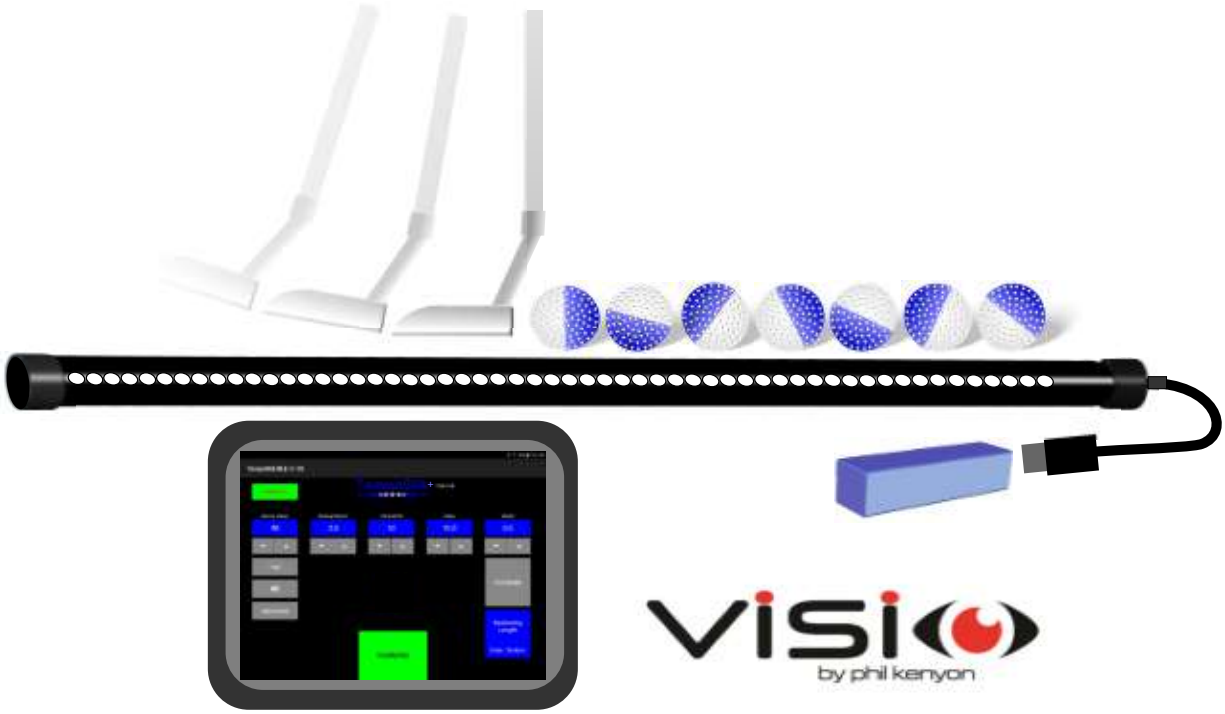
TempoStik+

Putting Tempo Trainer

Users Manual

2023



Introduction

The TempoStik+ is an advanced Golf Training device that teaches putting rhythm, tempo and speed control

While Metronomes provide timing cues for the takeaway and end of stroke positions, the TempoStik+ provides continuous detailed time-position cues throughout the putting stroke, using an ideal acceleration model.

TempoStik+ allows a golfer to select a desired roll distance and the TempoStik+ computes a detailed backswing and downswing sequence for that distance.

The TempoStik+ detailed putting stroke can be computed based on the speed of the green, the slope of the green, the tempo of the golfer and the swing ratio of the golfer.

The TempoStik+ utilizes 112 high intensity white LEDs to show the dynamics of a perfect putting stroke, one LED at a time, down to the millisecond. The golfer simply follows the LED sequence with his/her putter during the putting stroke.

Two modes of operation allow a golfer to learn the overall back and forth rhythm of the putting stroke as well as the allocation of backswing and downswing timing for a putting stroke. In addition, the TempoStik+ provides an audio analog of the putting stroke in sync with the LEDs. Listening to this audio while putting engrains the stroke into the golfer's mind and greatly aids in the development of the ideal putting stroke. The name of the audio feedback is called the SoundTempo™ and is available as an individual App.

