

NEW CHAPTER — Activity passports and calibration (October 2026)

The core principle: Schema specifies timing and abstract intensity; an activity passport turns intensity into a personal pace or speed target. Measured GPS and heart rate remain independent. Neither the passport nor the sensors rewrite Schema.

1. One Schema, different activities

Activity	Passport target	Independent τ cadence
Running	min/km	steps/min
Cycling	km/h	revolutions/min
Indoor rowing	min/500 m	strokes/min

The Timer's existing progress widgets adapt to their activity: with no speed passport they can display completed/total intervals; with a speed passport they display **planned** current-phase and session distance. Planned distance is never represented as measured GPS distance. For other speed-based sports, an appropriate template can be copied into a user folder when its unit and presentation semantics fit.

2. Ramped intensity is independent of cadence

```
20/10@8.5/3*8`#title=cycling intervals
(60/0@3->8 60/0@8->3)*5#
100/0@t[165->215 i:6->9]#
```

Work and recovery can have different intensity-derived speed targets. @3->8 is a linear intensity ramp, not a cadence or speed specification; repeating a block restarts the ramp. Cadence τ and intensity i can ramp together but remain distinct planned quantities. The compiler materialises the ramp into runtime phases without increasing the logical interval count.

3. Library, assignment, and transfer

Open **Timer** → **Passport** to assign a saved passport. Saving or importing one does not automatically activate it. Only one speed passport may be assigned to the current session. Copy a standard template into your personal library, edit individual levels, search and organise folders, and import/export or share a JSON passport through the card's menu. Standard running, cycling and rowing profiles are starting points, not universal physiological standards.

4. Target calculator: three directions

Open the crosshair button on the **In runtime** passport banner. The calculator identifies the active passport and uses its units:

1. **Speed/pace** → **intensity**: enter Target 1 and optionally Target 2. With two targets, copy an intensity ramp $i1 \rightarrow i2$ or work/rest pair $i1/i2$; reverse both target orders when needed. The tool does not invent a two-target phase schedule.
2. **Intensity** → **speed/pace**: choose a value inside the calibrated 1–10 scale to see the passport goal.
3. **Distance + finish time** → **speed/pace** → **intensity**: kilometres for running/cycling, metres for rowing, with mm:ss or hh:mm:ss time. Quick 5 km / 10 km entries are available for running.

A single-target result can produce a one-phase Schema of the specified duration, defaulting to five minutes when none is entered (300@5.5# is one example). Copying and explicitly loading the suggestion are separate actions. If the required speed lies outside the passport's coverage, show the target speed but **do not extrapolate an intensity**.

5. Calibrate directly from Graph

An explicit Schema 300/0@6# has authority over the Graph intensity slider. For interactive HR fitting, use 300/0# with its intensity unspecified, and enable the **separate intensity fallback for sessions with a speed passport** in Timer → Passport settings. The Graph Work/Rest sliders supply only missing values; explicit Schema intensity and ramps are preserved. The no-passport fallback is a separate preference. This lets you refit HR while keeping the time structure unchanged.

6. Fractional-anchor recalibration

Run a steady test at one level, holding the passport's displayed target speed, and save its Smart Curve. Fit the predicted HR to measured HR while considering Tau ON/OFF and drift. If a pace originally attributed to intensity 7.5 fits better at 6.4, enter the pair 7.5 → 6.4 in **Recalculate scale from fractional anchor**.

The helper applies a monotonic piecewise-linear mapping through the anchor and fixed endpoints 1 → 1, 10 → 10, then proposes interpolated values on the integer 1–10 scale. **The source passport is never overwritten.** A new copy is offered. Changes at untested levels are a hypothesis, not experimental confirmation.

7. Locks, comparison, and immutable versions

Once a level has been checked in a control pass, lock it in the passport editor. Ordinary editing is blocked until the lock is manually removed. During scale recalculation, both old and proposed values are shown for locked points; the athlete explicitly accepts or rejects each proposed change. **The lock remains in place even if a proposed value is accepted**, until deliberately removed. Unlocked proposals are accepted by default. A copy cannot be created if the chosen values violate strictly increasing speed.

Compare several passports side-by-side when their unit strings match exactly, highlighting changed levels. Delay locking until repeat tests support the calibration; do not treat one good curve fit as proof for the entire scale.

