3. Look at your QEEG Z-Score Map data and determine if what you see in the Tabular is a consistent finding with the Q.
   - **Note:** Sometimes in mapping you get data that is not consistent. You may think that a Q is always going to be constant every single time, but sometimes it is not. However, if you have a client with a consistent pathology it should show itself consistently, or if you have a client with clearly deviant Z-Scores at the time of the session and you’re sure it’s not artifact, that’s a good place to start as well.
   - **Note:** If you are looking at the Neuroguide Maps where your client has a Z-Score of 3 standard deviations and you run Z-score Neurofeedback, you will notice that the standard deviation will be close to half of that, say usually roughly 1.5. So if you have a map of someone with 3.0 Z-scores, make the assumption that it will be around 1.5 in NeuroField when making the comparisons.
4. Make a note of the frequency band and the outlier numbers determined above. You will use this data in the “To Setup a Custom Threshold” section below. For example, if High Beta comes consistently high (red) at Channel 1 and Channel 2, and shows outliers of (1.84, 1.75, etc.):
   - **Note** High Beta as your frequency band to Threshold.
   - **Note** 1 to -1 as your upper and lower limits to Threshold
5. Click on “Abort Process” button on the bottom right of your screen to stop the EEG acquisition.
   - **Note:** Again, you must abort the process before leaving or it will continue to scan. When you abort the scan, it will complete whatever scan is in process and then perform the abort.

After assessing your clients QEEG, you may find that preset drop down list does not contain a setup that matches your criteria. For example, you may want to train more than one frequency band at a particular site or the threshold limits appropriate for your client are not listed as a threshold. So, you can easily create a custom Threshold.

**To Setup a Custom Threshold:**
1. Click on the “Select Z Score Thresholds” button from the Stim Launch Pad.
2. Click on the drop down arrow next to the channel/site you want to threshold. For this example choose F4 and you will see a list of “Canned Thresholds”.
3. Scroll down to the end of the list and select the first option for “Empty”. This will bring up an empty threshold for you to customize.
4. Click on the “View” button for F4. You will now see the “ZAP Threshold Setup” screen appear. Here you can enable any of the frequency bands for a given site and set the Z-Score range anywhere between 1 to –1 and 6 to -6. This is a very versatile and powerful control for your thresholds.

5. First change the Name of your Setup in the “Name” field at the top of your screen. You can give it the name of your client or a more generic name for the frequency band itself. For this example we want to only change the upper and lower limits of the Theta frequency band at F4, so you will name it: “Theta 2.0 to -2.0” Note: You can add a description if you like. This is particularly useful if you are making a custom threshold for a specific client.

6. In the “ZAP Threshold Settings” section of the “Z-Score Threshold Setup” screen, notice that next to each frequency band is a check box that enables or disables it. If the box is not checked, it means that the frequency for the selected Channel (F4 in this example) is “Disabled”. Since the selected Threshold Setup was “Empty”, all the frequency bands are unchecked (or disabled) by default.

7. Enable the Frequency Bands you want to customize for your RTZ session by simply checking the box next to the desired band. You can check multiple bands if desired, but remember the more bands you choose the more difficult it will be to meet the criteria and get a “Hit”. If you make multiple selections here really evaluate the most effective Logic mode and you may want to use the “OR” option. For this example, we will only enable Theta.

8. Change the ZAP Upper and Lower threshold settings to 2 to -2 by entering a number in each of the respective boxes. Note: You don’t have to enter a lower range. If the QEEG shows that there is no deficiency, you can leave the setting at 0.

9. Click on the “Update This Threshold Setting” button and now the threshold is enabled.

10. Click on the “Return to Threshold Selection” button. Your custom threshold setup will now appear in the “Z-Score Thresholds Setups” drop down list for F4. You can then View it and see your Setup.

11. Repeat Steps 1 – 10 above for additional sites.

You have now completed setting up your custom ZAP Thresholds for RTZ training.

Running an RTZ Session – 19 Channels

Before running the RTZ session, get the client to relax:

- Feet on the floor
- Eyes looking forward or relaxed if closed
- Jaw loose and tongue floating (not pressed against roof of their mouth)
- If adult, train with Eyes Closed or Open depending on what procedure is being used. If child, play a DVD with no talking.

Note: Keep in mind that these protocols can take anywhere from 20 – 45 minutes to complete. It is important that after the treatment has started, you monitor the session. It is recommended to check in with the client every 10 minutes as the protocol commences. If the person reports any discomfort, abort the procedure and stop the session.
To Start and Monitor an RTZ Session:

1. Keep the loop set at 1. With RTZ you do not set the loops. The length of the session will depend on the threshold and how many hits the client gets.
2. Click on the “Start Standard Treatment” button. The RTZ session will begin and the client should start getting a “Hit” when the Z-Scores threshold criteria is met.
3. Look at the “RTZ Hit Count” in the “Loop” section of the Stim Launch Pad. It will update each time a Hit occurs and accumulate a running total. To generate a Hit during an RTZ session, NeuroField:
   - Gives an EMF pulse
   - Measures 4 seconds of EEG
   - Plugs that EEG into the Z-Score DLL
   - Returns all of the Z-Scores. **Note:** During this stage, if the eyes are open, the Neuroguide database will automatically artifact the data. It will look for eye blinks and EMG, and remove them.
   - Sounds a “Hit”, or Tone if all of the Z-Scores fall between the set upper and lower threshold limits (1 and -1) in each channel. This means the criteria is met and the brain likes that frequency. **Remember:** If “AND” logic mode is selected, more than one frequency band/site is selected, and the chosen limits are lower, the more complex the criteria and the harder it is to get a Hit.
   - Automatically gives that same frequency again. For example, let’s say the hit was at 24 Hz, NeuroField automatically gives you 24 Hz again, reinforcing the same frequency with an EMF that brings your brain toward the desired state that you setup in your threshold.
   - Keeps giving a Stim, reinforcing the same frequency again and again, pushing you towards a normative state until it no longer returns a Hit and stops doing it.
   - Moves on to the next frequency and repeats the process which could go on for 20 – 45 minutes depending on how you set the threshold. If you made the criteria difficult, you won’t get that many repeats and the session will go faster. But, if you set the threshold just slightly below the target Z-scores, then you are going to be driving the brain down into that range, and it will keep on repeating to stabilize the brain.
4. Monitor the session to determine if your Client is not getting a Hit at all or is constantly getting a Hit. This means that the criteria in the Threshold Setup is too difficult (no Hits) or is too easy (constant Hits). If this is the case, Abort the Process, adjust the Threshold, and start the session again. If you assessed your client in the section above, you will most likely not have to make many changes right away.

To Monitor Z-Scores using the Tabular:

You can monitor the Z-Scores in real time and observe the changes in the Z-Scores every time a stimulation is given.

1. Notice “Z Score Tabular” screen. There are 3 tabs:
2. Review the Data in each column on the ZAP tab. Every 8 seconds a new EEG scan pass will occur and the Tabular will populate with the Z-Scores. You will see Red, Blue, and Green data. The color coding is as follows: Note: With each scan the previous data gets overwritten.
   i. Green = Z-Score between 1 and -1
   ii. Red = Z-Score Excessive or above 1
   iii. Blue = Z-Score Deficient or less than -1
3. Notice the “20 Channel EEG Data” screen. Here you can see:
   - Individual EEG data for each site.
   - Double on the window and it will zoom into the data.
   - Select the “View Zoom” button to view individual plots.
   - Select the “EEG Zoom” to zoom in and look at the EEG from another perspective.
To Monitor Sessions When Using the HD or HD Rocking Protocols:

1. When you select say the:
   a. “T062 -- > 9-12 HD” protocol for someone who is deficient in Alpha, it starts at 9 Hz and steps through to 9.1, 9.2, 9.3 etc. all the way to 12.
   or
   b. “T015 -- > 1-4 HD Rocking” protocol for someone who is deficient in Delta, it starts at 1 Hz and steps through to 1.1, 1.2, 1.3 etc. all the way to 4 and then goes back down 3.9, 3.8 or 3.7 all the way back to 1. This is method instills flexibility and is not as jarring as going straight back to 1 after hitting 4.

2. Be patient during the session when monitoring the HD protocols. These protocols have the ability to really “tease out” what frequency will get the brain to where you want it to go. By stepping thru each frequency in small increments, you are ticking through each one of those pieces of the frequency band and eventually you will start hearing Hits. However, you could go for quite a while without getting a hit and then bam, the brain locks on to a frequency and the hits start coming.

3. Notice at this point that the brain will start replicating that frequency rhythm to correct the Z-Score and NeuroField will continue reinforcing it. If you get a Hit at 9.4 it will give 9.4 again. If
you get another Hit, it will give 9.4 again. The client could then go 20 minutes and only get through a small portion of the frequency band, but it is the most effective piece. At some point, it will then stop producing a normative Z-Score and move on.

