User Manual for the Micro-Pulse

Model C5

Rev: 2017-05-15

TABLE of CONTENTS:

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2 - You understand that Micro-Pulse LLC products are not proven clinically effective.

3 - You understand that Micro-Pulse LLC products are not proven safe.

4 - You take full responsibility for your use of any Micro-Pulse product.

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6 - You accept responsibility for the use of Micro-Pulse LLC products and any corollary or secondary effects caused by these products, such as electro-magnetic interference or unintended biological effects.

7 - You will use Micro-Pulse products only as allowed by law.

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Terminology in ICES-PEMF: *Hz* versus *pps*

Throughout this document you will see the term “pps” (pulses per second) to describe how many ICES pulses are generated per second, instead of the more common unit “Hz” (Hertz).

It is OK for you to think of *pps* as equivalent to Hz (i.e., *pulses per second* is equivalent to *Hertz*). When you see *pps*, just think: “frequency, Hz”

If you are comfortable with this, you can skip the rest of this page and move on to the rest of the C5 manual, remembering that “pps” just means “Hz”.

If you are wondering why I am splitting hairs on this topic, here is my justification.

Return to ToC

Power Input: 5 VDC @ 2 Amps (or higher rating)

- USB to micro-B cable: use good quality
- 3, 6, 10 feet (any length is OK)
- USB data lines are not used
- Use either micro-B port on the C5
- Do not use both ports, use only one at a time (second one is a spare)

Plastic case color may vary:
C5 is gray, B5 is red.

Power Input: 5 VDC @ 2 Amps (or higher rating)

- USB to micro-B cable
- 3, 6, 10 feet (longer ~ stiffer, be careful not to damage the USB micro-B ports)
- USB data lines are not used
- Use either micro-B port on the C5
- Do not use both ports, use only one at a time (second one is a spare)

Plastic case color may vary:
C5 is gray, B5 is red.

Power Input: 5 VDC @ 2 Amps (or higher rating)

- A laptop USB port may not have adequate power rating (< 2 Amps).
- Most plug-in car or wall outlet USB power/charger ports work very well. Be sure the rating is at least 2 Amps (10 Watts) per port

Power Input: Battery Packs

Inadequate power: < 10,000 mAh

- **AmazonBasics Power Bank (< 10,000 mAh)**

- **HAME 4000mAh**
- **Mocreo 2500mAh**

Power Input: Battery Packs (some work well, others do not)

Use Battery Packs with
-- > 2.0 Amp rating
-- > 10,000 mAh capacity

- ✓ **Anker PowerCore 10000**
- ⊘ **KMASHI 10000mAh with 3.1A Output**
- ✓ **Unifun 10400mAh**
- ✓ **Polanfo M50000-12000mAh**

Power Input: KNOW YOUR BATTERY

- Battery portable power packs are sophisticated devices. If you choose to use one you must take the time to learn how it works.
- Most battery packs are intended to recharge other devices, so they may not behave well when powering a device like the C5 which draws variable amounts of power as it changes modes and frequencies.
- Most battery power packs will shut off automatically if they detect very little or no power drain. This can be a problem, because the C5 is ultra efficient, so the battery power pack may decide that it is not connected to anything that is using power, and may shut itself off.

Power Input: KNOW YOUR BATTERY

POWER/RESET Button

- Or, if you draw too much power, such as at POWER UP for the C5 when it draws the most power, about 2 Amps, the battery pack may automatically shut down if it detects an over-current error. This protects the battery from self destructing.
- In either case, you may have to reset the device. Every battery pack is different. You need to know how to reset it. This battery pack can be reset by pressing the power button indicated above.
- If you are using a battery pack and your C5 keeps shutting off, this is probably the problem you are experiencing. You may need to try a different battery pack, or change how you are using the battery pack you have.
- Also note: this battery pack has two outputs: 1 Amp and 2.1 Amp. Use the higher one.

Power Input: very short or long USB cable

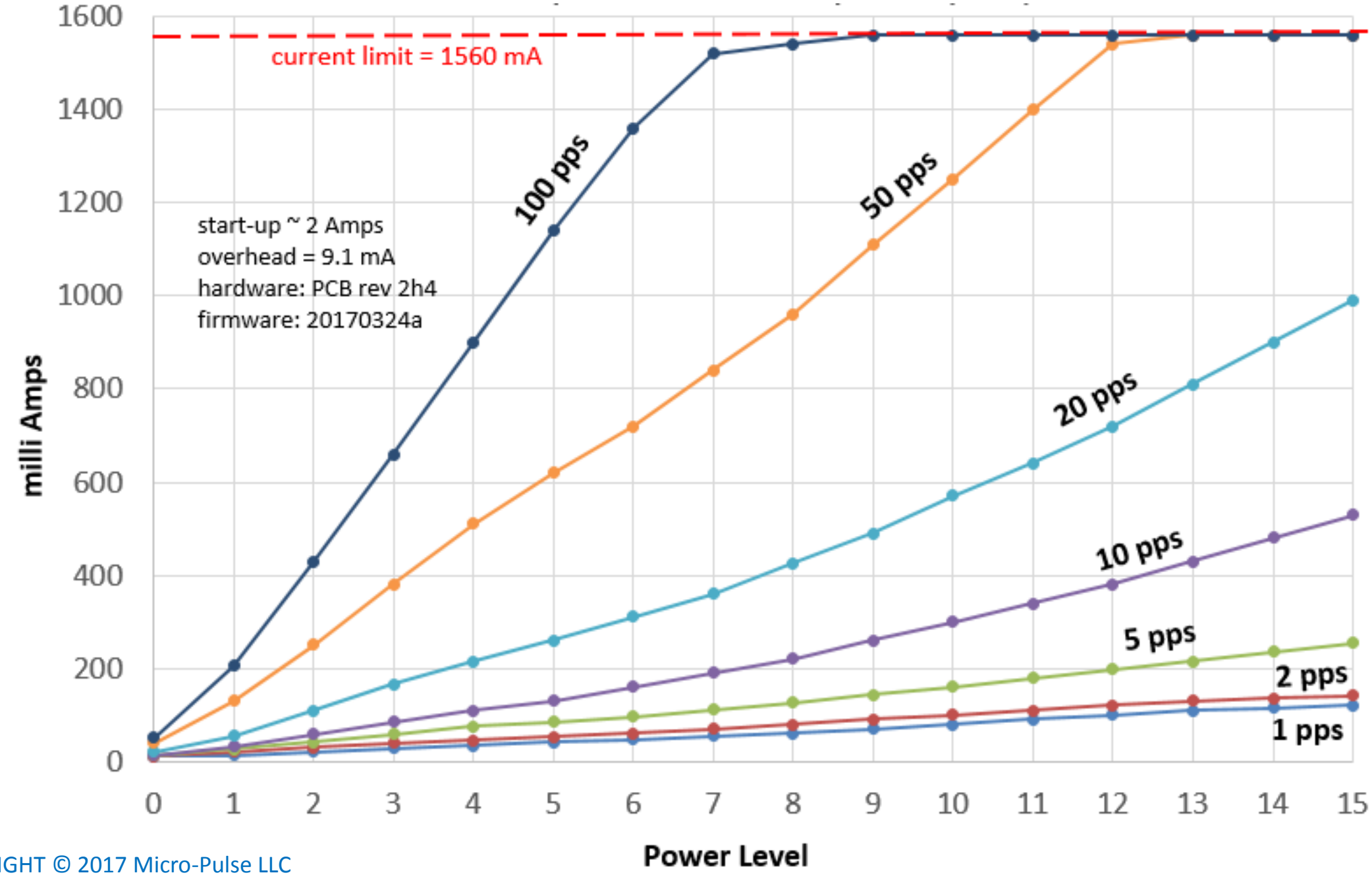
- Use with battery power packs or USB wall power converters
- Any length USB – micro B power cable can be used
- Some cables are better than others: some have unreliable connections while others seem to provide a good, reliable connection.

Power ON

- To power up the C5, first plug in to a USB power port using a micro-B cable, or in to an external battery pack.
- Then, switch the power ON
- The Power Switch is recessed into the case to prevent accidental switching
- You will use the Power Switch often, to control C5 protocol termination and to reset the device.