8. Planned progress, spoken GPS comparison, and Smart Curve snapshots

Planned distance is integrated phase by phase: $\sum \text{speedAtIntensity}(I_k) \times \text{duration}_k$. GPS provides separate measured speed and distance. Optional periodic voice feedback compares valid measured speed/pace with the active passport target every 30 seconds, 1, 2, 3 or 5 minutes. The goal remains useful without GPS, by checking a treadmill, rowing machine or bike computer.

Every Smart Curve can preserve a complete snapshot of its applied passport, including locked levels. Editing today's library passport cannot change yesterday's experiment. The strongest validation is a **new, previously untested Schema**, run against an already-fixed passport with no post-hoc fitting.

Current limitations: no third-party public activity-plugin SDK, automatic passport calibration from HR/GPS, measured cadence via the phone step counter, or fully adaptive accumulated distance integral yet. With mid-session intensity overrides, base-plan total distance and current runtime target can refer to different plan versions.

SchemaFit Timer

Expert user manual and practical reference

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2026

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About this manual

SchemaFit Timer turns a smartphone into a personal training laboratory. This guide covers workout modelling, the Schema language, multi-Schema programmes, Smart Curves and attempt families, camera telemetry, offline voice control, music, GPS, AI-assisted analysis and the Performance Optimiser.

The application connects one continuous chain:

```
Graph -> Schema -> Timer -> measured data -> Smart Curve -> comparison -> refinement
```

This manual describes a developing product. Labels and exact interface details may evolve, but the underlying workflow remains the same.

1. Philosophy and architecture

Most interval timers are digital stopwatches with sound. They know when a phase starts and ends, but they do not know who is training, how demanding the work is or what physiological cost the athlete pays.

SchemaFit Timer is designed as a mobile laboratory:

1. **Physiological modelling.** The timer combines the athlete's heart-rate zones, response and recovery parameters, τ , drift and a structured load description to build a theoretical heart-rate curve.
2. **Execution and live control.** During the workout it receives data from a Bluetooth heart-rate monitor and, where relevant, GPS. It can report heart rate, zone and divergence from the model without requiring the athlete to touch the screen.
3. **Video with telemetry.** The camera can record execution while transparent widgets show heart rate, zone, phase time, graph and speed.
4. **AI-assisted interpretation.** After the workout, the app can create a structured analysis file containing the data, reliability rules and a task for an AI system.

An ordinary timer counts time. SchemaFit Timer connects **plan, model, execution, measurement and refinement**.

2. The Graph screen and the stencil

The Graph screen is the visual editor for a workout model.

Why the sliders may appear locked

When an active text Schema is loaded, explicit values in that Schema take priority over Graph sliders. To construct a simple workout entirely from the Graph, use **Reset Schema**. This removes the external text Schema and makes the sliders authoritative again.

Preview card and Graph Explorer

The model preview card opens a full-screen interactive graph. Graph Explorer provides:

- fit-to-screen, 2x and 4x zoom;
- a scrubber for moving through the session;
- exact time, phase, intensity, predicted heart rate and zone at a selected point;
- comparison layers for measured or imported data.

The Graph screen is an editor and calibration surface; it does not start the workout. To run the session:

1. adjust the Graph parameters;
2. open the **Timer** tab;
3. press the main **Start** button.

Reset Schema and Clear Intensities

These controls serve different purposes.

Reset Schema removes the active text Schema and returns the Graph to a clean, slider-defined simple workout.

Clear Intensities preserves the structure of a complex Schema while removing its explicit intensity values. For example:

```
40/20@8/3t20*8#
```

can become:

```
40/20@t20*8#
```

The missing intensities become openings in the stencil and can be supplied by the Graph while the timing and tempo structure remain intact.

Calibrating tau and drift

The global kinetics controls include:

- **Tau ON (tau_on)** - how quickly the model rises towards a new load level;
- **Tau OFF (tau_off)** - how quickly the model falls during recovery;
- **drift per 10 minutes** - gradual rise in heart rate under sustained work.

Tune Tau ON against clear rising edges in measured heart rate and Tau OFF against clear recovery segments. Repeat this on several sessions. One noisy workout is not enough to identify a stable personal parameter.

Drift represents accumulated cardiovascular cost associated with heat, hydration, fatigue and other session conditions. It should be treated as a model parameter rather than a diagnosis.