**Ending a Treatment and Saving Session Data**

**To Complete an RTZ Session:**
1. When the protocol is done the Stim cycles will stop. At this point you can elect to end the session or
2. Run another session using the Z-Score Hits that are recorded in the Z-Score Hit Table during the Session.

If you want to view the session data or Plot it out using NeuroPlot, you must first Save the Session data. With NeuroPlot you can chart each one of the specific frequency bands.

**To View or Save Session Data:**
1. Click on the “Z Score Summary” button from the Main Menu side bar. Here you can see all of the data.
2. Scroll down and look at all 19 channels. You can look at each of the frequency bands and the Z-Score that was measured.
3. To save the data, Click on the “All Channel Text File Dump” button. This will save the data for all channels in the patient data folder.

This data can then be examined in NeuroPlot. See “IX NeuroPlot” later in this manual for details.
VII. Real Time Z-Scores (RTZ) Q20 - 1 to 4 Channels

Real Time Z-Score (RTZ) procedure can be used with 1 - 4 channels of EEG using the Q20. The RTZ protocol is a norm-referenced, pEMF biofeedback procedure in which a pEMF frequency is given, EEG is measured, and Z-Score data is generated. If the Z-Score falls within the Z-Score range set by the user, then the same pEMF is given again until the Z-Score no longer meets the Z-Score previously set. In essence, the RTZ procedure guides the brain to a regulated level of functioning using norm referenced Z-Score data. **Note:** NeuroField uses the Neuroguide database to generate norm referenced data.

The DLL used in the RTZ 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. Refer to Chapter II “Software Installation”. There you will find a section titled “Generating the License Key”. NeuroField also supports the use of a cap for 1-4 Channel training. See “VI RTZ using Q20 – 19 Channels” for instructions.

**Prepping for 1 – 4 Channel RTZ**

When prepping a patient for RTZ using individual electrodes, it is important that you clean the sites where the sensors are placed and correctly connect the electrodes to the Q20 device.

**To Clean Sites and Attach Sensors to Head:**

1. Take a cotton swap and apply a small amount of NuPrep to the swab.
2. Clean both ear lobes and the two sites were you intend to place electrodes with the NuPrep.

**To Attach the “Breakout Box”:**

1. Plug the white “Breakout Box” that came with your kit into the “Cap” slot on the front of the Q20 device.
2. Note the color-coded connectors on the Breakout Box and their purpose:
   - Four Red Connectors = Active Electrodes
   - Two White Connectors = Reference Electrodes
   - One Black Connector = Ground Electrode

**To Connect Electrodes to the Q20 and Attach Sensors:**

1. Plug the Ear Clip electrodes into the two white connectors on the Breakout Box and attach one to each ear. These are the Reference electrodes.
2. Plug a standard electrode for the Ground into the black connector on the Breakout box and attach to a grounding site on the head. **Note:** Often times a site approximately ½ inch from Fz towards the Nasion is used as a grounding site.

3. Plug the electrodes you will use for training into the red connectors on the Breakout box and one on each 10/20 site to train. These are the Active electrodes. Channel 1 is the red connector furthest to the left, then channel 2, 3 and channel 4 which is next to the white connector.

### Attaching the Coils

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.

**To Attach the Coils:**

With the EEG sensors placed on the head and connected to the unit as described above, cover the head and sensors with a surgical cap. **Note:** It is advisable to cut small squares of paper towels, place one over each electrode, and push down with a pinch and twist of the paper towel and electrode. This will secure the electrode to the scalp and provide another layer of protection between the electrodes and the surgical cap.

1. Place the black NeuroField Velcro Cap over the surgical cap.
2. Attach the Coils to the velcro strips on the NeuroField cap at the 10/20 sites you are training

### Setting Up the RTZ Session – 1 to 4 Channels

There are just a few preliminary steps necessary in order to complete your protocol setup and run an RTZ session for 1 to 4 Channels. **Note:** See “IV Software Basics” earlier in this manual for more in depth instructions on how to follow the procedures below.

**To enter RTZ mode:**

1. Select a patient.
2. Select a database.
3. Start the Program
4. Select a protocol (i.e. 1-4 HD Rocking). **Note:** These protocols are selected based on the QEEG data and requires training in order to do this correctly.
5. Click on Enable EEG. The EEG Measurement options appear.
6. Click on the “Enable Z-score” box.
7. Click on the “Enable RTZ” box.
   **Note:** All of the Options in Steps 5-7 above must be selected in order to run the RTZ procedure.
8. Enter the patient age into the “Patient Age” box.
9. Click on the “Eye Status” drop down menu and select the Eye Status condition, i.e. Open or Closed. For slow wave protocols, they are typically run with Eyes Closed.
10. Select “Individual Electrodes” as the type of Sensor Placement to be used. With the Q20 you have the option of using up to four individual electrodes. You can run 1 or all 4 channels. A Breakout Box” was part of the Q20 package for using this specific procedure.
11. Enable the sites you want to use. For this example, select four frontal sites: Fp1, Fp2, F3, and F4.

**Setting-up Thresholds**

NeuroField provides a number of “Canned Thresholds” for you to easily “Select and Go!” When setting up the Z-Score thresholds, you can choose to use the provided Preset Threshold setups from the drop down menu list. Or, you can customize your own thresholds.

After assessing your clients QEEG, you may find that preset drop down list does not contain a setup that matches your criteria. For example, you may want to train more than one frequency band at a particular site or the threshold limits appropriate for your client are not listed as a threshold. So, you can easily create a custom Threshold. See “VI Assessing Your Client - Setting-up Thresholds” earlier in this manual.

**To Use a Pre-Set Threshold:**

1. Click on the “Set Z-score Thresholds” button and “Z-Score Threshold Setup” window appears with Channel 1 (Fp1), Channel 2 (Fp2), Channel 3 (F3), and Channel 4 (F4) you selected.
2. Click on the drop down arrow next to the site you want to train to select the Z-Score ranges you want to use. You will see a list of “Canned Thresholds”. **Note:** NeuroField defaults to the Threshold Setup “OFF” selection.

3. In the drop down list, pick the Z-score range which specifies both the frequency band and the threshold limits settings you want to use. For this example we will be giving a slow frequency stim, so we would want to threshold at each site on High Beta 1 to -1 for the RTZ. During training the system will look for High Beta to fall between 1 to -1. **Note:** If the setup you want is not listed, you will need to follow the steps in “VI Assessing Your Client - To Setup a Custom Threshold” earlier in this manual.

4. Continue to select each site High Beta 1 to -1.

5. Click on the “View” button next to one of your chosen Site Thresholds and you can examine that the proper selection criteria is set. Check the settings to be sure that the:
   - Frequency bands you selected are the only ones enabled.
   - The Upper and Lower Limits are set to what you expected. For example, 1 and -1.

6. Click on the “Return to Threshold Selection” button to go back to the “Threshold Setup” screen.

**To Set the Logic Mode**

1. In the “Threshold Logic Mode” section of the “Threshold Setup” screen, select your logic mode. **Note:** The program defaults to the “OR” logic mode. How this works is that after an EMF stimulation is given, the EEG is recorded and Z-scores are generated for all 4 sites. The system then determines which, if any, of the sites achieve the designated threshold. In the example above, with the four channels set to High Beta 1 to -1, you have two choices for your threshold logic:
   
   a. “OR” meaning that any one of the Z-Scores at the selected sites can come within threshold range to create a “Hit”. For example, if Fp1 High Beta does not fall within 1 to -1, then the next site Fp2 is examined for High Beta 1 to -1. If not then F3 High Beta 1 to -1 is read and F4 High Beta 1 to -1. If any one of these sites achieves the threshold then a tone is played in NeuroField and the frequency will count it as a “Hit” and given again. This says, if Fp1 High Beta, or Fp2 High Beta, or F3 High Beta or F4 High Beta is 1 to -1, give it a hit. **Note:** It is a good idea to start with the “OR” option because it is easier for the client. As they progress you can make it harder by using the next “AND” option.
   
   b. “AND” meaning that all of the Z-Scores at the selected sites must come within threshold range simultaneously in order for a hit to occur. This is a more stringent threshold as it
requires that all of the chosen sites/frequency bands Z-Scores must achieve whatever threshold values you chose. If all one of these sites do not achieve the threshold then a “Hit” is not recorded and NeuroField moves to the next frequency. This says, if Fp1 High Beta, and Fp2 High Beta, and F3 High Beta and F4 High Beta is 1 to -1, give it a hit.