Power ON

- The C5 can only be adjusted within the first 10 seconds of power-up. After that, it initiates the AUTO-RUN sequence.
- Once the C5 is running, you can not adjust the settings. This is to prevent accidental changes to settings to the device.
- If power is interrupted for any reason, the C5 will restart the most recent protocol using your most recent settings as soon as power is reestablished. You do not need to do anything but provide reliable power.
- To adjust the settings, you simply switch the C5 OFF, wait one second, then switch it back ON.
- This feature seems annoying at first, but it prevents unintended changes to the settings on your C5. Once you get used to it, it will make sense.



NOTE: if the current limit is exceeded, the RED LED will light for ~ 1 second, then the C5 will resume function. It will continue at the high power level you have set, but next time, on POWER-UP, it will reset to a safe level, usually POWER = 9. Use lower power or frequency.

Connecting Coils and Arrays

ICES COIL OUTPUTS:

The C5 has four identical synchronized independently powered and controlled I.C.E.S. output ports to drive 4 sets of original I.C.E.S. coils, or 4 new 2x2 coil arrays, or any combination

Plug each coil in firmly, all the way

Use any or all four ports

Connecting Coils and Arrays

- Any Micro-Pulse coils or coil arrays can be used
- Coils and arrays can be used in any combination and in any port
- We advise against using audio cable splitters

How to Place Coils on the Body

For the most recent advice on coil placement, please visit YouTube and search the following terms:

“ICES PEMF tutorial” (optionally refine the search with the term “coil”)

Optionally, you can jump straight to the following links:

https://www.youtube.com/watch?v=FGMyCZVQM5E

https://www.youtube.com/watch?v=Ew1H4nglT0A&t=8s

https://www.youtube.com/watch?v=_WtdIF0OmJ0&t=275s

https://www.youtube.com/watch?v=Fy_p2ZtW03M&t=46s

USER Guide for the Micro-Pulse

Model C5

General Guidelines: BEFORE YOU BEGIN SELECTING and ADJUSTING PROTOCOLS

The best way to use the C5 is to think and plan before you begin to make adjustments.

You should have a clear plan in mind before you begin to press buttons on the C5:

-- What intensity (power level) do you need? Range is 0 to 15. We suggest you start with 9 or 10.
-- Which protocol do you want to use? There are 27. Decide before pressing buttons.
-- Where will you place the coils? This requires a bit of experimenting to find what works best for you.

If you have these specific things in mind before you begin making adjustments, then adjusting the C5 is easy and very fast. If you don't think about it beforehand, and you want to just decide as you go, you will find the C5 is very frustrating to use. You only have 5 seconds on each screen. This is plenty of time if you know what you want, but not enough time to browse indecisively. Plan ahead.

<u>REMEMBER:</u> You can only adjust the C5 during the first 10 seconds after power-up. This prevents unintended changes while the C5 is operating.

General Guidelines

Some protocols have different *modes*. For example, Omni 8 has 8 modes.
Each mode runs for a certain period of time, then the next mode starts.
The next mode runs for a different period of time, followed by the next.
The C5 cycles through each mode in each protocol.
At the end of the last mode, the C5 starts again with the first mode.
The C5 will continue to cycle through each mode: 1, 2, 3, 1, 2, 3, 1, 2, …….
Each mode runs for a defined time “t” in minutes.
For example, in the A9 Protocol the modes and times can summarized as:

Mode_1 = 5 pps +/- - for 10 minutes
Mode_2 = 100+ pps - for 10 minutes
Mode_3 = 100- pps - for 10 minutes

General Guidelines: Selecting a Protocol

The Micro-Pulse Model C5 allows self experimentation by responsible adults. It is not a marketing gimmick. We do not provide pre-programmed protocols to:

Enhance sleep

Amplify your brain power

Connect you with the Earth Mother Goddess

Magically cure a specific disease

Magically heal a serious injury

While many commercially available PEMF systems make such claims, we believe most of these claims have limited or no scientific basis. On the other hand, some PEMF devices have been reported to have remarkably beneficial effects. Many of these effects have been reported in peer-reviewed scientific papers, some have been verified by independent certified testing laboratories, and the FDA has approved several PEMF systems as safe and effective, to be used by prescription. Micro-Pulse ICES products are NOT FDA approved for any use. The C5 will allow you to experiment and explore these effects for yourself. The only miracles you should expect are the miracles of careful science.

Model C5
User Interface

UP

DOWN

NEXT

RUN

C5 User Interface: A closer look

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User Interface

green LED

red LED

OLED Display

yellow button (UP)

blue button (DOWN)

white button (NEXT)

red button (RUN)

The C5 name plate reminds you of the button functions:

UP DOWN NEXT RUN

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Functions of Buttons when Programing

Yellow = UP increases a value or goes up one item on a list

Blue = DOWN decreases a value or goes down one item on a list

White = NEXT goes to the next screen, one level deeper in complexity

RED = RUN skip all screens and RUN THE PROTOCOL IMMEDIATELY

<u>Rules of Thumb:</u>

- When you adjust the intensity (power) level, go to a protocol screen, or adjust a mode time, the C5 already sets the new value. You do not have to press a button to set it. If you see it, it is already set. So, if you go to the screen SELECT PROTOCOL – A9, then that automatically sets the protocol to A9 and the system remembers that setting until you change it again.
- Once you have set the thing you want to set, just press the RED button to save all changes and RUN IMMEDIATELY.
- If you make a mistake, power OFF, then ON, then start over.

Model C5

Adjust the Intensity (power level)

Power Up Screens

Adjusting the Intensity (power level)

A Note on Setting the Intensity (power) Level

For some reason many people seem to think that more power results in faster or better effects. With Micro-Pulse ICES technology this is definitely not the case. Safety should be considered more important that speed. We find scientifically that more power DOES NOT yield better biological effects. Most people and clinicians agree. The most effective intensity setting is generally in the range of 8 to 10. Many people find that higher settings can actually cause irritation, and when they (finally) agree to turn the power down a bit, they almost always get much better results. The higher power settings are there if you need them, but 99% of people do not benefit from more power.

User Interface: Starting at Power-Up

- The C5 takes about 4 seconds to power up.
- First the red and green LED will switch ON for 1 second. This simply allows you to verify that the LEDs are working, and power is ON.
- Then the OLED screen will swipe WHITE, then BLACK. This is the OLED display resetting itself.
- Then you will see the first screen.
- The first screen will look like this:

ICES model C5
Rev: C5-20170514
© 2017 Micro-Pulse
<NEXT> <RUN>

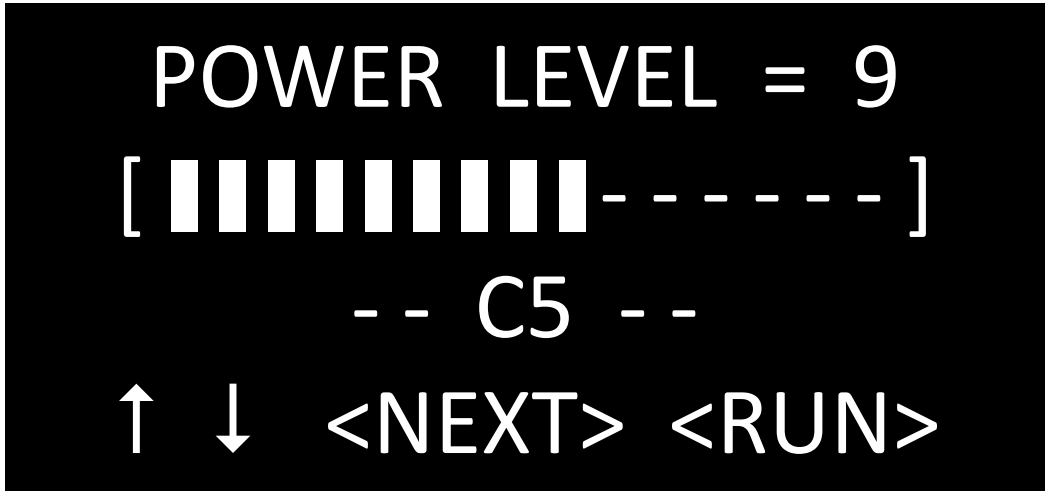
User Interface: Screen # 1 - Start-Up Screen

- Every screen has 4 lines
- On this screen, the top line tells you the device hardware version: C5
- The second line tells you the firmware revision date: 14 May2017
- The third line is a copyright statement.
- The bottom line tells you which buttons are active for the current screen.
- On this screen you can use 2 buttons:
- WHITE = <NEXT> which means advance to the next screen
- RED = <RUN> which means RUN NOW
- If you do nothing, the C5 will continue on automatically to the next screen in 5 seconds, then on to AUTO RUN.

