VIAVI

AVX-10K

Flight Line Test Set

Operations Manual

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Test Set

Operation Manual

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Front Matter

Table of Contents

Table of Figures

Preface

Purpose and Scope

The purpose of this AVX-10K Flight Line Operations Manual is to help users successfully use the test set features and capabilities. This Operations Manual includes task-based instructions that describe how to configure and use the AVX-10K test set.

Read this manual carefully before setting up or operating the instrument.

Product Nomenclature

The following terms may be used in this Operations Manual to refer to the AVX-10K Flight Line Test Set.

- AVX-10K
- AVX-10K test set
- Device
- Instrument
- Test Set

Intended User

This Operations Manual is intended for personnel who are familiar with avionic systems, associated equipment, and corresponding terminology.

This Operations Manual is intended for novice, intermediate, and experienced users who want to use the AVX-10K test set effectively and efficiently.

Related Information

Visit viavisolutions.com/avx-10k for additional product information.

Click viavisolutions.com/avx-10k-literature to visit the library, and access translated versions of released documents.

Use this manual in conjunction with the following information:

- **Getting Started Guide**: provides the basics of setup and use.
- **Maintenance Manual**: provides guidance for approved maintenance and troubleshooting procedures.
- **Product Brochure**: provides ordering information for parts and accessories.
- **Configuration Selection Guide**: provides information on configuration details.
- **Data Sheet**: provides technical specifications.
- **StrataSync™ User Guide**: provides operational information on the StrataSync™ Application

Contact Information

Contact VIAVI Customer Service for technical support or with any questions regarding this or any other VIAVI products.

- Phone: 844-GO-VIAVI
- email: Techsupport.avcomm@viavisolutions.com

For the latest information, go to:

- https://www.viavisolutions.com/en-us/services-and-support/support/technical-assistance

1. Overview AVX-10K

1.1. General Information

The AVX-10K Flight Line Test Set is a portable test instrument that provides a single instrument test solution for performing a variety of flight line testing including Transponder, TCAS, Target Generation, Navigation, Communications (COMMS), and ELT testing.

A test tool application is also provided that allows VSWR and Distance to Fault testing for cable and antenna troubleshooting.

Figure 1: AVX-10K Flight Line Operations Test Set

The AVX-10K is supported with two free applications. VIAVI's Mobile Tech application available from IOS App or Google Play Store, provides remote control via your IOS or Android device as well as technical documentation and training videos.

StrataSync™ (available from https://www.viavisolutions.com/en-us/products/stratasync) is a cloud-enabled application supporting asset and test data management.

Figure 2: Mobile Tech Application

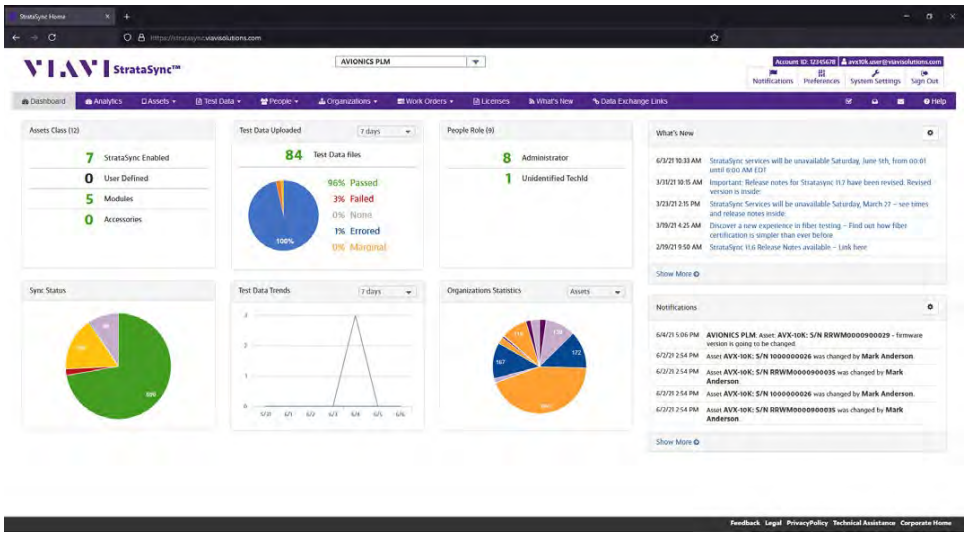


Figure 3: StrataSync™ Dashboard

1.2. Principles of Operation

The AVX-10K consists of the VIAVI OneExpert base platform and the AVX Application Module. The VIAVI OneExpert base platform supports system functionality such as network connectivity, system updates and power management. The AVX Application Module manages the device's RF test and measurement functions.

Testing with the AVX-10K can be performed in one of three methods:

- Direct with Coupler
- Over-the-air using an antenna that can be mounted on the AVX-10K chassis
- Directly connected to the UUT.

Direct with Coupler	Over the air	Direct to UUT
		

Figure 4: Operational Test Methods

1.3 Platform and System Features

The AVX-10K platform supports the following hardware and system features:

- Small, rugged design suitable for flight line use
- Rechargeable, internal battery supports up to 8 hours of typical use
- A multi-touch user interface that is similar to those provided on smart devices
- Wireless and WiFi connectivity supporting both 2.4 GHz and 5 GHz
- StrataSync™ cloud-based data collection and asset management application
- Field upgradeable software and option installation via USB or StrataSync™
- Dual Ethernet and 2.0 USB ports
- WiFi and GPS receivers
- Smart Access Anywhere - allowing VIAVI tech support to troubleshoot set up and test issues remotely
- Sleep Mode (battery power saving mode)

1.4. Features and Capabilities

The AVX-10K supports testing of the following avionics functions:

Communications	Navigation	Surveillance	Other Test Tools
▶ AM (VHF) ▶ FM (UHF) ▶ SSB (HF) ▶ SELCAL	▶ ILS ▶ LOC ▶ GS ▶ MB ▶ VOR ▶ DME	▶ Transponder Modes A, C and S ▶ ADS-B Out ▶ ADS-B In (Traffic) ▶ 1030 MHz (ADS-B, ADS-R, TIS-B) ▶ UAT (ADS-B, TIS-B, FIS-B) ▶ TCAS I/II and TAS testing ▶ ADS-B Monitoring ▶ GICB Monitoring ▶ UAT Monitoring	▶ ELT ▶ VSWR ▶ Distance to Fault

1.5. Device Software

AVX-10K ships from the factory with the current version of Software (SW) and Firmware (FW) installed on the Device.

Routine maintenance checks should be performed to ensure the Device has been upgraded to the latest production software release. This information is readily available on your StrataSync™ account.

In the event a software update is needed, AVX-10K software can be upgraded in the field using VIAVI's StrataSync™ application (via WiFi or a direct network connection) or by downloading the latest firmware from StrataSync™ to your USB device.

1.6. First Time Use and Self-Test

For First Time Use and unboxing instructions, please review the included Getting Started Guide.

Part of the First Time Use procedure is the Self-Test process. This process should be run any time that you believe there are issues with the test set. Please run this procedure before returning the unit to the factory.

Turn the Test Set ON

1. Press and release the Power Button. This is the green button at the bottom front of the test set.

- An initializing indicator screen is displayed during the boot-up process. Wait while the device completes the boot-up process.

- Battery LED indicator is illuminated, and the UI loads the Home screen in the display when the device is ready for use.
- Chime may occur (optional setting).

Run Self-Test

1. Remove the protective film from the touchscreen display before use.
2. Ensure that the Test Set is ON.
3. Verify Test Set Operation
    a. On the Home screen, open the Self-Test ribbon.
    b. Select the Self-Test application.
    c. Press the RUN soft key and follow the prompts as directed. A cable will be needed for External Loopback test. This cable is supplied with each AVX-10K.
    d. When Self-Test has completed running all tests, verify that all portions of the test have passed. If any portion of Self-Test fails, please contact VIAVI Customer Service.

Turn the Test Set OFF

1. Press and hold the Power button ~1 second; release the Power Button when the Front Panel displays a white screen with the VIAVI logo.
2. The device performs a series of power-down processes and shuts down.
    - Chime (optional setting).

