ALT-9000

Radio Altimeter Test Set

Getting Started Manual

ALT-9000

Radio Altimeter Test Set

Getting Started Manual

22149658 Rev 003

Part of CD: 22149666

VIAVI Solutions
1-844-GO-VIAVI
www.viavisolutions.com

Notifications

Notice

Every effort was made to ensure that the information in this manual was accurate at the time of release. However, information is subject to change without notice, and VIAVI reserves the right to provide an addendum to this manual with information not available at the time that this manual was created.

Copyright/Trademarks

Patent Information

Patented as described at: https://www.viavisolutions.com/en-us/corporate/legal/patents.

Copyright Release

Reproduction and distribution of this guide is authorized for US Government purposes only.

Terms and conditions

Specifications, terms, and conditions are subject to change without notice. The provision of hardware, services, and/or software are subject to VIAVI’s standard terms and conditions, available at: https://www.viavisolutions.com/en-us/corporate/legal/terms-conditions.

Warranty Information

Warranty information for this product is available on the VIAVI website at: https://www.viavisolutions.com/en-us/support/warranty-quality-compliance-policies.

Regulatory Compliance

Declaration of Conformity

VIAVI recommends keeping a copy of the Declaration of Conformity Certificate (shipped with the unit) with the test set at all times.

EMC Directive Compliance

This product was tested and conforms to the EMC Directive, 2014/30/EU for electromagnetic compatibility.

DFARS Statement

If software is for use in the performance of a U.S. Government prime contract or subcontract, software is delivered and licensed as “Commercial Computer Software” as defined in DFAR 252.227-7014 (Feb 2014), or as a “Commercial Item” as defined in FAR 2.101(a) or as “Restricted Computer Software” as defined in FAR 52.227-19 (Dec 2007) or any equivalent agency regulation or contract clause. Use, duplication or disclosure of Software is subject to VIAVI Solutions' standard commercial license terms, and non-DOD Departments and Agencies of the U.S. Government will receive no greater than Restricted Rights as defined in FAR 52.227-19(c)(1-2) (Dec 2007). U.S. Government users will receive no greater than Limited Rights as defined in FAR 52.227-14 (June 1987) or DFAR 252.227-7015 (b)(2) (November 1995), as applicable in any technical data.

Open Source Disclaimer - IMPORTANT READ CAREFULLY

The ALT-9000 includes third party software licensed under the terms of separate open source software licenses. By using this software you agree to comply with the terms and conditions of the applicable open source software licenses. Software originated by VIAVI is not subject to third party licenses. Terms of the VIAVI Software License different from applicable third party licenses are offered by VIAVI alone.

Federal Communications Commission (FCC) Notice

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment was tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

The authority to operate this equipment is conditioned by the requirements that no modifications be made to the equipment unless the changes or modifications are expressly approved by VIAVI.

Industry Canada Requirements

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions: 1) This device may not cause interference; and, 2) This device must accept any interference, including interference that may cause undesired operation of the device.
Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: 1) l'appareil ne doit pas produire de brouillage; et, 2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

EU WEEE and Battery Directives

This product, and the batteries used to power the product, should not be disposed of as unsorted municipal waste and should be collected separately and disposed of according to your national regulations.
VIAVI has established a take-back processes in compliance with the EU Waste Electrical and Electronic Equipment (WEEE) Directive, 2012/19/EU, and the EU Battery Directive, 2006/66/EC.
Instructions for returning waste equipment and batteries to VIAVI can be found in the WEEE section of VIAVI's Standards and Policies web page.
If you have questions concerning disposal of your equipment or batteries, contact the VIAVI WEEE Program Management team at WEEE.EMEA@VIAVISolutions.com.

EU REACH

Article 33 of EU REACH regulation (EC) No 1907/2006 requires article suppliers to provide information if a listed Substances of Very High Concern (SVHC) is present in an article above a certain threshold.
For information on the presence of REACH SVHCs in VIAVI products, see the Hazardous Substance Control section of VIAVI's Standards and Policies web page.

EU CE Marking Directives (LV, EMC, RoHS, RE)

This product conforms with all applicable CE marking directives. Please see EU Declaration of Conformity for details.
California Proposition 65
California Proposition 65, officially known as the Safe Drinking Water and Toxic Enforcement Act of 1986, was enacted in November 1986 with the aim of protecting individuals in the state of California and the state's drinking water and environment from excessive exposure to chemicals known to the state to cause cancer, birth defects or other reproductive harm.
For the VIAVI position statement on the use of Proposition 65 chemicals in VIAVI products, see the Hazardous Substance Control section of VIAVI's Standards and Policies web page.

