

# MULTI-BRAND ESC BLINKY MODE ANALYSIS & COMPREHENSIVE GUIDE

This document provides an exhaustive, brand-by-brand breakdown of **Blinky Mode** (Zero-Timing / Boost OFF spec racing mode) across all electronic speed controllers (ESCs) identified from competition homologation rosters, including verification indicators, setup methods, parameter mappings, and scrutineering compliance.

## 1. Overview & Compatibility Matrix

"Blinky Mode" refers to an ESC configuration where all forms of electronic timing advance—including **Boost**, **Turbo**, and dynamic RPM timing curves—are strictly disabled (locked to 0° advance). Mandated globally by governing bodies (**ROAR**, **IFMAR**, **EFRA**, **BRCA**, and national federations) in spec-stock racing classes (e.g., 21.5T, 17.5T, 13.5T), compliance is visually verified during technical inspection via a **flashing LED indicator at neutral throttle**.

The table below catalogs every manufacturer and model from the competition roster, detailing its Blinky mode implementation and operational profile:

| MANUFACTURER | ESC MODEL                          | BLINKY SUPPORTED?     | PRIMARY TARGET CLASS               | ROAR / IFMAR APPROVED? | BLINKY IMPLEMENTATION & NOTES                                                                                              |
|--------------|------------------------------------|-----------------------|------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------|
| ABSIMA       | Revenge CTS 10                     | Yes                   | 1/10 Touring / Buggy               | Yes                    | Parameter zeroing (Boost 0 / Turbo 0) or Blinky profile via CTS program box. Flashing Blue LED.                            |
| CORE RC      | PACE 100RM 1s                      | Yes (Hardware Locked) | 1/12 Pan Car (1S LiPo)             | Yes                    | Spec-built 1S zero-timing ESC with integrated DC-DC step-up booster. Factory locked zero-timing.                           |
| DUALSKY      | 850FT, 870FT                       | Yes                   | 1/10 Stock & Modified              | Yes                    | Features dedicated zero-timing "Stock Blinky" firmware profile. Status LED flashes at neutral.                             |
| ELCERAM      | Nitride, Oxide                     | Yes                   | 1/10 Stock (Oxide) / Mod (Nitride) | Yes                    | High-end ceramic-cooled ESCs. Blinky mode selectable via onboard TFT display; screen shows zero-timing status.             |
| HOBBYWING    | Xerun XR10 Justock / Club SPEC     | Yes (Hardware Locked) | 1/10 Spec Stock / Club             | Yes                    | Hardware-locked zero-timing architecture; timing cannot be altered. Continuous flashing Red LED at neutral.                |
| HOBBYWING    | Xerun XR10 Stock Spec              | Yes                   | 1/10 On-Road / Off-Road Stock      | Yes                    | Profile 0 / Zero-timing profile with programmable drive and brake feel. Flashing Red LED at neutral.                       |
| HOBBYWING    | Xerun XR10 Pro                     | Yes                   | 1/10 Flagship Competition          | Yes                    | Full Modified & Stock capable. Select Profile 0 (Zero-timing) or set Boost/Turbo to 0°. Flashing Red LED at neutral.       |
| HOBBYWING    | Xerun 120A / 60A-SD / Xtreme Stock | Yes                   | 1/10 Classic Touring & Buggy       | Yes                    | Supported via dedicated "Stock Spec / Zero-Timing" USB firmware updates (e.g. 508_No_Timing). Flashing Red LED at neutral. |
| LRP          | Flow X (TC Spec / Off-Road)        | Yes                   | 1/10 Professional Racing           | Yes                    | v4.1/v5.1 stock firmware or Profile 0. Flashes multi-color status LED at neutral throttle.                                 |
| LRP          | Flow Competition / Works Team      | Yes                   | 1/10 Touring & Modified            | Yes                    | Requires official "Blinky" / Boost 0 stock firmware. Flashes Mode & Set LEDs alternately at neutral.                       |