2. Click on the “Load ZAP Thresholds” button and the Window will close.
3. You are now ready to start a session.

Note: It is important to monitor your session and determine if your Preset Threshold setup is effective. If you notice that the patient is finding it very difficult to (or may never) meet the Threshold criteria and get a Hit, your preset threshold is too low (or too hard). For example, if the preset Theta threshold is set to 1 to -1 limits but during the session your client consistently hits Theta of say 2.5 in the upper range, you’ll need to follow the steps in the next section to create a custom threshold for F4 Theta and raise the limits to, say 2 and -2.

**Running an RTZ Session 1 – 4 Channels**
Before running the RTZ session, get the client to relax:

- Feet on the floor
- Eyes looking forward or relaxed if closed
- Jaw loose and tongue floating (not pressed against roof of their mouth)
- If adult, train with Eyes Closed. If child, play a DVD with no talking

Note: Keep in mind that these protocols can take anywhere from 20 – 45 minutes to complete. It is important that after the treatment has started, you monitor the session. It is recommended to check in with the client every 10 minutes as the protocol commences. If the person reports any discomfort, abort the procedure and stop the session.

**To Start and Monitor an RTZ Session – 4 Channels:**
1. Keep the loop set at 1. With RTZ you do not set the loops. The length of the session will depend on the threshold and how many hits they get.
2. Click on the “Start Standard Treatment” button and the EEG for all four channels will be read.
3. Look at the RTZ Hit Counter. It will update each time a Hit occurs and accumulate a running total. To generate a Hit during an RTZ session, NeuroField:
   - Gives an EMF pulse
   - Measures 4 seconds of EEG
   - Plugs that EEG into the Z-Score DLL
   - Returns all of the Z-Scores. **Note:** During this stage, if the eyes are open, the Neuroguide database will automatically artifact the data. It will look for eye blinks and EMG, and remove them.
   - Sounds a “Hit”, or Tone if all of the Z-Scores all the criteria is met. **Remember:** If “AND” logic mode is selected, more than one frequency band/site is selected, and the chosen limits are lower, the more complex the criteria and the harder it is to get a Hit.
   - Automatically gives that same frequency again. For example, let’s say the hit was at 24 Hz, NeuroField automatically gives you 24 Hz again, reinforcing the same frequency with an EMF that brings your brain toward the desired state that you setup in your threshold.
   - Keeps giving a Stim, reinforcing the same frequency again and again, pushing you towards a normative state until it no longer returns a Hit and stops doing it.
   - Moves on to the next frequency and repeats the process which could go on for 20 – 45 minutes depending on how you set the threshold. If you made the criteria difficult, you won’t get that many repeats and the session will go faster. But, if you set the threshold just slightly below the target Z-scores, then you are going to be driving the brain down into that range, and it will keep on repeating to stabilize the brain.

4. Monitor the session to determine if your Client is not getting a Hit at all or is constantly getting a Hit. This means that the criteria in the Threshold Setup is too difficult (no Hits) or is too easy (constant Hits). If this is the case, Abort the Process, adjust the Threshold, and start the session again. Most likely, if you assessed your client as described in “VI Assessing Your Client” earlier in this manual, you will most likely not have to make many changes right away.

**To Monitor Z-Scores using the Data Windows:**
You can monitor the Z-Scores in real time and observe the changes in the Z-Scores every time a stimulation is given.

1. Notice “Z Score Tabular” screen. There are 3 tabs:
- ZAP = Z-Score Absolute Power
- ZPR = Z-Score Power Ratio
- ZRP = Z-Score Relative Power

2. Review the Data in each column on the ZAP tab. Every 8 seconds a new EEG scan pass will occur and the Tabular will populate with the Z-Scores. You will see Red, Blue, and Green data. The color coding is as follows: **Note:** With each scan the previous data gets overwritten.
   i. Green = Z-Score between 1 and -1
   ii. Red = Z-Score Excessive or above 1
   iii. Blue = Z-Score Deficient or less than -1

3. Notice the “4 Channel EEG Data” screen. Here you can see:
   - Individual EEG data for each site.
   - Double on the window and it will zoom into the data
   - Select the “View Zoom” button to select individual plots. Zoom in and look at the EEG from another perspective.

To Monitor Sessions When Using the HD or HD Rocking Protocols:

1. When you select say the:
   a. “T062 -- > 9-12 HD” protocol for someone who is deficient in Alpha, it starts at 9 Hz and steps through to 9.1, 9.2, 9.3 etc. all the way to 12.
   or
   b. “T015 -- > 1-4 HD Rocking” protocol for someone who is deficient in Delta, it starts at 1 Hz and steps through to 1.1, 1.2, 1.3 etc. all the way to 4 and then goes back down 3.9, 3.8 or 3.7 all the way back to 1. This is method instills flexibility and is not as jarring as going straight back to 1 after hitting 4.

2. Be patient during the session when monitoring the HD protocols. These protocols have the ability to really “tease out” what frequency will get the brain to where you want it to go. By stepping thru each frequency in small increments, you are ticking through each one of those pieces of the frequency band and eventually you will start hearing Hits. However, you could go for quite a while without getting a hit and then bam, the brain locks on to a frequency and the hits start coming.

3. Notice at this point that the brain will start replicating that frequency rhythm to correct the Z-Score and NeuroField will continue reinforcing it. If you get a Hit at 9.4 it will give 9.4 again. If you get another Hit, it will give 9.4 again. The client could then go 20 minutes and only get through a small portion of the frequency band, but it is the most effective piece. At some point, it will then stop producing a normative Z-Score and move on.

**Ending a Treatment and Saving Session Data**

To Complete an RTZ Session:

1. When the protocol is done the Stim cycles will stop. At this point you can elect to end the session or
2. Run another session using the Z-Score Hits that are recorded in the Z-Score Hit Table during the Session.

If you want to view the session data or Plot it out using NeuroPlot, you must first Save the Session data. With NeuroPlot you can chart each one of the specific frequency bands.

**To View or Save Session Data:**

1. Click on the “Z Score Summary” button from the Main Menu side bar. Here you can see all of the data.
2. Scroll down and look at all 4 channels. You can look at each of the frequency bands and the Z-Score that was measured.
3. To Save the data, Click on the “All Channel Text File Dump” button. This will save the data for all channels in the patient data folder.

This data can then be examined in NeuroPlot. See “IX NeuroPlot” later in this manual for details.
VIII. Real Time Z-Scores (RTZ) – X2000 with 2 Channels

NeuroField RTZ can also be run for 2 Channel training if you have an X2000 with a Plus Unit. This hardware combination will engage the client in operant conditioning at the same time the brain is receiving the pEMF frequency, but at two channels only rather than the 4 channels supported with the Q20 and a Breakout Box or 19 channels with the Q20 and a cap. With this setup you simply attach the two and coils, load the proper protocol, set up the threshold, and the number of “Hits” will determine the length of the session.

The DLL used in the RTZ 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. Refer to Chapter II “Software Installation”. There you will find a section titled “Generating the License Key”.

**Note:** When connecting the Q20 to the X2000 and Plus unit, **ONLY USE ONE CANBus USB Adapter!!!!**
You can plug the CANBus Adapter into either device, preferably the Q20 shown below, as it will then be ready to use as a stand-alone amp when needed.

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**Prepping the Site**

As with any Neurofeedback procedure it is important to clean the site and properly attach the sensors to ensure good connections.

**To Clean Sites and Attach Sensors to Head:**

1. Take a cotton swap and apply a small amount of NuPrep to the swab.
2. Clean both ear lobes and the two sites were you intend to place electrodes with the NuPrep.
3. Apply a pea-sized amount of the 10/20 Paste to each sensor and the 2 ear clips.
4. Place the active sensors on the head at the 10/20 sites you want to train and the ear clips on each ear lobe.
**Note:** It is advisable to cut small squares of paper towels, place one over each electrode, and push down with a pinch and twist of the paper towel and electrode. This will secure the electrode to the scalp and provide another layer of protection.

**To Connect the Sensors to the X2000 - True Linked Ears:**
1. With a pea-sized amount of 10/20 paste on each sensor and ear clip, attach them to the head and ears:
   - 2 active sensors on the 10/20 sites you will be training
   - 1 ground sensor on the grounding site
   - 2 ear clips, one on each ear
2. Plug the active sensors on the head into the ports labeled A1 and A2 on the back of the X2000 unit.
3. Plug the mastoid sensor into the port labeled GND.
4. Remove the white linker if it is attached.
5. Connect one ear electrode to the port labeled REF1 and the other ear electrode to the port labeled REF2.
   This creates a true linked ear connection with NeuroField.

**Attaching the Coils**
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.

**To Attach the Coils:**
1. With the EEG sensors placed on the head and connected to the unit cover the sensors with a small piece of
2. Cover the head and sensors with a surgical cap.
3. 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 are training.

**Setting Up the RTZ Session – 2 Channels**
There are just a few preliminary steps necessary in order to complete your protocol setup and run an RTZ session for 2 Channels. **Note:** See “IV Software Basics” earlier in this manual for more in depth instructions on how to follow the procedures below.