2. Setup, Control, and Operation

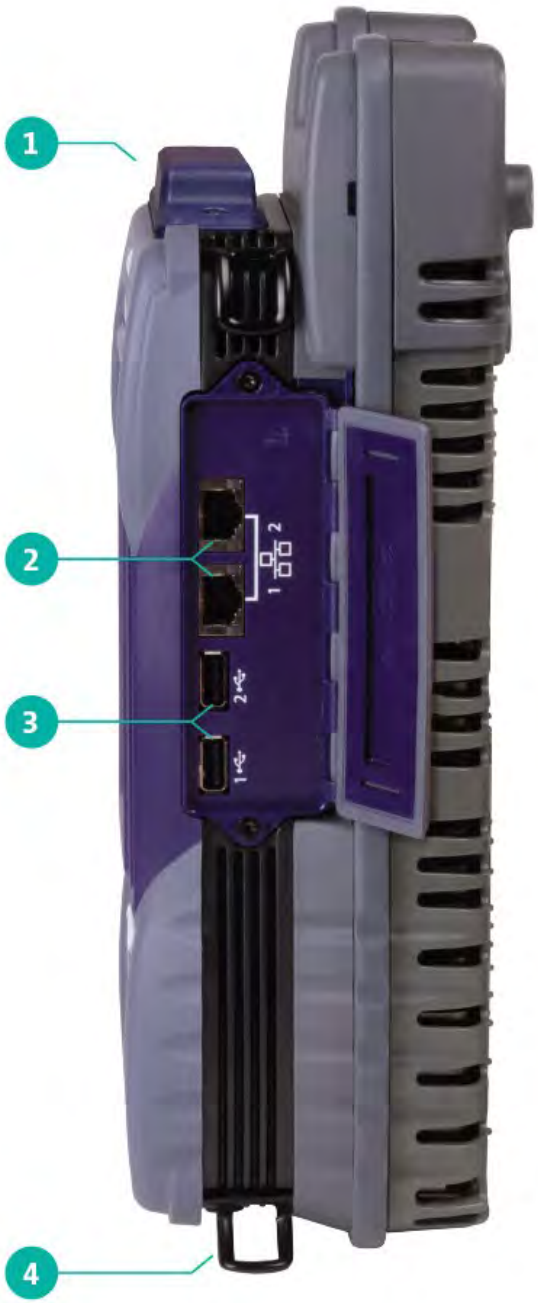
2.1. Control and Operation

The AVX-10K Flight Line Test Set can be operated locally using the touchscreen, keypad or remotely using any mobile device with VIAVI's Mobile Tech application which is available at any online application store. Optionally, remote control of the AVX-10Kcan be accomplished via a VNC viewing application (such as Tight-VNC) from a laptop or PC.

2.2. Hardware

5. Power Button
6. Speaker
7. Back Button
8. Home Button
9. Quick Tray Button
10. Cursor Control Keys
11. Function Keys
12. Full Color Touch Screen Display
13. Status Indicator Lights
14. GPS Antenna
15. Antenna (ANT) Port
16. Direct (RF/IO) Port
17. SWR Port

Figure 5: Front View



AVX-10K Side Detail

1. GPS Antenna
2. Dual Ethernet Ports
3. Dual USB Ports
4. Hand Strap Clips

Figure 6: Side View

2.2.1. Controls and Buttons

The front panel controls and buttons are used to operate, control, and configure the device, change test settings, view data, and navigate the user interface (UI).

- OK Button

	The OK Button is used to accept/confirm a changed setting or to proceed to the next menu.

- Power Button (5)

	The Power button is used to turn the device on and off. The device is turned on or off by pressing and holding the button for approximately 3 seconds. When needed, a hard reset is accomplished by pressing and holding the Power button for 10 seconds.

- Back Button (6)

	The Back Button is used to exit a menu or to go back to the previous menu or screen. If a data field is selected for editing, selecting the Back Button exits the data field, canceling an un-confirmed change.

- Home Button (7)

	Pressing the Home Button returns to the device's main/home screen. The UI Home button performs the same action.

- Tray Button (8)

	Pressing the Tray Button opens the Utility Tray which contains icons that access base functions that save test reports, turn on/off Wireless, or enable/disable Remote Operation.

The Utility Tray can also be opened using the  located at the top of the UI.

- Navigation Buttons (9) are used to navigate the UI and to open menus and fields on the UI.
- Function Hard Keys (10) select screen-specific options or to select menus associated with each key. The Function Hard Keys and UI Function Soft Keys perform the same functions.

2.2.2. I/O Connectors

The AVX-10K is equipped with three TNC-type connectors on the AVX Application Module. These connectors support test and measurement functions.

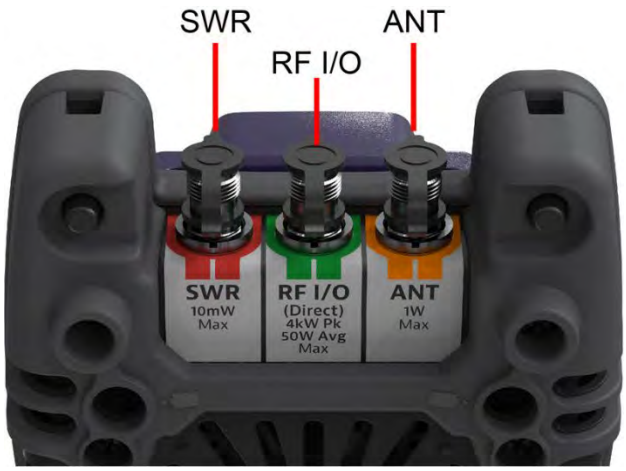


Figure 7: I/O Connectors

Caution: Do not overload input connectors. Refer to the product data sheet for maximum input ratings.

- SWR Connector

  The Standing Wave Ratio (SWR) connector is used when performing VSWR and Distance to Fault (DTF) troubleshooting.

- RF I/O Connector

  The RF I/O Connector is selectable as the RF Instrument's (Direct) connect high-power input/output connector.

The RF I/O Connector is a combined (Duplex) connector that provides an RF output connection and an RF Receiver input connection.

- ANT Connector

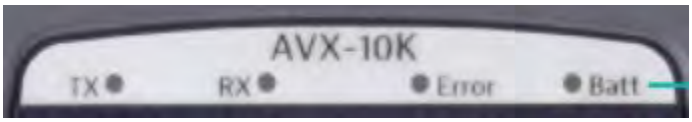
  The ANT Connector is selectable as the instrument's antenna input connector.

  The ANT connector should be selected to perform over the air testing using an external antenna or when test parameters require maximum input sensitivity. This connector should be used when measuring low level RF signals.

2.2.3. Hand Strap Rings

Four rings are located at the corners of the device and can be used to attach the carry strap.

2.2.4. Status Indicators



- **TX**: Transmit Indicator LED blinks green when transmitting to the device under test.
- **RX**: Receive Indicator LED blinks green when the AVX-10K is receiving input from the device under test.
- **Error**: This LED is solid red indicates error and alarm conditions. The type of error varies depending on the application. Errors are displayed in the Utility Tray.
- **Batt**: multi-color LED that indicates the battery status.
  - Solid green indicates that either the battery charge is higher than 30%, or that an external source is powering the unit.
  - Solid amber indicates that the battery charge is getting low (charge is between 10% and 30%).
  - Flashing red indicates the device is being powered by external AC Power and the battery is not installed in the device.
  - Solid red indicates that the battery charge is critically low, less than 10%. An audible beep occurs 30 seconds before shutdown.
- **Charge Status** LED: located on the bottom, next to the DC Input connector. The Charge Status LED is a multi-colored LED that indicates the charge status of the Battery.

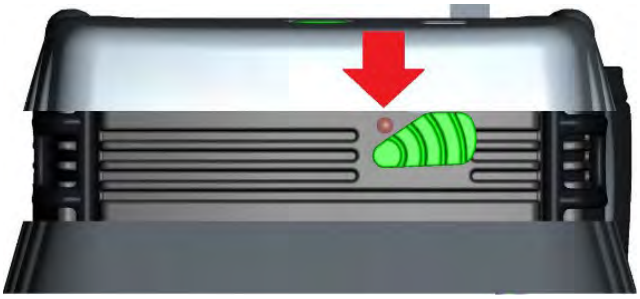


Figure 8: Charge Status LED

- Solid amber indicates that the battery is charging.
- Solid green indicates that charging is complete, and the battery is fully charged.
- Slow flashing red indicates that the battery charge is critically low, less than 10%.
- Fast flashing red indicates that the charging was suspended due to a fault and user intervention is necessary (for example, the wrong charger is attached).
- Solid red indicates that the charging was suspended due to overheating. The unit can continue to run, no user intervention necessary.

