RADIANT TECHNOLOGY

# G Meter™ Portable G / Tilt / Altitude Advisory Instrument

**Technical Specifications / Operation**

Last updated 5/28/2026 (firmware rev. GMA117)

The RADIANT G Meter is designed to show vertical G load, peak G history, roll and pitch information, altitude change, ambient temperature, and inclinometer information on a single vivid LCD screen. The instrument uses a solid-state accelerometer for G, roll, pitch, and ball information, and an internal barometric pressure sensor for altitude and temperature. The instrument measures approximately 2.44 × 2.24 × 0.48 inches and weighs approximately 46 grams.

It is intended as an advisory aid for VFR experimental, ultralight, and Light Sport Aircraft use, and as a portable motion / tilt awareness tool for automotive, off-road, backcountry, trail, shop, and test applications where appropriate.

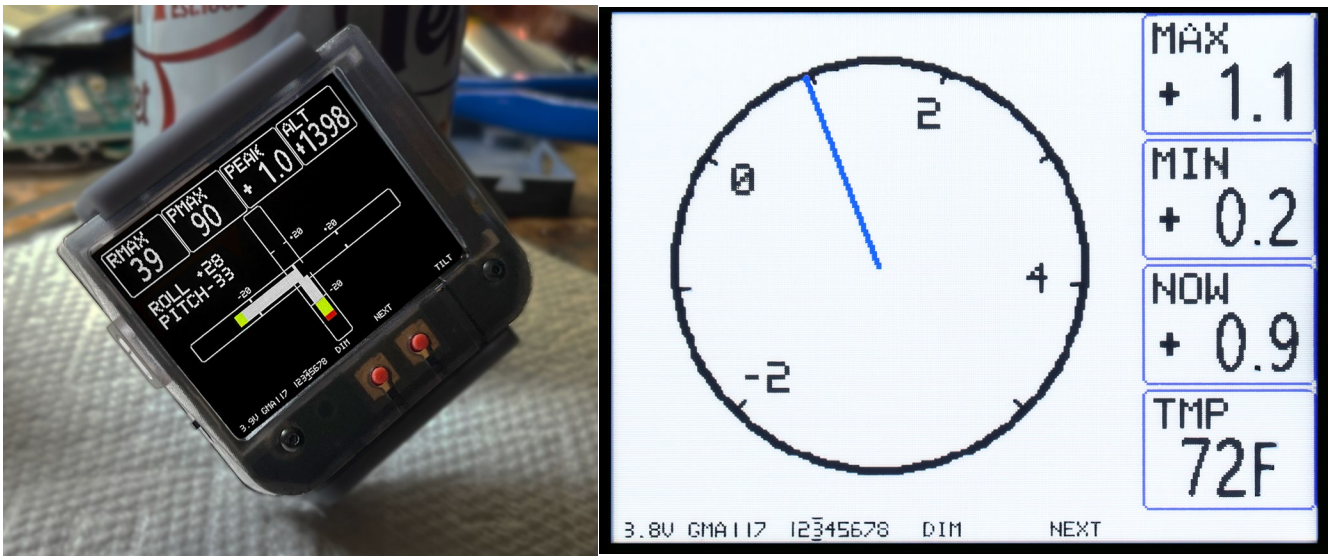


**Figure 1: Automotive Roll and Pitch with black background (Selectable screen); G-Meter Basic Dial in "Paper" mode (Selectable screen)**

## 1. Introduction

G Meter combines a traditional aviation-style G meter with compact glass-style views for ride harshness, vehicle/aircraft attitude cues, altitude trend, and ball-in-bowl inclinometer display. It has eight (8) unique screen views. There is no setup wizard in this build; the user cycles through the available views and uses the button shortcuts described below.

G Meter is not TSO'd, PMA'd, or NORSEE-approved and must not be used as a primary flight instrument. It is an advisory instrument only.

## 2. Intended Use and Limitations

- Aviation use: advisory information only. Do not use as a primary flight instrument, required aircraft instrument, or substitute for approved instrumentation.
- Automotive / off-road use: advisory information only. Do not use the display as a substitute for safe driving, spotters, terrain assessment, or vehicle manufacturer limits.