Korea Certification

A급 기기 (업무용 방송통신기자재) Class A Equipment (Industrial Broadcasting & Communications Equipment).	이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다. This equipment is **Industrial (Class A) electromagnetic wave suitability equipment** and seller or user should take notice of it, and this equipment is to be used in the places except for home.

Ordering information

This manual is a product of the VIAVI Technical Publications Department, issued for use with the ALT-9000.

Go to: https://www.viavisolutions.com/en-us/resources/literature-library

- Type ALT-9000 to find information and manuals associated with the ALT-9000.

Contact Information

Contact the Technical Assistance Center (TAC) for technical support or with any questions regarding this or other VIAVI products.

- Phone: 1-844-GO-VIAVI
- Email: Techsupport.Avcomm@viavisolutions.com

For the latest TAC information, go to: https://www.viavisolutions.com/en-us/support/technical-product-support/technical-assistance

Software Notifications

DFARS Statement

If software is for use in the performance of a U.S. Government prime contract or subcontract, software is delivered and licensed as “Commercial Computer Software” as defined in DFAR 252.227-7014 (Feb 2014), or as a “Commercial Item” as defined in FAR 2.101(a) or as “Restricted Computer Software” as defined in FAR 52.227-19 (Dec 2007) or any equivalent agency regulation or contract clause. Use, duplication or disclosure of Software is subject to VIAVI Solutions' standard commercial license terms, and non-DOD Departments and Agencies of the U.S. Government will receive no greater than Restricted Rights as defined in FAR 52.227-19(c)(1-2) (Dec 2007). U.S. Government users will receive no greater than Limited Rights as defined in FAR 52.227-14 (June 1987) or DFAR 252.227-7015 (b)(2) (November 1995), as applicable in any technical data.

Open Source Disclaimer -
IMPORTANT READ CAREFULLY
The ALT-9000 Radio Altimeter Test Set includes third party software licensed under the terms of separate open source software licenses. By using this software you agree to comply with the terms and conditions of the applicable open source software licenses. Software originated by VIAVI is not subject to third party licenses. Terms of the VIAVI Software License different from applicable third party licenses are offered by VIAVI alone.

Precautions
SAFETY FIRST - TO ALL OPERATIONS PERSONNEL

General Conditions of Use

This product is designed and tested to comply with the requirements of IEC/EN61010-1 'Safety requirements for electrical equipment for measurement, control and laboratory use' for Class I portable equipment and is for use in a pollution degree 2 environment. The equipment is designed to operate from installation supply Category II.

Equipment should be protected from liquids such as spills, leaks, etc. and precipitation such as rain, snow, etc. When moving the equipment from a cold to hot environment, allow the temperature of the equipment to stabilize before the equipment is connected to the supply to avoid condensation forming. The equipment must only be operated within the environmental conditions specified in the performance data.
This product is not approved for use in hazardous atmospheres or medical applications. If the equipment is to be used in a safety-related application, such as avionics or military applications, the suitability of the product must be assessed and approved for use by a competent person.
Refer all servicing of unit to Qualified Technical Personnel. This unit contains no operator serviceable parts.

Case, Cover or Panel Removal

Opening the Case Assembly exposes the operator to electrical hazards that may result in electrical shock or equipment damage. Do not operate this Test Set with the Case Assembly open.

Safety Identification in Technical Manual

This manual uses the following terms to draw attention to possible safety hazards that may exist when operating or servicing this equipment:

WARNING:	Identifies conditions or activities that, if ignored, can result in personal injury or death.
Caution:	Identifies conditions or activities that, if ignored, can result in equipment or property damage, e.g. Fire.

Safety Symbols in Manuals and on Units

	**WARNING:** Indicates a Toxic hazard. Item should be handled by Qualified Service Personnel. Dispose of item in accordance with local regulations.
	**WARNING:** Indicates a Fire hazard.
	**Caution:** Indicates item is static sensitive.
	**Caution:** Refer to accompanying documents. This symbol refers to specific CAUTIONS represented on the unit and clarified in the text.
	**AC TERMINAL:** Terminal that may supply or be supplied with AC or alternating voltage.

Equipment Grounding Protection

Improper grounding of equipment can result in electrical shock.

Use of Probes

Refer to Performance Specifications for the maximum voltage, current and power ratings of any connector on the Test Set before connecting a probe from a terminal device. Be sure the terminal device performs within these specifications before using the probe for measurement, to prevent electrical shock or damage to the equipment.

Power Cords

Power cords must not be frayed or broken, nor expose bare wiring when operating this equipment.

