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Quantum Cranial Advantage

A Novel Method to Improve Cerebral Processing

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Abstract

Repeated self-administered Critical Flicker Fusion (CFF) frequency measurements and subsequent mild noninvasive transcranial electromagnetic stimulation at the individual's measured CFF frequency may increase an individual's cranial processing speed.

Introduction

Recent scholarly articles about Critical Flicker Fusion (CFF)[1] [2] [3] and research in applying ElectroMagnetic (EM) signals to stimulate the brain[4] [5] [6] [7] have illuminated new insights on enhancing both mental and physical capabilities. Science and medicine are rediscovering Electromedicine using Bioelectronics to gain a deeper understanding of how the human mind operates and how to influence it. Elevating the mind to this new level of awareness and functioning is what NuTesla calls the Quantum Cranial Advantage (QCA).

QCA was developed by NuTesla after learning how US Air Force fighter pilots in the 1970s reduced reaction times using a device designed to reinforce higher brainwave activity by emitting EM pulses at the pilot's CFF frequency. The human brain is susceptible to external EM stimulus. Random or disorganized EM patterns can result in confusion, irritability and fatigue[8] [9] [10]. Repetitive EM signals can result in brainwave entrainment, which can both relax and stimulate parts of the brain. Transcranial Magnetic Stimulation is already being used for

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[1] 'Critical flicker fusion' test can measure the brain's processing speed
http://www.extremetech.com/extreme/218403-critical-flicker-fusion-test-can-measure-the-brains-processing-speed

[2] UGA Researchers Develop Visual Test to Quickly Check Brain Function Quality
http://www.newswise.com/articles/view/643545/

[3] Critical Flicker Fusion Predicts Executive Function in Younger and Older Adults
http://acn.oxfordjournals.org/content/early/2015/09/13/arclin.acv054.full

[4] http://www.nature.com/news/brain-doping-may-improve-athletes-performance-1.19534

[5] http://www.nature.com/news/2011/110413/full/472156a.html

[6] http://www.nature.com/news/brain-stimulation-in-children-spurs-hope-and-concern-1.18405

[7] http://journal.frontiersin.org/article/10.3389/fnhum.2016.00589/abstract

[8] Human Laboratory and Clinical Evidence of Effects of Electromagnetic Fields
https://www.ncbi.nlm.nih.gov/books/NBK208981/

[9] EFFECTS OF HIGH-FREQUENCY ELECTROMAGNETIC FIELDS ON HUMAN EEG: A BRAIN MAPPING STUDY
http://www.mitchelleffect.com/pdfs/electromagnetic%20fields%20effects%20on%20human%20brain%20EEG.pdf

[10] Could certain frequencies of electromagnetic waves or radiation interfere with brain function?
https://www.scientificamerican.com/article/could-certain-frequencies/

therapeutic purposes[11] [12]. Devices for consumer use are appearing on the market and have attracted the attention of the US FDA, who hosted a two-day workshop on *Neurodiagnostics and Non-Invasive Brain Stimulation Medical Devices*, in November of 2015[13]. QCA is the result of these and other discoveries concerning CFF and EM brain stimulation.

Background

Central to understanding and applying Quantum Cranial Advantage is first understanding Critical Flicker Fusion. CFF is most simply defined as the frequency, or rate, expressed in flashes per second, at which a flashing light appears to 'fuse' into a constantly illuminated, non-flashing light. This rate is usually between 20 to 40 flashes per second for humans, and correlates to a range of higher brainwave activity.

A study published in 1947 titled *FLICKER FUSION FREQUENCY AS A FUNCTION OF ANXIETY REACTION*[14] by Krugman disclosed a relationship between anxiety and flicker fusion frequency. The study enlisted WW2 airmen, fifty with PTSD symptoms and fifty without, and discovered a person's CFF frequency increased as his anxiety decreased. They were able to use the airmen's CFF frequency to measure his PTSD recovery. More recently CFF has been shown as a method to measure the brain's processing power, as well as cognitive abilities. The first three footnotes in this paper reference some of these recent studies.