Maximum heart rate: a practical calibration rule

Age-based formulas such as $220 - \text{age}$, Tanaka or Gellish provide population estimates, not individual measurements. A person's observed maximum can differ substantially.

SchemaFit Timer uses a practical consistency check:

1. tune Tau ON and Tau OFF first using sessions with clear rising and falling heart-rate segments;
2. compare several workouts of different duration and subjective severity;
3. fit the theoretical curve to the measured curve;
4. inspect the intensity required by the fit;
5. look for one HRmax value that makes the inferred intensities plausible across the whole set.

Useful broad anchors are:

- an all-out SIT effort of roughly 30-40 seconds should approach intensity 10 when the model and HRmax are plausible;
- near-limit work lasting roughly 2-3 minutes may be around intensity 9;
- hard but controlled work sustained for about 15 minutes should normally be well below near-maximal intensity, perhaps around 6-7;
- a long continuous session that requires intensity 9-9.5 in the model is a reason to re-check calibration.

These are sanity checks, not medical thresholds. Do not fit HRmax to one workout. Seek one stable value that makes several different sessions internally consistent. Laboratory testing remains the appropriate option when medically or professionally required.

Importing CSV and FIT tracks

Use **Import CSV/FIT** to load a workout from a compatible watch or earlier session. The curve becomes a comparison layer in Graph Explorer, allowing a new pass to be checked against a real archive rather than only against a theoretical model.

3. Schema editor, composition and multi-Schema programmes

Use the Schema editor when the workout goes beyond identical intervals.

The editor includes:

- a one-touch mini-keyboard for @, r, t, *, ~, backtick, #, !, brackets, ->, dur:, reps: and random;
- Undo and Redo;
- a **Constructions** menu for inserting valid templates such as tempo ramps, progressions and random blocks;
- a blank-line command for separating independent Schemas.

Composition

Schema's composition rule joins different movements and phases into one continuous planned session. Warm-up, work blocks at different intensities and cooldown can become one reproducible physiological object.

Composition is best when the whole sequence should be repeated later exactly and analysed as one session.

Multi-Schema programmes

A multi-Schema programme is a looser set of independent blocks. Separate Schemas with a blank line. Use this when blocks may be performed in a different order, skipped or launched independently.

Each individual Schema inside a multi-Schema programme may still use composition internally.

The interface can:

- keep the currently active Schema at the top;
- show the number of Schemas as a Library badge;
- switch between sub-Schemas from the Timer tab;
- remove an unwanted sub-Schema;
- share the full draft;
- encode and scan Schemas as QR codes.

4. Practical Schema syntax

Basic forms

```
30/30#      work 30 seconds, recover 30 seconds, finish
60/0#       work 60 seconds, no recovery
30/30*5#    repeat five times
30/30*5`#   repeat five times and omit final recovery
```

Intensity, repetitions and tempo

```
15/15@8/2#  work intensity 8, recovery intensity 2
30/0@r10#   target 10 repetitions in the work segment
60/0@t20#   tempo 20 movements per minute
```

`r10` is total repetition volume for the segment. `t20` is a rate. Do not use `r` and `t` simultaneously on the same side of an atom.

Groups and exercise labels

```
(15!1/0 15!2/0)*4# 1=pull-ups 2=push-ups
```

The group repeats four times. Labels connect executable segments to names that can be displayed or spoken.

Time and repetition scopes

```
dur:600(40/20*100)#
reps:100(30/0@r10*20)#
```

The first limits the block to 600 seconds; the second stops when the prescribed total volume reaches 100 repetitions.

Deferred work and Recorder mode

```
180/0*~#title=Open E3MOM
```

The number of rounds is decided during the session. The Timer shows a **Last round** action: press it during the round that should become final.

```
~/0#
```

Recorder mode imposes no interval plan and records time, heart rate and GPS data.

Progressions, ramps, random blocks and adaptation

```
30/30->[for:3,delta:-5/+5]#
```

Materialises as 30/30 , 25/35 , 20/40 .

```
60/10@t[15->25 d:2 i:6->9]#
```

Tempo rises from 15 to 25 in steps of 2; the two endpoints correspond approximately to personal intensities 6 and 9.

```
random(30/0@9t220 30/0@6t140 turb:7 dur:580 min:8 seed:42)#
```

Creates a controlled variable pattern. The seed makes the materialisation repeatable.

```
300/0@t180^#
```

An adaptive atom begins with target tempo 180 but permits live tempo changes.