2.2.5. Display Screen

The display screen is a Liquid Crystal Display (LCD). The LCD is a capacitive, touchscreen that operates similar to a smart phone or tablet where you press to open/select/activate, press and hold, press and drag, swipe sideways and pinch to zoom.

2.3. Remote Operation

The AVX-10K test set can be operated remotely via the Mobile Tech application or optionally via a VNC connection using a VNC application running on a computer. It is also possible to connect remotely via the Smart Access Anywhere application provided by VIAVI.

2.3.1. Mobile Tech Application

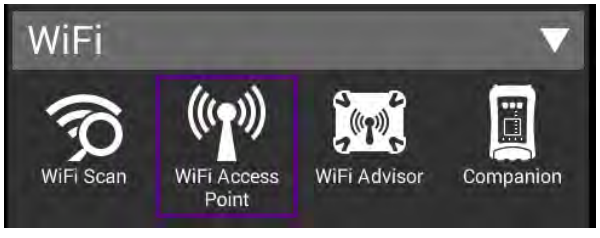
VIAVI's Mobile Tech app can be found in the Apple App Store or Google Play Store and can be run from any mobile device.

This application can connect to the AVX-10K via Wireless or WIFI connection. You must have an active StrataSync™ account to access all benefits of the Mobile Tech application. You may also login to the Mobile Tech application as a guest to remotely control the AVX-10K.

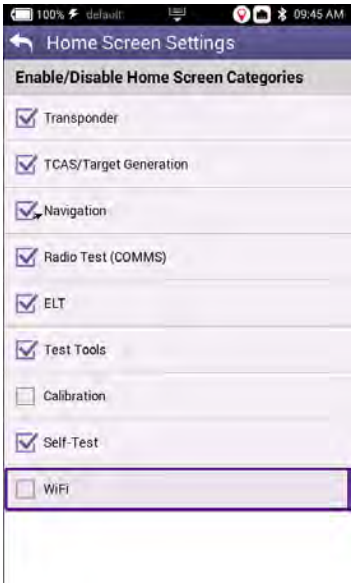
The Mobile Tech application also provides access to training videos as well as file access so that you can view test reports from the connected device.

To connect wirelessly, once the application is installed and you are able login, the Mobile Tech application will search for nearby connectable devices. Locate the ID of the AVX-10K that you want to connect to and press the CONNECT button. Once connected, press the Remote Display button and you will be able to view and control the AVX-10K test set from this device.

To connect a tablet or phone via WIFI, you will need to turn on the Access Point on the AVX-10K. This is available in the WiFi ribbon on the AVX-10K.



If that ribbon is not available on your Home Screen, you will need to add it by going to System Settings, Home Screen and enabling the WiFi option.



Load the WiFi Access Point application and start the process by clicking the Start button in the lower right corner.

You will then be able to connect your tablet or phone's WiFi to the AVX-10K. Go to your device settings, enable WiFi and look for an SSID that starts with "VIAVI-ONX" and connect. Then in the Mobile Tech application, type in the IP for the AVX-10K at the top of the screen where it says, "Enter an IP for Manual Connection" and press the CONNECT button. The default address for the AVX-10K device is 10.0.0.1. The Mobile Tech application should be connected via WiFi.

2.3.2. VNC Viewer

Establishing a VNC connection with the AVX-10K test set requires the following:

- A VNC viewing application must be installed on the computer
- AVX-10K test set and computer (both devices must be connected to the same network).

Configure the AVX-10K Remote Operation via Systems Settings using your own VNC password. This will be the password that the user of the VNC viewer software will need in order to gain access.

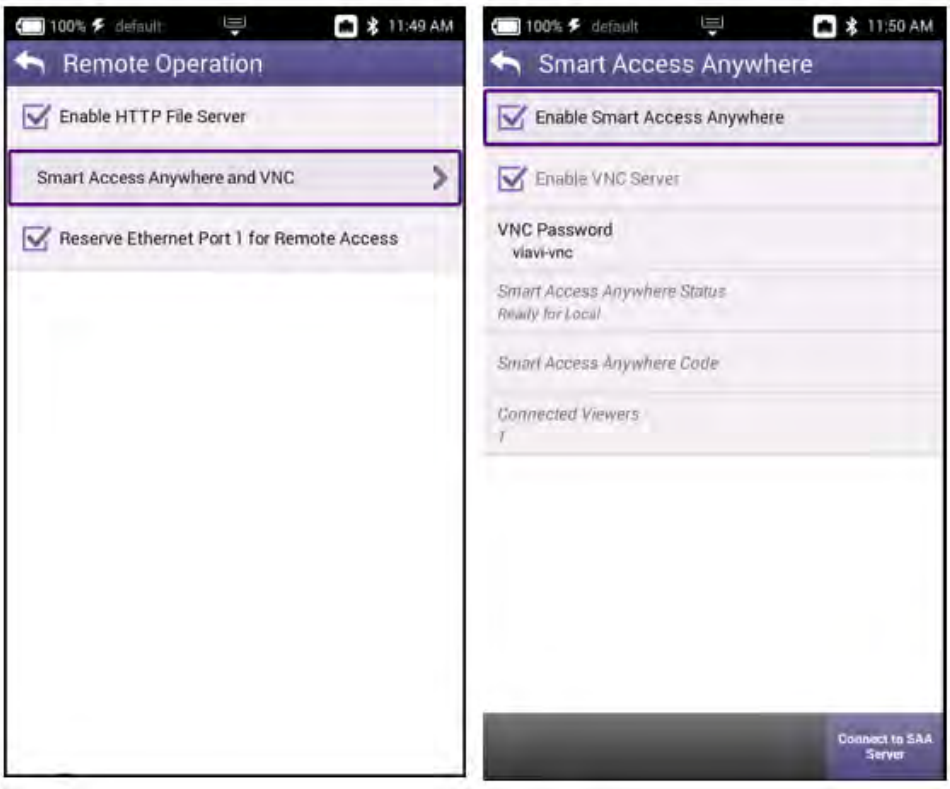


Figure 9: Remote Operation Settings

When you run the VNC viewer software, you will need to know the IP Address of the AVX-10K test set. This can be found by launching the Network application in the System ribbon.

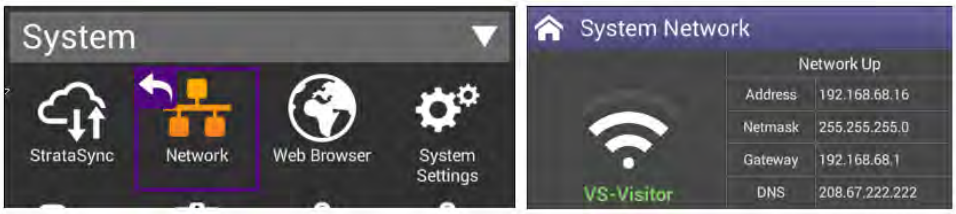


Figure 10: IP Address & Network ID

View the Device UI Remotely

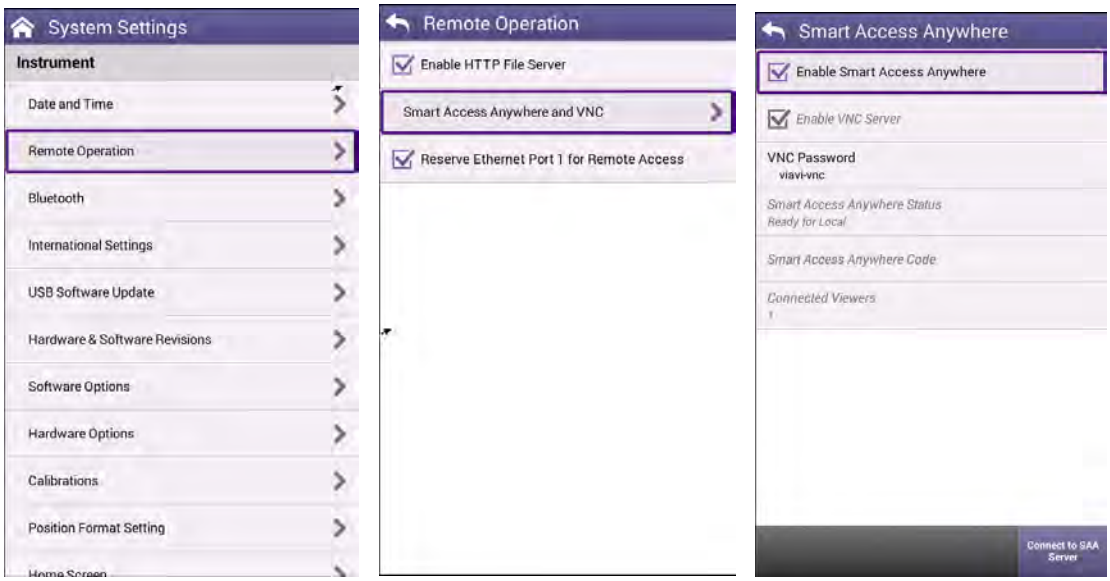
1. Ensure that the AVX-10K is connected to the internet.
2. Enable VNC capability:
   a. Open the System Settings Menu.
   b. Select Remote Operation button.
   c. Select VNC button.
   d. Select the Enable VNC Server check box.
   e. Define VNC password (recommended).
   f. Select **Back Button** to return to previous screen.
3. Launch the VNC viewing application on the computer.
4. Enter the IP address of the test set in the VNC viewer's server address field and select the **OK Button** to continue.
   - A password entry box appears.
5. Enter the VNC password (found on the Remote Operation menu) and press the **OK Button** to submit.
   - The AVX-10K test set user interface appears in the VNC viewer.