ICES model C5
Rev: C5-20170514
© 2017 Micro-Pulse
<NEXT> <RUN>

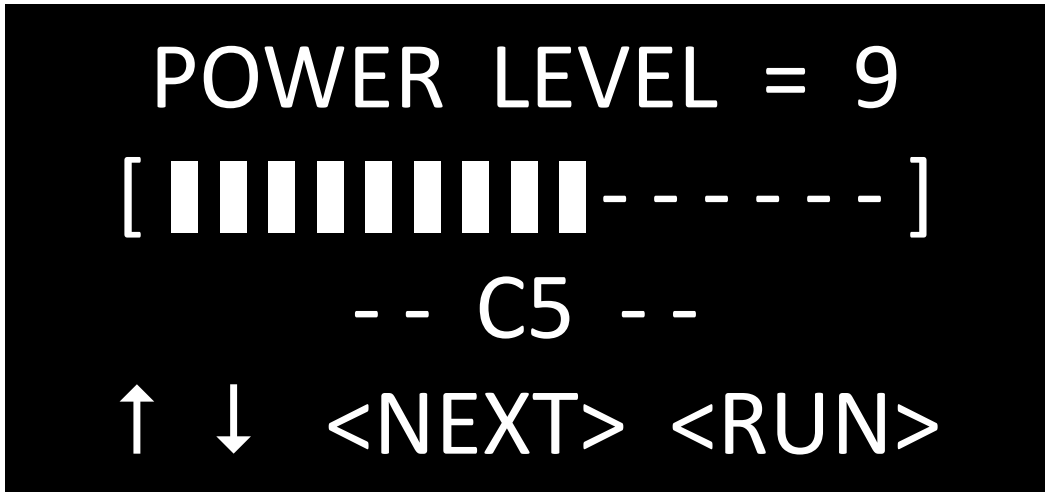
User Interface: Screen # 2 - ADJUST POWER

- Screen # 2 is the screen you will use most often
- On this screen, all four switches are active: UP DOWN NEXT and RUN
- To INCREASE the power level, press the YELLOW button which means <UP>
- To decrease the power, press the BLUE button which means <DOWN>
- WHITE = <NEXT> = go to next screen (Select Protocol)
- RED = <RUN> = RUN NOW
- If you do nothing, the C5 will continue on automatically to the next screen in 5 seconds.



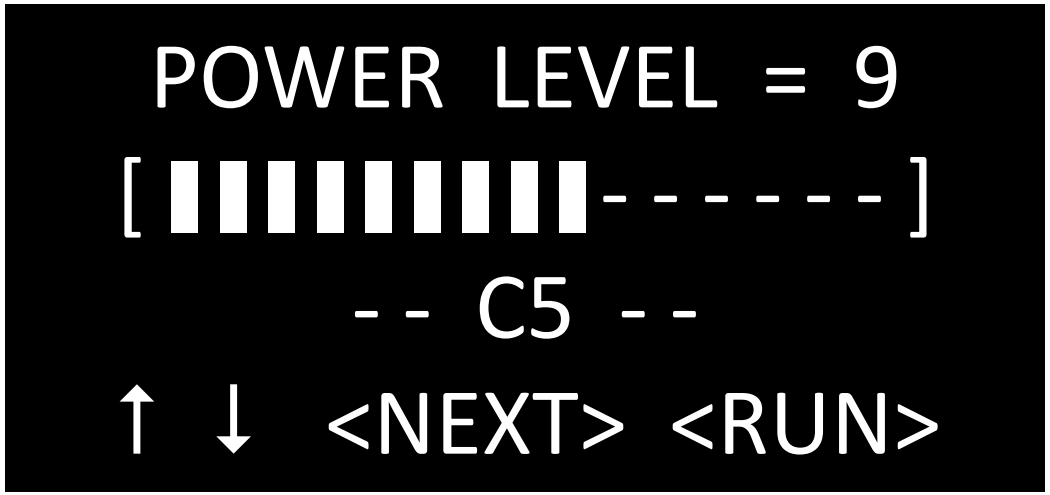
User Interface: Screen # 2 - ADJUST POWER

- Screen # 2 at POWER UP is the only time you can adjust the power level.
- To reset the power level, you must turn the C5 OFF, then ON again and wait for this screen which will display about 8 seconds after POWER UP.
- Or you can press WHITE <NEXT> on screen #1 to get straight to this screen without waiting
- There are 16 available power levels: 0 to 15
- The current power level is displayed both as a number (0 to 15) and a “power bar”
- Press the YELLOW button once for each level of power increase, BLUE once for each level of power decrease.
- The third line on this screen tells you the currently selected protocol.
- In this case, the protocol is the “C5” protocol. You can select a different protocol on the next screen.



User Interface: Screen # 2 - ADJUST POWER

- Once you have adjusted the power level, you have four options:
- Press the WHITE button <NEXT> to go to next screen which allows you to SELECT the protocol that will run.
- Press the RED button <RUN> to jump straight to RUN NOW. The C5 will immediately begin running the selected protocol at the power level you set.
- If you do nothing, the C5 will continue automatically to the next screen in 5 seconds.
- If you continue to do nothing, the C5 will AUTO RUN in about 10 seconds
- Or, you could just turn the C5 off.
- No matter what you do, the C5 will remember the power level you just set and will return to that power level the next time you use the device.



Model C5

Select a Protocol

AVAILABLE PROTOCOLS

List of Available Protocols

Descriptions of Protocols

- Standard ICES Protocols
- Schumann resonances
- Constant Frequency (pps)
- scTMS modified and timed protocols
- CNS “brain wave” protocols

Selecting a Protocol on the C5

List of Available Protocols on the model C5

Standard ICES Protocols:
- -- C5 (same as B5, but not adjustable)
- -- A9 original
- -- P2 (SomaPulse, AllevaWave, …)
- -- Omni 8 (same as Omni 1, but not adjustable)

Schumann Resonances:
- -- Schumann 1 (7.83 pps)
- -- Schumann 2 (7.83, 14.3 pps)
- -- Schumann 3 (7.83, 14.3, 20.8 pps)
- -- Schumann 4 (7.83, 14.3, 20.8, 27.3 pps)
- -- Schumann 5 (7.83, 14.3, 20.8, 27.3, 33.8 pps)

Sub-threshold continuous TMS modes:
- -- scTMS 10pps 30 minutes
- -- scTMS 10pps 60 minutes

Constant Frequency (continuous):
- -- 1 pps
- -- 2 pps
- -- 3 pps
- -- 4 pps
- -- 5 pps
- -- 10 pps

CNS/cortex wave patterns:
- -- alpha wave entrainment
- -- beta1 wave (low range)
- -- beta2 wave (mid range)
- -- beta3 wave (high range)
- -- delta wave
- -- theta wave
- -- mu wave
- -- SMA wave
- -- gamma wave

Standard Micro-Pulse ICES Protocols

- The Standard ICES Protocols have been developed primarily for severe chronic pain and severe orthopedic injury. These protocols use a sequence of different pulse patterns and frequencies both to achieve better tissue response, but also to minimize :accommodation", a process by which living tissues become progressively less responsive to a stimulus over time. This happens especially when the signals are "monotonic", that is, they stay the same over long time periods.
- The Standard ICES protocols include all of the previously available ICES protocols on earlier ICES devices, plus a new C5-B5 protocol.
- These are : -- C5 (same as B5, but not adjustable)
  -- A9 original
  -- P2 (SomaPulse, AllevaWave, …)
  -- Omni 8 (same as Omni 1, but not adjustable)

Schumann Resonance Protocols

- Many people want to experiment with Schumann Resonances. While I do agree that these frequencies are within a biologically beneficial range for tissues, I do not think it is because they are exactly in resonance with the earth-ionosphere resonant cavity.
- The C5 will let you use the following Schuman Resonances: 7.83, 14.3, 20.8, 27.3, 33.8 pps. Each Schumann setting on the C5 adds one additional resonance to the programmed sequence. Schumann 1 has only 7.83 pps, Schumann 2 has 7.83 followed by 14.3 pps, and so on.
- You can see the technical rationale for my skepticism at the end of this document.
- However, I could be wrong. I have been wrong in the past. So I will leave it to you to experiment with Schumann Resonances and decide for yourself how well they work for you.

