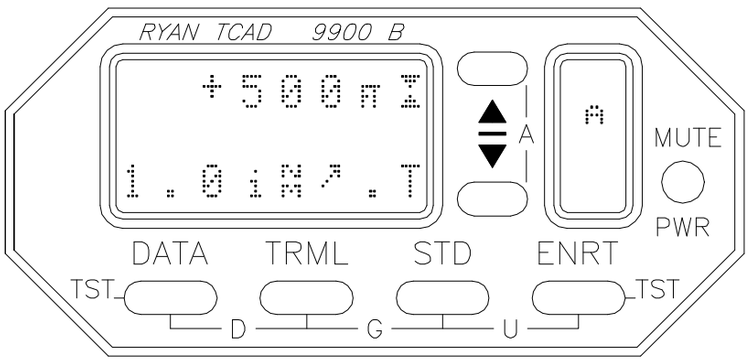
Ryan TCAD

Flying with TCAD

Examples of Operation
Adapted from the Pilot's Operating Handbook



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Thank you for your interest in *Ryan TCAD*

Electronic monitoring of airspace is a critical need in aviation. Aircraft have remarkable utility, with ability to operate in extreme environments, except when it comes to collision avoidance.

We cannot see all the aircraft around us, and ATC is limited in providing traffic alerts. An onboard sensor to detect nearby traffic is an important investment for you and your passengers.

The TCAD (Traffic and Collision Alert Device) monitors the airspace around your aircraft, providing you with audio and visual alerts, and an electronic view of nearby traffic, within a pilot defined volume of airspace. TCAD uses an alphanumeric display to show the traffic in a digital profile view. Traffic information is always in the same location, without abbreviation, in bright LED characters.

All TCAD models use top and bottom antennas to provide coverage uninterrupted by the airframe.

TCAD provides traffic information to assist in seeing and avoiding traffic, and to help in coordinating with Air Traffic Control. Traffic information, the N-number and squawk allow you to understand and anticipate ATC instructions, and lets you see if somebody close is deviating from what you expect them to do.

TCAD provides more traffic information than any other collision alert equipment.

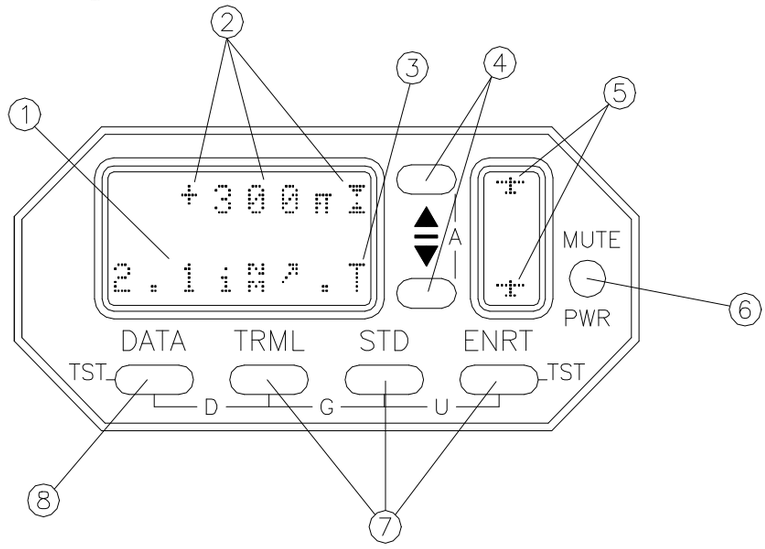
This booklet is designed to give you a basic understanding of the operation of the TCAD Model 9900B by taking you through a typical flight scenario. The Model 9900A displays identical information, but without bearing data. The Model 9900 supplies the essential information for traffic alert, and has fewer features than the 9900A or 9900B. Detailed information on the features of each TCAD model is found in the TCAD brochure.

TCAD is operating in nearly every type of business airplane and helicopter, from single engine to transport jets. Now, at an affordable price, you and your passengers can experience the safety and comfort of flying with the Ryan TCAD.

Operating the *Ryan TCAD*

TCAD uses an alphanumeric, digital profile view of the traffic, providing the most essential information (the altitude) on the first line in bright LED characters. Range and bearing to the traffic is displayed and quickly interpreted so you can get your eyes outside, where the traffic is.

The illustration below describes the TCAD display, and following the pages show examples of operation.



① Traffic shows 2.1 indicated Nautical Miles out, at 1:30.
② Traffic is 300 feet above, converging in altitude.
③ Mode indicator (Terminal Mode).
④ Buttons used to display second and third threat.
⑤ Second and third level threats. Flashing shows nearby and opposite in altitude
⑥ Mutes audible tones for a specified duration, and push/pull for on/off.
⑦ Used to select the mode.
⑧ Displays additional data about the displayed threat, including the MSL altitude, Mode A squawk, or N-number.