Internal Battery

This unit contains a Lithium Ion Battery; and can be replaced by an operator. Refer to the Operation Manual for detailed Operator-Level procedures.

EMI (Electromagnetic Interference)

Caution:

Signal Generators can be a source of Electromagnetic Interference (EMI) to communication receivers. Some transmitted signals can cause disruption and interference to communication service out to a distance of several miles. User of this equipment should scrutinize any operation that results in radiation of a signal (directly or indirectly) and should take necessary precautions to avoid potential communication interference problems.

Toxic Hazards

WARNING: Lithium

A Lithium battery is used in this equipment.

- Lithium is a toxic substance so the battery should in no circumstances be crushed, incinerated or disposed of in normal waste.
- Do not short circuit or force discharge since this might cause the battery to vent, overheat or explode.

INPUT OVERLOAD LEVELS

Caution:

UUT:RX maximum reverse power 100 mW.

Caution:

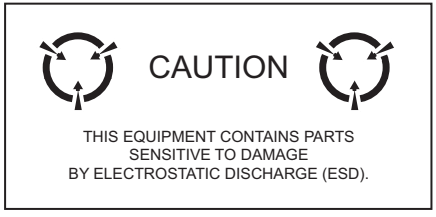
UUT:TX maximum power 300 W peak, 5 W average

Heavy Object

WARNING:

When the transit case is fully-loaded, the ALT-9000 Test Set Kit is a heavy object. Two-person lift required.

Static Sensitive Components



Caution:

This equipment contains components sensitive to damage by Electrostatic Discharge (ESD). All personnel performing maintenance or calibration procedures should have knowledge of accepted ESD practices and/or be ESD certified.

Table of Contents

Service Upon Receipt of Material

Unpacking

Customized foam packing material inside the transit case provides maximum protection for the Test Set.

Use the following steps to unpack the Test Set:

1. Cut sealing tape on top of the shipping container. Open shipping container.
2. Remove transit case from shipping container.
3. Place transit case on a flat, clean, and dry surface.
4. Locate the packing slip on the exterior of the shipping container. (used when “Checking Unpacked Equipment”).
5. Open the transit case (Figure 1).
6. Remove items from the transit case (Figure 2).

Warranty Information

Warranty information for this product is available on the VIAVI website at:

- https://www.viavisolutions.com/en-us/support/warranty-quality-compliance-policies.

Checking Unpacked Equipment

Identify and inspect equipment for possible damage incurred during shipment. If Test Set has been damaged, report the damage to VIAVI Customer Service.

Figure 1 Fully-Packed Transit Case

Figure 2 Unpacked Items[1]

1. Optional battery shown in photo. The instrument is shipped with a Battery Pack installed in the unit. The ‘tackle box’ and 12-inch cables are not shown in this photo.

The packing slip identifies the details of the purchased configuration and purchased options. Report all discrepancies to VIAVI.

Review packing slip to verify shipment is complete. Refer to Figure 2, Figure 4, and Table for help with item identification.

Verify the test set configuration and serialized components; see Figure 3.

Figure 3 Placard on Transit Case (serialized)

Test Kit Configurations

There are two configurations; ALT-9000 and ALT-9000B. Refer to Figure 4, and Table for configuration details.

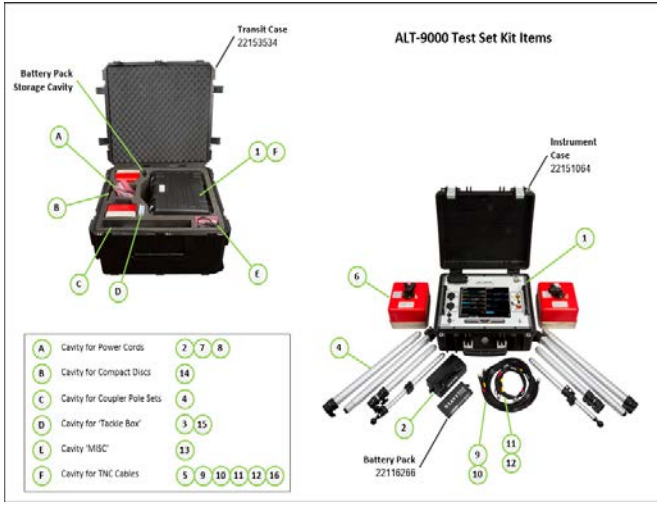


Figure 4 Kit Items

Kit Components

Table 1: Kit Components

#	Item	P/N	ALT-9000 (22145341)	ALT-9000B (22162529)
1	ALT-9000 Test Set	22151020	1	1
2	Power Supply	67374	1	1
3	Adapter, TNC-TNC	38353	2	2
4	Antenna Coupler Pole Set	139152	2	2
5	Cable, TNC M/TNC 1 ft	62401	1	1
6	Antenna Coupler	139139	2	2
7	Power Cord, US	62302	1	1
8	Power Cord, European	64020	1	1
9	Coax, TNC-TNC, yellow 4’	22153321	1	1
10	Coax, TNC-TNC, red 4’	22153326	1	1