Constant Frequency Protocols

- The C5 can generate a several constant output pulse frequencies.
- The list has the most commonly used single frequencies, including:
    - 1 pps
    - 2 pps
    - 3 pps
    - 4 pps
    - 5 pps
    - 10 pps
- Some people have good scientific reason to believe that one or more of these specific pulse frequencies may be of benefit for specific disease states. As a scientist I remain skeptical, and I am not a clinician, so I do not give specific advice on which frequencies to use for which condition.
- Using the C5 you may experiment for yourself.

Sub-Threshold Continuous TMS Protocols

- TMS stands for Transcranial Magnetic Stimulation. TMS was approved by the FDA for the treatment of depression in 2008, but this was only for approved TMS devices using a specific high-intensity protocol: rTMS
- If you have, or believe you have, depression, you must seek professional clinical advice. This is no substitute for professional clinical advice.
- TMS is currently under investigation for a wide range of clinical applications other than depression.
- Many people wish to self-experiment, and while the C5 (and B5) cannot generate the extremely high levels of power of a clinical TMS device, the inherent efficiency and lower power of ICES technology *may* be useful for this application. You are now in the realm of total self-experimentation, so you must be very cautious.
- The C5 is pre-programmed to only deliver scTMS, which means "sub-threshold, continuous TMS", whereas the FDA approved protocol is for very high intensity, short bursts called rTMS (repetitive TMS). High intensity rTMS is known to cause seizures in a small percentage of people subjected to rTMS, likely because the intensity used is sufficient to cause neural depolarization in the motor areas of the brain (see papers below).
- The C5 only delivers scTMS, which should be well below the threshold that could cause motor activation and lead to seizures. BUT THE SAFETY OF THIS APPROACH HAS NOT BEEN TESTED AND VERIFIED.
- The C5 delivers scTMS at the recommended 10 pps (Hs), with a timer that limits the stimulation to 30 minutes (recommended) or 60 min.
- This link will lead you to a recent Clinical Consensus Review Paper for the use of TMS for the treatment of depression:
  - http://www.brainstimjrnl.com/article/S1935-861X(16)30038-9/fulltext
  - or you can download a PDF of the same paper here: http://www.brainstimjrnl.com/article/S1935-861X(16)30038-9/pdf
- This link takes you to a clinical paper on the use of TMS in depression:
  - http://ajp.psychiatryonline.org/doi/pdf/10.1176/appi.ajp.2010.10060864
  - This paper clearly shows how coils may be placed on the head (on page 3 of 9)
- There are many more scientific papers available by searching Google Scholar using the search terms "TMS depression"

CNS/cortex “Brain Wave” Protocols

- These Wave protocols all gently ramp between two frequencies over time.
- Similar to natural brain wave patterns.
- The use of these wave patterns is totally experimental, we do not know the effects, it is not proven safe, and is for adult self-hackers only.
- You can find links to each brain wave pattern on Wikipedia.org:

  Neural oscillation brainwave entrainment
- The C5 delivers each wave in the central portion of each generally accepted frequency range as a gently shifting frequency over time, ramping from a higher frequency to a lower frequency, then back again, similar to the natural wave patterns of a living brain.
- The wave patterns are summarized on the following page

CNS/cortex “Brain Wave” Protocols

Pattern Name	Low	High	Ramp time (low-to-high or high to low)	cycle time (minutes)
Alpha	10 Hz	13 Hz	5 minutes	10 minutes
Beta1 (low)	12.5 Hz	16 Hz	2 minutes	4 minutes
Beta2 (med)	16.5 Hz	20 Hz	2 minutes	4 minutes
Beta3 (high)	20 Hz	28 Hz	2 minutes	4 minutes
Delta	1.5 Hz	3 Hz	10 minutes	20 minutes
Theta	5 Hz	6 Hz	10 minutes	20 minutes
Mu	8.5 Hz	11 Hz	5 minutes	10 minutes
SMA	13 Hz	15 Hz	5 minutes	10 minutes
Gamma	32 Hz	47 Hz	5 minutes	10 minutes

Note that the ramp time is for each direction (up or down). Total cycle time is 2 x ramp time.

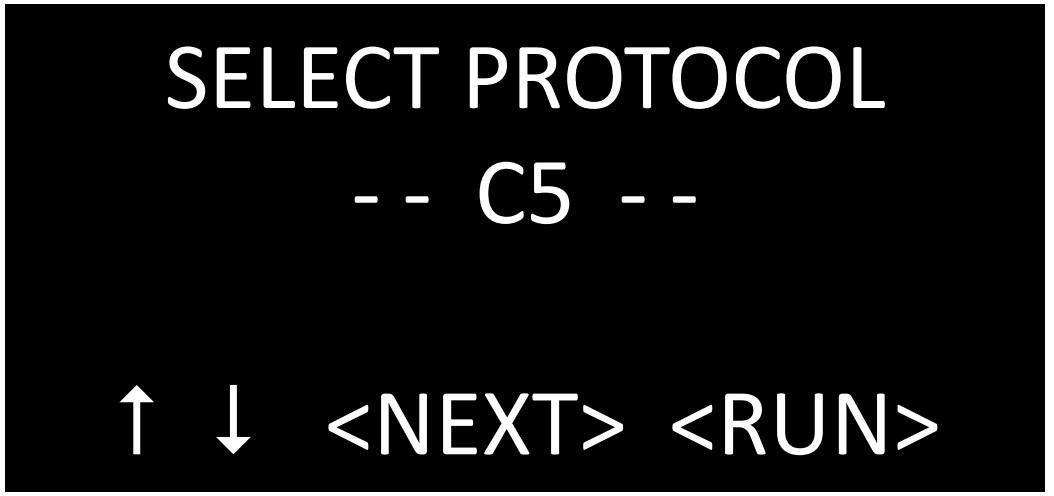
Also note that the effects and safety of these patterns has not been established. For example, while Gamma waves may affect memory, recall, and awareness by altering stochastic resonance, it may also just be irritating. Please exercise caution when self-experimenting with these protocols.

Matrix Protocol

- The Matrix Protocol is only for use by trained clinicians.
- This pattern is very similar to the Omni-8 protocol, but has a feature specific to the Matrix Repatterning system, developed by Dr. George Roth.
- For more information, please visit Matrix Repatterning at: matrixrepatterning.com

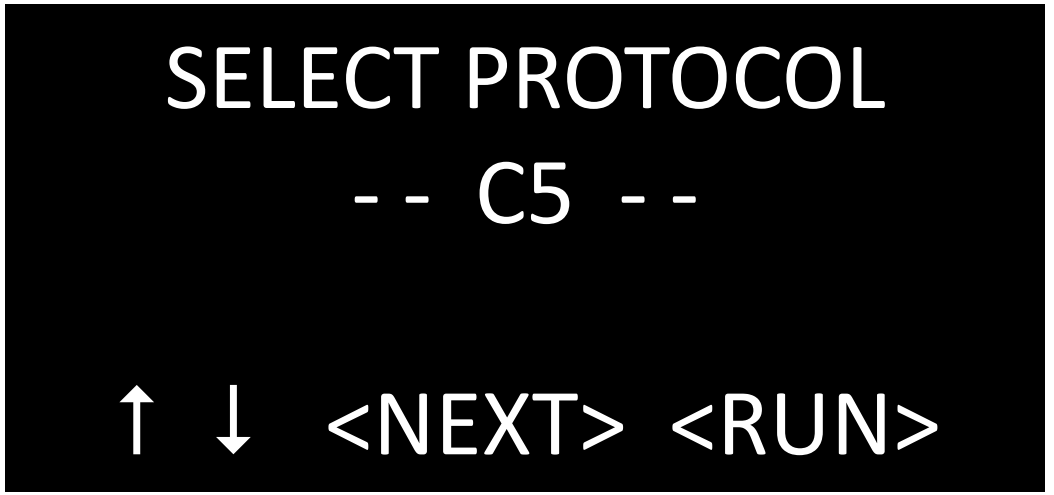
SELECT a PROTOCOL

- Get to the SELECT PROTOCOL screen by pressing the WHITE (NEXT) button from the ADJUST POWER screen. It will look like the screen at the right:
- The default protocol is “C5”, which is the new protocol developed for the C5 and B5 systems, but you can select a different protocol on the following screens.
- Use the BLUE (DOWN) button to scroll down the list of protocols. Each protocol is listed on its own screen.
- For example, from the C5 protocol, press the BLUE (DOWN) button three times to get to the Omni 1 screen, as shown:
- When you see the protocol you want, just press the RED button <RUN> to jump straight to RUN NOW. The C5 will immediately begin running the selected protocol at the power level you set. It will remember this protocol setting.
- The C5 protocol is identical to the B5 protocol on the B5.
- If you do nothing the C5 will automatically RUN in 5 seconds. Or press the RED button to RUN immediately.