TCAD is designed to provide warning of traffic and minimize distraction from extraneous targets. TCAD automatically sequences from ground operation to enroute, and from enroute back to ground operation for minimum pilot interaction and maximum effectiveness. In addition, the pilot can select the volume of airspace that provides the optimum coverage for the particular circumstances.

Modes of Operation

The mode defines the monitored volume of airspace. Six modes are discussed in the Examples of Operation. Ground, Departure and Approach are automatic; and Terminal, Standard and Enroute are pilot-selectable:

- **Ground Mode:** An automatic Mode that allows view of traffic in the air while muting warning tones and blocking display of aircraft on the ground.

- **Departure Mode:** An automatic transition mode that restores warning tones and provides a dynamic traffic shield that expands as you climb.

- **Terminal Mode:** A pilot selectable mode used to monitor a smaller volume of airspace. Terminal will display nearby traffic, and prevents distraction from traffic farther away.

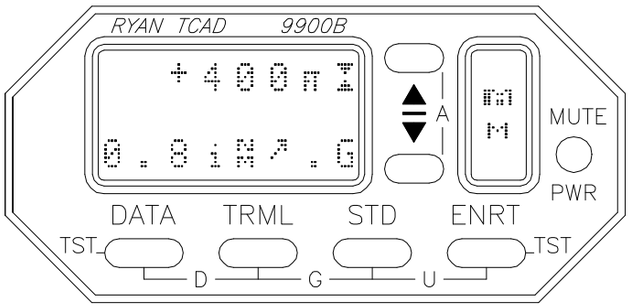
- **Standard Mode:** A larger volume of airspace used for high-traffic areas away from the pattern.

- **Enroute Mode:** Used for enroute operations.

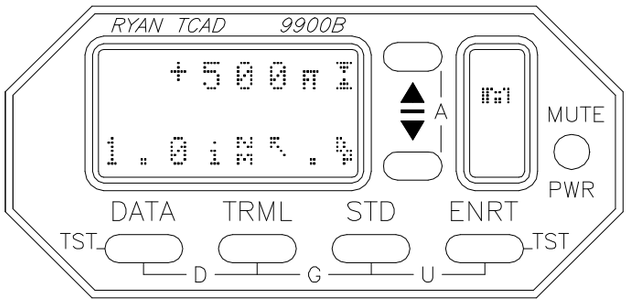
- **Unrestricted Mode:** Monitors traffic 10,000 feet above and below your aircraft. Though TCAD displays the traffic, the alert tones sound only when the traffic is detected within the Enroute shield.

- **Approach Mode:** Allows automatic transition from Enroute to the Ground Mode upon arrival at your destination.

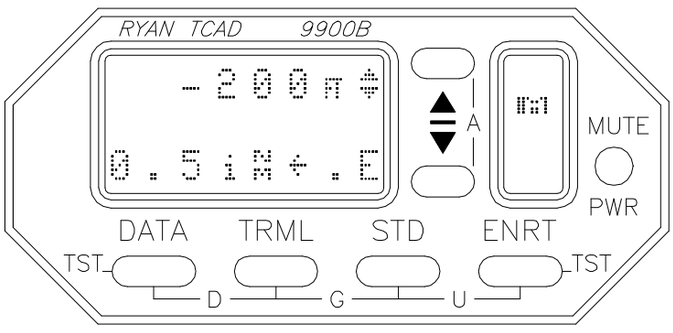
Examples of Operation



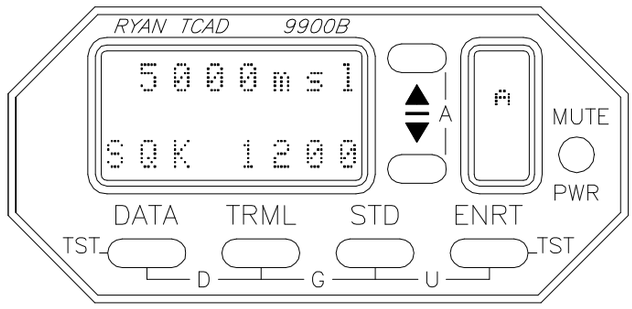
Upon startup, TCAD automatically enters the Ground Mode, and monitors for traffic. Warning tones are muted while on the ground. TCAD shows traffic 400 feet above, closing in altitude, 0.8 iNM away, at 1:30. Traffic is on a base to final, and lands before your departure.