Many devices used by Instructors today **analyze** a golfer's putting stroke. In contrast, only the TempoStik+ **shows you** and **helps you feel** ideal acceleration timing and rhythm.

The TempoStik+:

- Depicts the dynamics of a putting stroke through a moving LED
- Helps you train timing and rhythm
- Teaches how to execute an “ideal model acceleration” profile for the putting stroke

The Theory and Research behind the TempoStik+

The concepts that drive the TempoStik+ have emerged from over 20 years of research and collaboration between World Renowned Putting Coach Phil Kenyon and Golf Development Engineer Dean McConnell.

Their Kinematic analysis of 1000s of players has enabled them to establish the common patterns highly skilled putters acquire and in particular related to the Tempo and Rhythm celebration Profile of the Putting Stroke. To understand more and get the best out of your TempoStik+ it is important to understand the key concepts behind TempoStik+.

- Tempo
- Rhythm
- Velocity
- Acceleration/Deceleration

What is Tempo and Rhythm ?

Many golf experts have differing definitions of tempo, rhythm and timing. Many say that tempo is the time from the start of the backswing to impact in seconds. Using this definition of tempo, two golfers with identical "tempos" of 1.2 seconds could have very different backswing and downswing to impact times. A swing with a slow backswing followed by a very fast downswing is very different from a swing that may be quick back and then slow down although both could have the same backswing to impact time.

For putting, many use a Metronome to specify the tempo based on takeaway to impact timing expressed in beats per minute.

Since the two beats signify takeaway and impact, there is no beat for the top of the backswing. So, two golfers could follow the same "tempo" yet, have different backswing and downswing timings.

Definition: Tempo

Tempo therefore relates to the overall length of time the stroke OR the time one of Its component parts take

e.g., Tempo of backswing 800ms, tempo of downswing 400ms, overall tempo 1.2secs. The backswing can a have a tempo and the downswing can have a tempo.

Some technology companies (swing and putting analysis products), however define tempo as the ratio of backswing time to downswing to impact time. So, in the example, if the backswing was 0.8 seconds back and 0.4 seconds from the top of backswing to impact they would say the tempo was 2.0.

However, when comparing the relationship of different segments of the stroke it Would be more accurate to use the term rhythm.

Definition: Rhythm

The relationship in time of one or more of the component parts. eg. Tempo of Backswing 800ms, tempo of downswing 400ms. Stroke Rhythm 2.0

This definition was also used by Science and Motion (SAM) who devised a system to measure and analyze putting dynamics called SAM Puttlab. They also defined Backswing Rhythm as the ratio of Backswing time to downswing to Impact time.

Extensive Data Collection: Establishing Patterns of Elite Players

Using the SAM Puttlab data over the past 20 years the developers of TempoStik+ have been able to analyze and establish the typical Timing, Rhythm and acceleration profiles elite players use.

Based on 1000s of sets of data typically elite putters will have an **overall tempo** between 800ms to 1200ms and a rhythm that falls between 1.7 to 2.5. The term CoreTempo™ refers to the downswing time of the golfer's "swing".

This ***core tempo*** will range from 266ms to 400ms across elite players. Furthermore, Based on research by Dxp Tech, CoreTempo™ is essentially constant for all clubs in the bag. That is why it's called "CoreTempo"; it defines a golfer's core, fundamental downswing timing that is unique to the individual golfer. **For the majority of golfers, CoreTempo™ is constant for each club.**

For example, if a golfer's CoreTempo™ is 90bpm, the downswing to impact time for the golfer's wedge, 7 iron, 5 iron, Driver and putter will be close to 333ms. However, the backswing time may vary (Backswing Rhythm), typically rising as the club length increases but the downswing to impact time stays constant.

One thing we have also established is that elite golfers typically use this **same tempo and rhythm for putts of all length**. The timing and rhythm does not change much from

a short putt to a long putt. What happens is that the golfer swings longer or shorter in that time frame which, as a consequence, produces more club head speed. The phenomena can be appreciated through the Gravitational law of isochrony. This law states that pendulum swings of different lengths will always take the same time.