| MANUFACTURER       | ESC MODEL                           | BLINKY SUPPORTED?            | PRIMARY TARGET CLASS          | ROAR / IFMAR APPROVED? | BLINKY IMPLEMENTATION & NOTES                                                                          |
|--------------------|-------------------------------------|------------------------------|-------------------------------|------------------------|--------------------------------------------------------------------------------------------------------|
| <b>LRP</b>         | SXX Comp / SXX TC / Stock Spec      | <b>Yes</b>                   | 1/10 Classic Brushless        | Yes                    | SXX Stock Spec v2 features native zero-timing mode; TC Spec requires zero-timing factory firmware.     |
| <b>MUCHMORE</b>    | Fleta Euro                          | <b>Yes (Spec Tuned)</b>      | 1/10 Euro Spec Stock          | Yes                    | Dedicated stock-class ESC with pre-loaded non-timing program. Flashing Blue/Red LED at neutral.        |
| <b>MUCHMORE</b>    | Fleta Pro / Fleta Pro V2            | <b>Yes</b>                   | 1/10 Flagship Competition     | Yes                    | Requires selecting Profile 1 (Zero Timing) or loading dedicated Blinky firmware. Flashing Blue LED.    |
| <b>NOSRAM</b>      | Comet, Pearl, HD                    | <b>Yes</b>                   | 1/10 Stock & Modified         | Yes                    | German sibling platform to LRP Flow/SXX. Uses Boost 0 profiles / Blinky firmware. Dual LED flash.      |
| <b>ORCA</b>        | OE1, OE101, OE1 Mark II             | <b>Yes</b>                   | 1/10 Flagship Racing          | Yes                    | Dedicated Blinky program mode (Profile 0). Flashes Blue LED continuously at neutral.                   |
| <b>ORCA</b>        | OE1-1S                              | <b>Yes</b>                   | 1/12 Pan Car (1S LiPo)        | Yes                    | 1S-optimized circuit with built-in booster. Features zero-timing Blinky profile for 1/12 spec classes. |
| <b>ORCA</b>        | BP1001 BlinkyPro / OE1WLE           | <b>Yes (Factory Blinky)</b>  | 1/10 Spec Stock Racing        | Yes                    | Purpose-designed Blinky racing ESCs. Factory non-timing compliance with flashing LED.                  |
| <b>ORCA</b>        | Totem Stock Spec / Totem / 15 / Pro | <b>Yes</b>                   | 1/10 Club & Spec Stock        | Yes                    | Compact lightweight spec ESCs. Pre-programmed non-timing firmware with neutral flashing indicator.     |
| <b>R1WURKS</b>     | Digital Super Stock                 | <b>Yes</b>                   | 1/10 Stock Spec Touring/Buggy | Yes                    | Wireless/WIFI programmable. Selectable zero-timing Blinky profile with Flashing Blue LED at neutral.   |
| <b>R1WURKS</b>     | R1 Super LCG80                      | <b>Yes</b>                   | 1/10 Ultra-Low CG Stock       | Yes                    | Ultra-low profile stock ESC. Factory-supported Blinky mode with flashing LED confirmation.             |
| <b>RC OMG</b>      | Polaris                             | <b>Yes</b>                   | 1/10 Touring & Drift          | Yes                    | Zero-timing configuration via Polaris LCD program box (Boost = 0, Turbo = 0). Flashing Blue LED.       |
| <b>REDS RACING</b> | TX2, ZX Pro                         | <b>Yes</b>                   | 1/10 Competition Stock/Mod    | Yes                    | Designed by Mario Rossi. Features dedicated zero-timing stock mode. Flashes Blue/Red LED at neutral.   |
| <b>REEDY</b>       | Blackbox 510R / 410R                | <b>Yes</b>                   | 1/10 Flagship Competition     | Yes                    | Selectable Profile 1 (Zero-Timing / Blinky). Continuous flashing Green/Orange LED at neutral.          |
| <b>REEDY</b>       | Blackbox 800Z / 1000Z               | <b>Yes (Hardware Locked)</b> | 1/10 Spec Stock Racing        | Yes                    | Zero-timing spec ESCs with fixed timing advance. "Z" designation indicates zero electronic timing.     |
| <b>REEDY</b>       | Blackbox 600Z / 610R                | <b>Yes (Club Spec)</b>       | 1/10 Club Spec / Stock        | Yes                    | Entry/Club spec non-timing ESCs. Flashing status LED at neutral; timing circuitry locked out.          |