Table 1: Kit Components (Continued)

#	Item	P/N	ALT-9000 (22145341)	ALT-9000B (22162529)
11	Coax, TNC-TNC, yellow 20’	22153329	1	1
12	Coax, TNC-TNC, red 20’	22153332	1	1
13	Getting Started (paper)	22149658	1	1
14	Operation Manual (CD)	22149666	1	1
15	Attenuator, fixed 20 dB	112036	2	2
16	Cable Assy; TNC RA; Keyed; 12 inch	111838		1
	Antenna Coupler Labels	111838	1	1
	Transit Case	22153534	1	1

Standard Accessories

Table 2: Standard Accessories

Item	Part Number	QTY
'Tackle Box' Case	FBPP-GC-6	1

Optional Accessories

Table 3: Optional Accessories

Item	Part Number	QTY
Battery Pack	22116266	1
Maintenance Manual (CD)	22145346	1

Specifications: P/N 22145341

Refer to the Operations Manual for a complete list of Specifications.

Dimensions; Transit Case

- Width: 33.7 inches (85.6 cm)
- Depth: 28.5 inches (72.4 cm)
- Height: 16.4 inches (41.6 cm)
- Weight (fully-packed): 88 lbs. (39.9 kg)

Dimensions; Test Set

- Width: 18.6 inches (47.4 cm)
- Depth: 16.3 inches (41.5 cm)
- Height: 8.4 inches (21.4 cm)
- Weight (Test Set only): 32 lbs. (14.5 kg)

Environmental Characteristics

- Operational Temperature:
  -10°C ≤ T ≤ 55°C (14°F ≤ T ≤ 131°F)
- Operational Humidity:
  MIL-PRF-28800F Class 2
- Storage Temperature:
  -51°C ≤ T ≤ 71°C (-59.8°F ≤ T ≤ 159.8°F)
- Storage Humidity:
  MIL-PRF-28800F Class 2

Altitude, Operating:

- MIL-PRF-28800F Class 2
- 0-4600 meters (0-15,097 feet)

Altitude, Non-Operating:

- > 4600 meters (> 15,097 feet)

Safety Compliance:

- EN/UL-61010-1, 3rd Edition

Export Authorizations:

- WEEE, RoHS

EMC

- EN/IEC 61326-1: 2013

Characteristics for External AC-DC Converter

- Operational Temperature:
  5°C ≤ T ≤ 40°C (41°F ≤ T ≤ 104°F)
- Storage Temperature:
  -20°C ≤ T ≤ 71°C (-4°F ≤ T ≤ 159.8°F)
- Operational Altitude
  < 10,000 feet

Installation

The ALT-9000 Test Set is a Safety Class 1 instrument that must be grounded before use when connected to an external power supply. The Test Set should only be connected to a grounded AC supply outlet.

Complying with Instructions

Installation/operating personnel should not attempt to install or operate the Test Set without reading and complying with instructions contained in this manual. All procedures contained in this manual must be performed in exact sequence and manner described.

Safety Precautions

The following safety precautions must be observed during installation and operation. VIAVI assumes no liability for failure to comply with any safety precaution outlined in this manual.

Grounding Power Cord

WARNING:

DO NOT USE A THREE-PRONG TO TWO-PRONG ADAPTER PLUG. DOING SO CREATES A SHOCK HAZARD BETWEEN THE CHASSIS AND ELECTRICAL GROUND.

For AC operation, the AC Line Cable, connected to the External DC Power Supply, is equipped with a standard three-prong plug and must be connected to a properly grounded three-prong receptacle. It is the customer's responsibility to:

- Have a qualified electrician check receptacle(s) for proper grounding.
- Replace any standard two-prong receptacle(s) with properly grounded three-prong receptacle(s).

Operating Safety

Due to potential for electrical shock within the Test Set, the Case Assembly must be closed when the Test Set is connected to an external power source.

External Cleaning

The following procedure contains routine instructions for cleaning the outside of the Test Set.

Caution:
Disconnect power from Test Set to avoid possible damage to electronic circuits.