SELECT C5 PROTOCOL

- This is the default screen for the C5 protocol:
- When you scroll down to this screen, the system will remember that you want to use this protocol.
- The C5 protocol has 6 modes:
  - 10 minutes: 5 pps alternating bipolar
  - 2 minutes: +100 pps bursts every second
  - 2 minutes: -100 pps bursts every second
  - 5 minutes: 10 pps alternating bipolar
  - 1 min: +100pps burst every second and 5pps
  - 1 min: -100pps burst every second and 5pps
- The C5 protocol will just cycle through each mode, then start over from the beginning.

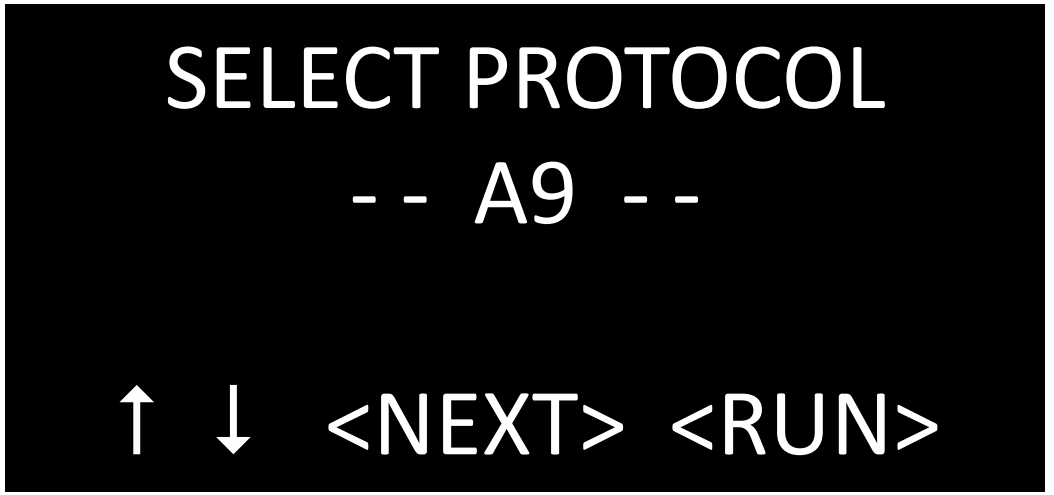


Once you are on this screen, just press the RED button to start the ICES stimulation immediately without adjusting the mode times.

The system will remember this protocol as its current setting, and will start here the next time you power up the system.

SELECT A9 PROTOCOL

- This is the default screen for the A9 protocol:
- When you scroll down to this screen, the system will remember that you want to use this protocol.
- The A9 protocol has 3 modes:
  - 10 minutes: 5 pps alternating bipolar
  - 2 minutes: +100 pps bursts every second
  - 2 minutes: -100 pps bursts every second
- The A9 protocol will just cycle through each mode, then start over from the beginning.

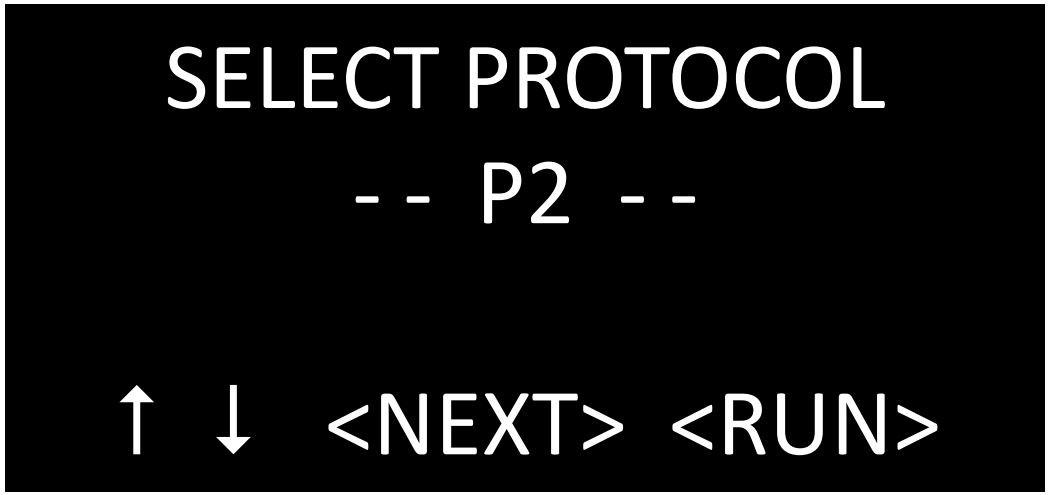


Once you are on this screen, just press the RED button to start the ICES stimulation immediately without adjusting the mode times.

The system will remember this protocol as its current setting, and will start here the next time you power up the system.

SELECT P2 PROTOCOL

- This is the default screen for the P2 protocol:
- P2 is the protocol that was used for older Micro-Pulse devices, such as SomaPulse, MagnaFix, AllevaWave, and others.
- When you scroll down to this screen, the system will remember that you want to use this protocol.
- The P2 protocol has 4 modes:
  - 10 minutes: 5 pps alternating bipolar
  - 10 minutes: +100 pps bursts every second
  - 10 minutes: -100 pps bursts every second
  - 10 minutes: REST (no pulses during the REST period)
- The P2 protocol will just cycle through each mode, then start over from the beginning.



Once you are on this screen, just press the RED button to start the ICES stimulation immediately without adjusting the mode times.

The system will remember this protocol as its current setting, and will start here the next time you power up the system.

SELECT Omni 8 PROTOCOL

- This is the default screen for the Omni 8 protocol:
- When you scroll down to this screen, the system will remember that you want to use this protocol.
- The OMNI 8 protocol has 8 modes:
  - 10 minutes: 5 pps alternating bipolar
  - 2 minutes: +100 pps bursts every second + 5 pps bipolar
  - 2 minutes: -100 pps bursts every second + 5 pps bipolar
  - 1 minute: 3.92 pps alternating bipolar
  - 1 minute: 7.14 pps alternating bipolar
  - 1 minute: 10.42 pps alternating bipolar
  - 1 minute: 13.20 pps alternating bipolar
  - 1 minute: 16.95 pps alternating bipolar
- The Omni 8 protocol will just cycle through each mode, then start over from the beginning.

Once you are on this screen, just press the RED button to start the ICES stimulation immediately without adjusting the mode times.

The system will remember this protocol as its current setting, and will start here the next time you power up the system.