5. Display configuration and layout presets

The execution screen uses a focused elastic layout. In the **Display** section, enable and arrange the widgets relevant to the sport:

- heart rate and zone;
- heart-rate drift;
- current and average speed;
- distance;
- target cadence;
- phase and session timers;
- model and measured heart-rate graph.

Save complete arrangements as layout presets, for example:

- **Kettlebells / gym** - large heart rate, drift and cadence;
- **Running / GPS** - speed, distance, heart rate and map-related metrics;
- **Video HUD** - compact telemetry arranged for recording;
- **Minimal** - only the essential phase and time information.

Applying a preset changes the whole configuration in one action. If you manually alter the active arrangement, the active-preset marker is cleared to show that the current view no longer matches the saved version exactly.

6. Smart camera and telemetry video

The camera can act as a mirror for positioning or record a workout. When telemetry is enabled, the timer, heart rate and selected metrics are burned into the video. The recording helps review technique, pace and pauses, while sensor data remains a separate measured result.

What makes the SchemaFit camera different from the phone's ordinary camera app is its connection to the workout plan. The timer knows which phase is work, which is recovery and when the next interval begins. The recording can therefore place useful data over the movement and remove long rests from the video without stopping the workout.

Camera mode and operator controls

- Choose the front or rear camera in settings. **Mirror Selfie** flips the front-camera preview for familiar positioning; the saved video remains unmirrored so text and telemetry are readable.
- **Record on Start** starts and stops video with the timer. When disabled, the camera remains a mirror without recording, and the microphone stays available for voice commands.
- **Operator controls** work with either camera. Tap the preview to choose where the camera should autofocus, when supported, adjust exposure and zoom, and lock or release focus and exposure. This is not manual lens focusing: you choose the focus target, let the camera focus there, then decide when to lock the result. Capabilities vary by phone. Front-camera operator controls are hidden during countdown and an active session.
- With operator controls disabled, choose a **1x**, **2x**, **3x** or **Max wide** zoom preset when the phone exposes the corresponding lens.

Why use operator mode when you train alone? The phone is usually fixed on a tripod while you move in the frame. With autofocus, the camera may keep searching for you as you bend, lift a weight or leave your starting position. Focus and brightness can appear to “breathe”. If a bright window or lamp is behind you, auto-exposure may meter for the background: the background looks correct, but you become a dark silhouette. Operator mode lets you aim focus at the place where you will be, set a suitable brightness and keep those settings steady during a set.

A solo setup: kettlebell work by a bright window.

1. Mount the phone on a tripod, enable **Operator controls**, then set the overall framing and zoom.

2. Without turning the phone, enable focus-area selection and drag the frame across the preview to an object or patch of wall near where your body will be. Choose something at roughly the same distance from the camera as you; this tells the camera to focus on the right plane.
3. Use the exposure control to set an initial brightness. Then be sure to tap **Lock focus and exposure**; without the lock, the camera will continue changing its settings as you move.
4. Take your starting position, start the timer and record a short test. Stop the timer and review the video: judge exposure with yourself in the frame, not only against the empty room.
5. If you look too dark in the recording, release the lock, raise exposure slightly and lock it again. If bright areas lose detail, lower exposure instead. Repeat the short test until the image looks right.

After a few setups, you will develop a good feel for the right exposure in a familiar room and lighting. In those conditions, test takes will rarely be needed: set the brightness and lock it. A new location, a different camera distance or strong backlighting is still a good reason to check again.

The focus frame is especially useful when the phone is already secured and awkward to turn: move the frame to the desired spot with your finger on the screen. If you later move the tripod, change your distance from the phone or the light changes substantially, release the lock and set up again. Changing exposure releases the lock. With the front camera, do this before starting because its operator controls are hidden during countdown and the workout.

Focus and exposure

Auto focus/exposure lock is an optional setting, not an unconditional camera behaviour. When enabled, focus and exposure are locked **five seconds after the start signal**; remain in the working position during those first seconds so the camera can meter the scene. A second option either keeps that initial lock for the session or allows the camera to repeat its adjustment about every **three minutes**. Periodic adjustment can follow changing light, but may be undesirable if you change position after a long rest.