1. Clean front panel buttons and display face with soft lint-free cloth. If dirt is difficult to remove, dampen cloth with water and a mild liquid detergent.
2. Remove grease, fungus and ground-in dirt from surfaces with soft lint-free cloth dampened (not soaked) with isopropyl alcohol.
3. Remove dust and dirt from connectors with soft-bristled brush.
4. Cover connectors, not in use, with suitable dust cover to prevent tarnishing of connector contacts.
5. Clean cables with soft lint-free cloth.

Controls and Connectors

Front Panel Controls and Connectors

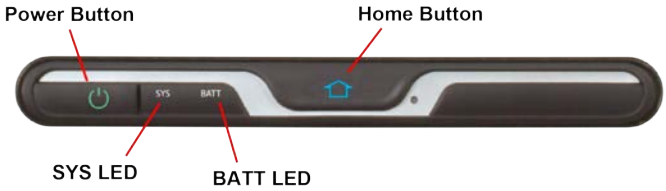


Figure 5 Front Panel Control

Control	Description
Power	The Power Button is used to power the Test Set on and off.
Home	Pressing and holding the Home Button for 5 sec sets the backlight to maximum brightness.

Control	Description
SYS LED	**Powered On** (steady green) Indicates the unit is in operational status.
	Failure (steady red) Some form of failure has occurred which precludes using the display to indicate the problem (e.g. main processor failure, power supply fault, etc.).
	Boot (flashing blue) Unit is booting and is not yet able to indicate status on the display (during initial OS and application load).
	Off/Standby (steady orange) Unit is off, but power is supplied to the power supply from the AC power source.
	Off w/o External Supply (off) Unit is off, no external power supplied.

Control	Description
BATT LED	**Battery Voltage Low** (steady red) The unit will turn off within one minute without charger.
	Battery Pre-Charging (flashing yellow) Trickle charge during extremely low voltage on the battery.
	Battery Charging (flashing green) Charge in progress.
	Battery Fully Charged (steady green)
	Battery Temperature Extreme (steady blue) Temperature <0^{o} C or >45^{o} C. Can't charge battery.
	Battery Error (steady red) Problem with the battery or charging system.
	Battery Missing (off) AC applied without battery in place.

Control	Description
	Battery Suspended Charge (flashing red) AC applied with battery charging suspended.

User Interface Components

The Test Set User Interface (UI) is a touch screen control panel that provides a flexible working environment for all users. The UI uses maximized Function Windows. One Function Window occupies the whole screen area. The Test Set User Interface (UI) is navigated locally using the Front Panel Touch Screen.

Launch Bar

The Launch Bar is a vertical scrolling menu located at the left side of the User Interface. The Launch Bar provides access to the Function Icons. The menu must be opened to access the Function Icons. The Launch Bar is opened and closed by touching the light gray bar on the menu.

When opened, the Launch Bar appears in front of any Function Windows currently occupying that area of the display. The Launch Bar can be closed to view the complete Function Window.

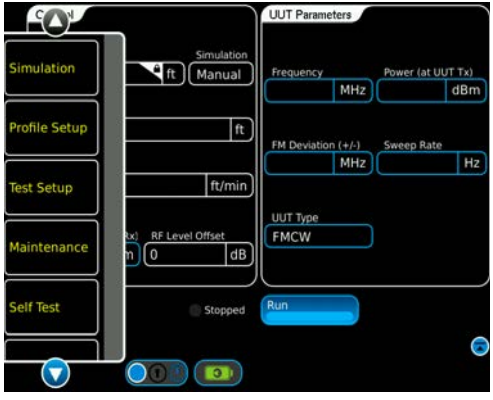


Figure 6 Launch Bar and Function Window

Launch Bar Navigation

The arrows on the top and bottom of the Launch Bar are used to move the Launch Bar up and down.

Simulation Function Window

Simulation Function Window provide visual access to the Test Set's operating parameters and measurement data.

Figure 7 Simulation Function Window.

Function	How to
Opening/ Closing Function Windows	Function Windows are opened by selecting the Function Icon from the Launch Bar. Function Windows are closed by selecting the blue circle icon at the bottom of the window.

Function Window Icons

Function Windows use the following icons to indicate various functions or states:

Icon	Description
	Closes the Function Window.
	Maximizes Function Window or opens Status Bars.
	Minimizes Function Window or closes Status Bars.
	Displays Detecting and a yellow circle when detecting the type of radio altimeter under test.
	Displays Running and a green circle when the simulation is running.
	Displays Stopped and a gray circle when the simulation is stopped.
	Displays remaining battery capacity in %.