SELECT Schumann PROTOCOLS

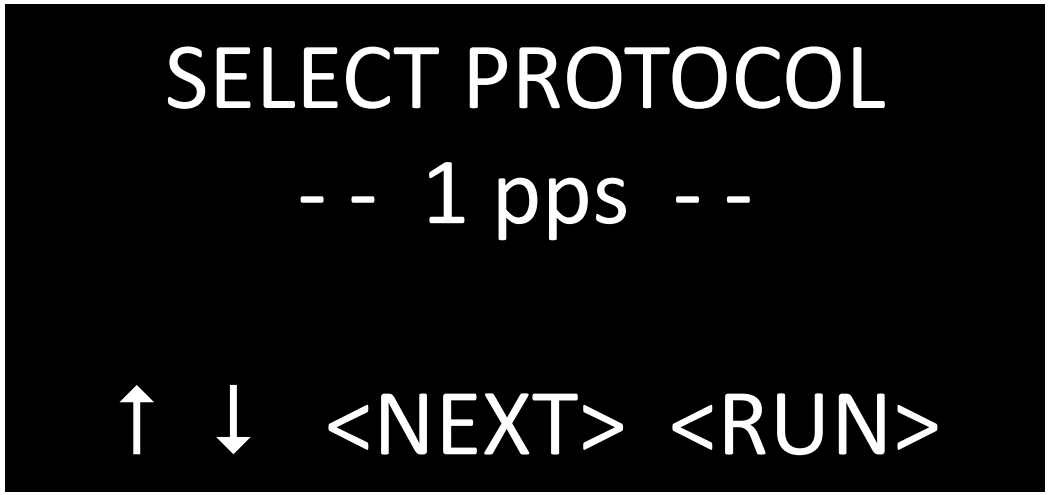
- Here are my thoughts on Schumann resonances.
- The default screen for the Schumann protocols →
- When you scroll down to these screens, the system will remember that you want to use this protocol.
- The Schumann protocol has 5 modes:
  - 5 minutes: Fundamental: 7.83 pps alternating bipolar
  - 1 minute: First harmonic: 14.3 pps bipolar
  - 1 minute: Second harmonic: 20.8 pps bipolar
  - 1 minute: Third harmonic: 27.3 pps bipolar
  - 1 minute: Fourth harmonic: 33.8 pps bipolar
- Schumann 1 only does mode 1; Schumann 2 does modes 1 and 2; Schumann 3 does modes 1-2-3 and so on. When finished, it starts over again.

Once you are on this screen, just press the RED button to start the ICES stimulation immediately without adjusting the mode times.

The system will remember this protocol as its current setting, and will start here the next time you power up the system.

SELECT Constant Frequency PROTOCOL

- The constant frequency protocols let you set one single frequency: 1, 2, 3, 4, 5, or 10 pps.
- This is an example screen for this protocol:
- When you scroll down to this screen, the system will remember that you want to use this protocol at the selected frequency.
- These protocols only have one mode:
  - You select one frequency: 1, 2, 3, 4, 5, or 10 pps
  - The C5 runs at that frequency continuously
- The C5 generates the selected frequency continuously until you turn the power OFF.



Once you are on this screen, just press the RED button to start the ICES stimulation immediately without adjusting the mode times.

The system will remember this protocol as its current setting, and will start here the next time you power up the system.

SELECT a Timed scTMS PROTOCOL

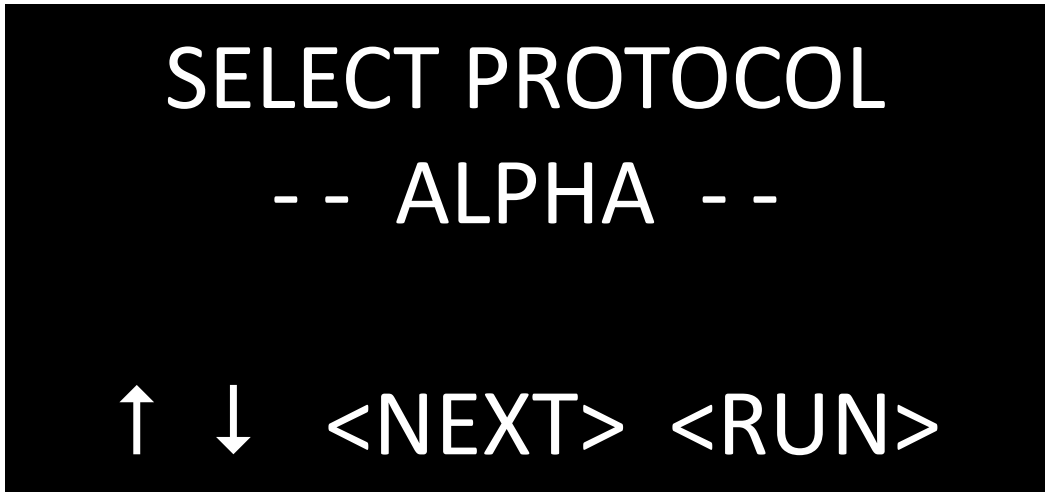
- The timed scTMS protocols are discussed in more detail above.
- This is the default screen for the 30-minute timed scTMS protocol protocol →
- The frequency is set for 10 pps continuous.
- There are two timer settings: 30 minutes and 60 minutes.
- The scTMS protocols are discussed in detail earlier in this document.
- The C5 will require you to shut the power OFF when the timer is completed. You can just let it sit there without shutting the power OFF, but it will not do anything else until you reset the system with a power-OFF.

Once you are on this screen, just press the RED button to start the ICES stimulation immediately without adjusting the mode times.

The system will remember this protocol as its current setting, and will start here the next time you power up the system.

SELECT a BRAIN WAVE PROTOCOL

- The CNS/Neural “brain wave” protocols are discussed in detail earlier in this document.
- This is the default screen for the ALPHA protocol →
- The frequency and ramp times are given in a table earlier in this document.
- The wave protocol you select will just keep ramping up and down along its pre-set frequencies until you turn the power OFF.

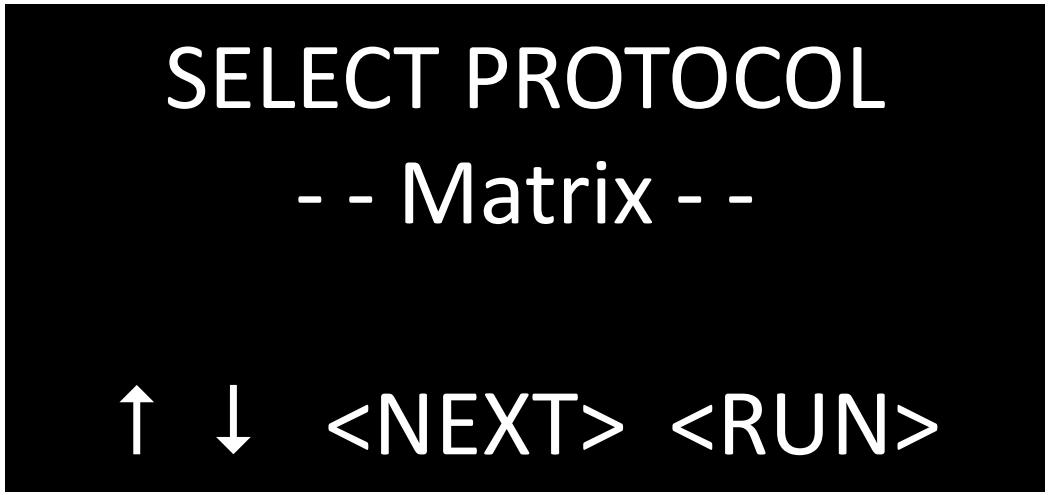


Once you are on this screen, just press the RED button to start the ICES stimulation immediately without adjusting the mode times.

The system will remember this protocol as its current setting, and will start here the next time you power up the system.

SELECT MATRIX PROTOCOL

- This is the default screen for the Matrix protocol:
- When you scroll down to this screen, the system will remember that you want to use this protocol.
- The Matrix protocol is only for use if you are a member of the Matrix Repatterning Network, which involves training.
- The Matrix protocol is identical to the default Omni-8 protocol except that it has an extended time for Mode #1, and the mode times are not adjustable:



Once you are on this screen, just press the RED button to start the ICES stimulation immediately.

The system will remember this protocol as its current setting, and will start here the next time you power up the system.

Model C5

Advanced System Diagnostics

The C5 has extensive internal system diagnostic capability.

Some of this is available to the user while the system is RUNNING.

The status of internal voltages, temperatures, and coil status can be checked.

The numbers do not update continuously. They are a single point snapshot of internal system status.

These numbers will update once when you press the appropriate button.