| MANUFACTURER | ESC MODEL                      | BLINKY SUPPORTED?     | PRIMARY TARGET CLASS             | ROAR / IFMAR APPROVED? | BLINKY IMPLEMENTATION & NOTES                                                                           |
|--------------|--------------------------------|-----------------------|----------------------------------|------------------------|---------------------------------------------------------------------------------------------------------|
| ROCKET       | TS160 V2 / V3                  | Yes                   | 1/10 Stock & Modified            | Yes                    | Surpass Hobby / Rocket-RC competition ESC. Profile 0 = Zero Timing. Flashes Blue LED at neutral.        |
| SKY RC       | TS50                           | Yes                   | 1/10 Club Spec Stock             | Yes                    | Compact plastic-case club ESC. Default non-timing firmware. Flashes Blue LED at neutral.                |
| SKY RC       | TS160 Pro V2                   | Yes                   | 1/10 High-End Modified/Stock     | Yes                    | Full competition ESC. Zero-timing enabled by setting Boost/Turbo to 0°. Flashes Blue LED.               |
| SKY RC       | Toro 1s 120A                   | Yes                   | 1/12 Pan Car (1S LiPo)           | Yes                    | Dedicated 1S competition ESC with built-in DC booster. Features ROAR-approved zero-timing mode.         |
| TEAM CAYOTE  | Crest X, Crest RS, Crest X Evo | Yes                   | 1/10 Professional Competition    | Yes                    | 32-bit ARM Cortex-M4 architecture. Blinky mode selected via Xlink or BTUNE app. Flashes Blue LED.       |
| TEAM POWERS  | Radon Pro, Pro-C               | Yes                   | 1/10 Flagship Competition        | Yes                    | Selectable Profile 1 (Blinky mode) or Boost/Turbo = 0. Flashing Blue LED at neutral throttle.           |
| TEAM POWERS  | SportC, Mini Spec Radon        | Yes (Spec Locked)     | 1/10 & 1/12 Spec Racing          | Yes                    | Factory-locked zero-timing architecture for club and spec classes. Continuous flashing indicator.       |
| TRACKSTAR    | TS160, GenII, GenII One Cell   | Yes                   | 1/10 & 1/12 Competition          | Yes                    | Turnigy Trackstar line. Features ROAR-approved Blinky firmware. Flashing Blue/Red status LED.           |
| TRACKSTAR    | Sportsman                      | Yes (Hardware Locked) | 1/10 Spec Class                  | Yes                    | Specifically built for non-timing Sportsman/Stock classes. Timing features physically omitted.          |
| TRACKSTAR    | Turbo                          | Yes (via Firmware)    | 1/10 Modified & Stock            | Yes                    | Requires flashing official non-timing / "Blinky" firmware via USB PC software.                          |
| YOKOMO       | BL-RPX3, BL-RPX4               | Yes                   | 1/10 Flagship World Championship | Yes                    | Program Mode 1 / Zero-timing profile via R100/RPX programmer or Wi-Fi module. Flashing Orange/Blue LED. |
| YOKOMO       | BL-R3                          | Yes                   | 1/10 Competition Stock/Mod       | Yes                    | Classic racing ESC. Supports zero-timing profile via YBP3 programmer. Flashes status LED at neutral.    |

## 2. Technical Implementation: LED Status Indicators by Brand

In competition scrutineering, technical inspectors visually verify that an ESC is operating in zero-timing mode by observing the **onboard status LEDs when the transmitter throttle trigger rests in the neutral position**.