Defining Parameters

Numeric Values

When a numeric data field is selected for editing, a group of data entry pop-up windows is launched which provides the following three methods for defining the value:

- Numeric Keypad
- Rotary Knob
- Single/Double Slider Bar

Figure 8 Numeric Keypad

0.0.A Numeric Keypad

The Numeric Keypad allows the user to enter a specific numeric value. A value is entered by pressing the numbers on the keypad. The value is enabled pressing the unit of measurement on the Numeric Keypad window.

Icon	Description
	Pressing Cancel voids any un-entered changes and closes the group of data entry pop-up windows. Pressing Cancel does not “undo” a changed value that was set using the Rotary Knob or Slide Bar.
	Pressing Clear resets a numeric value to 0”.
	Pressing Backspace deletes the last digit in the numeric value.
	Pressing Next Value Selection replaces the Numeric Keypad with the Rotary Knob. Press the Next Value Selection again and the Rotary Knob is replaced with the Slew Data Bar. Press again and the Numeric Keypad appears.

Data Slew Bar

For some data-entry fields, a data slew bar is available. When displayed, the operator can use the Data Slew Bar to incrementally adjust data values by sliding the bar.

To use the 'up' and 'down' buttons on the Slew Bar, buttons must be pressed and held for a few seconds.

Selecting x10 increases the step increment by a factor of 10. Selecting /10 decr eases the step increment by a factor of 10. Selecting Enter closes the Data Slew Bar.

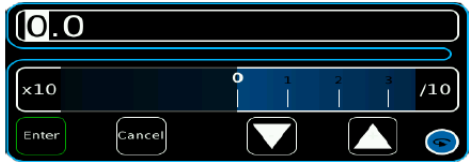


Figure 9 Data Slew Bar

Figure 10 Rotary Knob

Rotary Knob

The Rotary Knob is used to slew values up or down. Selecting x10 will increase the step increment by a factor of 10. Selecting /10 will decrease the step increment by a factor of 10. Selecting Enter closes the Rotary Knob.

Drop-down Menus

Drop-down Menus are used to list pre-defined variables. Selecting a Drop-down Menu opens the list of variables available for that field. The variable currently selected is displayed on the menu in bold. Drop-down Menus can be dragged up and down on the display in order to view long lists.

Figure 11 Drop-down Menu

Selectable Units

Some fields may have selectable units. For those fields identified, select the units field and a drop-down menu is displayed.

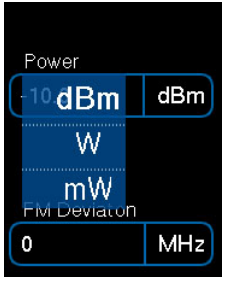


Figure 11 Selectable Units

Locked Fields

A small padlock symbol may be displayed against certain fields indicating that the field is locked and may not be edited or accessed (Fig. 10). Altitude field is locked and can only be modified when a manual simulation is running, then paused.

Figure 12 Locked Field

Setup

Perform the following steps to complete Setup:

1. Press the **Power Button** for a minimum of 1 second to power up test set.
2. Select **Test Setup** function key to display Test Setup Window.
3. Confirm the settings (shown in Figure 14) and change as necessary.

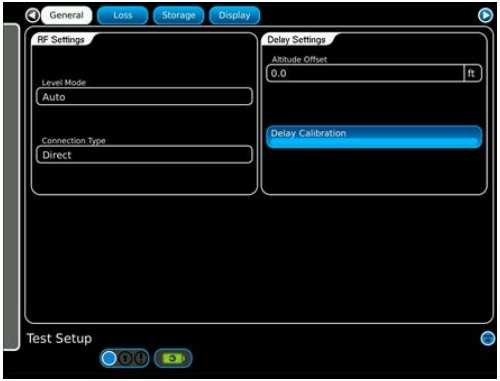


Figure 13 Test Setup General Tab Screen

4. From the General tab, select **Delay Calibration** to display the Delay Calibration Info screen. This screen starts the calibration procedure for Test Set/RF coaxial cable delay.

Figure 14 Test Setup / Loss Tab Screen

Test Setup / Loss Tab

Cable Loss:

- UUT:TX Cable Loss: Enter as marked on TX cable.
- UUT:RX Cable Loss: Enter as marked on RX cable.

Coupler Loss:

- UUT:TX Coupler Loss: Enter as marked on UUT:TX Antenna Coupler (for Coupler mode only).
- UUT:RX Coupler Loss: Enter as marked on UUT:RX Antenna Coupler (for Coupler mode only).