Velocity/Acceleration/Deceleration

To achieve different swing lengths in the same time (tempo), the acceleration profile must change. The club must accelerate more for longer strokes and accelerate less for shorter strokes.

This acceleration/deceleration in turn controls the velocity the club is travelling at which in term control the distance the ball travels.

As we can see Tempo, Rhythm, Swing length and Acceleration all interact to have a direct effect on club head speed. TempoStik+ will help you train all of these variables.

Through the developers research they have established what a model acceleration/deceleration profile looks like and have been able to program TempoStik+ to, regardless of your own person rhythm and tempo, produces an optimum acceleration/deceleration profile to help train world class speed control.

So, as we can see, there are many different definitions of rhythm and tempo in the Golf Industry. However we define them though, its commonly appreciated that good Tempo and rhythm will help you control your acceleration profile and club head speed.

Definitions Revisited

For the purpose or understanding or working with the TempoStik+ it's important we define the terms as we see them

Tempo:

Relates to the time of a particular segment or whole of the putting stroke

CoreTempo™:

Relates to the time of the downswing to impact segment of the putting stroke

Rhythm:

Relates to the relationship between different segments of the putting. IE the relationship between the backswing and the downswing

Swing Length:

The length the club travels in the backswing

Law of Isochrony:

All strokes of different lengths take the same time

Working with the TempoStik+

As we have described when it comes to an actual putt, there is a backswing and a downswing time. This timing can vary from player to player. The Rhythm of this backswing and downswing time can also vary slightly from player to player but what is critical is the consistency of this Rhythm and Timing and how it works to control your acceleration profile

It is also important that the Tempo and Rhythm remains constant regardless of the length of the putt. It's the actual length of swing that will vary to control the speed but the players tempo and rhythm will generally and stay the same.

Entering Your Tempo and Rhythm with the TempoStik+

The backswing time can range from 1.7 times the downswing to impact (DSI) time to 2.5 times the DSI. They can also range in terms of time itself not just the ratio.

However, in TempoStik+ Instead of expressing putting tempo as a backswing time in milliseconds and a downswing to impact time in milliseconds, TempoStik+ has developed a simpler definition.

There are two key numbers we need to understand to use the TempoStik+ effectively:

1. **BPM (tempo) number (beats per minute)**

   This represents the CoreTempo™ of the player which is based on the downswing to impact time (DSI). To work out the BPM use the formula:

   30 divided by the DSI= BPM

   For example, if your downswing time is 0.333 secs then divide 30 by 0.333 this will give you 90bpm.

   90bpm which would be the setting to replicate the a DSI of 0.333 secs

2. **Backswing Rhythm**

   Next, you need to set the Backswing Rhythm

   This is the backswing time divided by the DSI.

   A typical Backswing Rhythm seen my many of the best putters is 2.0 while a typical CoreTempo™ would be 0.333 seconds.

   For a CoreTempo™ of 90bpm and a 2.0 Backswing Rhythm ratio the backswing time would be (.333 seconds * 2.0) = .666 seconds.

   “90bpm/2.0” notation would fully describe a putting stroke in terms of its tempo and rhythm. In particular, these values are very commonly found but not exclusive to good putters.

Power Up:

Power up the TempoStik+ by plugging the micro USB plug into the TempoStik+ and the USB type-A connector into the USB power bank battery.

(***note: do not plug the cable into a USB receptacle of a PC or a wall powered USB jack. Only use a power bank battery***).

Shortly after power up, an LED test will activate each led in sequence down the length of the TempoStik+ and back. After the sequence completes, launch the TempoStik+ App on your tablet or smart phone. Press the ***Connect*** button on the App (top left corner, that initially appeared red). Give the system a few seconds to make a connection.

When the App establishes a connection with the TempoStik+ over BLE (Bluetooth low energy), The ***Connect*** button goes green. When you press ***Connect***, the App scans for BLE devices in the area with "TempoStik+" in its name. In the initial pairing, it may take a couple of tries to make a connection. If the App shows "BLE Lost", power down the TempoStik+ and Exit the App. Power up the TempoStik+ again and then bring up the App and press the ***Connect*** button again.