2.3.3. Smart Access Anywhere Application

VIAVI's Smart Access Anywhere (SAA) application allows a remote user to be able to connect with the test set. This could be a lead technician who is currently offsite or the VIAVI Service personnel. Both the AVX and the remote user must have access to the internet.

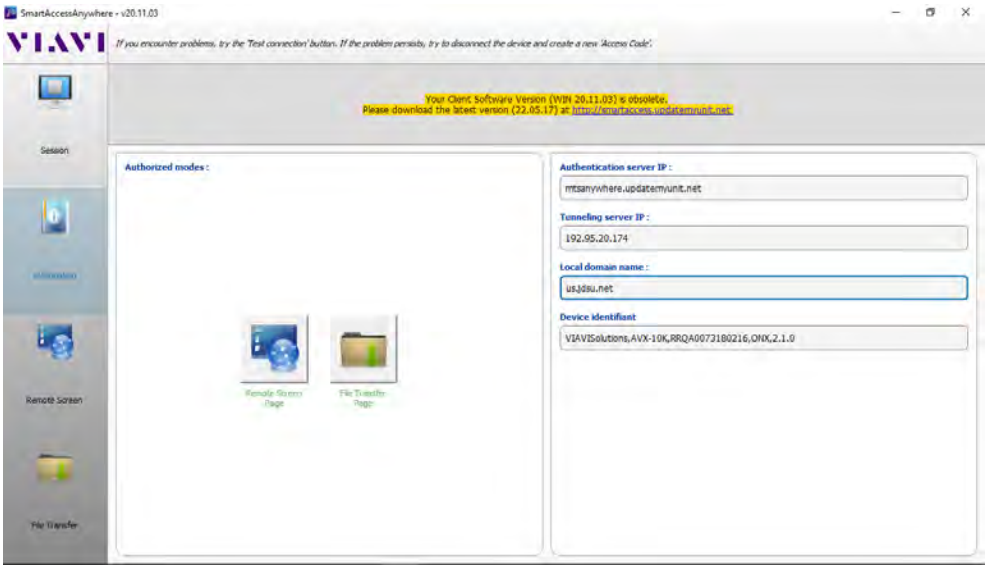
SAA can be downloaded from the VIAVI website – www.viavisolutions.com. Search for "Smart Access Anywhere" and go to the products page, then Resources tab, then Software Downloads. Here you can download versions for the PC, Android, or Apple. Once downloaded and installed, this application connects to the AVX-10K using a code that is generated on the AVX and supplied to the remote user.

To enable SAA on the AVX-10K and generate a code, open the System Settings application in the System ribbon, click Remote Operation, then Smart Access Anywhere and VNC. Ensure that top entry (Enable Smart Access Anywhere) is enabled and click the 'Connect to SAA Server' button in the lower right corner.

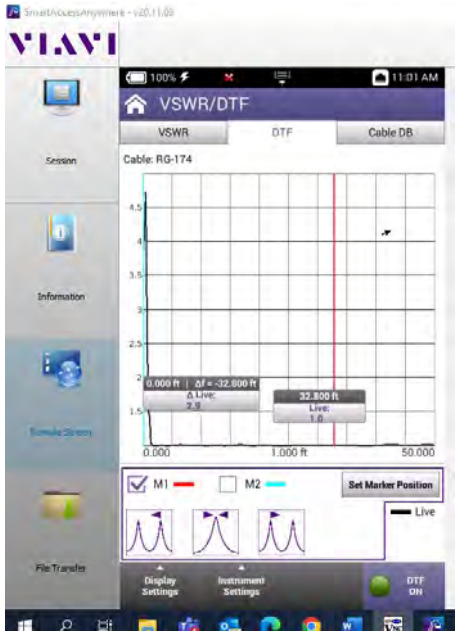


Once connected to the server, the application will generate a 10-digit hexadecimal code that will need to be shared with the person trying to connect with the test set. Once the need for remote connectivity is complete, click 'Disconnect' in the lower right corner or reboot the test set to terminate the connected session.

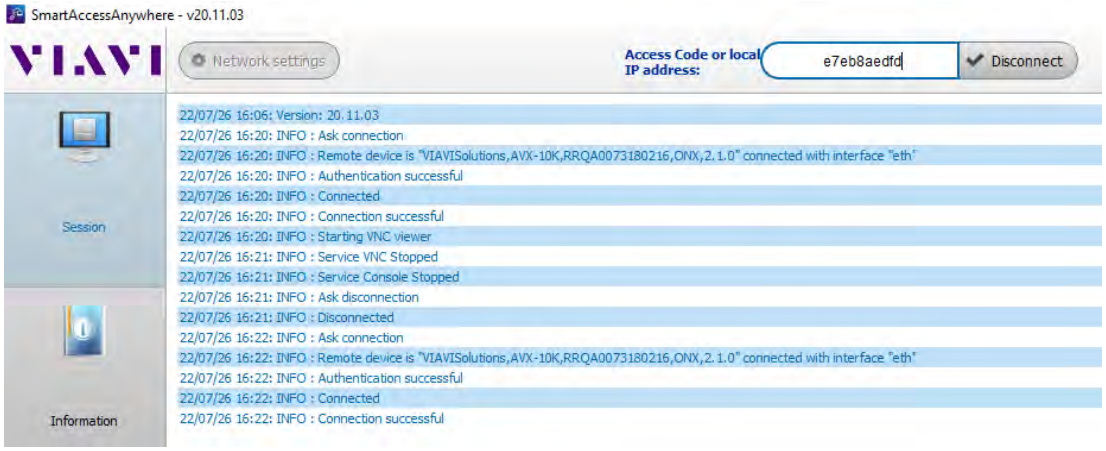
To connect to the test set from the Smart Access Anywhere application, enter the supplied 10-digit code at the top of the screen and click "Connect". Connection should occur but the length of time that it takes will depend on internet connection speed. You may need to be patient.



Once connected, click the Remote Screen Page button and the application will allow you to control the test set.



Once you have completed the session, click on the Session button and then ‘Disconnect”.



2.4. User Interface (UI) Layout

This section describes the UI screen layout and UI components.

2.4.1. General Screen Layout

The device's UI area consists of a Header Bar and Main Display area. The Header Bar is system defined and appears at the top of every screen. The Display Area updates depending on the screen selected (Home Screen vs Application Screen).

2.4.2. Home Screen Layout

The Home Screen contains collapsible menus (or "ribbons") that expand to provide access to system and test functions. The functions that are available from the Home Screen varies according to the software and hardware options that are enabled on the device.

The Header Bar displays system indicators and the Utility Tray Icon which is used to access standard device tools and functions. The Shortcut panel at the bottom of the screen is used to provide quick access to frequently used functions.

Figure 11: Home Screen Examples

2.4.3. Application Screen Layout

Application screens contain the Header Bar, a main Display Area and a row of Function Soft Keys. Function Soft Keys are selected using the touchscreen or the device's Function Hard Keys. The content of application screens varies according to the application, but layout is consistent from one application to another.

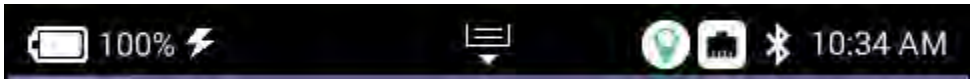
Figure 12: Application Screen Examples

2.5. UI Header Info and Indicators

The UI uses the following indicators to show function and system status:

- **Active Connectivity Icons** are shown at the top of the screen.