External Attenuation:

- UUT:TX Ext Attenuation: Enter as marked on Attenuator.
- UUT:RX Ext Attenuation: Enter as marked on Attenuator.

Caution:

UUT:TX PORT MAXIMUM POWER: 300 W, 5 W AVERAGE.

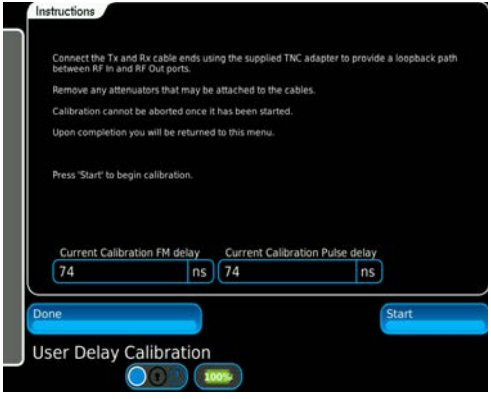


Figure 15 Delay Calibration Info Screen

5. Connect the ends of the UUT:RX and UUT:TX cables together using the supplied TNC Connector.
6. Select **Start** to start delay calibration. The calibration process is automatic. When delay calibration is complete the Display Calibration Info screen is displayed, showing the newly measured delay values. To return to the Test Setup screen, press **Done**.

Delay calibration may not be aborted once started.

7. Disconnect the TNC Connector from the UUT:RX and UUT:TX cables.
8. Perform appropriate installation and/or connection procedure required for altimeter testing. Refer to Operation Manual for specific altimeter test setup configurations.

If the aircraft antenna height at touchdown is known, enter this value in the **Altitude Offset** field. If height at touchdown is not known, and the radio is a FMCW or CDF type, steps 9 through 11 can be used to zero the indicator.

9. From the General tab, select **Altitude Indicator Zero** key to display the Altitude Indicator Zero screen.

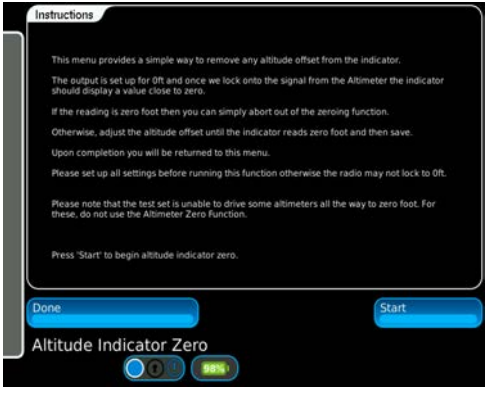


Figure 16 Altitude Indicator Zero Info Screen

10. Press **Start** to start the Altitude Indicator Zero procedure. Wait until the test set indicates it has a valid signal.
11. The test set is now simulating 0 ft at the end of the ALT-9000 RF coaxial cables.
    To compensate for the aircraft antenna height at touch down, select the **Altitude Offset** field. Using the +/- key or numeric pad, adjust the **Altitude Offset** field until 0 ft is displayed on the aircraft altitude indicator.
12. Select **Save & Return** to store value and return to the Info Screen window. Select the **Done** key to return to Test Setup (General Tab). The test set is now ready to perform the Linear Altitude Ramp Test.

Linear Altitude Ramp Test

The Linear Altitude Ramp Test performs a linear up and down altitude ramp, verifying adequate UUT loop gain. This is the lowest level of flight-line testing recommended to confirm reported problems, or to verify system operation after LRU replacement.

Perform the following steps to complete the Linear Altitude Ramp Test:

1. Confirm the following settings and change as necessary.

   Control

   Start Altitude = 0 ft (50 to 75 ft for pulse type)

   Stop Altitude = 2,500 ft (or maximum for system under test)

   Altitude Rate = 1,000 ft/min (2.5 mins duration)

> Altitude Rate is selected 1 to 120,000 ft/min. If trip operation is to be verified, a recommended rate of <1000 ft/min should be entered.

2. Select **Run** Key to start simulation. Altitude Pause key is displayed.

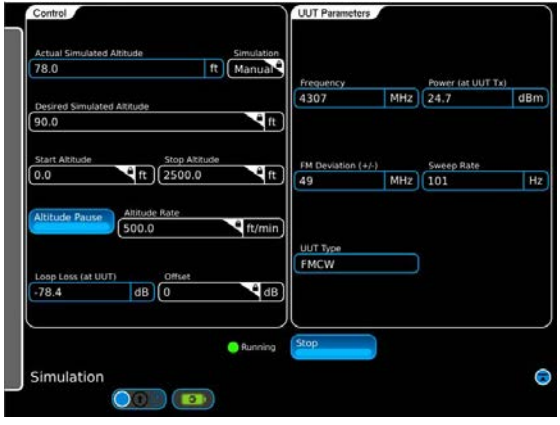


Figure 17 Altitude Pause Key

3. Confirm Aircraft altitude indicator tracks altitude smoothly from Start Altitude to Stop Altitude, and that no indicator flag is in view.