Repeat this sequence until the ***Connect*** button goes green (which means a connection has been established). Now that the App is communicating with the TempoStik+, you'll see that the ***Compute*** button is red indicating that the backswing length calculation needs to be performed after any parameters have changed. In general, when a Connect or Compute button is red, it indicates that action is required to proceed.

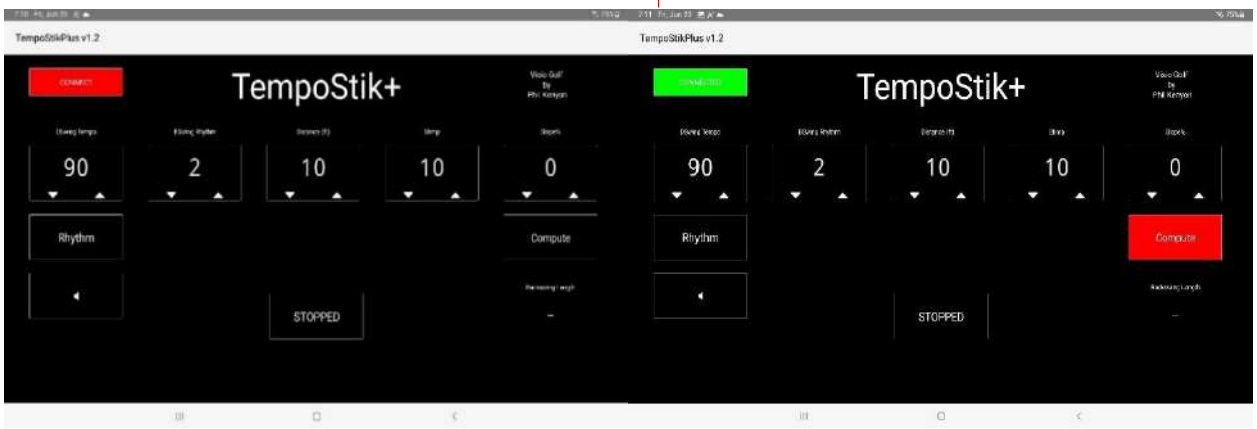


Figure 1 Initial TempoStik+ App screen (before and after BLE connection established)