  When connected to the network via the LAN port, the top indicators will look like this:



  When connected to WIFI, the top indicators will look like this:

- **Template Name**: If a template is being used, this area will reflect the name of the selected template. See Template Management in System settings for more information.

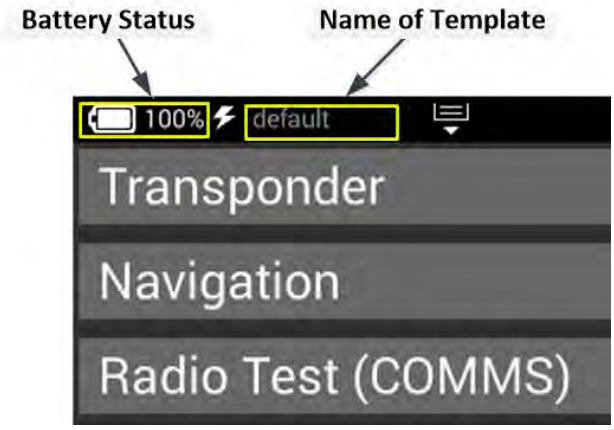


Figure 13: UI Header Info and Indicators

- Battery Status Indicator

	The Battery Status Indicator displays the charge level of the device's internal battery. The charge level is also displayed as a percent next to the indicator.

- AC Power Indicator

	The AC Power Indicator is displayed when the device is connected to an AC power supply.

- GPS Connection Indicator

	This indicates the status of your GPS Connection: Green indicates a 3D Fix; Yellow indicates a 2D Fix, and Red indicates it is in an Acquisition state.

- Network Connection Indicator

	The Network Connection Indicator is displayed when the device is connected to an active LAN via one of the device's Ethernet connectors.

- WiFi Indicator

	The WiFi Indicator is displayed when the device is connected to a network via WiFi.

- Wireless Indicator

	The Wireless Indicator is displayed when Wireless mode is enabled on the device.

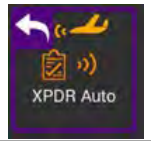
- System Error Indicator

  See "Notifications" for information about the Notifications panel.

	A red "X" is displayed when the device experiences a critical system error. A system generated error message will also be displayed in the Notification panel.

- Function and Test Application Status

  Function and test application icons change color to indicate whether or not the function is current initialized (actively running) on the device.

	**Function Off** Function icons are displayed with a white background when the function is inactive (turned off).
	**Function Initialized** When a function or application has been initialized, the icon updates to orange with an "X" displayed to the left of the icon. The "X" is used to close the application.
	**Function Running** Selecting the Back Arrow will disable or stop the application.

2.6. UI Navigation

UI screens are navigated using the following controls and techniques:

- Expandable trays are opened and closed by selecting the directional arrow on the right side of the title bar.
- Navigation arrows are used to move up/down, left/right on the screen from a remote keyboard or from the device's front panel Navigation Buttons.
- Swipe left/right is used to "flip through" screens on multi-tabbed screens (i.e., VSWR/DTF screen).

	The Back Arrow is used to: • Return to the previously viewed screen • Close a running function or application • Close a menu without making a selection • Exit and cancel a change being made to an alpha/numeric data field.

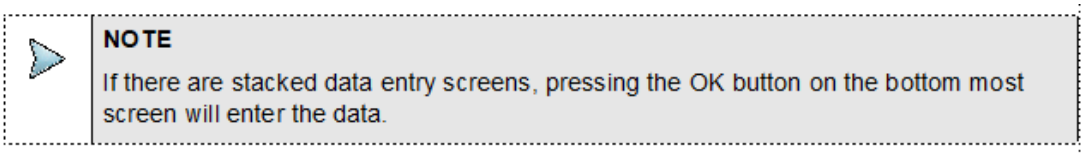
2.7. Selecting and Entering Parameters

The UI uses menus and editable data fields for making selections and configuring system and test parameters.

Entering Alpha/Numeric Data

Some parameters are defined using text or numeric entry fields (for example, test settings or user information). The process is similar to data entry on a mobile device.

1. Select (or navigate to) the desired parameter to open the data entry field.
   - A data entry box is displayed.
2. Select (or navigate to) the data entry box.
   - A keypad is displayed on the screen.
3. Use the keypad to enter the data.
   - To switch from letters to numbers, use the button in the lower left (123 or ABC).
   - On the alphabetic keypad, the second key, the up arrow, is the shift key.
   - On the numeric keypad, the second key (1/2) switches between multiple numeric screens.
   - The left pointing arrow with the x in it is the backspace key.
4. Select the enter/return key (the fourth system key) on the screen keypad or press the OK key.
   - The data is entered and stored.



NOTE

If there are stacked data entry screens, pressing the OK button on the bottom most screen will enter the data.

Select Menu Item

- Open the menu and select the menu item. When a menu item is selected using the touchscreen, the selection is activated upon selection and the menu closes.

< or >

- Use the arrow navigation keys to highlight the desired item; press the OK button to confirm. When confirmed, the selection is activated and the menu closes.

2.8. Managing Application Shortcuts

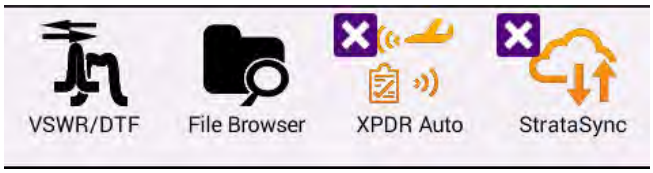


Figure 14: UI Shortcuts Panel

The Home Screen contains an area at the bottom of the screen that can be used to create shortcuts for up to four frequently used applications.

To create a shortcut

Touch and hold the function icon, drag and drop the icon to the Shortcut panel located at the bottom of the screen.

To remove or overwrite a shortcut

To remove, touch and hold the application icon in the shortcut panel, drag and drop away from the shortcut panel, or move an application icon to the Shortcut panel placing it over one of the existing shortcuts.

2.9. Configuring System Settings

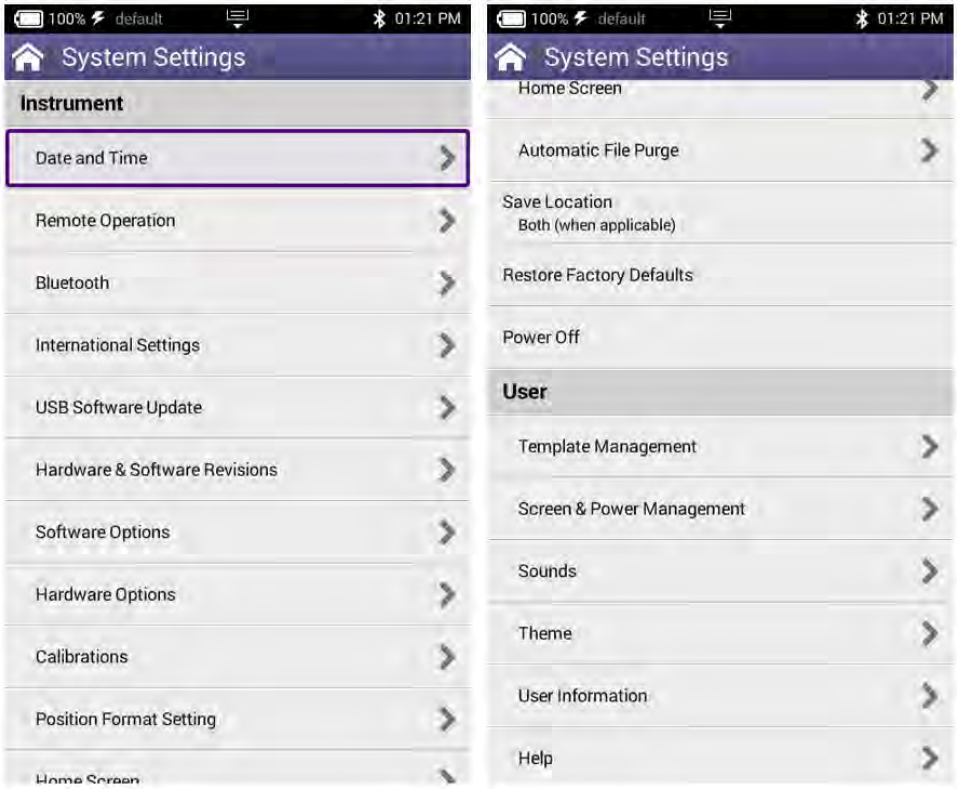


Figure 15: System Settings.