Operator mode provides manual focus/exposure locking instead of the automatic schedule. Changing exposure releases the current lock; when focus-area selection is enabled, tapping the preview selects a new focus point and also releases it. Metering and focus capabilities vary by device. During a long session with changing light, remember that a one-time lock will not adapt to sunset or a move from indoors to outdoors.

Use periodic adjustment when the light is likely to change substantially during the workout. Keep a one-time lock when lighting is stable or you want to avoid focus and brightness changes between sets. If you move to a different position or distance, check focus again manually.

Pause recording during long rests

Pause during long rests shortens the video by omitting part of long recovery intervals; the timer and workout plan continue running. The feature is off by default. Set the rest threshold from **20 to 300 seconds** (default **30 seconds**). Pausing is limited to rests that have a work phase afterwards.

- **Auto:** recording pauses five seconds after an eligible rest begins and resumes five seconds before the next work phase.

- **Manual:** use the on-screen button during the available part of the rest. It becomes available five seconds after rest begins and remains available until the final five seconds; recording resumes automatically before work.
- The video shows a “**Rest break**” slate before recording pauses, then displays the actual recording-pause duration for one second after it resumes. If you resume manually early, the displayed time is the real pause duration, not the full planned rest.

This feature pauses **video recording only**. It does not pause the timer, change the intervals or skip work phases.

Example: a compact SIT video. Consider five 25-second work intervals separated by 215-second rests:

```
25/215@9.7*5`#
```

Enable Auto pause, automatic video recording and set the rest threshold to 215 seconds or less. The backtick after the repeat removes the final rest, so the workout ends after the last work interval. The phase-based recording duration without pauses is $4 \times (25 + 215) + 25 = 985$ seconds, or **16 minutes 25 seconds**. With auto-pause, roughly the first and last five seconds of each of the four long rests remain in the video; the middle is omitted: $5 \times 25 + 4 \times 10 = 165$ seconds, or **about 2 minutes 45 seconds of video** instead of 16 minutes 25 seconds. The actual file may be slightly longer because of camera timing and recording finalization; the workout itself still lasts 16 minutes 25 seconds.

[!WARNING] **A rest before the finish is not paused:** there is no following work phase for recording to resume into. If you do not intend to rest after the final set, add a backtick after the repeat, for example `*5`#`, to remove only that final rest from the plan.

Voice start before video recording

Automatic video recording uses the microphone, so voice commands are disabled during the countdown and workout. Once your phone is positioned and you are ready, use the “**Start**” command before the session begins: the timer starts and automatic recording follows. This avoids setting a long countdown in advance; prepare first, then start when convenient. Choose a short or zero countdown if that suits the workout. In camera mirror mode without recording, the microphone is not occupied by video and voice commands remain available.

Video quality, telemetry and framing

- **Video quality: Auto** uses the maximum quality supported by the device. Resolution mode offers options up to **4K**; Advanced settings let you choose frame height, **9:16** or **4:3** aspect ratio and bitrate. The app provides an estimated file size; actual size depends on the camera and scene.
- **Exposure in Advanced settings:** when operator mode is off, exposure compensation is available from **−2 to +2 EV**.

- **Telemetry overlay:** enable **Record Telemetry** and choose **Time + Heart Rate** or **Screen Mirror**. The latter uses the Timer screen's configured widgets. Overlay opacity is adjustable.
- **Schema QR code:** when telemetry is enabled, add the current Schema as a QR code in the lower corner of the video. Phase progress bars are kept near the bottom of the frame.

7. Sensors, GPS, voice and music

Bluetooth heart-rate monitors

Open **Sensors** -> **Heart-rate monitor**, search and select the BLE device. During the workout, measured heart rate is compared with the model and can be spoken on request.

GPS tracking

The speed engine smooths GPS positions and rejects isolated spikes. When the athlete stops, speed should fall promptly towards zero, while average speed remains calculated over the session timeline.

Audio policies

- **Default** - concise warning shortly before a phase change; suitable for short HIIT/SIT intervals.
- **Extended** - richer announcements before longer phases, including exercise name, target tempo and intensity.
- **Custom** - individually select the warnings and spoken feedback required.

Offline voice commands

Voice recognition is designed to work locally, without an internet connection. This is particularly useful when hands are wet, gloved or holding equipment.