Below is the definitive reference for LED behavior across each manufacturer:

| MANUFACTURER     | NEUTRAL LED BEHAVIOR IN BLINKY MODE                                          | NEUTRAL LED BEHAVIOR WITH BOOST/TURBO ACTIVE | LED COLOR(S) USED     |
|------------------|------------------------------------------------------------------------------|----------------------------------------------|-----------------------|
| Hobbywing        | Flashing <b>RED</b> continuously (slow blink or rhythmic pause)              | Solid RED at neutral                         | Red / Green           |
| LRP / Nosram     | Flashing <b>BLUE</b> continuously (1.30s pulse on Flow X; steady in Boost 0) | Solid BLUE at neutral                        | Blue / Red / Multi    |
| Reedy (Blackbox) | Flashing <b>GREEN</b> continuously (Red+Green flash = sensor fault)          | Solid GREEN at neutral                       | Green / Red           |
| ORCA             | Flashing <b>BLUE</b> continuously                                            | Solid BLUE at neutral                        | Blue / Red            |
| Muchmore Racing  | Flashing <b>GREEN</b> continuously (Red flash = error code)                  | Solid GREEN at neutral                       | Green / Red           |
| Yokomo           | Flashing <b>GREEN</b> continuously (or Orange on older BL-R3)                | Solid GREEN at neutral                       | Green / Red / Orange  |
| Elceram          | Flashing Status LED + TFT Screen displays "ZERO TIMING"                      | Screen displays active timing advance        | Multi-color TFT + LED |
| Team Powers      | Flashing <b>BLUE</b> continuously                                            | Solid BLUE at neutral                        | Blue / Green / Red    |
| SkyRC / Rocket   | Flashing <b>RED</b> continuously                                             | Solid RED at neutral                         | Red / Green           |
| R1Wurks          | Flashing <b>GREEN</b> (rapid pulse with short pause)                         | Solid GREEN at neutral                       | Green / Red           |
| Team Cayote      | Flashing <b>BLUE</b> continuously + App status confirmation                  | Solid Blue at neutral                        | Blue / Red            |
| Trackstar        | Flashing <b>BLUE / RED</b> continuously                                      | Solid RED or solid Blue at neutral           | Blue / Red            |
| Core RC          | Flashing <b>GREEN</b> continuously                                           | <i>Cannot enable timing (Locked)</i>         | Green                 |
| Absima           | Flashing <b>BLUE</b> continuously                                            | Solid Blue at neutral                        | Blue / Red            |
| Dualsky          | Flashing <b>RED / GREEN</b> alternately                                      | Solid Green at neutral                       | Red / Green           |
| Reds Racing      | Flashing <b>BLUE</b> continuously                                            | Solid Blue at neutral                        | Blue / Red            |
| RC OMG           | Flashing <b>BLUE</b> continuously                                            | Solid Blue at neutral                        | Blue / Red            |

[!IMPORTANT] A flashing LED is only valid when the transmitter throttle trigger is at the centered neutral position. If the throttle trim or sub-trim on the radio is offset, the ESC may read a slight forward or brake input, causing the LED to stay solid even if zero-timing is programmed. **Always zero out radio sub-trims before tech inspection.**

### 3. Configuration & Parameter Mapping Across Brands

ESC manufacturers implement Blinky mode across four fundamental architectural groups:

| ARCHITECTURE GROUP | CLASSIFICATION TYPE         | PRIMARY MECHANISM & BEHAVIOR                                                                                                               | PROMINENT ESC EXAMPLES                                                                                                    |
|--------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Group A            | Hardware-Locked Zero Timing | Timing circuits physically omitted or locked in base MCU code; zero electronic timing possible                                             | Hobbywing XR10 Justock, Core RC PACE 100RM, Reedy 800Z / 1000Z / 600Z, Trackstar Sportsman, Team Powers SportC            |
| Group B            | Pre-Set Software Profiles   | Multi-profile firmware; selecting <code>Profile 0</code> or <code>Profile 1</code> locks timing registers to zero and initiates Blinky LED | Hobbywing XR10 Pro / Stock Spec, Reedy 510R / 410R, Yokomo RPX3 / RPX4, ORCA OE1 / OE101, Team Powers Radon Pro           |
| Group C            | Dual-Parameter Zeroing      | ESC allows manual adjustment; Blinky mode engages when both <code>Boost Timing = 0°</code> and <code>Turbo Timing = 0°</code>              | SkyRC TS160, RC OMG Polaris, Absima Revenge CTS 10, Rocket TS160                                                          |
| Group D            | Dedicated Blinky Firmware   | Modified code is replaced by flashing official non-timing homologated firmware via PC / USB Link                                           | LRP Flow Works Team ( <code>Boost 0</code> ), Hobbywing 120A ( <code>v508_No_Timing</code> ), Trackstar TS160 ROAR Blinky |