Setting Parameters

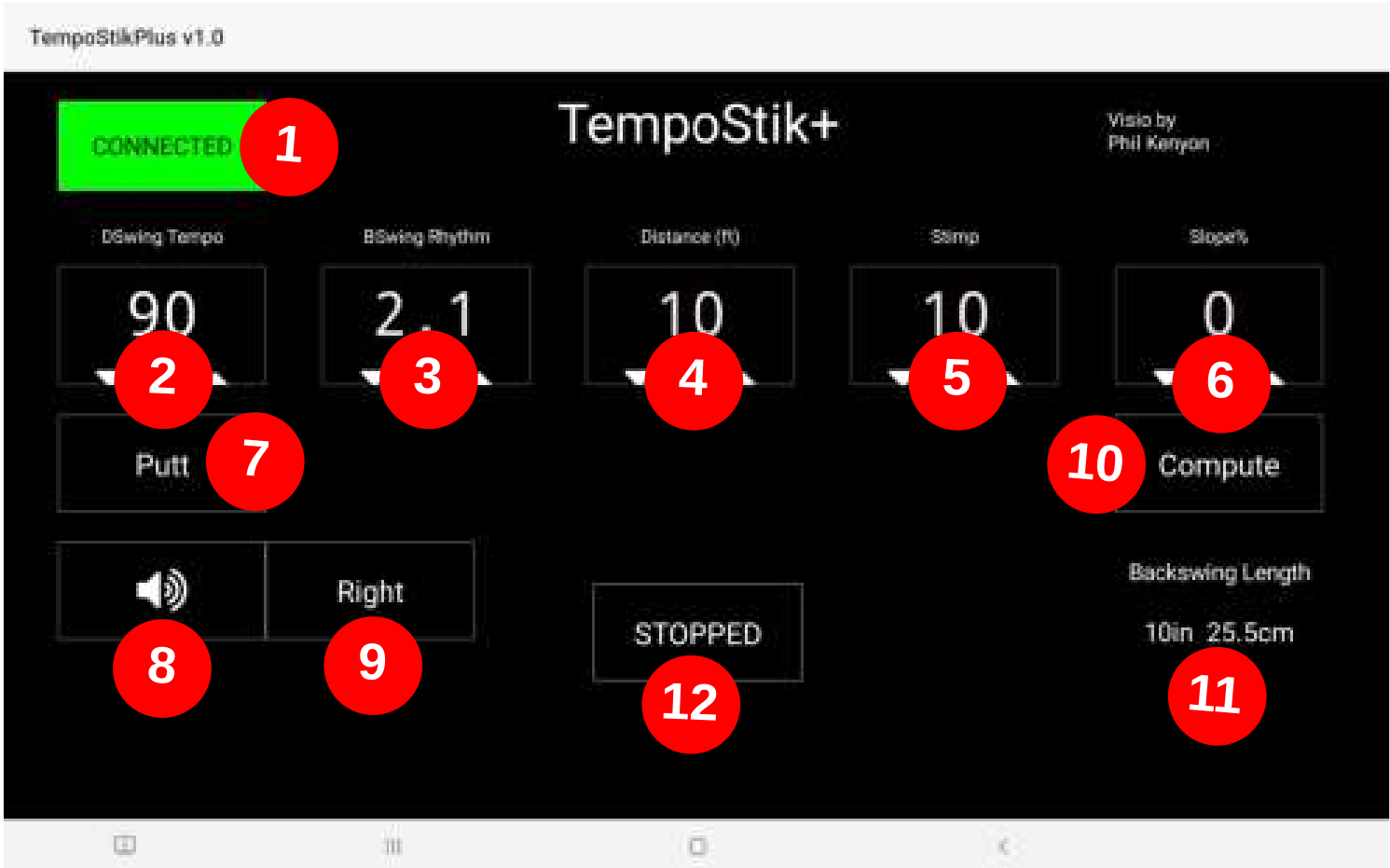


Figure 2 TempoStik+ App Screen

Looking at Figure 2, we see the TempoStik+ App functions:

1. Connect App to TempoStik+ BLE connection button/indicator
2. Tempo setting buttons
3. Backswing Rhythm setting buttons
4. Distance setting buttons
5. Green Speed setting (Stimp) buttons
6. Green Slope setting (% grade) buttons
7. Putting Stroke or Rhythm Swing mode setting button
8. Sound On/Off Button (activates SoundTempo™ in sync with stroke)
9. Left or Right-handed button (affects SoundTempo™)
10. Compute button (press when red), calculates backswing length
11. Backswing Length in inches and cm based on parameters
12. Stop/Run button, cannot make changes while Running (green)

Tempo (2):

To enter Tempo, press the Tempo up/down buttons until the desired tempo is reached. Tempo has a range of 72 to 130 bpm.

Backswing Rhythm Ratio (3):

To enter Backswing Rhythm Ratio, press the Backswing Rhythm Ratio up/down buttons until the desired rhythm ratio is reached. Backswing Rhythm Ratio has a range of 1.7 to 2.5.

Distance (4):

To enter desired putt Distance in feet, press the Distance up/down buttons until the

desired distance is reached. Distance has a range of 1 to 60 feet in 1 ft increments.

Stimp (5):

To enter Stimp in feet, press the Stimp up/down buttons until the desired speed is reached. Stimp has a range of 5.0 to 16.0 in 1/2 ft increments.

Slope Percentage (6):

To enter slope, press the Slope up/down pushbutton until the desired slope is reached. The slope percent is defined as the ratio of the rise/run expressed in percentage. For example, a positive slope of .01 foot rise for every 1 foot of run would be a +1% slope grade. A downward slope is negative. If you specify a negative slope and too fast of a green speed, it is possible that the ball won't be able to stop. If so, the TempoStik+ App will notify you with a message telling you to lower the slope and/or slow the green speed.