Common commands include:

Purpose	Example commands
Control	Start, Pause, Resume, Stop, Next, Lap, Last round, Finish
Queries	Heart rate, Zone, Time, Remaining, Compare heart rate, Compare repetitions
Voice	Louder, Quieter, Voice off
Music	Next track, Previous track, Music louder, Music quieter

Purpose	Example commands
Live adjustment	Tempo up, Tempo down, Set repetitions 15

The recognised vocabulary depends on the selected interface language.

Music and tempo synchronisation

The built-in controller can manage tracks during a session. Tempo analysis estimates the BPM of local music. When the Schema specifies a cadence, playback speed can be adjusted within a limited correction range so that the musical beat supports the movement rhythm.

Use a conservative maximum correction, such as 8-15%, to avoid obvious pitch or speed distortion. A suitability filter can show only tracks that require modest correction.

MusicLightEffect adds a visual pulse linked to phase cadence and intensity.

8. Smart Curves, families and session history

A **Smart Curve** is the saved evidence of one training attempt, not merely an anonymous CSV or FIT file. It brings together the recorded data, the Schema when available, analysis context and a persistent identity. Related attempts can be linked into a family so that progress and changes remain inspectable over time.

Identity and lineage

Each curve has a unique `curveId` stored in its metadata. Its identity does not depend on the filename or folder: renaming, moving or transferring the file should not turn it into a different attempt. When a new pass continues an existing line of investigation, its metadata can also store the parent's ID as `parentCurveId`.

A family is a history of attempts: one root curve followed by one or more descendants. Start a new branch when a pass begins a distinct comparison; choose **Continue Smart Curve** when it is a continuation of an existing line. Make this choice before exporting the result, because that is when the parent relationship is recorded. For a different training question, create a new root rather than attaching unrelated sessions to an existing family.

A practical Smart Curve workflow

1. In **Library -> Smart Curves**, choose one working folder for CSV/FIT results. A stable folder makes search and family history dependable; the app remembers the granted folder access and can ask you to select it again if that access is revoked.

2. Perform a clearly defined Schema with heart-rate recording and any useful GPS or video telemetry. After the session, create a new root or continue the appropriate Smart Curve before exporting. Do not overwrite an earlier attempt.
3. Open the saved curve on the Graph. Select an honest analysis window, excluding sensor dropouts, false stops or obvious execution failures. Fit the model to the measured heart rate by tuning intensity, Tau ON, Tau OFF and drift as the data supports.
4. When the fit and window are credible, choose **Hydrate**. This stores the checked model, Schema and analysis window with that curve, so the result can act as a personal reference for similar work.
5. Add a short athlete note for context the signals cannot show, such as sleep, heat, technique or the purpose of the attempt. Change one important factor at a time when you want the next pass to answer a clear question.

Hydration is a way to preserve a checked personal model with its source curve; it is not a claim that the model is medically validated. A family is useful only when its members are comparable enough to answer the question being asked.

Base, Result and family comparison

In an ordinary live session, the current Schema model is **Base** and the recorded heart rate is **Result**. Compare them on the Graph, inspect the analysis window and metrics, then fit the model if appropriate. Resetting the comparison clears graph roles, solo mode, offsets and comparison windows; it does not delete imported files.

The Library's **Show family** view presents the root and its descendants as a tree. Opening one member inspects that attempt alone. **Compare entire family on Graph** loads the root as Base and later attempts as Results, allowing you to compare duration, average and peak heart rate, curve shape and change from each attempt's direct parent. Compare like with like and use athlete notes or video as context, not as proof of cause.

Starting a new workout clears the previous live Result, so export an important pass and select its parent before the next start. You can also reopen a saved Smart Curve later to compare, fit and hydrate it.

Video and family transfer

When available, a video is associated with its curve by the curve's unique ID, not by the video filename. The Library can show and open the related recording alongside the attempt. Video can reveal technique, pace and pauses that heart rate alone cannot, but it remains separate from the curve's lineage.

A family ZIP contains the original CSV/FIT files and a `family.json` file describing the links between attempts. An AI-analysis package can add a short brief. Videos are deliberately excluded to keep archives manageable; share a relevant video separately and identify the curve it belongs to. Preserve the original files and IDs, and do not import the same family ZIP repeatedly into one working folder: duplicate IDs there make the history ambiguous.

For a repeat test, compare the new pass against the same Schema and, when useful, the measured heart rate from your previous pass. Use the model when the question is model fit; use the previous real curve when the question is how your response has changed.