- The G, roll, pitch, ball, temperature, and altitude indications are sensor-derived and may be affected by mounting angle, vibration, shock, pressure changes, temperature, and sensor tolerances.
- The red, yellow, and caution indications are display cues only. They do not represent the certified structural limits of any aircraft, vehicle, or mount.
- Do not interact with the instrument in a way that distracts the pilot or driver.

### 3. What's in the Box

- G Meter instrument.
- Micro-USB charging cable. This cable is provided for charging only; G Meter does not support data transfer.
- Convertible clip holster. Mounting screws and other mounting hardware are not included.

### 4. Quick Start

1. Charge the unit before first use with the included Micro-USB charging cable and a suitable USB power source. The cable is for charging only; it does not enable data transfer.
2. Install the included holster securely on a flat horizontal surface, such as the top of a car dashboard, or on a vertical instrument panel. Slide the instrument into the holster from the left side until it stops against the right side.
3. Press Right short to step through the eight views. The highlighted digit in the 12345678 strip shows the current view position. (Tiny digits at the bottom of the screen.)
4. Press Left short to toggle BRIGHT / DIM. Hold Left for about three seconds to toggle Paper / inverse screen mode.
5. Press Both short at the desired reference altitude to set the ALT zero for the current session.
6. In the Inclinometer view, hold Right for about two seconds only when the unit is stable and level, or in the intended coordinated reference condition, to store the lateral / roll zero.

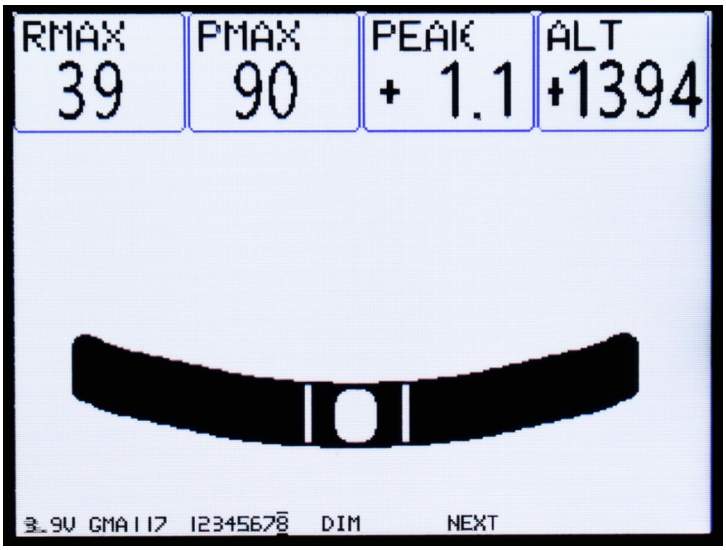


Figure 2: Inclinometer Screen in "Paper" mode

### 5. Controls & Display Layout

The display is divided into three working areas: the main view area, the four value cells, and the bottom strip.

- Main view area: shows the active view, such as a strip chart, dial, tilt cross, altitude graph, or inclinometer bowl.

- Four value cells: show either MAX/MIN/NOW/TMP or RMAX/PMAX/PEAK/ALT, depending on the active view. In the Dial view the cells are stacked at the right; in other views the cells appear across the top.
- Bottom strip: shows battery voltage, firmware revision, the eight-position view index, button labels, and the active view caption when applicable.

| Bottom strip item | Meaning |
|---|---|
| Battery voltage, e.g. 3.7V | Live battery estimate. Text turns red below the low-battery threshold. |
| GMA117 | Firmware revision label painted in the bottom strip. |
| 12345678 | View index. The highlighted digit shows the current position in the eight-view cycle. |
| DIM | Left short press toggles bright/dim. |
| NEXT | Right short press advances to the next view. |
| Caption area | Shows labels such as 8G-METER, HARSH, TILT, +-250 FT, +-1000FT, or +-2000FT when the active view uses a caption. The Dial and Inclinometer views do not use a caption. |

### 6. Button Operation

G Meter uses two front buttons. Short presses fire when released. Long presses fire automatically after approximately two seconds while the button is still held.