### Group A: Hardware-Locked Zero-Timing ESCs

- **Models:** Hobbywing Xerun XR10 Justock / Club SPEC, Core RC PACE 100RM, Reedy Blackbox 800Z / 1000Z / 600Z, Trackstar Sportsman, Team Powers SportC.
- **Mechanism:** These units are physically or unalterably firmware-locked to zero timing advance. The microcontroller code contains no timing advance calculations, making accidental or intentional boost activation impossible.
- **Advantage:** Universally favored by club organizers and scrutineers because non-compliance is technically impossible without hardware replacement.

### Group B: Profile-Selectable Blinky ESCs

- **Models:** Hobbywing XR10 Pro / Stock Spec (Profile 0), Reedy Blackbox 510R / 410R (Profile 1), Yokomo BL-RPX3 / RPX4 (Profile 1), ORCA OE1 / OE101 (Profile 0), Team Powers Radon Pro (Profile 1).
- **Mechanism:** The ESC firmware stores multiple preset operational maps. Selecting the designated Zero-Timing profile automatically disables all subordinate timing registers and activates the neutral flashing LED.

### Group C: Dual-Parameter Zeroing (Boost 0° / Turbo 0°)

- **Models:** SkyRC TS160 Pro V2, Rocket TS160 V2/V3, Absima Revenge CTS 10, RC OMG Polaris.
- **Mechanism:** The ESC features continuous degrees of timing advance. Blinky mode is engaged when both **Boost Timing** and **Turbo Timing** are set to `0°` (or `OFF`). The firmware detects both values at zero and triggers the flashing LED routine.

### Group D: Dedicated Homologated Blinky Firmware Flashing

- **Models:** LRP Flow Works Team / Competition, Nosram Comet / Pearl, Hobbywing Xerun 120A V2.1 (firmware `V508_No_Timing`), Trackstar Turbo.
- **Mechanism:** The user connects the ESC to a PC via USB and flashes a designated sanctioning-body approved firmware file. All timing code is erased from the flash memory, leaving only the zero-timing drive logic.

## 4. Brand-by-Brand Technical Breakdown

### 1. ABSIMA

- **Featured Model:** `Revenge CTS 10`

- **Configuration:** Connected via the ABSIMA CTS Program Box or PC Software. Under the **Timing Menu**, set **Boost Timing = 0** and **Turbo Timing = 0**.
- **Indicator:** Blue LED flashes rapidly at neutral.

## 2. CORE RC

- **Featured Model:** **PACE 100RM 1s**
- **Configuration:** Factory locked zero-timing unit with integrated DC-DC booster designed specifically for 1/12 scale LMP pan cars running single-cell (3.7V) LiPo batteries.
- **Indicator:** Green LED flashes continuously at neutral.

## 3. DUALSKY

- **Featured Models:** **850FT**, **870FT**
- **Configuration:** Programmed via Dualsky USB Link or Smart Program Card. Select the pre-loaded **Stock/Blinky Mode**.
- **Indicator:** Alternating Red and Green LED flashing cycle at neutral throttle.

## 4. ELCERAM

- **Featured Models:** **Nitride**, **Oxide**
- **Configuration:** Czech-engineered speed controllers featuring ceramic substrates. The G2 models include an integrated **TFT color screen**. Blinky mode is selected directly through the onboard screen menus or wireless app.
- **Indicator:** The onboard TFT screen displays a prominent **"ZERO TIMING"** badge, accompanied by a flashing status LED.