- **Date and Time** – Time and Date are driven by having the AVX-10K connected to an NTP (Network Time Protocol) server. Date and Time formats can be adjusted, and Time Zone set for local time. Use of Daylight Savings time can be toggled on or off as well.
- **Remote Operation** – These settings are used to support the connection of remote devices as described in section 2.6. Typically, all settings are left enabled. You can enter a password to be used for VNC viewer connectivity.
- **Wireless** can be toggled on or off which can also be done from the system tray. This screen will show the name of your device which is used to connect in the Mobile Tech app. All paired devices are shown here as well as their connectivity state.
- **International Settings** – Country, Language, Keyboard type, Measurement System, Temperature Units and Time Zone are all settable from this page.
- **USB Software Update** – If you need to update software via USB drive, this is the right place. There should only be one software update file on the root drive of the USB drive. Insert a USB drive with the provided or downloaded software update file into either of the USB ports on the

side of the AVX-10K. Click the Force Software Update option and then click the Update button in the lower right corner.

- **Hardware and Software Revisions** – This is where you go when someone from VIAVI asks what hardware or software revisions your unit has.
- **Software Options** – This screen provides a listing of all of the VIAVI software options aligned with the AVX-10K (and more). This will also reflect the activation level of the respective option (Enabled or Upgradeable).
- **Hardware Options** – This screen reflects the ID and Serial Number of the installed GPS Module.
- **Calibrations** – Simply shows last calibration date.
- **Position Format Setting** – This is a replicated setting from the ADS-B, GICB, and Traffic (Target Gen) setup screens that allows you to change the Latitude and Longitude format being used. e.g. “DD MM SS.SS”. This setting is globally reflected for all applications.
- **Home Screen** – This setting allows for enabling or disabling the top-level ribbons on the Home Screen. For instance, if you don’t have the ELT software option and you do not need to see it on the Home Screen, toggle ELT to off.
- **Automatic File Purge** – Having this option set to ON will help keep the file folders from filling up. This function works in conjunction with StrataSync™ so that whenever files are sent to your StrataSync™ account, they are removed from the AVX-10K file folder. You can also trigger a manual file purge from here to remove all reports.
- **Save Location** – This setting allows you to select where you want report files to be saved. They can be saved locally to the AVX-10K file folders or to a connected USB drive or to both, where applicable.
- **Restore Factory Defaults** – Resets all System and Application Settings back to factory defaults and allows for you to selectively delete all files in the file folders and clear international settings.
- **Power Off** – If you are tired of pressing the green button to turn the device off, you can come here and do the same thing. This will also allow you to automatically reboot after power off.
- **Template Management** – This allows you to Save (and name) / View / Delete / Load a template for all settings. The named template will appear in the top bar of the Home Screen once loaded. More information on Templates can be found in the StrataSync manual. Templates are a snapshot of all of the system settings and are a way to align configurations across multiple AVX-10Ks. Templates are pushed out to test sets from StrataSync. Once available on the AVX-10K after a sync, the template can be loaded from this screen.
- **Screen and Power Management** – These settings allow you to set the backlight, the backlight timeout and the power off delay.
- **Sounds** – Toggle Play Chime on Power Up/Down and control the associated volume.
- **Theme** – Changes the color scheme of the test set.

- **User Information** – Sets the user information. Some of this information is reflected in the reports.
- **Help** – Provides phone numbers, website and email contact for VIAVI support staff.

2.10. Establishing Network Connections

You can establish wired network and intranet connections, and wireless WiFi connections to your instrument to update the firmware, transfer files, synchronize to the StrataSync™ server, or control the instrument's user interface remotely.

Enable Network Connectivity

Before you establish a connection to an Ethernet or WiFi network, you must enable network connectivity on your instrument.

1. Go to the Tray menu.
2. Press the Network icon.
   - The icon will be green when connectivity is enabled.
   - Network connectivity is enabled.

2.10.1. Establish Ethernet Connection

You must have an Ethernet LAN cable to establish an Ethernet connection to your instrument.

1. Using an Ethernet cable, connect the instrument to the LAN:
   - Connect one end of the Ethernet cable to the AVX-10K Ethernet connector located on the side panel and connect the other end of the Ethernet cable to the LAN.
2. Verify that network connectivity is enabled.
3. Go to the **System** menu, then press **Network**. The System Network menu appears.
4. Select the **Ethernet** button at the bottom of the menu. Items appear that allow you to specify settings that are required to connect to the LAN.
5. Select **Network Mode** and then specify the network mode: **IPv4, IPv6,** or **IPv4/ IPv6 Dual Stack**. Depending on the Network Mode, you have one or more additional settings to specify.
6. Configure the instrument's IP settings to match the LAN settings by doing one of the following:

If you specified IPv4 as your network mode, specify the following settings:

IPv4 Address Mode

DHCP

Use Vendor ID – Enter your Vendor ID if your network requires a Vendor ID.

Use User Class – Enter your User Class if your network requires a User Class

Use Arp Announce – If required, enable Arp Announce to have the instrument do the Arp announce after the DHCP request.

Static

IPv4 Address – Enter the instrument's IP address.

IPv4 Netmask – Enter the netmask address to indicate whether the packets are to be routed to other networks or sub-networks.

IPv4 Gateway – Enter the address for the gateway that is used to route packets that are not on the same subnet.

IPv4 DNS Server – Enter the address of the DNS server.

Shared – Share the IP from another interface (for the multi-interface mode).

If you specified IPv6 as your network mode, specify the following settings:

IPv6 Address Mode

DHCPv6

DHCPv6 Request Type

Address **–** Specify the address.

Prefix **–** Specify the prefix.

Stateless

IPv6 DNS Address Mode

DHCPv6 – No additional settings to specify.

Manual – Enter the IPv6 DNS Server address.

Static

IPv6 Global Address – Enter the instrument's IPv6 address to access the global network.

IPv6 Local Address

Manual – Enter the IPv6 Local Address.

Automatic – The address is populated automatically.

IPv6 Subnet Prefix Length – Enter the subnet prefix length.

IPv6 Gateway – Enter the address for the gateway that is used to route packets that are not on the same subnet.

IPv6 DNS Address Mode

DHCPv6 – No additional settings to specify.

Manual – Enter the IPv6 DNS Server address.

If you specified IPv4/IPv6 Dual Stack as your network mode, specify the following settings:

IPv4*/IPv6 Dual Stack Address Modes*

Static – See the IPv4 Address Mode in this section.

Stateless – See the IPv6 Address Mode in this section.

7. Display the **Tray** menu, and then press **Network** to establish the connection. The instrument establishes an Ethernet connection to the LAN.

2.10.2. Establishing a WiFi Connection

The WiFi option allows you to establish a WiFi connection to a wireless network to 1) Synchronize your instrument to the StrataSync™ server, 2) Export reports, screenshots (using FTP), or 3) Update the firmware on your instrument.

Adding a WiFi Network Profile

If an access point does not broadcast its Service Set Identifier (SSID), you can manually create a profile for a WiFi network. Your instrument will save the profile, then automatically authenticate and establish a connection to the network if 1) network connectivity is enabled, 2) the network's access point is in range, and 3) the network is determined to provide the best available access point (based on signal strength and/or encryption supported).

The instrument can save up to 32 WiFi network profiles.

> **Note:** Your instrument will automatically save a profile after successfully connecting to a new WiFi network.

1. Verify that network connectivity is enabled.
2. Go to the **System** menu, then press **Network**. The System Network menu appears.
3. Select the **WiFi** button at the bottom of the menu. Your instrument immediately scans for WiFi networks and lists each network as an item.
4. Press Add Network. The Add WiFi Network menu appears.
5. Specify the following settings:

   SSID – The SSID (Service Set Identifier) of the WiFi network.

   Password – The password required to authenticate to the network. A password is not required if Key Management is set to None.

   Key Management – Open, WEP, or WPA/WPA2 Personal.

   Network Mode – IPv4, IPv6, or IPv4/IPv6 Dual Stack. Depending on the Network Mode, you have one or more additional settings to specify. For details, see those areas earlier in this section.

6. Return to the System Network menu. The network that you created a profile for is listed on the menu.

> **Note:** Hidden SSIDs are not currently supported. To connect, un-hide the SSID, connect the AVX-10K and re-hide the SSID or leave the SSID unhidden.

Connecting to a WiFi Connection

You can manually connect to any compatible WiFi network that is within range of your instrument, and for which you have authorized access (and a password for authentication).