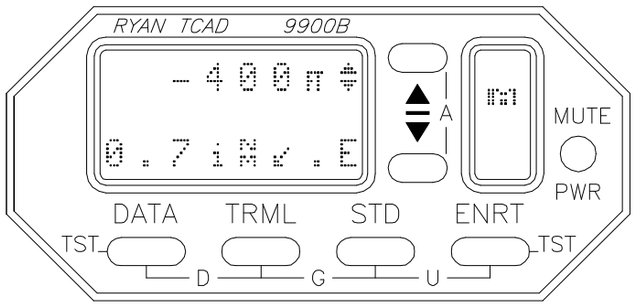
After takeoff, the mode symbol changes to "Dp", indicating automatic departure transition. If a high-rate climb were made, the Dynamic Shield would expand to monitor for traffic well above the set shield. Voice annunciation sounds with the word “Traffic”, and TCAD shows traffic 500 feet above the host aircraft, closing in altitude, 1.0 iNM, at 10:30. The traffic is visually acquired to the left front, descending.



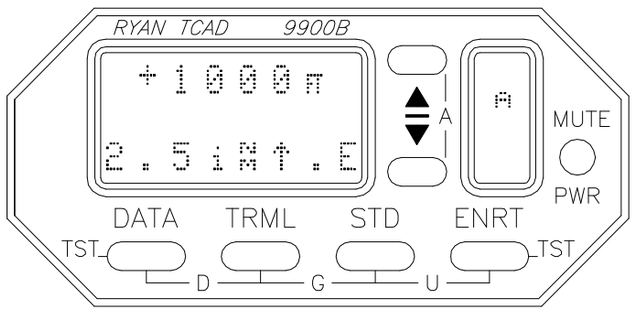
TCAD shows the traffic passing now, 200 feet below and 0.5 iNM, off the left wing.



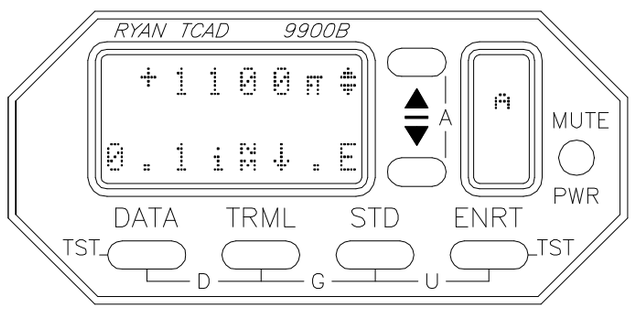
Pressing the DATA button reveals the traffic to be VFR at 5,000 feet MSL.



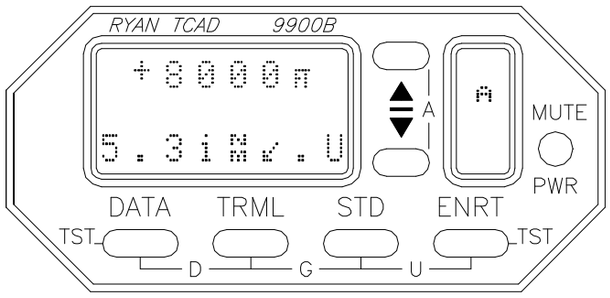
Traffic continues to descend, and passes to the left.



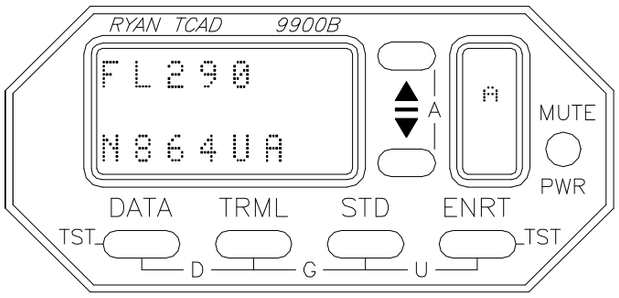
Traffic is acquired 1,000 feet above at 2.5 iNM, 12:00 o’clock.



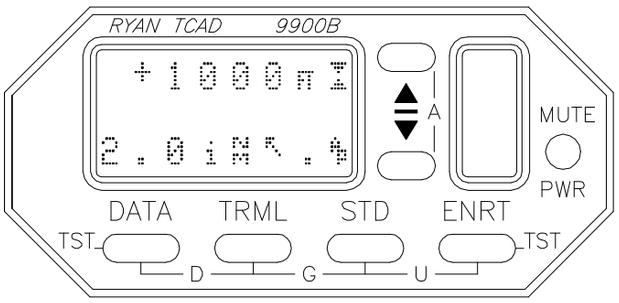
The traffic continues to close in range, and eventually flies overhead and passes behind.