| Gesture | Action |
|---|---|
| Right short | NEXT — advances to the next view in the eight-view cycle. |
| Right long (~2 s) | Context action: resets MAX/MIN, resets RMAX/PMAX/PEAK, or calibrates the inclinometer / lateral zero, depending on the active view. |
| Left short | Toggles BRIGHT / DIM. |
| Left long (~2 s) | Toggles normal / Paper-inverse screen. |
| Both short | Sets the current barometric altitude as the ALT zero reference. |
| Both long | Unassigned in this firmware revision. |

### 6.1 Button Timing

- 0 to about 0.5 seconds: short press, fires on release.
- About 0.5 to 2.0 seconds: ignored on release. This prevents accidental short actions from slow button presses.
- About 2.0 seconds or longer: long press, fires once at the two-second threshold while the button remains held.

### 7. View Cycle

Press Right short to cycle through the eight views. The bottom-strip view index shows 1 through 8; the highlighted digit identifies the current view.

| Index | View caption/name | Primary purpose | Value cells |
|---|---|---|---|
| 1 | 8G-METER | Wide vertical-G strip chart, ±8 G scale. | MAX / MIN / NOW / TMP |
| 2 | HARSH | High-resolution ride-harshness chart, ±2 G about a +1 G cruising baseline. | RMAX / PMAX / PEAK / TMP |
| 3 | Dial | Round G-meter dial from -2 G to +5 G with persistent needle-tip trail. | MAX / MIN / NOW / TMP |
| 4 | TILT | Roll/pitch cross display with caution and danger zones. | RMAX / PMAX / PEAK / ALT |
| 5 | +-250 FT | Altitude graph, centered on entry altitude, ±250 ft scale. | RMAX / PMAX / PEAK / ALT |
| 6 | +-1000FT | Altitude graph, centered on entry altitude, ±1000 ft scale. | RMAX / PMAX / PEAK / ALT |
| 7 | +-2000FT | Altitude graph, centered on entry altitude, ±2000 ft scale. | RMAX / PMAX / PEAK / ALT |
| 8 | Inclinometer | Ball-in-bowl slip/skid display. | RMAX / PMAX / PEAK / ALT |

**8. Value Cell Meanings**

| Cell label | Meaning |
|---|---|
| MAX | Highest positive vertical G recorded since startup or last MAX/MIN reset. |
| MIN | Lowest negative vertical G recorded since startup or last MAX/MIN reset. |
| NOW | Current vertical G. |
| TMP | Ambient temperature. U.S. SKU displays °F; international SKU may be built for °C. Temperature is measured inside the instrument and may lag fast ambient changes. |
| RMAX | Peak absolute roll angle, in degrees, since startup or last PEAK reset. |
| PMAX | Peak absolute pitch angle, in degrees, since startup or last PEAK reset. |
| PEAK | Peak absolute G load since startup or last PEAK reset. |
| ALT | Altitude difference from the user-set ALT zero reference, in feet. |

## 9. Operating the Main Views

### 9.1 8G-METER Strip Chart

The 8G-METER view is the traditional wide-range G display. It plots vertical G across a ±8 G range and keeps MAX, MIN, and NOW visible in the value cells. This view is useful for sustained-G and maneuver-history awareness.

- The chart updates continuously as the unit runs. The trace is drawn as a thick min/max ribbon so bumps and spread are easier to see than with a single-pixel line.
- The trace color follows the active screen theme; warning values are red.
- MAX and NOW turn red at approximately +4.0 G. MIN turns red at approximately -2.0 G.
- Right long resets MAX and MIN to the current G value.
- The red thresholds are display thresholds only and are not aircraft or vehicle structural-limit indicators.

### 9.2 HARSH View

The HARSH view uses a higher-resolution vertical-G chart intended to make small bumps, jolts, and ride harshness more visible. The scale is ±2 G around a +1 G cruising baseline, so ordinary motion is easier to see than on the wide ±8 G view.

- RMAX and PMAX show peak roll and pitch angle in degrees.
- PEAK shows the largest absolute G load measured since startup or reset.
- TMP remains visible in this view.
- Right long clears RMAX, PMAX, and PEAK to zero.

### 9.3 Dial View

The dial view presents vertical G on a circular scale from -2 G to +5 G. The needle color changes when the current G exceeds the red thresholds. The dial also keeps a small persistent trail at the needle tip, showing where the G value has been during the current dial-view session.