## 5. HOBBYWING

- **Featured Models:** **Xerun XR10 Justock**, **XR10 Stock Spec**, **XR10 Pro**, **Xerun 120A**, **Xerun 60A-SD**, **Xtreme Stock**, **Justock Club SPEC**
- **Configuration:**
  - **XR10 Justock / Club SPEC:** Always in Blinky mode out of the box (hardware locked).
  - **XR10 Pro / XR10 Stock Spec:** Connect LCD Program Box Pro or OTA Programmer; select **Profile 0 (Zero-Timing / Blinky)**, or set **Boost = 0°** and **Turbo = 0°**.
  - **Legacy 120A / 60A-SD:** Flash dedicated non-timing firmware (e.g. **V508\_No\_Timing**) via USB Link PC software.
- **Indicator:** **Flashing RED LED** at neutral throttle (Green LED is OFF; Green blinks during throttle, turns solid Green at 100% full throttle).

## 6. LRP

- **Featured Models:** **Flow X (TC Spec / Off-Road)**, **Flow Competition**, **Flow Works Team**, **SXX Comp**, **SXX TC Spec**, **SXX Stock Spec**
- **Configuration:**
  - **Flow X:** Update to official stock firmware (e.g., v4.1 or v5.1 Stock) via USB Bridge; select Mode 0.
  - **Flow / SXX Series:** Flash official "Blinky" software. When set to zero-timing, Mode 4 (Boost) is turned off.
- **Indicator:** Multi-color LED array flashes a distinct **alternating Blue/Green or rapid Blue pattern** at neutral.

## 7. MUCHMORE RACING

- **Featured Models:** **Fleta Euro**, **Fleta Pro**, **Fleta Pro V2**
- **Configuration:** Using the Muchmore LCD Program Card or FLETA USB Link, select **Profile 1 (Blinky)** or set **Boost = 0°** and **Turbo = 0°**.
- **Indicator:** **Flashing BLUE LED** continuously while at neutral throttle.

## 8. NOSRAM

- **Featured Models:** Comet , Pearl , HD
- **Configuration:** Shares the core electronic platform with LRP. Firmware updates are performed via the Nosram USB Bridge. Select **Boost 0 Profile**.
- **Indicator:** Dual LED array flashes simultaneously or in an alternating pattern at neutral.

## 9. ORCA

- **Featured Models:** OE1 , OE101 , OE1-1S , BP1001 BlinkyPro , OE1WLE , Totem Stock Spec , Totem , Brushless Pro , Totem 15 Brushless Pro , OE1 Mark II
- **Configuration:**
  - **BP1001 BlinkyPro / Totem Stock Spec:** Factory locked to zero timing.
  - **OE1 / OE101 / OE1 Mark II / OE1-1S:** Using the ORCA Program Card, select **Profile 0 (Blinky)** or configure all timing advance registers to 0.
- **Indicator:** Flashing **BLUE LED** at neutral throttle.

## 10. R1WURKS

- **Featured Models:** Digital Super Stock , R1 Super LCG80
- **Configuration:** Configured wirelessly via the R1 Wireless Module / App or direct programming card. Under Profile Selection, choose **Blinky Mode**.
- **Indicator:** High-intensity **Flashing BLUE LED** at neutral.

## 11. RC OMG

- **Featured Models:** Polaris
- **Configuration:** Connect the Polaris LCD Program Box. Navigate to **Boost Timing** and **Turbo Timing** ; set both values to 0 .
- **Indicator:** Status LED flashes **BLUE** continuously at neutral.

## 12. REDS RACING

- **Featured Models:** TX2 , ZX Pro
- **Configuration:** Using the REDS Racing Program Box or PC Interface, load the pre-programmed **Zero-Timing Spec Profile**.
- **Indicator:** **Flashing BLUE / RED LED** pattern at neutral.

## 13. REEDY

- **Featured Models:** Blackbox 410R , Blackbox 800Z , Blackbox 1000Z , Blackbox 510R , Blackbox 600Z , Blackbox 610R
- **Configuration:**
  - **800Z / 1000Z / 600Z / 610R ("Z" Series):** Factory hardware-locked zero-timing spec controllers.
  - **510R / 410R:** Connect the Blackbox PRO Program Box; select **Profile 1 (Zero-Timing / Blinky)**.
- **Indicator:** **Flashing GREEN / ORANGE LED** at neutral.