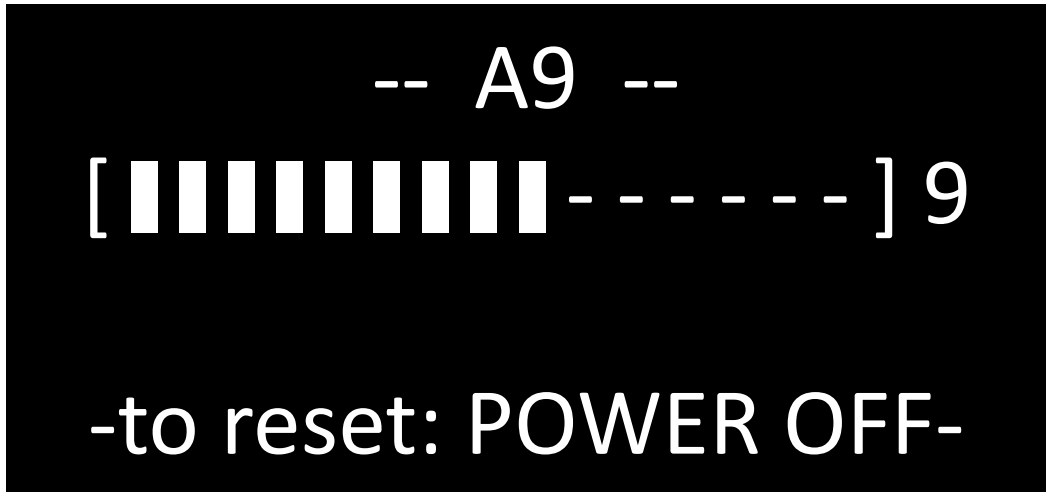
These are generally not something the user can do much about, but they are included here for the advanced user, and for completeness of documentation.

If seeing actual numbers gives you anxiety, just disregard this section. If you think the world is a precise, deterministic clockwork, and that everything should always be absolutely precise and clear, disregard these numbers. They only have meaning in the context of the overall system operation. They contain a lot of electronic noise that is unavoidable.

You might need to look at these numbers if you require over-the-phone diagnostic help with your C5, before sending it in.

ADVANCED SYSTEM DIGNOSTICS

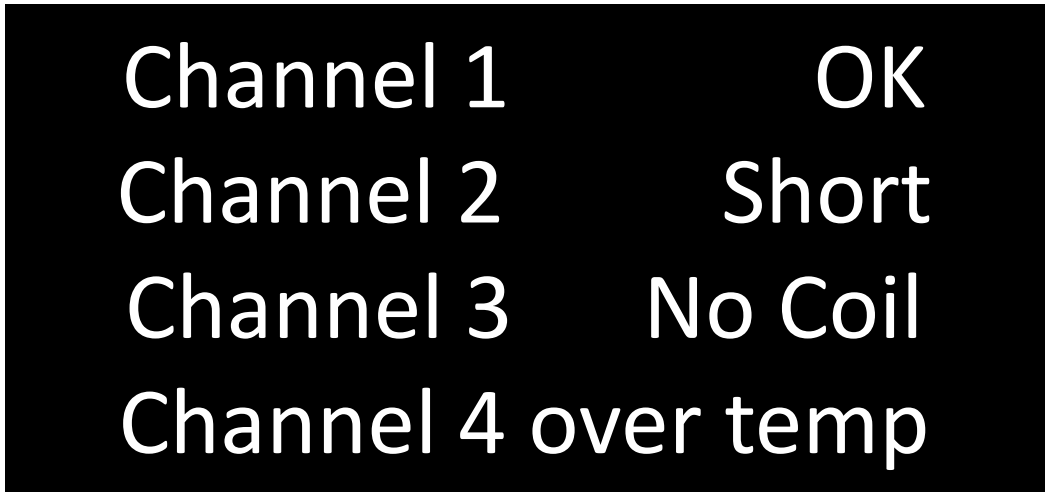
- Once the C5 is in RUN mode, the buttons can no longer be used to change the protocol settings.
- This is to assure that settings do not inadvertently change while the system is operating.
- While operating, the green LED will flash or toggle ON/OFF for every pulse.
- The user interface buttons have different functions when the C5 is RUNNING. Those are discussed in this section.
- The initial RUN screen looks like this if you happen to have selected the A9 protocol at intensity level = 9:



ADVANCED SYSTEM DIAGNOSTICS

- Once RUNNING, you can press the YELLOW (UP) button to view the internal voltages and temperatures as shown to the left.
- You may have to PRESS and HOLD the YELLOW button for one second or longer for this screen to come up.
- The voltage and temperature for each of the four channels is shown on each line.
- This is only a snapshot. The numbers do not update continuously. You must press the YELLOW button again to see the numbers update.
- NNN/MMM show the voltages immediately before and after each pulse on each channel. There is noise on the signal lines, so the voltages will vary. Do not panic and send emails if these numbers are slightly different from what you think they should be. They are an approximation and contain a lot of electronic noise. Their meaning is primarily in how they average and change over time, but this screen gives you a window into internal system operation.
- The voltages to not include the decimal point, so NNN = NN.N volts, and MMM = MM.M volts
- Temperature is in degrees Fahrenheit, also accurate only to +/- 4 F

ADVANCED SYSTEM DIAGNOSTICS



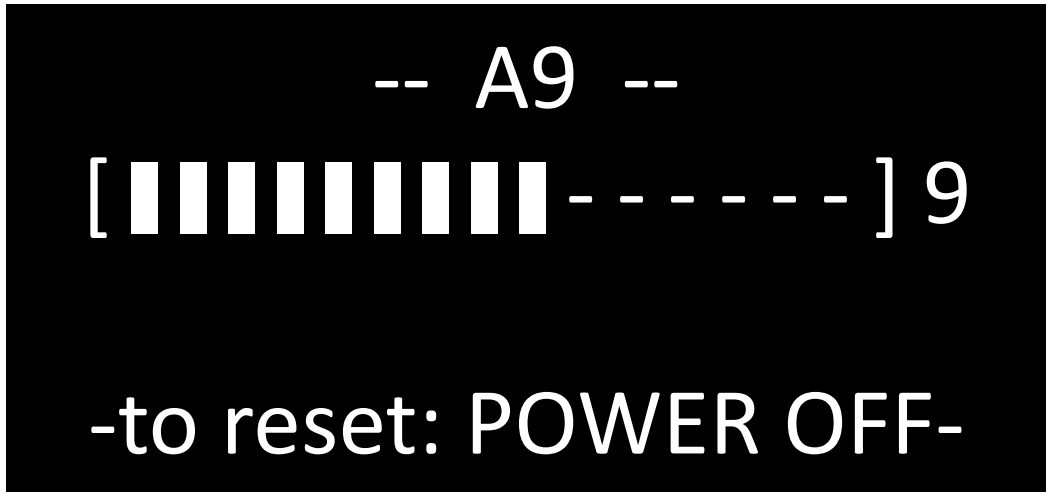
- Once RUNNING, press the BLUE (DOWN) button to view the status of the coils. Four possible status indicators are shown: “OK” “Short” “No Coil” “Over Temp”
- You may have to PRESS and HOLD the BLUE button for one second or longer for this screen to come up.
- This screen displays only what the C5 *thinks* is happening with the coils. This may not be reality. But it can be helpful.
- The only way to tell for sure if the coils are working is to use the hexagonal coil test chip that comes with every Micro-Pulse system.
- But this screen may be helpful to you as a quick check that the C5 system thinks everything is OK.
- Keep in mind, these status indicators are based upon calculations of the coil voltages during operation. But this computation is complex and assumes things about what type of coil is being used, what your protocol is, and many other factors. So these status indications can be incorrect. Use your coil tester.
- Here are the possible indications:
  - **OK** - this is what you should see most of the time. It means everything is OK.
  - **Short** - this usually means your coil is not pushed in far enough. Push it in.
  - **No Coil** - this usually means you do not have a coil plugged in, or a wire is broken.
  - **Over Temp** – This means the system thinks the internal temperature is getting too high
  - If the temperature is persistently too high, the C5 will warn you with a new screen, then it will flash the RED LED. Eventually the system will shut down the output power in an attempt to prevent damage. If you see this, try reducing the frequency or intensity.

ADVANCED SYSTEM DIAGNOSTICS

ICES model C5
rev: C5-20170514
(C) 2017 Micro-Pulse
Power ON # = 74

- Once RUNNING, you can press the WHITE (NEXT) button to view SYSTEM START STATUS screen.
- You may have to PRESS and HOLD the button for one second or longer for the screen to come up.
- The first line shows you the hardware model and revision (ICES model C5).
- The second line shows you the firmware revision and release date (14 May 2017).
- The third line is a copyright statement.
- The fourth line tells you how many times the C5 has been powered ON since updating the firmware. This is similar to the odometer on a car. The C5 tells you how many times you have turned the power ON and OFF. It can be helpful to know this for system maintenance.