**To enter RTZ mode:**
1. Select a patient.
2. Select a database.
3. Start the Program
4. Select a protocol (i.e. 1-4 HD Rocking). **Note:** These protocols are selected based on the QEEG data and requires training in order to do this correctly.
5. Click on Enable EEG. The EEG Measurement options appear.
6. Click on the “Enable Z-score” box.
7. Click on the “Enable RTZ” box.
   **Note:** All of the Options in Steps 5-7 above must be selected in order to run the RTZ procedure.
8. Enter the patient age into the “Patient Age” box.
9. Click on the “Eye Status” drop down menu and select the Eye Status condition, i.e. Open or Closed. For slow wave protocols, they are typically run with Eyes Closed.
10. Select “Individual Electrodes” as the type of Sensor Placement to be used. With the X2000 Plus Unit you have the option of using 2 individual electrodes.
11. Enable the sites you want to use. For this example, select four frontal sites: Fp1 and Fp2.

**Setting-up Thresholds**

NeuroField provides a number of “Canned Thresholds” for you to easily “Select and Go!” When setting up the Z-Score thresholds, you can choose to use the provided Preset Threshold setups from the drop down menu list. Or, you can customize your own setups.

After assessing your clients QEEG, you may find that preset drop down list does not contain a setup that matches your criteria. For example, you may want to train more than one frequency band at a particular site or the threshold limits appropriate for your client are not listed as a threshold. So, you can easily create a custom Threshold. Refer to “VI Assessing Your Client - To Setup a Custom Threshold” earlier in this manual.

**To Use a Pre-Set Threshold:**

1. Click on the “Set Z-score Thresholds” button and “Z-Score Threshold Setup” window appears with Channel 1 (Fp1) and Channel 2 (Fp2) selected.

2. Click on the drop down arrow next to the site you want to train. You will see a list of “Canned Thresholds”. **Note:** NeuroField defaults to the Threshold Setup “OFF” selection.
3. In the drop down list, pick the Z-score range which specifies both the frequency band and the threshold limits settings you want to use. For this example we will be giving a low frequency stim, so we would want to threshold at each site on High Beta 1 to -1 for the RTZ. During training the system will look for High Beta to fall between 1 to -1. **Note:** If the setup you want is not listed, you can create a Custom Threshold described in VI earlier in this manual.
4. Continue to set your second site to High Beta 1 to -1.
5. Click on the “View” button next to one of your chosen Site Thresholds and you can examine that the proper selection criteria is set. Check the settings to be sure that the:
   - Frequency bands you selected are the only ones enabled.
To Set the Logic Mode:
1. In the “Threshold Logic Mode” section of the “Threshold Setup” screen, select your logic mode.

   **Note:** The program defaults to the “OR” logic mode. How this works is that after an EMF stimulation is given, the EEG is recorded and Z-scores are generated for both sites. The system then determines which, if any, of the sites achieve the designated threshold. In the example above, with the two channels set to High Beta 1 to -1, you have two choices for your threshold logic:
   a. “OR” meaning that any one of the Z-Scores at the selected sites can come within threshold range to create a “Hit”. For example, if Fp1 High Beta does not fall within 1 to -1, then the next site Fp2 is examined for High Beta 1 to -1. If either one of these sites achieves the threshold then a tone is played in NeuroField and the frequency will count it as a “Hit” and give it again. This says, if Fp1 High Beta, or Fp2 High Beta is 1 to -1, give it a hit.
   b. “AND” meaning that all of the Z-Scores at the selected sites must come within threshold range simultaneously in order for a hit to occur. This is a more stringent threshold as it requires that all of the chosen sites/frequency bands Z-Scores must achieve whatever threshold values you chose. If all one of these sites do not achieve the threshold then a “Hit” is not recorded and NeuroField moves to the next frequency. This says, if Fp1 High Beta, and Fp1 High Beta is 1 to -1, give it a hit.

2. Click on the “Load ZAP Thresholds” button and the Window will close.
3. You are now ready to start a session. Continue to the section below titled, “Running an RTZ Session.”

   **Note:** It is important to monitor your session and determine if your Preset Threshold setup is effective. If you notice that the patient is finding it very difficult to (or may never) meet the Threshold criteria and get a Hit, your preset threshold is too low (or too hard). For example, if the preset Theta threshold is set to 1 to -1 limits but during the session your client consistently hits Theta of say 2.5 in the upper range, you will need to create a custom threshold as described in “VI Assessing Your Client – To Setup a Custom Threshold” earlier in this manual.

**Running an RTZ Session – 2 Channels**

Before running the RTZ session, get the client to relax:

- Feet on the floor
- Eyes looking forward or relaxed if closed
- Jaw loose and tongue floating (not pressed against roof of their mouth)
- If adult, train with Eyes Closed. If child, play a DVD with no talking

**Note:** Keep in mind that these protocols can take anywhere from 20 – 45 minutes to complete. It is important that after the treatment has started, you monitor the session. It is recommended to check in
with the client every 10 minutes as the protocol commences. If the person reports any discomfort, abort the procedure and stop the session.

**To Start and Monitor an RTZ Session:**
1. Keep the loop set at 1. With RTZ you do not set the loops. The length of the session will depend on the threshold and how many hits they get.
2. Click on the “Start Standard Treatment” button. The RTZ session will begin and the client should start getting a “Hit”.
3. Look at the RTZ Hit Counter. It will update each time a Hit occurs and accumulate a running total. To generate a Hit during an RTZ session, NeuroField:
   - Gives an EMF pulse
   - Measures 4 seconds of EEG
   - Plugs that EEG into the Z-Score DLL
   - Returns all of the Z-Scores. **Note:** During this stage, if the eyes are open, the Neuroguide database will automatically artifact the data. It will look for eye blinks and EMG, and remove them.
   - Sounds a “Hit”, or Tone if all of the Z-Scores fall between the set upper and lower threshold limits (1 and -1) in each channel. This means the criteria is met and the brain likes that frequency. **Remember:** If “AND” logic mode is selected, more than one frequency band/site is selected, and the chosen limits are lower, the more complex the criteria and the harder it is to get a Hit.
   - Automatically gives that same frequency again. For example, let’s say the hit was at 24 Hz, NeuroField automatically gives you 24 Hz again, reinforcing the same frequency with an EMF that brings your brain toward the desired state that you setup in your threshold.
   - Keeps giving a Stim, reinforcing the same frequency again and again, pushing you towards a normative state until it no longer returns a Hit and stops doing it.
   - Moves on to the next frequency and repeats the process which could go on for 20 – 45 minutes depending on how you set the threshold. If you made the criteria difficult, you won’t get that many repeats and the session will go faster. But, if you set the threshold just slightly below the target Z-scores, then you are going to be driving the brain down into that range, and it will keep on repeating to stabilize the brain.
4. Monitor the session to determine if your Client is not getting a Hit at all or is constantly getting a Hit. This means that the criteria in the Threshold Setup is too difficult (no Hits) or is too easy (constant Hits). If this is the case, Abort the Process, adjust the Threshold, and start the session again.

**To Monitor Z-Scores using the Data Windows:**
You can monitor the Z-Scores in real time and observe the changes in the Z-Scores every time a stimulation is given.
1. Notice “Z Score Tabular” screen. There are 3 tabs:
2. Review the Data in each column on the ZAP tab. Every 8 seconds a new EEG scan pass will occur and the Tabular will populate with the Z-Scores. You will see Red, Blue, and Green data. The color coding is as follows: Note: With each scan the previous data gets overwritten.
   i. Green = Z-Score between 1 and -1
   ii. Red = Z-Score Excessive or above 1
   iii. Blue = Z-Score Deficient or less than -1

To Monitor Sessions When Using the HD or HD Rocking Protocols:
1. When you select say the:
   a. “T062 -- > 9-12 HD” protocol for someone who is deficient in Alpha, it starts at 9 Hz and steps through to 9.1, 9.2, 9.3 etc. all the way to 12.
   or
   b. “T015 -- > 1-4 HD Rocking” protocol for someone who is deficient in Delta, it starts at 1 Hz and steps through to 1.1, 1.2, 1.3 etc. all the way to 4 and then goes back down 3.9, 3.8 or 3.7 all the way back to 1. This is method instills flexibility and is not as jarring as going straight back to 1 after hitting 4.
2. Be patient during the session when monitoring the HD protocols. These protocols have the ability to really “tease out” what frequency will get the brain to where you want it to go. By stepping thru each frequency in small increments, you are ticking through each one of those pieces of the frequency band and eventually you will start hearing Hits. However, you could go for quite a while without getting a hit and then bam, the brain locks on to a frequency and the hits start coming.
3. Notice at this point that the brain will start replicating that frequency rhythm to correct the Z-Score and NeuroField will continue reinforcing it. If you get a Hit at 9.4 it will give 9.4 again. If you get another Hit, it will give 9.4 again. The client could then go 20 minutes and only get through a small portion of the frequency band, but it is the most effective piece. At some point, it will then stop producing a normative Z-Score and move on.
Ending a Treatment and Saving Session Data

To Complete an RTZ Session:

1. When the protocol is done the Stim cycles will stop. At this point you can elect to end the session or
2. Run another session using the Z-Score Hits that are recorded in the Z-Score Hit Table during the Session.