## 14. ROCKET (Surpass Hobby)

- **Featured Models:** TS160 V2 , TS160 V3
- **Configuration:** Connect the LCD Program Card. Navigate to **Boost** and **Turbo** menus; set both parameters to 0° .
- **Indicator:** **Flashing BLUE LED** at neutral.

## 15. SKY RC

- **Featured Models:** `TS50`, `TS160 Pro V2`, `Toro 1s 120A`
- **Configuration:** Programmed via SkyRC Program Box, PC Link, or Bluetooth Module via RC-Gear App. Set `Boost Timing = 0°` and `Turbo Timing = 0°`.
- **Indicator:** Flashing **BLUE LED** at neutral throttle.

## 16. TEAM CAYOTE

- **Featured Models:** `Crest X`, `Crest RS (60/80/120)`, `Crest X Evo`
- **Configuration:** Equipped with 32-bit ARM Cortex-M4 processing. Programmed using the **Xlink Program Box** or the **BTUNE wireless smartphone app**. Select the **Blinky Racing Profile**.
- **Indicator:** Flashing **BLUE LED** at neutral; real-time verification visible in BTUNE app telemetry.

## 17. TEAM POWERS

- **Featured Models:** `Radon Pro`, `Radon Pro-C`, `SportC`, `Mini Spec Radon`
- **Configuration:**
  - **SportC / Mini Spec Radon:** Hardware locked spec ESCs.
  - **Radon Pro / Pro-C:** Connect the Radon LCD Program Card; select **Profile 1 (Blinky)** or set Boost/Turbo to zero.
- **Indicator:** Flashing **BLUE LED** at neutral.

## 18. TRACKSTAR (Turnigy)

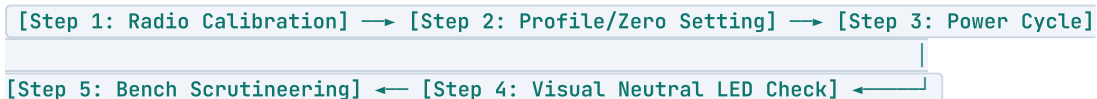
- **Featured Models:** `TS160`, `Sportsman`, `Turbo`, `GenII`, `GenII One Cell`
- **Configuration:**
  - **Sportsman:** Dedicated hardware-locked zero-timing ESC.
  - **TS160 / GenII / Turbo:** Connect via Trackstar USB PC software; flash official ROAR-approved **Blinky Firmware**.
- **Indicator:** Flashing **BLUE & RED LED** at neutral.

## 19. YOKOMO

- **Featured Models:** `BL-R3`, `BL-RPX3`, `BL-RPX4`
- **Configuration:** Using the Yokomo Program Box (or Wi-Fi Module via Smartphone App), select **Profile 1 (Zero-Timing / Blinky Mode)**.
- **Indicator:** Distinct **Flashing ORANGE / BLUE LED** pattern at neutral.

# 5. How to Set Up & Verify Blinky Mode (Universal Checklist)

Follow this 5-step technical inspection checklist before presenting any vehicle for scrutineering:



### 1. Radio Zeroing & Calibration:

- Set transmitter throttle trims, sub-trims, and exponential curves to `0`.

- Ensure Throttle End Point Adjustment (EPA) is set to **100% / 100%**.
- Re-calibrate the ESC throttle endpoints (Neutral, Full Throttle, Full Brake).

## 2. Select Zero-Timing Map:

- Access the ESC via its designated programmer (Button, Program Box, USB, or Bluetooth App).
- Either select the dedicated **Blinky Profile** or set both **Boost Timing = 0°** and **Turbo Timing = 0°**.

## 3. Reboot the System:

- Disconnect the programmer, save parameters, and **power-cycle** the ESC and receiver.

## 4. Visual Neutral Verification:

- Leave the transmitter powered on with the throttle trigger resting untouched in neutral.
- Verify that the designated LED is **flashing steadily**. If the LED is solid, re-check transmitter trims or re-calibrate the throttle range.

