



**GARMIN**®

# GI 205 Pilot's Guide



306296

Rev 1

This document and the information contained herein is the propriety data of SANDIA aerospace Corporation. No part of this document may be transmitted, reproduced, or copied in any form or by any means without the prior written consent of SANDIA aerospace.

Due to SANDIA aerospace's continued product and quality improvement programs, information contained in this document is subject to change without prior notice.  
Copyright 2014 SANDIA aerospace Corporation, all right rights reserved.

Printed in USA.

**Record Of Revisions**

Revision	Date	Description	Approval
1	Nov 21, 2014	DRN 458	CLH



## Table of Contents

1. Section 1 – GI 205 Overview.....	1
1.1 Introduction.....	1
1.2 GI 205 Product Description.....	1
1.2.1 Functions.....	2
1.2.2 System Interfaces.....	2
2. Section 2 - Normal Operation.....	3
2.1 Initial Power On.....	3
2.2 Pilot Display and Controls.....	3
2.2.1 Push Test Button and Encoder.....	3
2.3 Radar Altitude.....	4
2.4 Decision Height.....	4
2.5 Decision Height Alerts.....	5
2.6 Trend Indicator.....	5
2.7 “ALT1”.....	6
2.8 “ALT2”.....	6
2.9 Pilot Configurable Options.....	6
2.9.1 MIN BRIGHTNESS.....	6
2.9.2 VOLUME.....	6
2.9.3 ALTITUDE UNIT.....	7
2.9.4 ALTITUDE TREND.....	7
3. Section 3 – Failure Conditions.....	8
3.1 Flash Check.....	8
3.2 RAM Check.....	8

## List of Illustrations

Illustration 1: GI 205 Overview.....	1
Illustration 2: Power On Screen.....	3
Illustration 3: Display Elements.....	3
Illustration 4: Radar Altitude Highlighted.....	4
Illustration 5: Decision Height Highlighted.....	5
Illustration 6: Minimum Brightness Adjustment.....	6
Illustration 7: Volume Adjustment.....	6
Illustration 8: Altitude Unit Selection.....	7
Illustration 9: Altitude Trend Selection.....	7

# Section 1 - GI 205 Overview

## 1.1 Introduction

This manual describes the operation of the Garmin GI 205 Radar Altimeter Indicator (manufactured by SANDIA Aerospace). The GI 205 is designed to operate exclusively with the Garmin GRA 55 or GRA 5500 radar altimeters.

## 1.2 GI 205 Product Description

The GI 205 can be installed as a stand-alone display of radar altitude or in parallel with an integrated avionics suite.

In a stand-alone installation, the pilot may input a Decision Height (DH) setting on the GI 205 display, and the GI 205 deduces the DH crossover point and generates appropriate visual and aural alerts. DH alerting in this scenario is independent of the GRA 55/5500.

The GI 205 can also be installed in parallel with an integrated avionics suite. In this scenario, the GI 205 provides a dedicated radar altitude display. The GI 205 can be configured to disable the redundant local Decision Height alerts, and it can optionally generate aural or visual alerts based on discrete outputs from the integrated avionics.



*Illustration 1: GI 205 Overview*

### 1.2.1 Functions

The GI 205 performs the following functions:

- Receive and process ARINC Label 164
- Visual and aural annunciations
- Decision Height alert discrete output
- Activate Self Test mode in GRA 55/5500
- Display Radar Altitude (Meters/Feet)
- Auto adjust the brightness of the display
- Volume control
- Enable/Disable Altitude Trend

Various parameters can be configured by the installer (not pilot accessible):

- Altitude Filter Time Constant
- Maximum Trend Scale
- Trend Filter Time Constant
- DH Display Name
- DH Visual Alert
- DH Aural Alert
- Default Decision Height
- ARINC 429 Speed
- Select Rounding Options

### 1.2.2 System Interfaces

The GI 205 interfaces with Garmin GRA 55 and GRA 5500 radar altimeters via ARINC 429 interface.

Inhibit DH Input: If this discrete input is connected to ground, the decision height functionality is masked from the display.

GRA Altitude Alert Discrete Input 1: If this discrete input is connected to the GRA 55 or GRA 5500, the GI 205 provides a visual and aural annunciation when the input is active.

GRA Altitude Alert Discrete Input 2: If this discrete input is connected to the GRA 55 or GRA 5500, the GI 205 provides a visual and aural annunciation when the input is active.