STEP PROCEDURE

Sudden indicator display of a ground height is indicative of an aircraft antenna ground plane bonding problem or RF feeder cable termination problem, resulting in leakage between TX and RX antennas. This usually manifests at higher altitude when the reflected TX power seen by the receiver falls below the level of leakage.

Control
Current Altitude = displays current test set simulated altitude

4. To pause altitude at any point select **Altitude Pause** key.

Altitude may now be manually-slewed using the Data-entry popup.

STEP PROCEDURE

5. Select **Altitude Resume** key to resume simulation from current altitude.

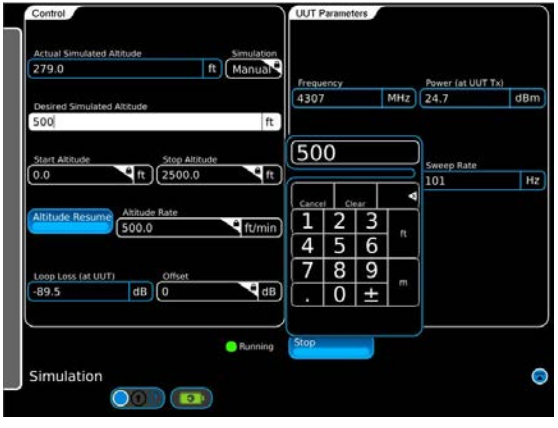


Figure 18 Paused Altitude Rate

Power Requirements

The ALT-9000 is powered by a removable 14.8 v 6.6 Ah Lithium Ion Battery. The battery charging circuit enables the operator to recharge the battery anytime the unit is connected to the AC Adapter. The ALT-9000 can operate continuously utilizing the AC Adapter.

The internal battery is equipped to power the ALT-9000 for four continuous hours of use. When the battery needs charging the charge indicator illuminates a fast blinking yellow. Closing the screen cover powers down the display. The battery should be charged every three months (minimum) or removed for long term inactive storage periods of more than six months.

AC Power

The AC Adapter, supplied with the ALT-9000, operates over a voltage range of 100 to 250 VAC at 47 to 63 Hz. The battery charger operates whenever DC power (11 to 32 Vdc) is applied to the Test Set with the supplied AC Adapter or a suitable DC power source.

If the supply voltage is <11 V, the unit switches to internal battery. If the voltage is >32 V, a 7 Amp resettable fuse on the DC input port opens, protecting the test set. Reset fuse by disconnecting and reconnecting the power cord to the unit.

When charging, the battery reaches an 100% charge in approximately four hours. The Battery Charging temperature range is 0° to 45° C, controlled by an internal battery charger.

BATTERY RECHARGING USING EXTERNAL POWER SUPPLY

Perform the following steps to recharge the battery using and external power supply:

1. Connect AC Line Cable to AC PWR Connector on the AC Adapter and an appropriate AC power source.
2. Connect the AC Adapter DC output to the DC POWER Connector on the ALT-9000.
3. Verify the BATT LED displays flashing green.
4. Allow four hours for battery charge or until the BATT LED displays a steady green.

BATTERY STATUS INDICATORS

Battery Voltage Low (steady red)
The unit will turn off within one minute w/o charger.
Battery Pre-Charging (flashing yellow)
Trickle charge during extremely low voltage on the battery.
Battery Charging (flashing green)
Charge in progress.

BATTERY STATUS INDICATORS (cont)

Battery Fully Charged (steady green)
Battery Temperature Extreme (steady blue)
Temperature <0° C or >45° C can't charge battery.
Battery Error (steady red)
The unit has a problem with the battery or charging system.
Battery Missing (off)
AC applied w/o battery in place.
Battery Suspended Charge (flashing red)
AC applied with battery charging suspended.

ALT-9000
Radio Altimeter Test Set
Getting Started Manual

22149658 / Rev. 003

Part of CD: 22149666

March, 2026

VIAVI Solutions

North America:	**1.844.GO VIAVI / 1.844.468.4284**
Latin America	**+52 55 5543 6644**
EMEA	**+49 7121 862273**
APAC	**+1 512 201 6534**
All Other Regions:	**viavisolutions.com/contacts**