## 5. Pre-Tech Bench Check:

- Verify that when slight forward throttle is applied, the flashing LED transitions to solid illumination, and resumes flashing immediately when released back to neutral.

# 6. Remote Transmitter Adjustments & Telemetry Regulations

Modern radio protocols offer bidirectional telemetry and remote parameter adjustment (e.g., Sanwa SSL, Futaba S.BUS2, FlySky i-BUS, Hobbywing OTA).

**[!WARNING] Strict Competition Ban on Mid-Race Remote Tuning:** In all sanctioned Blinky events governed by ROAR, IFMAR, EFRA, and BRCA:

- **Rules explicitly forbid remote adjustment of ESC timing or throttle curves while the vehicle is on the track.**
- Even if an ESC supports live wireless telemetry adjustments, sanctioning rules require that telemetry ports be unplugged or that the receiver profile be locked down during competition heats.
- Any electronic capability that allows dynamic timing adjustments from the driver stand results in immediate disqualification.

# 7. Firmware Integrity & Scrutineering: Can Boost be Enabled While Keeping the Blinky Indicator?

**Is it possible to secretly enable Boost while retaining the flashing Blinky indicator?**

**In official factory firmware: No.**

**Via firmware tampering: Prevented by hardware cryptography and caught by multi-tier race scrutineering.**

## 1. Hardcoded State Coupling in Official Firmware

Across all 19 manufacturers listed, the microcontroller routines controlling the status LED are hardcoded to the motor commutation timing state machine:

- When timing advance algorithms are active, the LED pin is held HIGH (solid).
- Only when timing calculations are completely bypassed does the firmware invoke the timer interrupt that flashes the LED.
- No manufacturer includes a legal setting or profile that allows timing advance to execute while outputting the Blinky flash pattern.

## 2. Barriers to Firmware Modification & Hacking

- **Encrypted Firmware Payloads:** Commercial RC ESCs use proprietary encrypted binary containers (e.g., Sanwa `.PRO`, Hobbywing `.bin`, LRP proprietary updates) that cannot be altered with simple hex editing.
- **Bootloader Integrity Checks:** Onboard bootloaders verify digital checksums and model identification headers before writing to flash memory. Tampered binaries result in checksum failure ( `Write Error` ) or permanently brick the microcontroller.
- **Read-Out Protection (ROP):** Factory microcontrollers (STMicroelectronics, Silicon Labs, NXP, ARM Cortex) have hardware read-out protection enabled, preventing extraction and modification of the base assembly code.

## 3. How Scrutineering Detects Timing Beyond the LED

Sanctioned technical inspections do not rely exclusively on the blinking light:

### 1. Free-Rev Motor Tachometer Checks:

- Spec-stock brushless motors (21.5T, 17.5T, 13.5T) have a physical maximum RPM dictated by their stator design, rotor strength, and battery voltage (8.40V).
- In genuine zero-timing mode, no-load free-rev RPM cannot exceed the physical threshold:
  - **21.5T Spec:** Legal Blinky range: **14,500 – 17,500 RPM** (Max tech ceiling: **18,000 RPM**). Illegal boost spike: **21,000 – 26,000+ RPM**.
  - **17.5T Stock:** Legal Blinky range: **18,000 – 21,500 RPM** (Max tech ceiling: **22,000 RPM**). Illegal boost spike: **25,000 – 32,000+ RPM**.
  - **13.5T Super Stock:** Legal Blinky range: **25,500 – 29,500 RPM** (Max tech ceiling: **30,500 RPM**). Illegal boost spike: **35,000 – 44,000+ RPM**.
- If electronic timing advance (Boost or Turbo) is active, no-load RPM spikes by **25% to 45%+**, which post-race tech immediately flags with an optical tachometer.

### 2. Handheld Scrutineering Program Box Audits:

- Scrutineers plug official inspection programmers directly into competitor ESCs in impound to read the firmware version string, register tables, and internal profile checksums.

### 3. Approved Homologation Whitelists:

- Sanctioning bodies maintain strictly updated lists of legal firmware versions. Operating with unlisted, modified, or beta firmware constitutes an immediate technical disqualification.