NuTesla added CFF to its instruments starting in 2008 after meeting with a scientist who formerly worked for the US government during the cold war era. He had recently seen one of the first Rhythmedics® Pendulums[15] by NuTesla and noticed a similarity to an anti-mind control device[16] developed during his work for the government. The device was worn by some government officials and military personnel to counteract the possible mind controlling effects of Soviet Union EM Signals. One of these signals was called the Russian Woodpecker signal[17], a repetitive tapping like sound transmitted at 40 MHz and modulated at 8 to 14 cycles per second, the same as the brain's alpha-wave range. Exposure to alpha-waves can cause a person to enter a trance-like state. Highway hypnosis[18] is an example of this altered mind state and occurs when the white lane dividing stripes move rapidly past the driver at high speeds on the highway.

The device from the 70's was intended to counteract alpha-wave EM signals by reinforcing higher beta-wave brain activity. It was a small battery-powered instrument with a red light and a

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[11] Technology Insight: noninvasive brain stimulation in neurology--perspectives on the therapeutic potential of rTMS and tDCS - Fregni, Felipe; Pascual-leone, Alvaro. Nature Clinical Practice. Neurology; London3.7 (Jul 2007): 383-393. https://search.proquest.com/openview/6f00a83c1e809b7793862b879cae4d93/

[12] Bihemispheric brain stimulation facilitates motor recovery in chronic stroke patients http://dx.doi.org/10.1212/WNL.0b013e318202013a *Neurology December 14, 2010 vol. 75 no. 24 2176-2184*

[13] Federal Register Notice http://www.gpo.gov/fdsys/pkg/FR-2015-08-14/html/2015-19990.htm

[14] http://journals.lww.com/psychosomaticmedicine/Abstract/1947/07000/Flicker_Fusion_Frequency_as_a_Function_of_Anxiety.8.aspx

[15] http://pendulum.nutesla.com/

[16] ELF WAVES AND EEG ENTRAINMENT - A PSYCHOTRONIC WARFARE POSSIBILITY https://borderlandsciences.org/journal/vol/36/n06/Beck_ELF_Waves_EEG_Entrainment_V.html

[17] http://content.time.com/time/magazine/article/0,9171,911755,00.html

[18] https://en.wikipedia.org/wiki/Highway_hypnosis

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timing circuit adjusted by a small knob. Its design was inspired by a device invented and manufactured by Dr. Wolfgang Ludwig in Germany called Vitasette, which emitted ElectroMagnetic (EM) pulses. A series of switches on the Vitasette allowed the user to select different frequencies, including Schumann's Resonance of 7.83 Hertz (Hz or cycles per second).

The US government redesigned Vitasette, replacing the frequency selecting switches with a potentiometer (a variable resistor) and knob (like a volume control) and added a red light that flashed with the coil's EM pulses. The scientist never said what the redesigned device was called and given the US government's refusal to acknowledge its own employees' reports of effects from the Woodpecker signal (see Time's article in the footnotes above) it's not surprising an internet search doesn't reveal anything about its existence. Though the government's now published MK-Ultra Project's declassified documents[19] clearly show its involvement with EM mind control experiments.

The users were instructed to wear the device around his or her neck when awake, or pinned under the collar. Three times a day she or he was to remove the device and pull up the knob connected to the potentiometer on top to start flashing the red light. The user was to twist the knob to adjust the rate of flashing until the light just appeared to be continuously lit. This was the 'critical' flicker fusion rate or frequency for that individual. The user was then to push the knob back down into its normal position, at which time the light would extinguish, and for the next 30 minutes the device would emit its EM pulses at the user's flicker fusion frequency.

Typical CFF frequencies of 20 to 40 flashes per second rate are in the range of beta-wave brain activity. Beta-wave brain activity occurs when a person is alert and focused on a task requiring mental effort[20]. Below beta is the alpha frequency range, which occurs when a person is awake and relaxed, day dreaming or even hypnotized. Studies[21] [22] indicate people are most susceptible to suggestions, or outside influences, when in the Alpha range. The Russian Woodpecker signals of 8-14 cycles per second were in the Alpha brainwave range, leading to the supposition that long term exposure could result in suggestibility and slower response time or even a lack of concern. Since the user's CFF rate is in the range of the brain's beta-wave activity this resulted in the device reinforcing the user's higher brainwave functions, making him or her less susceptible to outside influences from whatever source (light, sound, vibration, or radio-waves).