If you want to view the session data or review the data using NeuroPlot, you must first Save the Session data.

To View or Save Session Data:

1. Click on the “Z Score Summary” button from the Main Menu side bar. The “Stim Summary and Measurement Data” screen will appear. Here you can see all of the data.

2. Click on the “Select EEG Channel” drop-down and scroll through it to look at all 19 channels. Select a specific channel you want to look at.
3. In the “Frequency Band Selection” section of the Stim Summary screen, select a specific frequency band for the channel you selected above. The Z-score that was measured will appear in the “EEG Channel ZAP Value” section of the screen. You can look at each of the frequency bands and the Z-Score that was measured.
4. To Save all the data, Click on the “All Channel Text File Dump” button. This will save the data for all channels in a file in the patient data folder.
5. This data can then be examined in NeuroPlot. See “IX NeuroPlot” next in this manual. With NeuroPlot you can chart each one of the specific frequency bands.
IX. NeuroField HRV – Body Protocols

Nogier Frequencies
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.

Body protocols are run 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.

One method for using the 7 Nogier frequencies in NeuroField is to use the HRV sensor device and 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 like 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 particular Nogier frequency that it wants, this facilitates clients finding relief from their symptoms.

Another method is to simply use a built-in 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 auto immune 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.

HRV-Nogier Custom Protocols – An 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. A pEMF
frequency can be delivered and heart rate variability measured via either of the following NeuroField systems:

- Q20 with a breakout box, an X3000, and a stand-alone HRV unit or the
- X2000 and Plus unit with HRV built-in

**Overview – Selecting the Nogier Protocol**

Nogier frequencies respond to every major energy system in the body. So, for instance, if a client has a bad shoulder, coils are placed over the shoulder, 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 particular client. **Note:** Step-by-step instructions on how to select and run a Nogier protocol are detailed in the sections below.

**Overview – Scanning the 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.

**Overview – Running the Nogier Protocol with only the “Hits”**

Lastly, only the “hits” or the frequencies that the body responded to are given. 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.
Hooking-Up the HRV Sensor & Loading the Nogier Database

The NeuroField software installs the NeuroField database by default. However, the Nogier database is also included and is copied to your database folder during the installation process. The Nogier database is provided to be used with the NeuroField HRV system and contains several different protocols:

- a single protocol with all seven Nogier frequencies, one for low and one for high
- several individual protocols that corresponds to each of the Nogier frequencies A thru G both low and high

You will need to first load the Nogier database so that these specific protocols options are available when selecting your protocol. **Note:** If you need more detailed instruction from what is provided below, please refer to “IV Software Basics – Starting the Program” earlier in this document.

To Connect the PPG Sensor to the Unit:

1. Turn off NeuroField before using the HRV system.
2. Connect the PPG sensor that came with your system firmly into the plug labeled “HRV Sensor on the rear panel of the HRV unit. (If you have an X2000, plug it into the slot marked “HRV”.) This is a standard PPG sensor purchased from HeartMath.
3. X3000 and Stand-Alone HRV Box

3. 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.

To Launch NeuroField and Load the Nogier Database:

1. Click on the NeuroField icon located on your desktop to start NeuroField. The main NeuroField 7.x.x screen will appear where you can select your patient for the HRV session.
2. Click on the “Other Database” option under the “Stimulation Database Options” section of the NeuroField main menu.
3. Click on the “Click to Browse” button and the NeuroField database folders will appear.
4. Select the “Nogier database” and Click the “Open” button and the database will load.
5. Click on the “Start Program” button and the following will occur:
   - An initialization process will query the system to see if the NeuroField hardware is connected to the computer, a “Compatible Stim Unit Found!” message will be displayed,
   - Hrv Unit Found will appear
   Make sure that NeuroField sees both the X3000 Stim Unit and the HRV unit. If using the X2000 Plus, it will only see the one device.
   - The NeuroField “Stim Launch Pad” window will load.

### Attaching Sensor/Coils and Verifying the Heart Rate

Once you have connected the sensor to the unit, you will need to prep the patient, place the coils, and attach the sensor and verify you are getting a good heart beat. 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.

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

1. Prep the client. The PPG sensor has to 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) and check the heart rate.
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 Verify You Are Getting a Good Heart Rate

1. With the sensor attached, Click on the “Enable HRV” option from the “Stim Launch Pad” and the HRV controls will appear.

2. Click on the “Continuous Scan” button and the HRV window will open. It will turn on the HRV and continuously scan. Notice that you will get a heartbeat on the screen. You just want to be able to catch the edge across the yellow line. To ensure you have enough of a heartbeat to calibrate:
   - 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. Once you see the heart rate is good, select “Abort Process” and you are ready to continue on. It will finish its last scan and then abort. **Note:** Continuous Scan will continue to scan until you tell it to stop or abort the process.

**Calibrating the PPG Sensor**

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. See the section “HRV Advanced Mode – Calibrating Manually” later in this chapter.
To Run the Calibration - Automatically

1. Instruct the client to close their eyes and breathe normal. They should remain still, and not talk, hold their breath or meditate. You want them calm, quiet and alert and to breathe normally. This helps to prevent artifact from skewing the calibration process. The calibration process takes 32 seconds.

2. Next press the "PPG Sensor Cal" button. The “Measurement Device Data” screen will appear and the HRV unit will begin to display the heart rate and the collected data.

3. Look at the photo diode level on the HRV screen. It should read between 0.5-2 volts. If you are not getting a good signal, it usually means the client is not grounded. 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:
   a. Have the Client cover their ear during calibration.
   b. Put the Velcro cap over the sensor.
   c. 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.

4. During the Calibration process the sensor calibration will take several scans to ensure that NeuroField is catching the heartbeat. It will do four 8 second passes:
   - 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 it gets captured by the computer. In the “Final Heart Rate Edge” window, a little 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, then you have a good calibration. Says 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 section “Advanced Mode- Calibrating Manually” later in this chapter.

- **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 in order to prevent artifact. It has to wait to detect a heartbeat. The Hold Off can be set manually as well. We want a heartbeat between 750 – 1000 milliseconds typically, but it varies.

5. When the calibration is over, Click “OK” in the “Congratulations, 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 "Final Heart Rate Edge" graph:

   - Again, if you see the threshold just below the signal, all the vertical edges crossing the threshold, and the picket fence lined up in an orderly fashion, then the calibration is good. There should be spaces in between each box and most importantly, none of the “pickets” should be missing, as pictured below.

   ![Graph](image1)

   ![Graph](image2)

   - If the threshold is just below the signal, but an edge did not come down enough to cross the threshold, it wasn’t captured by the computer as a heartbeat. As a result, the picket fence will be missing pickets, and it is considered a bad calibration, as pictured below.

   ![Graph](image3)

   ![Graph](image4)
2. Notice that the “Threshold Level’ and “Holdoff Time” boxes in the “PPG Sensor Calibration” section of the “Stim Launch Pad” 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 the Advanced Mode section below. **Note:** it is suggested to read the Advanced Mode section to get a better understanding of the HRV settings and calibration process.

### Choosing the Nogier Protocol

Once the sensor is attached and calibrated, you can go ahead and determine which of the Nogier protocols is appropriate for a particular client. In this portion of the process you will give the client a set of Nogier frequencies and let the heart make the choice for what frequency the client needs. To do this you will first run a protocol with all Nogier frequencies. Then you will determine which of those frequencies the body liked the most and select the corresponding Nogier protocol that was designed for that frequency.

![Protocol Selection](image)

**To Run Nogier “Low Frequencies All”:**
1. Click on the “Standard” button and from the NeuroField “Stim Launch Pad”, Click on the “Select Protocol/Treatment Setup” button.
2. Click on the “Select Treatment Protocol” drop down menu. This loads up all seven of the Nogier frequencies. **Note:** Nogier Database should be loaded. If not following instructions in previous section for “Loading the Nogier Database”.

3. Scroll down towards the end of the Nogier Protocols listed and select the Protocol, “Low Frequencies all”. The 7 Nogier frequencies will be loaded. These are the original Nogier frequencies. **Note:** The “High Frequencies All” protocol contains the harmonics of the low frequencies. Harmonics can be described as a “ringing” out of the original tone that exponentially grows larger the further out it gets. These frequencies are bigger and faster than the low frequencies and typically used in Lasers.