- A tight cluster near +1 G indicates smooth operation.
- A lone dot or fan of tip marks indicates a bump, jolt, or maneuver history.
- Switching away from the dial and returning starts a fresh needle-tip trail.
- Right long resets MAX and MIN, but does not separately clear the visible needle-tip trail while remaining on the dial view.

### 9.4 TILT View

The TILT view shows roll and pitch as a cross display. It is intended for quick attitude / tilt awareness. Roll and pitch are limited to the displayed ±45° range.

- Roll caution begins at approximately 25°; roll danger begins at approximately 35°.
- Pitch caution begins at approximately 20°; pitch danger begins at approximately 30°.
- RMAX and PMAX record the largest absolute roll and pitch angles seen since startup or reset.
- Right long clears RMAX, PMAX, and PEAK to zero.
- The caution and danger zones are advisory display cues only and are not vehicle rollover limits.


Figure 3: Pitch and Roll in hand

### 9.5 Altitude Graph Views

The three altitude graph views show barometric altitude change over time. Each graph centers itself on the current altitude when that view is entered, then plots a thick trace blob about every 12 seconds. Choose the scale that matches the size of altitude changes you want to see.

| View | Displayed range | Best for |
|---|---|---|
| +-250 FT | 250 ft above and below the entry altitude | Small hills, local climb/descent detail, fine trend awareness. |
| +-1000FT | 1000 ft above and below the entry altitude | General terrain and pattern-size altitude trends. |
| +-2000FT | 2000 ft above and below the entry altitude | Larger altitude changes and longer climbs/descents. |

- The graph center is captured when the view is entered. To re-center the graph, cycle away and back to that altitude view.
- The ALT cell is separate from the graph center. ALT uses the user-set zero reference described in Section 10.
- Right long clears RMAX, PMAX, and PEAK to zero in these views.

### 9.6 Inclinometer View

The inclinometer view is a ball-in-bowl display derived from the accelerometer. It is not a turn coordinator and does not show yaw rate. It is a slip/skid or lateral-balance advisory display only.

- Use this view for ball-centered reference information, not for primary attitude or turn guidance.
- Right long calibrates the ball / lateral zero. Perform this only when the unit is stable and level, or in straight, coordinated, unaccelerated flight if that is the intended reference.
- The stored lateral zero is also used as the roll reference for the roll-related tracker values. Recalibrate after moving the unit to a new mounting orientation.

## 10. ALT Zero and Altitude Use

ALT is barometric and advisory. It is not terrain-aware, GPS-derived, or certified altitude information. Weather pressure changes, cabin pressure changes, airflow, temperature, and vehicle motion can affect the reading.

1. Place the unit at the altitude you want to treat as zero, or establish the desired in-flight reference.
2. Press Both short.
3. In views that show the ALT cell, the ALT value will update relative to that captured reference.

- Both short is available from any view. If the current view does not show ALT, the new zero will still be used when you enter an ALT-cell view.
- For practical use, set ALT zero at the beginning of each session.
- The ALT zero is a session reference. Do not use it as a certified altimeter setting.

## 11. Reset and Calibration

### 11.1 Resetting MAX / MIN

In the 8G-METER and Dial views, Right long resets MAX and MIN to the current G value. The cell values change on the next display update; no separate banner is shown in GMA117.

### 11.2 Resetting RMAX / PMAX / PEAK

In the HARSH, TILT, and altitude graph views, Right long clears RMAX, PMAX, and PEAK to zero. The cell values change on the next display update. In the Inclinometer view, Right long calibrates the lateral / ball zero instead of clearing the peak values.

### 11.3 Inclinometer / Lateral Zero Calibration

In the Inclinometer view only, Right long stores the current lateral reference as the ball / roll zero. Calibrate only when the instrument is stable and the desired reference condition is known.

1. Enter the Inclinometer view (view index 8).
2. Place the unit on a level, stable reference, or establish straight/coordinated/unaccelerated flight if using an in-flight reference.
3. Hold Right for approximately two seconds.
4. Release after the long action has fired. The ball will use the new zero reference.