Based on the scientist's explanation of the device from the 70's NuTesla conducted additional research and subsequently added CFF to its line of wellness instruments. CFF yielded several benefits, even before the QCA discovery. Tracking a person's CFF rate provided a measurement of changes in a person's overall wellness and stress levels. NuTesla referred to the measured CFF rate as the user's Personal Wellness Number. The user measured his or her CFF rate by pressing a switch when a rapidly flashing Red LED, which initially appeared to be constantly

[19] https://www.cia.gov/library/readingroom/search/site/MK-Ultra
[20] What is the function of the various brainwaves? https://www.scientificamerican.com/article/what-is-the-function-of-t-1997-12-22/
[21] Structural and Functional Cerebral Correlates of Hypnotic Suggestibility https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3966870/
[22] The impact of hypnotic suggestibility in clinical care settings https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3731942/

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illuminated, started to visibly flicker. The CFF rate was then displayed as counted flashes of light for tens and ones digits. For example, if the user counted five white flashes followed by four green flashes it meant a Personal Wellness Number of fifty-four. This provided an objective tool for NuTesla users to gauge improvements in his or her wellness resulting from the use of the instruments. Secondly, each of the instruments would emit the user's CFF frequency for thirty minutes following the measurement and displaying of his or her Personal Wellness Number. This resulted in reinforcing a person's higher brainwave activity and promoted an increased feeling of wellness. QCA takes CFF and these benefits to an entirely new level.

Beyond Measuring CFF

NuTesla's focus is using healthy EM pulses to improve wellness, and the correlation between CFF frequency and beta-wave brain activity led to further research. Several years after the initial conversation with the former government scientist he shared an observation about the Air Force fighter pilots using the 70's device. The pilots noticed after adjusting the flashing rate to the point when the red light fused on, if they didn't push the knob back down, but looked away and waited about thirty seconds, when they looked back at the light they could see it flickering again. The pilots would then turn the knob slightly to increase the flashing rate until it appeared continuously lit, then look away for another thirty seconds and when they looked back at the light it was again flickering. This continued for several iterations until no flickering was observed after looking away for thirty seconds. The pilots would repeat this at least once a day and it resulted in their CFF rate increasing by as much 30% to 40% over time.

There was no way for the pilots to determine how much their CFF rate had increased, but they noticed their reaction times were getting shorter. This group of pilots had a lower incidence of accidents both flying and driving, as well as remarking they received fewer speeding tickets. Something was happening to increase their CFF rate and it appeared to be related to the pilots being in control of adjusting the flickering rate in addition to repetitively setting it. It took several more years of research and the recent academia studies on the use of CFF mentioned above to unlock the mechanisms of what was occurring.

Three important points are worth noting here. First, the published literature on studies using CFF reveal only the clinician conducting the study controlled the flashing rate, not the participants. Second, the participants of CFF studies were not exposed to EM pulses of his or her CFF rate. Third, when retesting occurs it had been done to get an average CFF rate, not to look for trends in the rate for an individual participant. There have been no published trials on the method of individuals self-measuring his or her CFF rate or on increasing the CFF rate by successive retesting and EM stimulation.

A few more years passed and more studies were conducted as academia became more aware of CFF and its possibilities for diagnosing a variety of health issues from mental disease to cirrhosis. In 2016 a study was published showing CFF rate was an indicator of a person's brain processing power (see footnote 1 above). The higher a person's CFF rate the more critical problem solving he or she could do. They could handle more data, accept more sensory inputs per second, and process them faster. This study validated the scientist's observation that the fighter pilots in the 70's had boosted their CFF rates and were thus able to think and react faster.

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New Neural Pathways

Improving CFF measuring and reporting isn't enough to expand the brain's processing speed. One of the possible explanations for the fighter pilots' increased CFF rates is the eye-hand coordination experience where the eye perceived the CFF rate which the hand was controlling by twisting the knob. This eye-hand coordinated experience appeared to establish, or awaken, a previously untapped neural pathway. Prior to QCA NuTesla's CFF measuring only allowed the user to view a rapidly flashing red light which got progressively slower and stop the test when the light slowed to a flicker. With the advent of QCA the instruments now allow the user to increase and decrease the flashing rate using the pushbutton dome switches on the back. This change supports the necessary eye-hand coordination to take advantage of this new neural pathway.