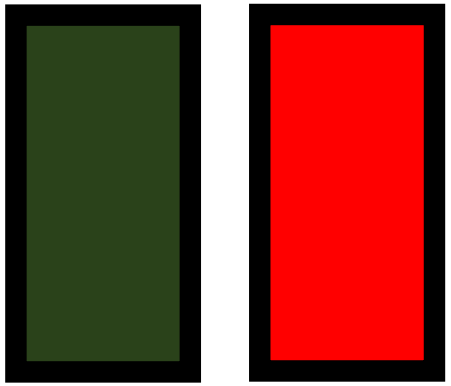
ADVANCED SYSTEM DIAGNOSTICS



- Once RUNNING, you can press the RED (RUN) button to view the RUNNING screen.
- You may have to PRESS and HOLD the button for one second or longer for the screen to come up.
- This is the screen that normally shows as soon as the C5 begins to RUN.
- The top line displays the protocol you are running.
- The second line shows the intensity (power level) as both a power bar and a number.
- The third line is blank.
- The fourth line reminds you that you need to shut the power OFF in order to reset or adjust the 5 settings.

ADVANCED SYSTEM DIAGNOSTICS

Channel 1 over temp
Channel 2 over temp
Channel 3 over temp
Channel 4 over temp

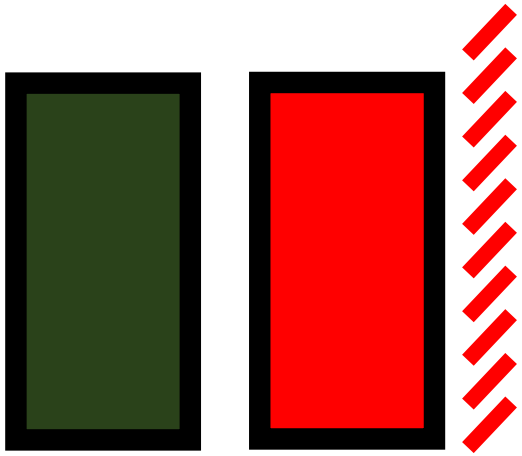


WHAT TO DO IF THE RED LED COMES ON

- If the red LED flashes very briefly, less than one second, that just means the system is changing modes within a protocol. This is nothing to worry about.
- If the red LED comes on for a second or two, that means the system has detected a potential OVER TEMPERATURE condition. It may correct itself, or you may need to reduce the frequency or intensity of your protocol.
- If the red LED comes on and stays on, that means a CRITICAL OVER TEMPERATURE condition has been detected. Your system is definitely running too hot and it has decided to shut down. You may see a warning screen. You should turn the power OFF. Check the coils: be sure they are plugged in all the way. A slightly pulled out coil may cause a short.
- The system may automatically adjust your intensity (power level) down to a safe level, usually level 9.

ADVANCED SYSTEM DIAGNOSTICS

Channel 1 over temp
Channel 2 over temp
Channel 3 over temp
Channel 4 over temp



“WHY CAN’T I JUST RUN THE C5 AT FULL SPEED AND FULL POWER WITH MAXIMAL LOAD ALL THE TIME?”

- Consider this: what would happen if you took your car out on the open road. Then you just floored the accelerator and ran it at maximum speed and power. And you just kept it there…..
- A typical production vehicle will do this for a minute or two, then it will self-destruct.
- The police will give you a ticket, a judge will throw you in jail and you may lose your license permanently. Your insurance will gain a few extra digits. You may kill some innocent person, you may lose your home, or you may leave your children without a parent. So don’t do it.
- Many very good products require common sense and self control.
- The C5 is a scientific instrument. It has not been “child-proofed”. It tries to keep you safe and prevent you from destroying it, but remember that you purchased the C5 under the condition that you were to act like a responsible adult. Avoid the temptation to think that more power = more effectiveness.
- There is no scientific or rational basis to think that MORE POWER makes PEMF work better. When properly designed, PEMF works at very low power.
- If the C5 tells you it is in the danger zone, then it is too much. Tone it down a bit by reducing the power level.

Terminology in ICES-PEMF: *Hz* versus *pps*

As a general rule, a field of science can not progress rapidly until everyone involved in the field agrees to a common set of terms and definitions. This is because it is impossible to have an accurate conversation about anything when people are using imprecise terminology. I have carefully reviewed hundreds of scientific papers in the field of PEMF (and related disciplines) and it is my professional opinion that one of the greatest obstacles to scientific progress in our understanding of the biological effects of PEMF is the sloppiness of the terminology. By my assessment, more than 90% of the peer-reviewed articles on PEMF either used technical terms incorrectly, or failed to adequately define the terms they were using. Even more confusion arises from the fact that the scientific terminology of PEMF has been hijacked by marketers, who distort and misuse the terminology to try to gain a market advantage and boost their sales.

This can lead to a lot of confusion when non-scientific usage is mixed with formal scientific usage. The biggest example of this is the use of Hz (Hertz) to describe the waveform and rate of a low-frequency PEMF system, especially since some of these systems generate sine waves, while others generate discrete trapezoidal pulses or other very different waveforms.

The term “frequency” has a very specific technical meaning, as well as a much less strict technical meaning, and also various common usage meanings. In its strictest form, frequency is the first time derivative of the phase of a sine-like wave. But the term “frequency” is also more commonly used to describe anything that happens periodically. In electronics, the term frequency can describe things such as the clock rate of a computer microprocessor. The word “frequency” has a lot of meanings, as you can see at the Wikipedia disambiguation page:

https://en.wikipedia.org/wiki/Frequency_(disambiguation)

This general problem of sloppy terminology in PEMF research spills over into the medical and biological terminology as well. This makes it very difficult to precisely describe both ends of a scientific experiment: what was done (the PEMF protocol) and what happened biologically as a result (the effects on tissues, cells, and chemical signaling). In many scientific papers, the terms are so unclear or missing that it is impossible to draw any conclusions. And the bottom line when money is involved is this: wherever there is scientific confusion, there will be abuse and distortion of the facts.

So, I am trying to remedy this scientific sloppiness and market confusion by applying the following strategies:

- 1- Educate the consumer – if people understand that the terminology can be very precise, they can become as informed as they wish to be, and then they can spot abuses and distortions.
- 2- Hold myself to a higher standard – I understand the need for terminology in common use, and this is fine, but I will use the terminology with adequate precision to advance the science.
- 3- Conduct and support only good-quality science – in scientific meetings and other forums of scientific discussion, I will try to raise the bar by encouraging precision in the discussion.

Return to ToC Return to Terminology

Bob's thoughts on Schumann Resonances

- For technical reasons, I remain skeptical that any PEMF products can resonate with the Schuman frequencies of the earth-ionosphere system.
- That is not to say that these frequencies do not work well for PEMF, in fact they seem to work just fine, but not for the reasons many people think.

My skepticism is based upon one opinion and two facts:

- **OPINION:** The references on the Internet to Schumann Resonances in PEMF therapy were first put forward by marketers to lend credibility to their products. It sounds cool and "earthy". But these claims are based upon made-up "NASA" experiments that never happened. If you disagree, do not send angry emails claiming "NASA has published 2000 studies…." Just send me one study from NASA showing that Schumann Resonance has a biological effect. Just a *single* one. Send the entire reference, not just a title or a link to a blank page. This is very easy to debunk. If I am mistaken, I will thank you.
- **FACTS:**

  (1) the phase of the earth-ionosphere Schumann wave is not detected by any PEMF system, because detection of Schumann resonances requires large and highly specialized equipment, so even at a precise Schumann frequency, commercial PEMF systems are just as likely to be in anti-resonance as in resonance. They could cancel, not resonate.

  (2) Schumann frequencies vary slightly with changes in the earth-ionosphere cavity geometry, so even a precise non-phase-locked open-loop pulse generator will result in beat frequencies, where: $f_{beat} = (f_{system} - f_{earth}) / 2$ thus generating an amplitude modulation of much lower frequency.

  https://en.wikipedia.org/wiki/Beat_(acoustics)

Return to ToC Return to Schumann Protocol

Micro-Pulse

Model C5 Manual

Bob Dennis