## 12. Power & Battery

- Internal single-cell Li-ion battery, nominal 3.7 V.
- Micro-USB charging port; charge with a suitable USB power source.
- The included Micro-USB cable is for charging only. It is not a data cable, and data transfer is not possible.
- The bottom strip displays battery voltage directly, such as 4.1V or 3.7V.
- Below approximately 3.5 V, the voltage text turns red and the instrument forces the backlight into a low-power dim state.
- When voltage recovers to approximately 3.6 V or higher, the forced low-battery dim is released.
- Low temperature, screen brightness, battery age, and charging source will affect runtime.
- Do not charge or route the cable where it can interfere with flight controls, vehicle controls, occupants, or egress.

## 13. Brightness and Paper / Inverse Screen

Left short toggles between BRIGHT and DIM. Low-battery auto-dim overrides the user brightness setting until battery voltage recovers.

Left long toggles normal and Paper / inverse display. In inverse mode, the foreground and background colors swap and the moving trace changes color for contrast. This mode may improve readability in bright light or when a paper-like display appearance is preferred.

## 14. Mounting and Use

- Place the instrument where it is visible and secure.
- For roll, pitch, and ball indications, mount the instrument rigidly and align it with the vehicle or aircraft axes as consistently as practical.
- The included convertible clip holster may be mounted in either of two orientations: on a flat horizontal surface, such as the top of a car dashboard, or on a vertical instrument panel.
- For flat horizontal mounting, remove the lower support section of the vertical base as required so the holster sits correctly on the mounting surface.
- Use thin-head screws and verify that screw heads do not protrude into the slide path or prevent the instrument from seating fully.
- The holster provides a two-hole mounting pattern on 1.3 inch centers. Use #4-40 screws with thin heads. Screws are not included.
- Where a four-hole installation is used, the hole pattern is 1.3 inches × 1.3 inches. Use the same #4-40 thin-head screw arrangement. Screws are not included.
- The instrument slides into the holster from the left-hand side and stops against the right-hand side.
- The power connector and power switch are on the left-hand side, so they remain accessible when the instrument is seated in the holster.
- Make sure the instrument is fully seated and retained before operation.
- After changing mounts or mounting orientation, set ALT zero again and recalibrate the Inclinometer / lateral zero if roll or ball indications are used.
- Do not allow the instrument, cable, or mount to interfere with flight controls, vehicle controls, required instruments, or pilot/driver movement.
- For aviation use, verify that any installation is appropriate for the aircraft category and does not replace required certified instrumentation.
- For portable use, secure the unit before operation. Do not leave it loose in a cockpit or vehicle.

## 15. Care & Safety

- Do not expose the instrument to fuel, oil, water, solvents, or cleaning chemicals. Water ingress is not allowed; the product has no IP rating.
- Operate only from -10 °C to +60 °C (14 °F to 140 °F). Store only from -20 °C to +70 °C (-4 °F to 158 °F). Very low temperatures reduce battery runtime; high temperatures can damage the battery and display.
- Do not leave the unit in a hot closed vehicle or cockpit where battery/display temperatures may exceed safe limits.
- Charge only from appropriate USB power sources.
- This product contains a Li-ion battery. Do not puncture, crush, short, or incinerate the unit. If the case is damaged, discontinue use.
- Clean only with a soft, dry cloth unless Radiant provides different production-specific cleaning instructions.