4. Make sure it is set for 1 loop and Click on the “Select and Close”

5. 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. Click on the “Start Standard Treatment” button and the HRV will start running the protocol and plotting the SDNN data for you.

The first thing NeuroField will do is take a baseline for 4 seconds and place the number in the “Running SDNN” window. Then it will give the first Stim for 5 seconds and measure the heart rate for 4 seconds, placing a red graph in both the SDNN and RMS windows. After that it will then give the 2nd Stim and measure for 4 seconds and so on. It will do this for all seven frequencies until the protocol is complete.

6. During the treatment notice the two bottom scales:
- 1st ones shows the RMS or the Amplitude or strength of the pulse. Is it weak or does it get stronger.
- 2nd one shows the SDNN or Standard Deviation from Normal to Normal heartbeat variability.

NeuroField takes the baseline, for example 12.64 and posts it at the top of the SDNN graph window. Each time the heart rate is measured NeuroField will plot the information. You can watch to see how the client responds to each stim and what happens to the variability. If the variability or SDNN increases by 10 milliseconds or more above the baseline, example 22.64, that is considered a “yes” response from the heart and it is noted as a “Hit”. If it doesn’t increase by 10 ms, it is not considered a “Hit”.

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7. When complete the “Stim Summary and HRV Scan Data” window will appear. Keep this window open. **Note:** If you don’t see the Stim Summary window, move the Stim Launch Pad window as it may be hiding behind it.

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:
   a. Run this process again this time selecting the “High Frequencies all” protocol described above.
   b. Lengthen the duration of each stim which will give a longer time period for the body to figure out what it is getting and the heart to determine how it will respond. Instead of giving a 5 second Stim you can use the Sweep Control to give a 10 second Stim instead. See “Software Basics – Using Sweep Control” earlier in this manual for detailed instructions.

**To Choose the Frequency the Body Liked the Most:**
There are two ways to check the results and determine which frequency shows the greatest variability. At this point have the client open their eyes while you go ahead and review the results.

1. Review the “Running SDNN” window at the bottom of the screen to see how the heart responded:
   a. Again make a note of the baseline. If the baseline was 12.64 wherever the variability is 10 msec above baseline (22.64 or higher) there will be a Hit.
   b. Look to see which frequency had the greatest variability denoted by the red graph that is the highest. Jot down or make a mental note of this number. **Note:** The Frequency X axis starts at 0. If the highest variability (noted by the red graph) falls between 1 and 2, use the number on the right. In this case it would be Frequency number 2. **Note:** You can also look at the RMS graph. If the Amplitude gets stronger, that is also considered to be a response the body liked.

2. Review the actual “Hits’ data:
   a. Look at the “SDNN Hits” button on the “Standard Page”. When there is a change in the variability of 10 milliseconds or higher from the baseline, it is recorded as a “Hit” and “(Found)” will be noted on the “SDNN Hits” button. If there are no Hits, it will not be noted on the button.
b. Review the Stim Summary and HRV Measurement Scan Data.

```
<table>
<thead>
<tr>
<th>Event</th>
<th>Event Name</th>
<th>Time</th>
<th>Protocol Name</th>
<th>Stim Cycle</th>
<th>HRV</th>
<th>SDNN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pre-Stim Measurement</td>
<td>0</td>
<td>Low Frequencies all</td>
<td>0</td>
<td>0.069</td>
<td>21.962</td>
</tr>
<tr>
<td>2</td>
<td>Inter-Stim Measurement</td>
<td>9.951</td>
<td>Low Frequencies all</td>
<td>1</td>
<td>0.111</td>
<td>42.14</td>
</tr>
<tr>
<td>3</td>
<td>Inter-Stim Measurement</td>
<td>19.63</td>
<td>Low Frequencies all</td>
<td>2</td>
<td>0.036</td>
<td>23.158</td>
</tr>
<tr>
<td>4</td>
<td>Inter-Stim Measurement</td>
<td>23.02</td>
<td>Low Frequencies all</td>
<td>3</td>
<td>0.105</td>
<td>5.914</td>
</tr>
<tr>
<td>5</td>
<td>Inter-Stim Measurement</td>
<td>38.973</td>
<td>Low Frequencies all</td>
<td>4</td>
<td>0.077</td>
<td>23.785</td>
</tr>
<tr>
<td>6</td>
<td>Inter-Stim Measurement</td>
<td>48.054</td>
<td>Low Frequencies all</td>
<td>5</td>
<td>0.15</td>
<td>10.164</td>
</tr>
<tr>
<td>7</td>
<td>Inter-Stim Measurement</td>
<td>59.245</td>
<td>Low Frequencies all</td>
<td>6</td>
<td>0.103</td>
<td>22.264</td>
</tr>
<tr>
<td>8</td>
<td>Inter-Stim Measurement</td>
<td>68.015</td>
<td>Low Frequencies all</td>
<td>7</td>
<td>0.073</td>
<td>6.188</td>
</tr>
<tr>
<td>9</td>
<td>Post-Stim Measurement</td>
<td>72.455</td>
<td>Low Frequencies all</td>
<td>0</td>
<td>0.034</td>
<td>13.191</td>
</tr>
</tbody>
</table>
```

Look at the “SDNN” Column. The highest number and the corresponding stim cycle will tell you frequency the body liked the most. Stim Cycle 0 is the baseline. In this example, it is Stim Cycle 1.

c. Again, Jot down the Stim Cycle with the highest SDNN. This number will be used in the next section to choose a specific Nogier Protocol. Click on the “Close Window” button.

To Choose the Nogier Protocol:

You are now ready to choose the specific Nogier protocol which corresponds the stim cycle that you noted above and that registered the greatest degree of variability. However, here is where your clinical expertise can influence this decision. If number 1 had the greatest variability, but the client is complaining of back pain, you can choose 6 instead of 1, 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. With the “Stim Launch Pad” active, Click on the “Select Protocol/Treatment Setup” button and then Click on the “Select Treatment Protocol” drop down. A list of Nogier Protocols with their corresponding letters will appear. The Nogier Protocols are listed from A – G, both high and low versions. Using the stim cycle number selected in the sections 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. Using the example that 1 was the selected Nogier Stim with the greatest variability, select “A - tissues” as your protocol to load, keep the loop set to 1, and Click on “Select and Close”. Note: If you used “All Frequencies Low” choose the Low version of the protocol, if you used “All Frequencies High” use the High version of the protocol.
Now that you have selected the Nogier Protocol to use specific to your client, you will now fine-tune it or “zero-in” on it even further by running a scan of each frequency in that protocol for 1 loop and finding which frequencies here the body responds to the most. These will be noted as “Hits” and you will then run a full session using only the frequencies within the Nogier protocol that are “Hits”.

**Note:** This will take a little longer. NeuroField has to scan frequencies below it and above it because Nogier said there is variability in every human and not everybody is going to hit 18.25 exactly, the range will vary 30% above or below. So you have to scan to find the exact frequency that will work for the client. 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 particular client.

**To Scan the Nogier Protocol and Find the Hits:**

1. With the HRV Sensor still attached and HRV enabled instruct the client to close their eyes to reduce external distractions. Then, select “Start Standard Treatment” button.
2. Run a single loop of 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 for 5 seconds and measure the HRV. Make a note of the baseline, say 17.11.

**Note:** You can change the default 10 milliseconds baseline setting. See “HRV Advanced Mode – Adjusting the HRV Settings” and “Set Threshold Level” later in this chapter. Also, NeuroField has its own built-in artifact rejection. If anything goes above 125 milliseconds, that variability is immediately rejected. Most humans don’t have variability this high. The exception may be runners and athletes who have really large variability, so you can also change this setting to say...
150 or 175. See “SDNN Rejection Control” in the “HRV Advanced Mode – Adjusting the HRV Settings” section later in this Chapter.

3. When done the “Stim Summary” table appears where you can see all of the data. Some of the frequencies may not be there as a result of artifact rejection and NeuroField pulled them out. If there are any “Hits” that went above the baseline, the “SDNN Hits” button includes “(Found)”. **Note:** You can dump this data to a file to view it in NeurPlot and see a single trend line.

4. Click on the “Close Window” button. You are now ready to run the protocol and give only the frequencies that were a hit.

**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 are “Hits”. Click on the “Standard” button if you are not already at the “Stim Launch Pad”.

2. On the Standard Page click on the “HRV” radio button to disable HRV and remove the HRV Sensor. You will now run a regular NeuroField session.

3. Click on the “SDNN Hits (Found)” button. The “Results Table” page will appear listing the Stim Cycles that were registered as a Hit or a “Yes” response from muscle testing the heart. In this table you can see which ones came in as a Hit. These are all the frequencies that the body wanted. Again, some are not there and got removed as part of the artifact rejection described above. **Note:** There may be several or there may only be two.