9. Backup, metrics and AI assistance

Export system state

After configuring zones, `tau`, layouts, audio policies and presets, export the complete system state as JSON. Store the file somewhere independent of the phone. Import it after a device change or reset to restore the laboratory configuration.

Comparison metrics

The **Results** panel reports formal comparison metrics. Typical measures include:

- correlation - similarity of curve shape;
- RMSE - average magnitude of heart-rate error in beats per minute;
- lag - temporal offset between model and measurement;
- overlap and data-quality indicators.

High correlation is useful only when the input data and alignment are trustworthy. Treat thresholds as guidance, not proof. RMSE under roughly 5-8 bpm may indicate a close model for many sessions, but the required precision depends on the purpose and sensor quality.

AI report

The **AI report** action creates a structured file containing the workout, model, metrics, reliability guidance and relevant series. Share that file with an AI assistant to obtain a human-readable interpretation.

The task adapts to the comparison:

- model vs measured session - evaluate model fit and physiological cost;
- current vs previous pass - focus on progress and efficiency.

The AI receives calculated evidence; it does not replace the timer's formal analysis.

10. Performance Optimiser

The Performance Optimiser supports tactical planning for a record attempt.

The athlete supplies:

- target, such as maximum repetitions in ten minutes;
- sustainable and high-tempo characteristics;
- duration limits;
- fatigue assumptions;
- hand-switch cost where relevant.

The engine simulates accumulated fatigue and compares tactics such as even pacing, stepwise progression or a smooth ramp. The output is an executable Schema representing the selected strategy.

Optimisation is a planning aid, not a guarantee. Technique, readiness and real-time physiological response still govern safe execution.

11. Ready-to-use programmes

Separate the following blocks with a blank line to create a multi-Schema programme.

Kettlebell: warm-up, negative split and cooldown

```
120/0@t[14->22] 0/20*3#title=Block 1: smooth-entry warm-up

[base=18 race=22 kick=26]
120/0@t[base->race] 360/0@t22 120/0@t[race->kick]`#
title=Block 2: 10-minute snatch negative split

60/0@t[24->14]*4`#title=Block 3: swing cooldown
```

Calisthenics: pull-up ladder and push-up density

```
[dw=2 dr=2 N=8]
(dw/dr@r1
->[to:auto/auto@rN,delta:+dw/+dr@r+1]
->[to:auto/auto@r1,delta:-dw/-dr@r-1])*1`#
title=Block 1: pull-up ladder to 8

20/20@r10
->[to:20/5@r16,delta:20/-5@r+2]#
title=Block 2: push-up recovery compression
```

Running: cadence wave and finishing strides

```
[easy=165 fast=190]
(180/0@6t[easy->fast] 180/0@6t[fast->easy])*3#
title=Block 1: 18-minute cadence wave

(20/70@9t[180->215])*6`#
title=Block 2: six smooth accelerations
```

Appendix A - Schema quick reference

Element	Example	Meaning
Reset Schema	-	remove text Schema and unlock Graph sliders
Clear Intensities	-	remove intensity values for calibration
blank line	between blocks	create a multi-Schema programme
/	30/30#	work / recovery
#	60/0#	finish the workout
*N	30/30*5#	repeat five times
backtick	30/30*5`#	remove final recovery
@	@8/2	work intensity 8 / recovery intensity 2
r	30/0@r10#	target ten repetitions
t	60/0@t20#	rate of 20 per minute
!N	15!1/0# 1=pull-ups	named segment
~	180/0*~#	value decided during execution
Recorder	~/0#	free recording of time and sensors
->	30/30->[...]	progression
t[...]	t[15->25 i:6->9]	tempo ramp and intensity correspondence
seed:	seed:42	reproduce a random materialisation

Appendix B - Troubleshooting

Graph sliders do not respond

An active text Schema is overriding them. Use **Reset Schema** on the Graph screen.

Preserve settings when changing phone

Open Settings, export the system state as JSON and store the file away from the device. Import it on the new phone.

Voice commands do not respond

Confirm that voice commands are enabled, use the selected interface language and reduce strong background noise.

Heart-rate monitor will not connect

Enable Bluetooth and the permissions required by the Android version. Check that another application is not holding the sensor connection.

Train productively, reproducibly and with respect for the evidence from your own sessions.