The second factor affecting the pilots' increasing CFF rate was the brief exposure to the EM pulses emitted at the pilot's CFF rate. Both the 70's device and all NuTesla instruments use bipolar switching to pulse the coils in each device. The result of sending electrical current one direction through a coil and then reversing the current causes the stored charge to collapse on the reversing energy and create an emitted standing wave, also known as a Scalar wave. Scalar waves are the basis for Nikola Tesla's energy work and were also a component of the Russian Woodpecker signal transmitted continuously worldwide during the 70's to late 80's. Both the 70's device and all NuTesla's instruments emit a Scalar wave component in addition to the EM pulses.

The CFF rate EM pulses and their Scalar wave component reinforce the eye-hand neural pathway and recharge all the active neural pathways by its resonant energy. The EM pulses and Scalar wave component are emitted at the same frequency as the CFF rate, which has been shown to be a measure of the brain's processing power. The CFF rate is also the current brainwave operating frequency and exposing the brain to the EM pulses and Scalar waves at the same frequency takes advantage of resonant amplification, just as pushing a swing at the right time increases the travel of the swing. When a person sees his or her own CFF rate resulting from controlling the flashing rate with his or her own hand, and is exposed to mild, noninvasive EM pulses and Scalar waves at that same CFF frequency, there is a resulting increase in the cranial processing rate. While this increase for any given measurement may be small (less than 1/10 of a Hertz or flash per second), repeated CFF measurements with exposure to the same frequency EM pulses and Scalar wave, can result in seeing flickering when the light had appeared continuously lit before.

Overcoming Visual Acuity Differences

One of the challenges in measuring CFF is overcoming variations in visual acuity, which affects his or her measured CFF rate. Cone cells are the color sensitive photoreceptor cells in the central region of the retina of the eye and function best in relatively bright light. The motion-sensitive rod cells in the periphery of our retina have little, if any, role in color vision; however they are

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100 times more sensitive to light[23]. Recent studies have shown Contrast Sensitivity[24] as a better method than a single light source flashing on and off, even with a dimly lit background of a different color. If the there was a dim backlight against which the flashing occurred the user would then be seeing a contrast change from one brightness of the flashing light to a much dimmer brightness of the backlight. Using contrast sensitivity reduced the visual acuity differences significantly.

NuTesla went one step beyond contrast sensitivity in reducing variations in CFF measurement. A study conducted in 1965[25] regarding sensitivity to different colors of light, specifically red, green and blue, the primary colors of light, concluded human eyes are similarly responsive to red and blue, whereas they are more sensitive to green light. NuTesla's testing discovered alternately flashing the red and blue LEDs in the instrument's Spectrum LED (SLED), which is on the face of all the instruments, provided the highest degree of reproducibility and reduced visual acuity variations by the greatest degree. The flickering of these two alternating LEDs relies on the eye's contrast sensitivity and overcomes the barrier of differences in visual acuity,

Prior to QCA, NuTesla's CFF measurements reported a person's Wellness Number, which was not the same as the number of flashes per second. QCA now displays the user's measured CFF frequency as the number of flashes per second to an accuracy of one-tenth of a second. This is displayed as successive counted flashes of white for the tens digit, followed by counted flashes of green for the ones digit and then counted flashes of amber for the tenths digits. Thus, at the end of the measuring cycle if the instrument flashed white three times then green four times and amber seven times, the CFF rate would be 34.7 cycles per second.

Using Clarius to Boost Brainpower

Rhythmedics Clarius with software versions 4.0 and higher include the Quantum Cranial Advantage feature. This section describes how to access and use QCA with a capable Clarius.

