



SafeTurn (Standard) Portable Turn Coordinator

Technical Specifications / Operation

Last updated October 30, 2025

The RADIANT SafeTurn is designed to show simultaneous turn (yaw) and bank (roll) information. Yaw information is derived from a solid state gyroscope. Roll information is derived from a solid state accelerometer.

All of this information is presented digitally and graphically on a single vivid LCD screen, inside a portable case.

1. Introduction

SafeTurn is a portable, battery-powered turn coordinator / inclinometer that uses the same foundational hardware and firmware used in our panel Turn Coordinator instruments—gyro/accel processing, selectable Gyro Filter, calibration flow, and temperature compensation—adapted to a handheld, self-powered format. SafeTurn is not TSO'd or NORSEE-approved and must be treated as an advisory aid only; do not use as a primary flight instrument.

2. What's in the Box

- SafeTurn instrument
- USB charging cable (type may vary by production batch)

Optional accessory: Panel Mount Holster (sold separately) for 3-1/8" instrument holes or flat-surface mounting.

3. Controls & Indicators

Front display

- Turn indicator (left/right) with smooth, readable motion
- Slip/Skid "Ball" (lateral acceleration)
- Digital yaw rate (°/s) continues beyond the graphic range

- Battery Gauge (top-left): four stacked segments (Green/Green/Yellow/Red) with a small “button” cap at the top

Buttons (identical to RTCC)

- Left (short press): DIM (Bright ↔ Dim)
- Right (long press ≥7 s): CAL (store offsets and reboot)
- Both (short press, simultaneous): Gyro Filter level 0→1→2→3→0

Automatic functions

- Temperature compensation: firmware maintains yaw/ball stability over typical cockpit temperature changes

4. Power & Battery

- Internal single-cell Li-ion (nominal 3.7 V)
- Typical runtime: ~5 hours (Bright), ~20 hours (Dim). Actual runtime varies with temperature and usage.
- Charging: connect to USB power. A full charge is recommended prior to first use.

4.1 Battery Gauge Behavior

Four vertical segments (top to bottom): Green / Green / Yellow / Red

- Top Green: near-full state of charge (nominal ≥ ~3.90 V)
- Second Green: healthy mid-range (nominal ~3.72–3.89 V)
- Yellow: reduced capacity (nominal ~3.55–3.71 V)
- Red (solid): low battery (nominal ~3.40–3.54 V).
- Red (blinking): critical battery (nominal < ~3.40 V).

Notes: Thresholds are nominal and may vary slightly with load and temperature. The gauge self-heals if any part of the screen is repainted by other functions.

5. Mounting Options Mounting Options

- Portable use: place on a stable, visible surface in your cockpit. The display is sunlight-readable; use Dim for night/low light.
- Panel Mount Holster (optional accessory): a rigid enclosure that screws into a standard 3-1/8" instrument hole (no electrical connection). It provides a convenient

parking spot in your own aircraft. The holster can also be mounted to flat surfaces using corner holes or adhesive tape.

CAUTION: Ensure the instrument and any mount do not interfere with flight controls or required instrumentation.

6. Operation

1. Power On: SafeTurn starts in the last used brightness setting.
2. Brightness: Left short press toggles Bright/Dim.
3. Calibration (CAL): Right long press (≥ 7 s) stores offsets and reboots. Perform on a level reference or in straight-and-level, unaccelerated flight.
4. In-Flight Use: Interpret the “ball” like a conventional inclinometer—centered ball indicates coordinated flight. Turn indication responds smoothly to rate; the digital yaw ($^{\circ}/s$) continues beyond the graphic range.

6.1 Gyro Filter (levels 0–3)

Balance responsiveness vs. smoothness of the yaw indication.

- Select: Both buttons short-press to cycle 0 → 1 → 2 → 3 → 0
- Recommended use:
 - 0 — Aerobic / snappy: minimal smoothing; fastest response; most sensitive to bumps
 - 1 — Balanced (default): everyday GA handling
 - 2 — Smooth: stronger damping for turbulence or training; slight lag
 - 3 — Molasses: maximum smoothing; very stable display; deliberate response
- The chosen level is retained across power cycles.

7. Calibration

Perform calibration on a level reference (bench) or in straight-and-level, unaccelerated flight.

1. Establish stable, level conditions.
2. Press and hold Right (≥ 7 s) to CAL.

- 3. The unit will store offsets and reboot; normal operation resumes automatically.

When to calibrate

- After first use or significant maintenance
- If the bubble does not center while wings-level
- If a turn is indicated while straight

If calibration is attempted during turns/acceleration, results may be inaccurate. Repeat under proper conditions.

8. Care & Safety

- Do not expose to liquids, fuels, or solvents.
- Avoid extreme temperatures; very low temperatures reduce battery runtime.
- Charge only with appropriate USB power sources.
- This product contains a Li-ion battery. Do not puncture, crush, or short the battery. If the case is damaged, discontinue use.

9. Troubleshooting

Symptom	Likely Cause	Remedy
Battery gauge momentarily disappears after a screen repaint	Normal repaint behavior	Gauge restores automatically within ~1 s; no action needed
Brief flash to Bright when in critical red	Expected behavior on user press	Unit returns to Dim to preserve power
Yaw readout jittery in turbulence	Gyro Filter level too low for conditions	Short-press both buttons to increase filter level (0→1→2→3)
Yaw feels sluggish / delayed	Gyro Filter level too high	Short-press both buttons to reduce filter level (3→2→1→0)
“Ball” feels off-center	Sensor bias / mounting angle	Perform CAL (Right ≥7 s) on a level reference

10. Specifications (typical)

- Power: 1-cell Li-ion (nominal 3.7 V)

- Runtime (typical): ~5 h Bright (~105–110 mA), ~20 h Dim (~25 mA)
- Indicators: 4-segment battery (two greens, yellow, red) with critical blink
- Controls: Left DIM (short); Right CAL (≥ 7 s); Both short = Gyro Filter 0–3 (retained)
- Processing: RTCC-derived firmware with temperature compensation
- Displayed turn rate ranges: Graphical airplane up to ± 5.0 °/s; Digital yaw $> \pm 10.0$ °/s
- Dimensions / weight: 2.5 x 2.5"; 1.8 oz (64 x 64mm; 50 grams)
- Operating temperature: [0 to 45C]
- Warranty: [3 year]

Regulatory: Advisory use only. Not TSO'd/NORSEE-approved. Do not rely on SafeTurn as a primary flight instrument.

11. Accessory: Panel Mount Holster (Optional)

A dedicated holster that fits a 3-1/8" panel cutout or flat-surface mount. No electrical connection; simply provides a secure place to park the instrument in your aircraft. Sold separately. Order [here](#).

12. Disclaimers

Products from Radiant Technology are not designed to be used in applications where their failure would endanger safe flight or human life in any way. They are intended solely for use in VFR conditions. They are not certified to meet any Technical Standard Order and are not produced under a Parts Manufacturing Authority (TSO / PMA). As a result, if permanently installed in the aircraft, they are suitable only for use in experimental and ultralight aircraft, and in Light Sport Aircraft, if meeting the requirements of the respective manufacturer. Specifically not for use as a primary display instrument in certified aircraft.

13. Warranty

Your new Radiant Technology instrument carries a three-year warranty, from the invoice date. Please contact us at support@radiantinstruments.com should your product need warranty service. There is an additional charge for international warranty service.

14. Return / Refund Information

Must be returned in new, uninstalled, resalable condition within 14 days after receipt. Ship to Radiant Technology, PO Box 20690, Wichita KS 67208.