## 16. Troubleshooting

| Symptom | What to check |
|---|---|
| Display too bright at night | Press Left short to toggle DIM. If battery is very low, the unit may force DIM automatically. |
| Display colors are reversed or paper-like | Press Left long to toggle Paper / inverse screen. |
| Wrong view shown | Press Right short to cycle views. Use the highlighted digit in the 12345678 strip to identify position. |
| MAX/MIN or PEAK values will not clear | Use Right long in the appropriate view. Hold until the two-second action fires. In the Inclinometer view, Right long calibrates lateral zero instead of clearing peaks. |
| Short press does nothing | The press may have been held longer than the short-press window. Keep short presses brief, under about 0.5 s. |
| ALT does not read zero | Press Both short at the desired zero reference. Remember that ALT is barometric and advisory. |
| Altitude graph is not centered | Cycle away from that altitude graph and back. The graph captures its center altitude when the view is entered. |
| Ball is off-center | Enter the Inclinometer view and perform Right-long calibration under stable, level conditions. |
| Roll or ball indication changed after remounting | Recalibrate the Inclinometer / lateral zero after securing the unit in the new mounting orientation. |
| Temperature seems slow to change | The sensor is inside the instrument and may lag rapid ambient temperature changes. Allow time for the unit to stabilize. |
| Battery voltage is red or display forced dim | Recharge the unit. Forced dim begins below about 3.5 V and releases around 3.6 V. |
| Computer does not recognize the unit as a device | The Micro-USB connection is charging-only. The included cable is not a data cable, and G Meter does not support data transfer. |
| Instrument will not slide fully into the holster | Insert the instrument from the left-hand side until it contacts the right-side stop. Check that #4-40 screw heads are thin and do not protrude into the slide path. |
| Instrument exposed to water | Stop use and disconnect charging power. Water ingress is not allowed and the product has no IP rating. Allow the unit to dry fully and contact Radiant if there is any sign of damage or malfunction. |

## 17. Specifications (typical)

| Item | Specification |
|---|---|
| Firmware revision covered | GMA117. |
| Physical size | Approximately 2.44 × 2.24 × 0.48 inches. |
| Weight | Approximately 46 grams. |
| Processor / firmware target | MSP430G2533/G2553-class 16 KB MSP430 firmware; manual based on GMA117 behavior. |
| Display | 320 × 240 color LCD. |
| Primary motion sensor | MC3416 solid-state accelerometer, configured for ±8 G range. |
| Barometric sensor | MPL3115A2 pressure/temperature sensor, altitude mode with 128× oversampling. |
| View cycle | Eight universal views: 8G-METER, HARSH, Dial, TILT, ±250 ft altitude, ±1000 ft altitude, ±2000 ft altitude, Inclinometer. |
| G display | Current, maximum, and minimum vertical G; displayed to tenths of a G. |
| G red thresholds | Approximately +4.0 G and -2.0 G. |
| Dial range | -2 G to +5 G. |
| Harshness chart | ±2 G about a +1 G baseline. |
| Roll/pitch display range | ±45° displayed range. |
| Tilt caution/danger thresholds | Roll: 25° caution / 35° danger. Pitch: 20° caution / 30° danger. |
| Altitude cell | Barometric altitude difference from user-set ALT zero, displayed in feet. |
| Altitude graph scales | ±250 ft, ±1000 ft, ±2000 ft around graph-entry altitude. |
| Altitude graph cadence | Approximately one trace step every 12 seconds. |
| Temperature | °F by default for U.S. SKU; °C may be provided on international SKU builds. |
| Battery | Internal single-cell Li-ion battery, nominal 3.7 V. |
| Battery display | Live voltage text; red below approximately 3.5 V; forced dim below approximately 3.5 V with recovery around 3.6 V. |
| Charging / data connection | Micro-USB charging only. Included cable is not a data cable; data transfer is not possible. |
| Included holster | Convertible clip holster included. Mounts on a flat horizontal surface or vertical instrument panel. Two-hole pattern: 1.3 inch centers. Four-hole pattern: 1.3 × 1.3 inches. Use #4-40 thin-head screws; screws are not included. Instrument slides in from the left and stops against the right, leaving the left-side power connector and switch accessible. |
| Operating temperature | -10 °C to +60 °C (14 °F to 140 °F). |

| Item | Specification |
|---|---|
| Storage temperature | -20 °C to +70 °C (-4 °F to 158 °F). |
| Water ingress | Water ingress not allowed. No IP rating. |
| Controls | Two front buttons: Left, Right, and Both combinations with short/long gestures. |
| Regulatory status | Advisory use only. Not TSO'd, PMA'd, or NORSEE-approved. |
| Compliance markings | None. |

### 18. 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 an 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.

For automotive, off-road, backcountry, trail, shop, and test use, the product provides advisory information only. It does not determine whether terrain, slope, vehicle load, vehicle setup, speed, or operator action is safe. Always operate within vehicle, aircraft, and regulatory limits.

### 19. Warranty

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

### 20. 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.