Aircraft power is the only electrical power interface.

# Section 2 - Normal Operation

## 2.1 Initial Power On

Upon initial power-on, the unit will display the company logo, software version and software checksum for about 10 seconds and then proceed to the normal display.



*Illustration 2: Power On Screen*

## 2.2 Pilot Display and Controls

The following shows the possible on-screen functions and pilot control during normal operation.



*Illustration 3: Display Elements*

### 2.2.1 Push Test Button and Encoder

Pushing the “PUSH TEST” button activates the optional manually initiated self test mode in the GRA 55 and GRA 5500 (if this functionality is connected between the GI 205 and the GRA). If the internal GRA self test passes, the GRA transmits a test altitude of 40 ft, which is displayed by the GI 205. If the self test fails, the text “FAIL” will be prominently displayed on the GI 205 display. This text cannot be removed from the GI 205 display unless power is cycled to the GRA.

If the manually initiated self test mode is currently inhibited by the GRA, the GI 205 will show “TEST INHIBITED” in place of “RADAR ALTITUDE” on the display, and the self test will not initiate. Refer to the GRA 55 or GRA 5500 Installation Manual for more information about the Self-Test and Self-Test Inhibit Functionality of the GRA.

A rotary encoder (turnable knob) is built in with the same “PUSH TEST” button. Rotating the encoder during normal operation sets the Decision Height in the range of 0 to 2500 feet or 0 to 760 meters.

## 2.3 Radar Altitude

Current radar altitude is displayed below the “RADAR ALTITUDE” title text. The GI 205 can be configured to display the radar altitude in either feet or in meters.

If the GI 205 receives an indication that the unit providing the Radar Altitude has failed, it will display “FAIL” in place of the Radar Altitude value.

If the GI 205 receives an indication that the unit providing the Radar Altitude is in self test mode, it will display “TEST” in place of Radar Altitude.

## 2.4 Decision Height

Decision height is displayed below the “DH” or “MIN” text (based upon the “DH DISPLAY NAME” configuration selection during installation). It is displayed either in feet or in meters, based upon the “ALTITUDE UNIT” configuration selection during installation.

Decision height is set by turning the encoder and changes by the factor shown in the table below:

Decision Height (in Feet)	Increment/ Decrement Factor	Decision Height (in Meters)	Increment/ Decrement Factor
0 to 200 Feet	10 Feet	0 to 60 Meters	3 Meters
200 to 500 Feet	50 Feet	60 to 150 Meters	15 Meters
500 to 2500 Feet	100 Feet	150 to 760 Meters	30 Meters

*Table 1: Decision Height Increment/Decrement Factor*

If the decision height alert is activated, and if the “DH VISUAL ALERT” field is configured to “ALT FIELD” during installation, the Radar Altitude value will blink for two seconds and then stay highlighted as long as the currently displayed radar altitude is below (or up to 50 ft above) the selected decision height.



*Illustration 4: Radar Altitude Highlighted*

If the decision height alert is activated, and if the “DH VISUAL ALERT” field is configured to “DH FIELD” during installation, the decision height text and the decision

height value will blink for two seconds and then stay highlighted as long as the currently displayed radar altitude is below (or up to 50 ft above) the selected decision height.



*Illustration 5: Decision Height Highlighted*

## 2.5 Decision Height Alerts

The decision height alerts are activated if the currently displayed radar altitude crosses below the set decision height. The alert is annunciated both visually and aurally. The options for the visual alert are described in the above section. The GI 205 also plays an aural alert heard as a “minimums, minimums” annunciation in a male or female voice or a 1 kHz tone for two seconds, depending upon the “DH AURAL ALERT” configuration selection during installation.

As stated in the above section, once the visual alert is active it remains active until the displayed radar altitude reaches 50 feet above the set decision height, with one exception. If the decision height is set to 0 feet (or meters), and if the displayed radar altitude also becomes 0 feet (or meters), the alert becomes inactive after 1 second.