1. Verify that network connectivity is enabled.
2. Go to System, then press Network. The System Network menu appears.
3. Select the WiFi button at the bottom of the menu. Your instrument immediately scans for WiFi networks and lists each network as an item.

   • A lock indicates that authentication is required to connect to a network.

   • Saved, In Range – A profile for the network has been saved on your instrument, and a connection can be established to the instrument.

   • Saved, Out of Range – A profile for the network has been saved on your instrument, but the network is out of range (and therefore, a connection cannot be established).

   • Incompatible – A connection cannot be established to a network.

   • Connected – The instrument has already established a connection to the network.

The instrument automatically connects to the network determined to provide the best available access point (based on signal strength and/or encryption supported).

4. If you want to connect to a different network, press the SSID of the WiFi network. A screen appears with items that allow you to specify advanced settings (profile settings), forget a saved network, or connect to the network.

5. Press Connect.
   • Messages appear briefly indicating the instrument is performing a four-way handshake, then authenticating to the network.
   • The status of the connection (Network Up), and details concerning the connection (IP address, netmask, gateway, and DNS server) appears at the top right of the menu.

The instrument is connected to the WiFi network.

2.10.3. Establishing a Wireless Connection

The Wireless option allows communication with a paired mobile device.

Enable Wireless Connectivity

Wireless functionality must be enabled on the device before a Wireless connection can be established.

1. Navigate to the Wireless panel (System Settings > Wireless button).
   - The Wireless panel is displayed.
2. Select the tick box to Enable Wireless.
   - Wireless connectivity is enabled.

Connecting to a Wireless Device

You can establish a connection to any Wireless device that is within range of your instrument, and for which you have authorized access.

1. Go to the System Settings menu, then select Wireless. The Wireless Settings menu appears.
2. Press the box next to Enabled. A checkmark appears.
3. Press Scan for devices. The instrument scans for Wireless devices, then lists the devices on the menu.
4. Select the device to connect.
   - If the instrument successfully authenticates to the device, a message appears indicating that pairing was successful.
   - If the instrument does not successfully authenticate to the device, a message appears indicating that pairing failed.

If pairing was successful, you can use the instrument with the paired device.

2.10.4. Synchronizing to the StrataSync™ Server

StrataSync™ is a hosted, cloud-based software application that provides VIAVI instruments with access to asset, configuration, and test-data management functions. StrataSync™ manages inventory, test results and performance data with browser-based ease and improves technician and instrument efficiency.

Features include the following:

- Tracking ownership of the AVX-10K test set
- Pushing configuration settings (templates) to the AVX-10K test set
- Receiving configuration settings from the AVX-10K test set
- Adding and/or removing software options on the AVX-10K test set
- Updating the software on the AVX-10K test set
- Uploading and storing of test reports, screen shots, and configurations

To obtain the latest configuration settings, software options and updates, and ownership registration information, the AVX-10K can synchronize with a VIAVI server via the Internet. The synchronization also stores any user files stored on the unit to the StrataSync™ server.

StrataSync™ synchronization should be performed often, as part of the instrument's operator level maintenance procedures to assure the latest firmware is installed.

To establish a StrataSync™ account refer to the Quick Start Guide for additional information and visit https://www.viavisolutions.com/en-us/products/stratasync and click the REQUEST AN ACCOUNT link.

Preliminary Step

Obtain or verify server settings with your company's IT organization.

Sync with StrataSync™

1. Specify the user information on the User Info menu.
    - A valid account ID must be entered in order to synchronize with the StrataSync™ server.
2. Open the System menu and select the StrataSync™ button. The StrataSync™ settings menu appears.
    - Specify the settings:

      StrataSync™ Account ID - Enter the account identification number. Only change this if necessary.

      StrataSync™ Tech ID/User ID- Enter the technician/user identification number.

Server Address - Enter the DNS address for the server. The default address is:

"https://stratasync.viavisolutions.com"

Server Port - Enter the server port number. The default port is: 443

3. Select the Start button. As the process runs, the sync state is displayed on the screen.

    - Upon synchronization with the StrataSync™ server, the device will send the following information to the server:

        - The device's serial number.
        - The device's hardware information - assemblies and their revision levels.
        - The device's MAC address.
        - The device's User settings - name (user/technician) and ID.
        - Software update milestones (includes status and warnings, if applicable)

    If the configuration information contained on the server is newer than the information on the unit, the server will be considered to be the most up-to-date.

    - The server will then send any files to the unit being synchronized that it determines are newer than those on the unit.
    - The device will then send any Reports, Configuration profiles, XML results, screen shots, etc. that have been saved on the unit since the last configuration.
    - The server then applies any applicable Options to the device.
    - If any upgrades are available, the user will be informed of the update availability and offered the choice to upgrade.
    - When synchronization is complete, the Status will indicate "Sync Complete". The device may be disconnected from the server.

2.10.5. Updating Test Set Software

StrataSync™ Update Procedure

1. From the StrataSync™ account, select “Update Firmware” from the Assets Menu and click the rocket ship icon next to the version of the software to install.

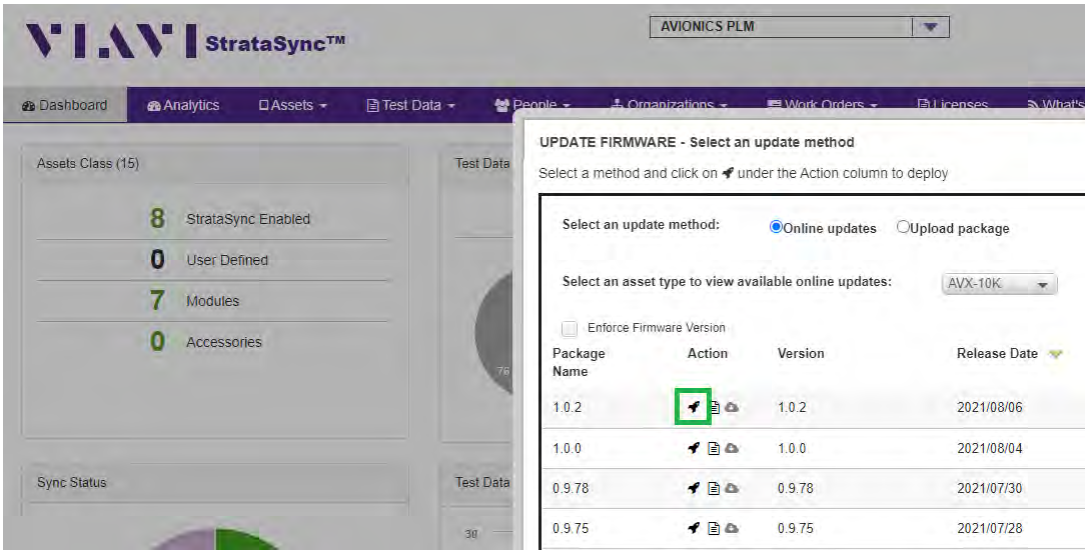


Figure 16: StrataSync™ Update

2. Locate the test set (or test sets) that you would like to update and click the box in the left-most column and “YES” on the next screen to proceed.
3. Then from the AVX-10 test set that has been targeted for update, select the START button from the StrataSync™ page. Follow the prompts to finalize software update. The unit will shutdown after the update is complete.

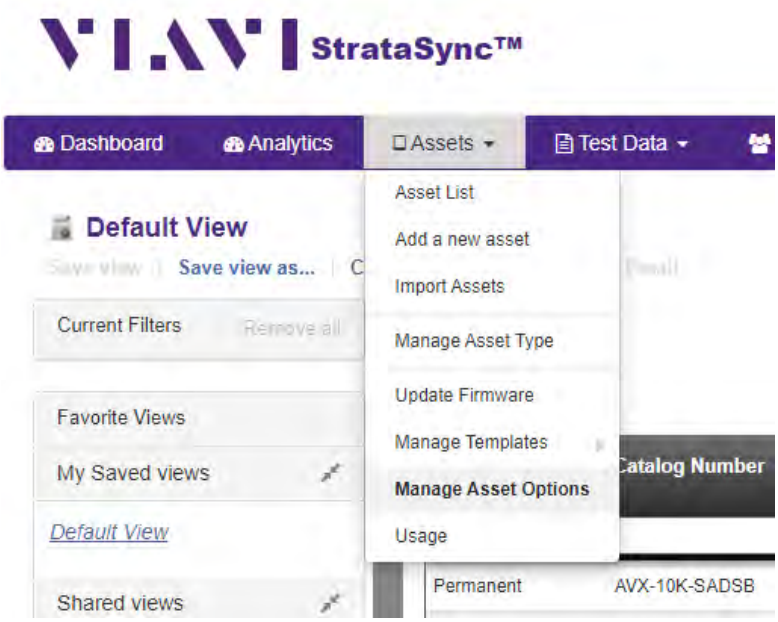
USB Update Procedure

> **Note:** Disconnect Ethernet cable connections before proceeding with the software update.