Clarius is powered through its Mini-B USB connector, as shown in the figure to the right. Clarius can be powered by either its included AC power adapter or using the included USB A to Mini-B programming cable connected to powered USB source. When the 5Volt USB power is connected to Clarius it begins its initialization and start-up process that includes verifying the Bio-Pulse emitters are working properly, followed by flashing the Spectrum

[23] http://en.wikipedia.org/wiki/Rod_cell
[24] Visual Responses to Time-Dependent Stimuli https://www.osapublishing.org/josa/abstract.cfm?uri=josa-51-4-422
[25] THE FLICKER FUSION FREQUENCY OF THE BLUE-SENSITIVE MECHANISM OF COLOUR VISION http://onlinelibrary.wiley.com/doi/10.1113/jphysiol.1966.sp007879/pdf

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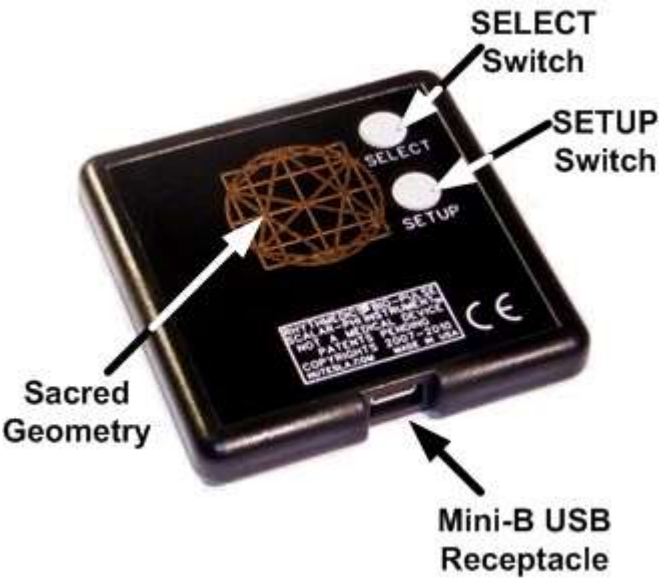
LED (SLED) to indicate the Clarius' serial number and software version. Following this start-up sequence the Clarius will flash the color of the last run preset program as a two flash heartbeat signal.

After the start-up sequence has occurred the user can start the QCA feature by pressing and releasing the white SETUP dome switch in the back of Clarius as shown to the right. This is usually best accomplished by holding Clarius in the left hand with the thumb just below and to the left of the Clarius name on the face and the pointer finger resting on the slightly raised white dome switch on the back. The user then squeezes Clarius between his or her thumb and pointer finger and should feel a slight give in the dome switch, at which point the user releases the squeezing pressure while still holding Clarius in his or her hand.



When the SETUP dome switched is released the SLED on the face of Clarius will flash Red four times rapidly to indicate the QCA feature has started and Clarius is entering the CFF measurement phase. The SLED will initially appear constantly illuminated Violet color. The SLED appears Violet as both the Red and Blue LEDs are being alternately illuminated at a very high frequency (faster than 100 flashes per second). The alternating Red and Blue will automatically decrease in frequency to a point where visible flickering occurs, usually within forty to sixty seconds. If neither dome switch is pressed the flickering will continue to slow and become more definite until after two minutes the CFF measuring phase ends without a valid ,measurement and the Clarius reverts to running the last Preset Program as indicated by the Violet flickering stopping and the SLED flashing the dual heartbeat signal for the running Preset Program. If this occurs, press and release the white SETUP dome switch once more to restart QCA.

While the SLED is illuminated Violet, before or after any flickering is observed, the user can simply press and hold the upper white SELECT dome switch to increase the SLED's flashing rate, or press and hold the lower white SETUP dome switch to decrease the SLED's flashing rate. Pressing and releasing one of the dome switches will respectively increase or decrease the SLED's flashing by a small amount, less than $1/10^{th}$ of a flash per second.

Clarius should be held with the SLED a couple inches directly in front of the user's dominant eye. Clarius may be held with either left or right hand with the thumb immediately to the left side of the Clarius name on the front and the pointer finger resting on the upper SELECT dome switch and the middle finger resting on the lower SETUP dome switch on the back. Holding Clarius this way allows the user to alternate pressing of the upper and lower dome switches to respectively increase or decrease the flashing rate. Alternately increasing and decreasing the

flashing rate of the Red and Blue LEDs will assist in becoming familiar with controlling and observing changes to the flashing.