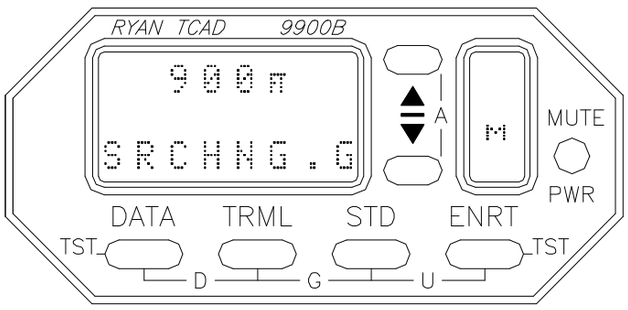
Leveling at FL 210, the Unrestricted Mode is selected, and traffic is displayed 8,000 feet above and 5.3 iNM, aft and to the left.



Pressing the DATA button, TCAD shows N864UA at FL290.



Descending now, TCAD automatically transitions to the Approach Mode. TCAD shows traffic 1,000 feet above, closing, 2.0 iNM at 10:30. The traffic is then visually acquired. A short time later, ATC reports the traffic.



The traffic eventually passes out of the shield. On short final, TCAD automatically transitions to the Ground Mode.

Thanks for reviewing the examples of operation.

Your favorite avionics shop can give you information about installation of TCAD in your aircraft. If you have additional questions, please give us a call.

Specifications

Display Dimensions:	3.26 in. (8.3 cm) wide; 1.55 in. (3.9 cm) high
Processor Dimensions	7.25 in. (18.4 cm) wide; 3.1 in. (7.9 cm) high; 9.325 in. (23.7 cm) deep; 11.675 (29.6 cm) deep with connectors
Weight:	7.88 pounds (3.4Kg)
Operating Voltage:	11 - 29 Volts DC
Current Requirements:	2.0A @ 14 VDC 1.25A @ 28 VDC

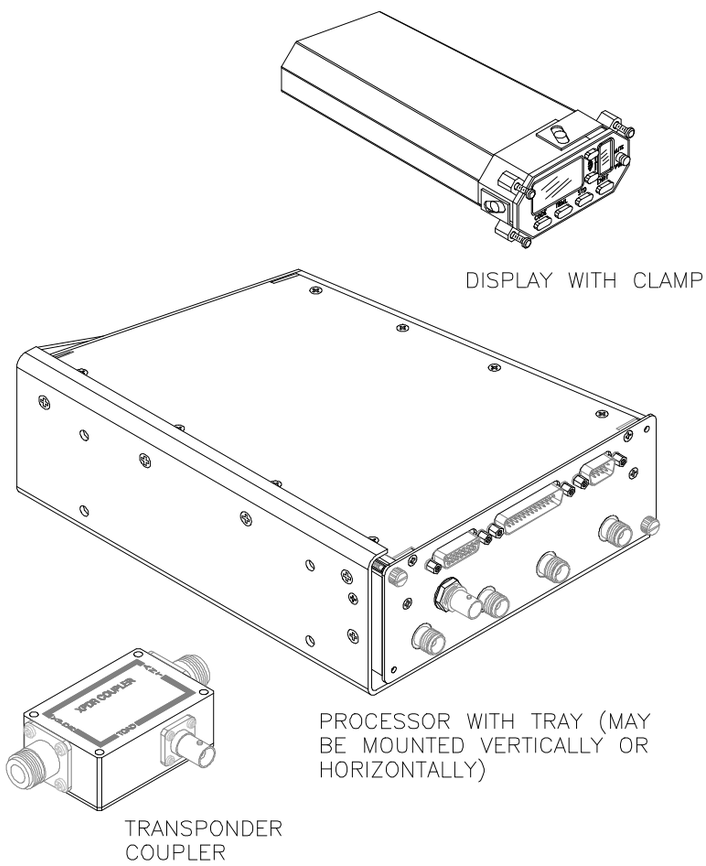
Airspace Volume Limits for each Mode

TRML:	200 FT to 1000 FT 0.5 to 1.5 iNM
STD:	500 FT to 1500 FT 1.0 to 3.0 iNM
ENRT:	1000 FT to 2000 FT 2.0 to 5.0 iNM (6.0 for Mode S traffic)
Unrestricted:	±10,000 FT and 6.0iNM

TCAD 9900 Series Components are illustrated on the following page.

COMPONENTS

The *Ryan TCAD* 9900 Series consists of three basic components, the Display, remote Processor and Transponder Coupler. An optional second Display is available for two-pilot operations, and two couplers are normally used when the aircraft has two transponders.



The Display contains 20 bright-character LED elements and all controls for operation of the TCAD.

The Processor contains dual high-performance microwave receivers, and an advanced high-speed computer. The Transponder Coupler is included to interface with the onboard transponder.

The TCAD antennas are aerodynamically designed blade antennas mounted on the top and bottom of the aircraft.

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