4. Notice that the HRV Loops will default to 1 and tell you how long it will take to run 1 loop. The traditional amount of time for running Body protocols is typically 30 to 50 minutes.

5. Increase the number of loops to equal the amount of time you’d like for the session, at least 30 minutes.
6. Click “Start SDNN Peak Treatment” button. It will continue to loop through only the few frequencies that are “Hits” for 30 minutes. During this time you can give the client a magazine or a movie. Or, you can talk to them. During therapy a person will start to relax and talk about what is going on. Often times they will feel more disinhibited and more willing to get into an open state.

7. Once the session has completed, instruct the client to drink a lot of water and make sure they hydrate well. Their body may detox and eliminate toxins from the gut, however do not make any suggestions such as that they may suddenly have strong eliminations because it doesn’t happen with everybody. Also, if it does most people can handle it.

**Quick Start – Using HRV-Nogier Body Protocols:**

**To Quickly Setup and Run HRV-Nogier Protocols:**

1. Make sure the ear and finger are clean and attach the Sensor to person. **Note:** Plug HRV PPG Sensor into NeuroField X2000 or HRV Unit **FIRST BEFORE** turning on the device. Otherwise you may harm the electronics.
2. Select the Patient.
3. Instruct Client to close eyes, breath normally and to stay still.
4. Enable HRV.
5. Click on Continuous Scan and check to be sure there is a good heart rate. Abort Process.
6. Click on PPG Sensor Cal to automatically calibrate.
7. Examine Sensor Cal outcome and if HRV is not being tracked correctly, make manual adjustments (described in Step 12 Below).
8. Run Nogier “Low Frequencies All” and note the frequency the body liked the most from the Stim Summary table.
9. Choose the Nogier Protocol that matches the frequency noted in Step 8.
10. Run the chosen Nogier Protocol for 1 loop scanning for “Hits”.
11. Run the “Hits only” from the Nogier Protocol for a full session, looping for 30 – 50 minutes.
12. Manual Adjustment Tips: (For details see section “HRV Advanced Mode – Calibrating Manually” later in this chapter.)
• The Threshold Level will ALWAYS be a NEGATIVE Number.
• To LOWER the Threshold change the threshold level to a larger negative number.
• To RAISE the threshold change the threshold number to a smaller negative number.
• The Hold off time should be around 400-500 msec. If the auto calibration process produces a hold off time of 150-200 it is probably incorrect.
• When the calibration is correct you will see the ‘picket fence’ on the Final Heart Rate Edge graph.
• Setup HRV measurement durations. Using the defaults is efficient for most cases.
• Setup SDNN Threshold Level. Using the defaults is efficient for most cases.
• Setup SDNN Rejection Control. Using the defaults is efficient for most cases.
• Run Protocol.
• When HRV Protocol is complete look at the SDNN Peak Button. If there are hits it will tell you so.

**Using HRV Custom vs Built-in Nogier Protocols**

Using HRV to pin point the exact frequency and run a custom protocol that the client’s body responds to the most is one way to run body protocols in NeuroField. The other very effective treatment is to simple choose a built-in Nogier protocol that Paul Nogier determined to be effective for a specific body complaint. Even though the HRV method does drill down to build a custom frequency protocol, it also extends out the time to run just one protocol. So when choosing between the two methods, keep that in mind. There is a certain amount of time management that you have to balance when working with a client and it does takes a while to find the frequency, get the hits and run the hits.

Once you get good at using body protocols, however, you can go and directly use a specific built-in Nogier protocol. There are a lot of times where you will get a big bang for the buck by simply using these protocols. If you know a person has gut issues then you don’t need to do a screening of all 7 frequencies. Just go to the Nogier database and choose” B–gastrointestinal and metabolic (low)” . If a client talks about a bone or joint issue, you can use either the E-pain and nerve” or the “F-brain and bone” protocols that are both good for pain. For more detailed information on the use of built-in Nogier protocols, refer to the “Nogier Frequencies” document located in the NeuroField Documents folder placed on the desktop during installation.

But, if you are not really sure what to do, introduce all 7 frequencies and see what the heart does. One suggestion is to find the HRV custom protocol for your client as part and of their initial intake or on the first day of training so you have that information in your tool box to use as needed. Run it a couple of times to see how it does and then switch to built-in Nogier protocols as needed.

**HRV Advanced Mode - Adjusting the HRV Settings**

Once the sensor is attached and calibrated, you can use the default settings or you can go ahead and manually change the settings as needed.
To Setup HRV Stim Options:
1. In the “HRV Setup” on the Left side of the “Stim Launch Pad” choose your “HRV During Stim Options”, either “Pre and Post HRV” or “Full Stim Cycle HRV”:
   - “Pre and Post HRV” – Enables pre and post protocol monitoring. It works as follows:
     - HRV is measured.
     - Full protocol is given.
     - HRV is measured again after the entire Protocol has completed.
   - “Full Stim Cycle HRV” – Enables stim by stim monitoring. It works as follows:
     - HRV baseline is taken.
     - Stim is given for the 1st frequency.
     - HRV is measured briefly.
     - Stim is given again for the next frequency
     - HRV is measured briefly. This continues to the next frequency until the entire protocol is completed.
     - Another Baseline taken again.

Note: “Disable HRV/EEG” option simply disables the HRV module and is the default setting when the program loads.

To Setup Measurement Duration and Threshold Level:
1. In the” HRV Setup” section of the “Stim Launch Pad”, set the “HRV Measurement”. This is the amount of time to use for measuring baseline and increases in HRV. The default settings typically used are:
   - Pre-Stim = 4 seconds (this is the baseline)
   - Inter-Stim = 4 seconds
   - Post-Stim = 4 seconds
2. Set the “Threshold Level (msec)” in the “SDNN Threshold Control” box. The default setting typically used is a 10 msec increase. This is the amount of time HRV must increase above the baseline for the frequency to be interpreted as a “yes” response by the body or a “Hit”.

Note: The Threshold Level can only be seen in the “HRV Setup” section when the “Full Stim Cycle HRV” option is enabled.

After the baseline is taken during Pre-Stim, NeuroField begins to look for increases in HRV above the pre-treatment baseline. This is done by calculating the SDNN or Standard Deviation from Normal to Normal heartbeat. If SDNN increases above the baseline by the amount set in the “Threshold Level”, then the frequency is registered as a “Hit”, meaning the body liked that frequency. Frequencies that register a “Hit” are then saved in a table called the “SDNN Hit” table.

For example, when using the default values, in order to accept a frequency as a "Hit", the SDNN must be 10 milliseconds or greater than the Pre-Stim baseline SDNN:
   - If Pre-Stim baseline is 25.35 msec and the
   - Threshold level is set to 10 msec, add the two together.
• A “Hit” is Registered when the Heart Rate Variability is 35.35msec or greater.

You can change the threshold and make the “Hit” responses more or less stringent by setting the threshold to monitor increases or decreases in the SDNN:
• To monitor increases in SDNN set the threshold using positive numbers above zero.
• To monitor decreases in SDNN set the threshold to negative numbers below zero (for example, -10).

To Setup SDNN Rejection Control:
1. The default setting is 125 milliseconds. This is the amount of time allowed before a measurement is rejected by the system.

Some clients may move and create an artifact that causes an increase in the SDNN or they may hold their breath which causes the SDNN to go higher and forces the heart to become variable. Normal range has been found to be:
• 10 or 15 - 90
• Athletes tend to have a higher SDNN between 150 - 175
• 125 is an upper-end number that has been found to work for most people

2. You can also uncheck, “Clean Up Missed Beats” and it will turn off Rejection Control.

HRV Advanced Mode – Calibrating Manually

To Run the Calibration – Manually
If automatic calibration has trouble getting a good calibration, you can run the calibration manually. In the “PPG Sensor Calibration” section of the “Stim Launch Pad”, the numbers correspond to the HRV “Measurement Device Data Screen” as follows:
• “Threshold Level” = Yellow Threshold bar in the “First Derivative” window.
• “Holdoff Time” = “Final Heart Rate Edge/Holdoff Period” window.

Threshold Level
The number in the “Threshold 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 or to a positive number, 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;

**Holdoff Time**
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 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 “Threshold Level” box to a high negative number, for example from \(-2.77\) to \(-3.277\).

2. Click in the “Threshold Time” box to get the computer to accept the new setting and then click on the “Continuous Scan” button. In the HRV “Measurement Device Data Screen”:
   - The Yellow Threshold bar will drop to the value you set in Step 1 above, \(-3.277\) and rest below the heartbeat edge.
   - The “Final HeartRate Edge” window will not display any boxes.

   **Note:** NeuroField will continue to scan the Heart Rate Variability until you select the “Abort Process” button in the lower right hand portion of the screen.