## 2.6 Trend Indicator

An altitude trend indicator is optionally displayed on the right side of the radar altitude display. The trend indicator attempts to calculate the radar altitude trend (climb or descent and relative magnitude thereof) based upon incoming altitudes from the GRA. It consists of an up/down arrow and a maximum of five associated bars. Positive vertical trend (climb) is indicated by an up arrow and associated bars below it. Negative vertical trend (descent) is indicated by a down arrow and associated bars above it. The trend indicator maps the arrows and bars to six trend points based upon the “MAX TREND SCALE” value configured during installation (full deflection of the trend indicator). The trend indicator displays only the up or down arrow when vertical trend reaches 8% of the “MAX TREND SCALE” selection. It then adds a successive bar below/above the arrow when vertical trend reaches 20%, 40%, 60%, 80% and 100% of the configured “MAX TREND SCALE” value.

The altitude trend indicator can be hidden by disabling the “TREND INDICATOR” configuration option during installation. The trend indicator display is also temporarily disabled when the “PUSH TEST” button is depressed and the GRA enters the manually initiated self test mode.



## 2.7 “ALT1”

If connected, when the GRA Altitude Alert Input 1 becomes active, the GI 205 plays the configured aural alert for two seconds and blinks the “ALT1” text at the bottom row of the display for two seconds. The text then stays visible and highlighted as long as the input is active.

## 2.8 “ALT2”

If connected, when the GRA Altitude Alert Input 2 becomes active, the GI 205 plays the configured aural alert for two seconds and blinks the “ALT2” text at the bottom row of the display for two seconds. The text then stays visible and highlighted as long as the input is active.

## 2.9 Pilot Configurable Options

Pressing and holding the “PUSH TEST” Button for 5 seconds enters the pilot configuration mode. After entering the pilot configuration mode, pushing the “PUSH TEST” button will cycle through the following user configuration pages: “MIN BRIGHTNESS”, “VOLUME”, “ALTITUDE UNIT” and “ALTITUDE TREND”.

Once in the pilot configuration mode, the GI 205 will return to normal operation mode if no input is received through the button or the rotary encoder for 8 seconds.

### 2.9.1 MIN BRIGHTNESS



*Illustration 6: Minimum Brightness Adjustment*

The minimum brightness level of the display can be selected in this configuration page. Turning the rotary encoder changes the minimum brightness limit of the display. After the GI 205 returns to the normal mode of operation, the dynamic control of the display brightness is automatically controlled by the GI 205 photocell. The display becomes brighter as the surrounding light gets brighter, and the display becomes dimmer as the surrounding light gets dimmer (limited by the minimum brightness setting).

### 2.9.2 VOLUME

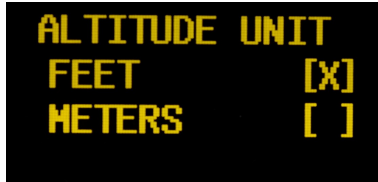


*Illustration 7: Volume Adjustment*

The aural alert volume can be set in this configuration page. Turning the rotary encoder changes the volume. For monitoring purposes, the GI 205 plays the aural alert while on this page to help adjust to the desired alert volume.

Setting the volume to the minimum setting will completely mute the aural alert.

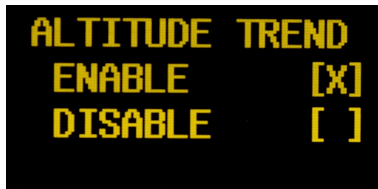
### 2.9.3 ALTITUDE UNIT



*Illustration 8: Altitude Unit Selection*

The unit of the altitude display can be selected to “FEET” or “METERS” by turning the rotary encoder in this configuration page. This configuration affects both the radar altitude field and the decision height field.

### 2.9.4 ALTITUDE TREND



*Illustration 9: Altitude Trend Selection*

The altitude trend indicator can be selected to “ENABLE” or “DISABLE” by turning the rotary encoder in this user configuration page. If “ALTITUDE TREND” is disabled, the trend indicator will not be displayed during normal operation. If “ALTITUDE TREND” is enabled, the trend indicator will be displayed per the description in Section 2.6.

## **Section 3 - Failure Conditions**

### **3.1 Flash Check**

The unit continuously checks for any errors in the internal Flash memory. If it encounters an error, the unit will display “EOC CRC FAILED” and will become inoperable. If this occurs, the GI 205 must be returned to the factory for service.

### **3.2 RAM Check**

The unit checks for any errors in the internal RAM (random access memory) during unit startup. If it encounters an error, the unit will display “RAM TEST FAILED” and will become inoperable. If this occurs, the GI 205 must be returned to the factory for service.