To identify the user's CFF rate the flashing should be adjusted down until both Red and Blue LEDs appear to be flickering and then adjusted up as needed to achieve the visual condition of both Red and Blue LEDs appearing to be continuously lit. The frequency can be adjusted up and down repeatedly to allow the user to see this transition from flickering to constantly illuminated. It's important that both Red and Blue LEDs appear constantly illuminated at the same time. The threshold at which this occurs is the point of Critical Flicker Fusion.

NOTE: Once either the SELECT or SETUP dome switch has been pressed a five second idle timer begins and the automatic slowing of the flashing rate ceases. The user must then press the SELECT or SETUP dome switch to either increase or decrease the flashing rate within five seconds of a previous dome switch press to continue the CFF measuring phase. After five seconds of neither dome switch being pressed the CFF measuring stops and the frequency is reported.

The CFF frequency is reported as three series of colored flashes. The CFF frequency tens digit is first shown as counted flashes of White. After a short pause the ones digit is shown as counted flashes of Green. If the ones digit is a zero a single Blue flash will occur. The tenths digit is then shown as counted flashes of Amber. If the tenths digit is a zero a single Blue flash will occur. For example, if a user counted three White flashes, followed by seven Green flashes and five Amber flashes the CFF frequency would be 37.5 Hertz (flashes per second). If four White flashes are followed by a Blue flash and two Amber flashes the CFF frequency would be 40.2 Hertz. If four White flashes are followed by two Blue flashes the CFF frequency would be 40.0 Hertz. It is recommended to record the CFF frequency measured at the beginning of each QCA session.

After the CFF frequency is reported the SLED will again illuminate its Violet color at the reported CFF rate, accompanied by the Bio-Pulse emitters operating at the same frequency. If neither the SELECT nor SETUP dome switches are pressed the Violet flashing and EM pulses with Scalar wave component will continue for twenty minutes. After twenty minutes the Clarius will stop and revert to its last run Preset Program.

To continue the QCA feature the Clarius should be held by the user without looking or staring at the Violet light for at least thirty seconds. After this time has elapsed the user should move the Clarius back to within a couple inches in front of the dominate eye, at the same distance and position previously used in measuring the CFF rate. If the user does not perceive any flickering of either the Red or Blue LED at this point the Clarius should be moved away so to prevent looking or staring at the Violet light for at least an additional thirty seconds. If after the subsequent waiting flickering is still not observed, the user should lay the Clarius down and allow it to run its twenty minute CFF frequency and attempt the QCA feature at a later time.

When the Clarius is returned to the same position and distance from the dominate eye and a slight flickering of either the Blue or Red LED is observed, the user should press and quickly release the upper SELECT dome switch to increase the flashing rate by its smallest incremental

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step. If either the Red or Blue LED is still flickering the SELECT dome switch should be again pressed and quickly released. This should be repeated until no further flicker is observed. After five seconds of neither dome switch being pressed the Violet light will turn off and the CFF frequency will be reported as three series of counted flashes as before. Since the incremental increase in flashing rate is less than 1/10 of a Hertz, it is possible for subsequent higher flashing rates to be reported as the same previous CFF rate, even though the SLED is operating at the slightly higher rate.

After the CFF frequency is reported the SLED will again illuminate its Violet color at the reported CFF rate, accompanied by the Bio-Pulse emitters operating at the same frequency. As before, if neither the SELECT nor SETUP dome switches are pressed the Violet flashing and EM pulses with Scalar wave component will continue for twenty minutes and the Clarius will then stop and revert to its last run Preset Program.

This procedure, of holding the Clarius so as not to view the SLED for at least thirty seconds followed by checking for flickering and increasing the rate until the flickering is not observed, should be repeated until no new flickering is observed after the minimal thirty seconds period. At this point the Clarius may either be left operating at the CFF frequency for its twenty minute period or it may be disconnected from its power source to turn it off.

To stop the twenty minute CFF period and revert to the last run Preset Program, the user should press and hold both the SELECT and SETUP dome switches at the same time until the SLED is off and then release both dome switches. The Clarius will then revert to running the last run Preset Program as seen by the program's double heartbeat flash.