3. Start raising the bar:
   a. Lower the negative number in the “Threshold Level” box toward zero, for example, from \(-3.277\) to \(-2.277\).
   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 “Threshold Level” box and the Threshold bar will raise up to \(-2.277\) 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. Abort the Process once you have a “Picket Fence” on the “Final Heart Rate Edge” graph and the pickets are 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 some kind of debris on the finger or the ear, or you may have a person who is not appropriate for HRV.
X. NeuroPlot

NeuroPlot is a Microsoft Excel spreadsheet that is designed to graph the data collected from your NeuroField sessions. For example, when using NeuroPlot for data collected during an RTZ Session, you can review all 19 channels of EEG data across the 10 different frequency bands that the Applied Neuroscience .dll monitors.

With this data you can evaluate the brain’s response to stimulation at any given channel and see the trend of the Z-scores throughout the session, with the goal being to aim towards a Z-Score of Zero. Each plot graphically displays how the brain naturally tries to re-calibrate and normalize itself as it is shown how to do so with each NeuroField stim cycle. As you will experience, it is very rare to see a plot with a trend that goes outside of the normative range. It usually corrects pretty quickly!

NeuroPlot can also be used to review HRV sessions. For full details on running an HRV session see “X. NeuroField HRV – X2000” later in this manual.

Note: To use NeuroPlot you must have Microsoft Excel installed on your computer.

Prepping for NeuroPlot

After an RTZ protocol has completed, the data is available for review. However, the data must first be saved to a text file and this can easily be done within NeuroField.

To Dump Data to Text File:
1. Select a Patient if you don’t already have an active patient.
2. Run a Z-Score protocol to completion if you haven’t already done so.
3. Click on the “Z-Score Summary” button from the “Main Menu SideBar”.
4. Click on the “All Channels Text File Dump” button from the Summary Page to save the data to a text file. You can examine the data here in NeuroField as it is available for review in this window if you want to see it immediately. However, it is easier to review the data using NeuroPlot.
5. Note the ID number of the patient in the .txt file. It will be needed when you look for the data later.
6. Minimize or quit the NeuroField program.

Opening NeuroPlot and Enabling Macros

To Open NeuroPlot:
After an RTZ protocol has completed and the data has been dumped to a text file, the data is available for review using NeuroPlot.

1. Double click on the NeuroPlot icon installed on your desktop. This will start Microsoft Excel and display the following window:
To Enable Excel Macros:

Often times you will get the following message when you launch NeuroPlot using Excel 2010:

1. Click on the “Enable Editing” button next to the Protected View. This will bring up the following message:

   ![Security Warning]

   Some active content has been disabled. Click for more details. Enable Content

2. Click on the “Enable Content” button next to the Security Warning. This will complete the launch of NeuroPlot.

It is possible that your version is an earlier version of Microsoft Excel and will not present the “Enable Editing” button when the software is launched. Instead you may see a security warning at the top of the page saying “Some active content has been disabled”.

   1. Click on the “Options” button next to the security warning. This will open the security options window.
   2. Click on “Enable this content”
   3. Click “Ok”.
**Importing and Reviewing the Data**

**To Import the data:**
1. Click on the “Load Z-Score Data and Create New Plots” button. A window will open asking you to point to your patient data.

2. Navigate to the Patients folder whose data you want to review.
3. **Double** click on the PatientData folder and scroll down to the folder with the patient ID that you want to plot. The data will be loaded into NeuroPlot as seen below.

![Image of NeuroPlot interface](image)

**To Review the data:**

1. Take a look at the plot for the data you just loaded and notice the:
   - **Frequency Band ZAP** displayed at the top of the Chart. In the plot above the Beta ZAP (Absolute Power) frequency band is displayed.
   - **Vertical axis** of the plot where you can see the Z-Scores. This allows you to review the brain’s response to each one of the EMF stimulations received.
   - **Horizontal Axis** where you can see the stim cycles that were given.
   - **Trend analysis line** through the plot. Here you can see the direction of the Z-Score from the beginning of the session to the end of the session. In this particular patient, Beta
was low and you can see from the trend line that the Z-scores did increase for Beta from
the beginning to the end of the session.

- **Channel Up and Down Arrows** allow you to select each specific channel, i.e. Channel 1 is
  Fp1. In the above screenshot you can see that Beta at Fp1 did increase.

4. Move the “Channel Down” arrow buttons to select different channels. You will see the red
   highlight move to reflect the brain’s stimulation response during the length of the session for
   the newly selected channel. This allows you to see what the result was as the treatment
   progressed.

5. Quit Excel and you can save your data for later review.
XI. Creating Protocols & Using Provider Database

NeuroField installs an empty database so you can create your own client protocols. You can either use the Protocol Wizard which guides you through the process or you can create a protocol on your own from scratch. Note: It is always a good idea to make a backup copy of your provider database and store it on your desktop for future use if needed.

Creating Protocols - Using the Protocol Wizard

Creating a protocol can take time and a lot of effort. An easy way to setup the basic structure of a protocol is to use the Protocol Wizard. The wizard can do a lot of the work for you.

To Use the Protocol Wizard:

1. Select an empty table in the Provider database by choosing one from the drop down menu on the “Standard Page”.
2. Click on the “View Protocol” button.
3. Check the “Enable Protocol Wizard” box. The interface will change to reveal the wizard controls.
   The Protocol Wizard allows you to select the:
   - Number of Stim Cycles
   - Start Frequency
   - Step Frequency
   - Duration
   - Amplitude

   For instance, if you want to create a 1-5000 protocol that: steps by 1 Hz each stim cycle, gives 1 second of stim, and gives 5 volts, you would enter:
   - 5000 into the “Number of Stim Cycles” box
   - 1 in the “Start Frequency” box
   - 1 in the “Step Frequency” box
   - 1000 in the “Duration” box
   - 5 in the “Amplitude” box.
4. Click the “Generate New Protocol” button.
   Practice with this control and you will see how powerful it is!
Creating Protocols – From Scratch

To Create Protocols:

1. Launch NeuroField
2. Select “Provider” database when prompted to “Select a Database. This database is empty and allows you to create up to 50 individual protocols.
3. Click on the “View Protocol” button on the “Standard Page”. This will bring up the “Stim Cycle Setup” page. On this screen you will see the Frequency/Stim Cycle list as well as the Stimulation Cycle Parameters information. Any of this information can be changed and modified.

4. Select the first frequency, “Index 1”, in the “List of Stim Cycles” table on the left side of the page. A sideways triangle will appear signifying that it is the active Stim Cycle.
5. On the right side of the page, Click on the “Check to Enable” check box in the “Frequency, Duration and Amplitude Control” table to enable (activate) the channels you want, either Channels 1, 2, 3, and/or 4:
   - Channel 1 controls F3, F4, Fp1, Fp2, F7 and F8.
   - Channel 2 controls C3, T3, C4, and T4.
   - Channel 3 controls T5, T6, P3, P4, O1, and O2.
   - Channel 4 controls Fz, Cz, and Pz.
6. Click on the “Frequency” box in the “Frequency, Duration and Amplitude Control” table and enter the values that you want for each enabled channel. NeuroField can give frequencies from 1Hz to 100,000Hz reliably.

7. Click on the “Duration” box for each enabled channel and enter the Duration of time that you would like the channel to be active. Time is programmed in milliseconds with 1000 milliseconds equal to 1 second. You can program time from 1-60 seconds.

8. Click on the “Amplitude” box and select the Amplitude you want for each channel enabled. Amplitude is the amount of power that you send through the cap. It can be set from 800 (0.0008) microvolts to 5 volts.

9. Click on the “Update” button to save the setup.

10. To setup the next Stim Cycle, Click on the next frequency from the list in the table on the left side of the screen. The sideways triangle will move down to designate the next active Stim Cycle. **Note:** Each Stim Cycle must be setup individually.

11. Repeat Steps 5 – 9 above.

12. Once you have completed setting up each Stim Cycle, Click on the “Reload New Data into the Treatment and Close Window” button. This will take you back to the “Standard Page”.

13. Click on the “Edit Name” button and name the protocol that you created.

14. Enter a description into the “Description” box.

15. Click on the “update” button next to it. The data is now saved, and the next time you open this database the protocol will be available for use.
XII. 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 a 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 abrasion. 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 \textit{EVER} attach the NeuroField cap to the scalp with electro paste. You will inject electricity into the person with the potential of causing harm.
XIII. 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.

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XV. Contact Information & RMA’s & Troubleshooting

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Official NeuroField Website: www.NeuroField.com

RMA’s
If you experience problems with your NeuroField device that requires repair you are required to call NeuroField, Inc and speak to a technical support representative. If it is determined that your system requires repair you will be given a RMA number and instructed to send your system in for repairs to the NeuroField office. NeuroField, Inc. will not be responsible for systems that are sent in without an RMA number. Shipping and repairs for systems that are not under warranty are the responsibility of the system owner.