Putt/Rhythm Mode (7):

Putt/Rhythm toggles between Putt and Rhythm modes. When the Putt/Rhythm button shows Rhythm Mode, pressing the button toggles to Putt Mode and vice versa.

Putt Mode

Putt Mode, as the name implies, executes a putting stroke based on the selected Tempo, Backswing Rhythm Ratio, Distance, Stimp, and Slope parameters. The LED sequence will start from the setup position.

Rhythm Mode

Pressing the Putt/Rhythm button while Putt Mode is showing, toggles the putting stroke mode to Rhythm Mode. Rhythm Mode executes a series of 8 sets of putting swings from the top of the backswing to the top of the follow through and then back. This is a continuous motion back and forth.

Note: changing Putt/Rhythm mode can only be accomplished while the TempoStik+ has been stopped (RUNNING/STOPPED button showing "STOPPED").

Upon changing Putt/Rhythm mode, the Compute Backswing button (showing red) must be pressed to update parameters and compute the backswing length.

Sound On/Off (8)

Sound toggles between Sound OFF and Sound ON. If Sound is on while in Putt Mode, a SoundTempo™ tone is played while the TempoStik+ is RUNNING. If Sound is on while In Rhythm Mode, a SoundTempo™ Rhythm tone is played while the TempoStik+ is RUNNING.

Left/Right (9)

The Left/Right button toggles between Left/Right. If the Left/Right button shows Right, then the sound file indicates a left to right backswing and a right to left downswing. If the Right/Left button shows Left, the sound file indicates a right to left backswing and a left to right downswing when using headphones.

Compute (10)

The Compute button (when Red), computes the backswing length required to roll the ball the desired distance selected using Stimp, Slope, and Tempo. It also generates the SoundTempo™ tone if Sound is ON. When the TempoStik+ is in Stopped mode and Any parameter changes (Tempo, Rhythm, Stimp, Slope, or Distance), the Compute Button will change to red. Red indicates the button needs to be pressed.

Backswing Length (11)

The result of a Compute button computation is the backswing length. The backswing length sets up the resulting peak velocity of the downswing and the distance the ball will roll after impact. Backswing Length is shown in inches and centimeters (cm).

Run/Stop (12)

After the backswing length has been computed and the Compute button is blue and not red, press the Run/Stop button to start the TempoStik+ sequence whether in Putt or in Rhythm mode. When the TempoStik+ is running, the Run/Stop button will be green and the label of the button will show "RUNNING". Pressing RUNNING stops the TempoStik+, changes the Run/Stop button to STOPPED, and allows changes to parameters to be made. Green buttons indicate Go while Red buttons require pressing action.

Impact LED Position:

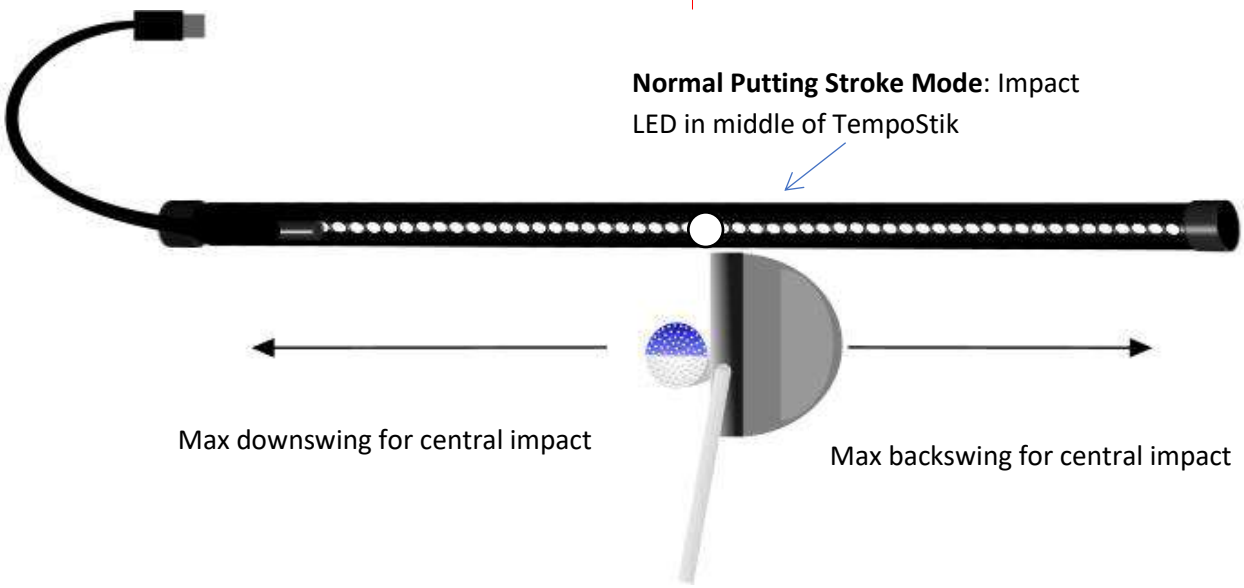
In normal putt mode The Impact LED is a bright white-blue LED that indicates impact of the golf ball. It's placed in the middle of the TempoStik+ between two white LEDs in order to stand out from the other LEDS that represent the motion of the club.

Normal Putting Stroke Mode

For putts whose backswings are less than half the TempoStik+ length, ***Normal Putting Stroke Mode*** is followed. It starts in the middle and consists of a backswing, downswing to impact, and a follow through. The impact LED is centrally located.

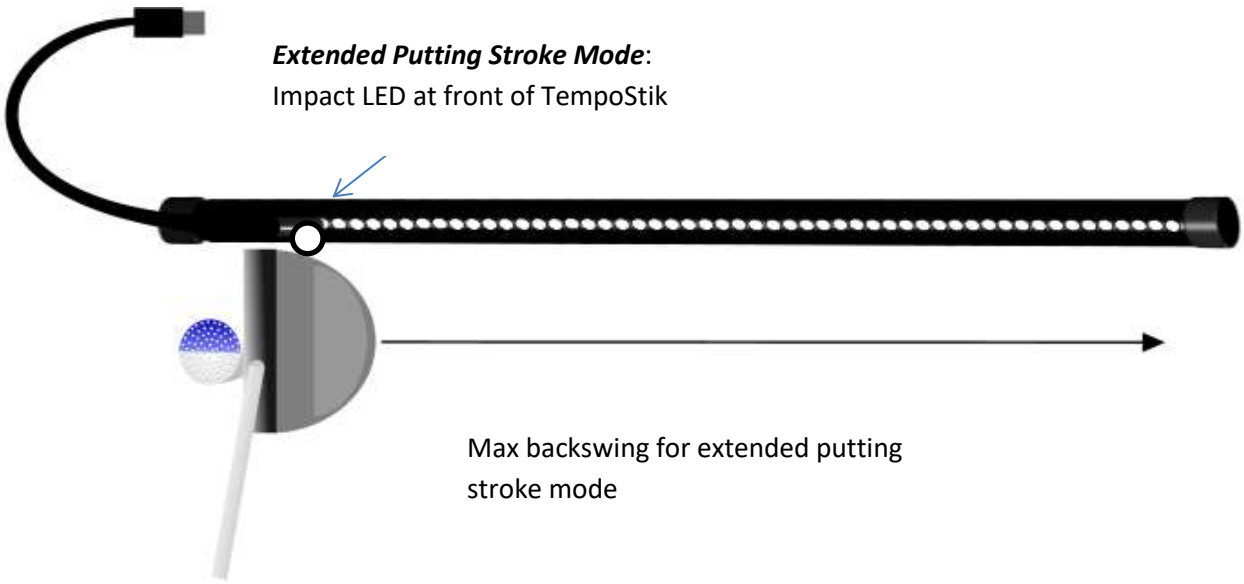
Extended Putting Stroke Mode

For putts that require longer backswings, ***Extended Putting Stroke Mode*** is followed. In this configuration, the first LED becomes the start of the backswing with an impact LED to its left. ***Extended Putting Stroke Mode*** has a backswing and a downswing to impact, but no follow through. The TempoStik+ will automatically adjust from Normal to Extended as a longer backswing is selected.



Normal Putting Stroke Mode starts at the center and shows the backswing, downswing, and followthrough. For putting strokes that require longer backswings (for longer distance putts), The TempoStik+ has an additional mode called the ***Extended Putting Stroke Mode***. The putting stroke address position is located at the first LED instead of the middle LED.

The ***Extended Putting Stroke Mode*** is automatically selected when you select a distance, tempo, stimp, and slope that requires a backswing longer than one that starts at the middle led.



Putting Drills with the TempoStik+

Select Your CoreTempo™ and Swing Ratio Prior to drills

Rhythm Mode:

- press the Putt/Rhythm mode button to select Rhythm Mode
- start out with a 5 foot putt swing by selecting the Distance button
- press the ***Compute Backswing*** button to determine the backswing
- press the STOPPED button to change the TempoStik+ to RUNNING
- practice swinging the putter back and forth for 8 cycles following the LEDs
- increase the backswing length by 5 Feet
  - stopping the TempoStik+
  - adjusting the Distance by another 5 feet
  - pressing Compute Backswing button followed by the STOPPED button
- you will learn how to keep the same rhythm and tempo regardless of swing length

If you are unsure of what your core tempo is still then start with 90 bpm and complete the drill as above. Ascertain how easy or difficult it was to sustain that tempo across different putt types. Slow down or increase the tempo dependent on how it felt? Was it too quick to sustain across all putts or was it too slow?

Change the BPM and try again, once you have a core tempo that you feel comfortable with the use that BPM in putt mode and follow the instructions below.

Start with a Rhythm of 2.0, see if that feels comfortable to match the backswing from a static start. Lower or higher the ratio as desired.

A common fault for club golfer is to have backswing that is too slow and then as a consequence the downswing is gets too quick to try and generate speed. These Rhythm ratios can typically be higher. Therefore, starting with 2.0 ratio can often be a good principle to follow

Putt Mode:

- press the pushbutton to select Putt Mode while the TempoStik+ is STOPPED
- Select the Rhythm to match the backswing tempo to the core tempo
- start out with a 5 putt and then increase by 5 ft increments
- practice putting following the LEDs, strike ball in sync with middle impact LED
- increase the backswing length and repeat
- you will learn how to keep the same rhythm and tempo regardless of putt length

Tour Professional Rhythm and Tempos

Here is a list of some well know Tour Professionals and their associated

TempoStik+ Coretempo (bpm) and Backswing Rhythm Ratios
(bpm = beats per minute, BS = Backswing sec, DSI = Downswing to Impact sec)

Player	Coretempo (bpm)	Rhythm Ratio (BS/DSI)
Darren Clarke	104	2.3
Justin Rose	90	2.0
Henrik Stenson	90	2.0
Francesco Molinari	100	2.1
Martin Kaymer	86	2.2
Tiger Woods	104	2.3
VJ Singh	98	2.1
Justin Thomas	98	2.0
Matt Fitzpatrick	90	1.8
Rory McIlroy	95	2.1
David Howell	100	2.2
Tommy Fleetwood	85	1.9
Stan Utley	106	2.2

TempoStik+

Bluetooth Module Certification

Contains Processor with Bluetooth Module FCC ID: Z4T-XIAOESP32C3. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received,

TempoStik+ FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: • Reorient or relocate the receiving antenna. • Increase the separation between the equipment and receiver. • Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. • Consult the dealer or an experienced radio/TV technician for help.

FCC Part 15 Subpart B 15.103 Exempted Devices (h) Digital devices in which both the highest frequency generated and the highest frequency used are less than 1.705 MHz and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Digital devices that include, or make provision for the use of, battery eliminators, AC adaptors or battery chargers which permit operation while charging or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, do not fall under this exemption.

TempoStik+ CE/UKCA Compliance

1) The TempoStik+ has been tested to determine conformity with the relevant emissions parts of EN 55032:2015.
2) The TempoStik+ has been tested in conformity with the standards EN 55035:2017, CISPR 35:2016 and AS/NZS CISPR 35:2016 (immunity) concerning susceptibility and transient, conducted and radiated disturbances including electrostatic discharges


VISI
by phil kenyon