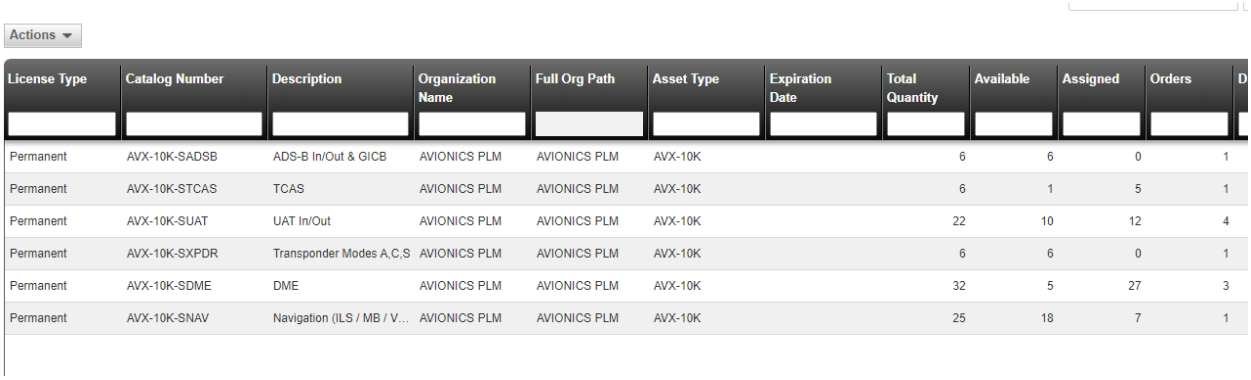
1. Navigate to the AVX-10K Software Download Page:
   - https://www.viavisolutions.com/en-uk/software-download/avx-10k-flight-line-test-set
2. Select the latest/desired software version release.
3. Download the file to your PC.
   a. There are two files – The Software and the Release Notes.
   b. VIAVI Solutions advises reviewing the release notes prior to upgrading.
   c. The Software file is in .oxu format (approx. 200-300MB size) and needs no special file structure or unzipping.
   d. Do not alter the filename.
4. Prepare a USB Drive as FAT32 file format.
   a. VIAVI Solutions advise a freshly formatted USB Drive from a reputable manufacturer, preferably with no other files on it.
5. Copy the .oxu file from step 3 to the root directory of the USB Drive.
6. Safely Eject and remove the USB Drive from your PC.
7. Ensure the AVX-10K is connected to a power source.
8. Insert the USB Drive into either of the two USB slots on the right-hand access panel of the AVX-10K.
9. Navigate to “System Settings” from the Menus.
   a. Select “USB Software Update”.
   b. The AVX-10 will automatically prompt you for the file on the root directory of your USB Drive.
   c. Accept the pop-up from stage ii.
   d. Ensure “Force Software Update” is selected.
   e. Press the “Update” button at the bottom right of the display.
   f. Review the pop up ensuring that the “Currently installed” and “To Be Installed” are both in line with what you expect.
10. The unit will now switch to a basic VGA-style blue screen to start the process. This process can take up to 15 minutes.
11. Once the process is complete, the unit will shut down itself. Remove the USB Drive at this point and power the unit back on.
12. Once the AVX-10 has booted, navigate back to “System Settings” from the Menus
    a. Select “Hardware & Software Revisions”.
    b. Ensure that “SW Bundle” header and “Solution” panel on the list reflect what you expect/SW installed.

2.10.6. Updating Software Options on AVX-10K

1. From the StrataSync™ account, select “Manage Asset Options” from the Assets Menu at the top of the screen.

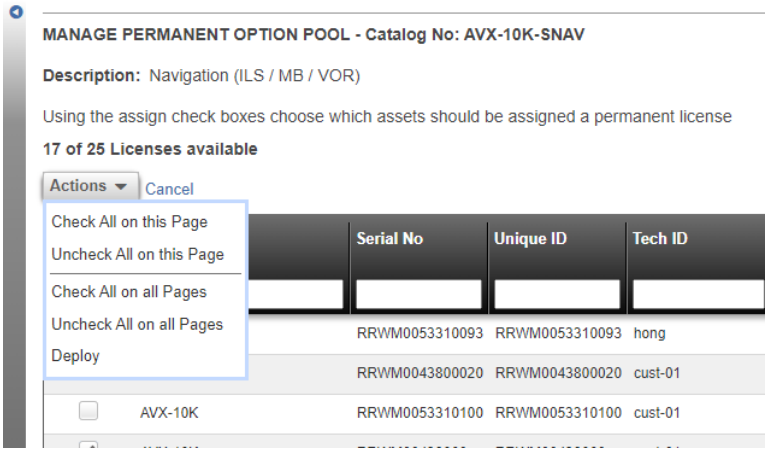


2. All available software options will be displayed along with the available quantity for distribution.


Actions

License Type	Catalog Number	Description	Organization Name	Full Org Path	Asset Type	Expiration Date	Total Quantity	Available	Assigned	Orders	D
Permanent	AVX-10K-SADSB	ADS-B In/Out & GICB	AVIONICS PLM	AVIONICS PLM	AVX-10K		6	6	0	1	
Permanent	AVX-10K-STCAS	TCAS	AVIONICS PLM	AVIONICS PLM	AVX-10K		6	1	5	1	
Permanent	AVX-10K-SUAT	UAT In/Out	AVIONICS PLM	AVIONICS PLM	AVX-10K		22	10	12	4	
Permanent	AVX-10K-SXPDR	Transponder Modes A,C,S	AVIONICS PLM	AVIONICS PLM	AVX-10K		6	6	0	1	
Permanent	AVX-10K-SDME	DME	AVIONICS PLM	AVIONICS PLM	AVX-10K		32	5	27	3	
Permanent	AVX-10K-SNAV	Navigation (ILS / MB / V...	AVIONICS PLM	AVIONICS PLM	AVX-10K		25	18	7	1	

3. Double-click on the option that you wish to deploy and select the AVX-10K that you wish to enable with this software option. Ensure that the serial number of the AVX-10K is the correct device. Click the checkbox to the left of the selected AVX-10K and choose “Deploy” from the Actions pulldown.



4. You should receive a response indicating that the software option has been deployed. Go to the StrataSync application on the AVX-10K that the software option has been deployed to and press the Start key in the lower right corner. This will enable this AVX-10K to utilize this software option.

3. Test Application Common Settings / Steps

3.1. Antenna Setups

3.1.1. Direct with Coupler

This is one of the more common test setup methods where the AVX-10K RF I/O port is cabled to a coupler which is then mounted over or clamped to an antenna. When using this setup, the cable loss as well as the coupler loss must be considered. These values can be entered in the Setup tab.

3.1.2. Over the Air

The AVX-10K can also be used to test the onboard equipment using the over-the-air test setup. When using this setup, the antenna gain, the height of the antenna and the distance from the antenna must be considered. These values can also be entered in the Setup tab. The antenna gain values can be found on the label of the antenna.

Caution: Testing over-the-air with ADS-B transponder turned on can cause interference with ATC and nearby aircraft. Utilize antenna couples and proper shielding where applicable and refer to SAFO 17002 and follow proper procedures to avoid.

Three antennas are shipped with the AVX-10K-CNS kit. The larger panel antenna (AC10K-FPANT) is intended for use with all Transponder, TCAS, Target Generation and the DME Applications.

The other two antennas (AC10K-ANT-ILS and AC10K-ANT-MB) are intended for use for Navigation, COMMs and ELT Testing. The AC10K-ANT-ILS antenna has a rubber base and can be extended. The AC10K-ANT-MB antenna is short, non-extendable and rubber encased (shown below on the right).

The intended usage for these antennas is described here:

Antenna	Usage
AC10K-ANT-ILS	Non-extended Usage: Glide Slope testing; Marker Beacon; ELT 406 MHz Testing Extended Usage: Localizer and ELT 121.5/243 MHz Testing
AC10K-ANT-MB	Specific Marker Beacon Testing (Testing for MTL levels)

Note: For most cases of ILS Testing (including Marker Beacon), the extendible ILS antenna alone should be sufficient.

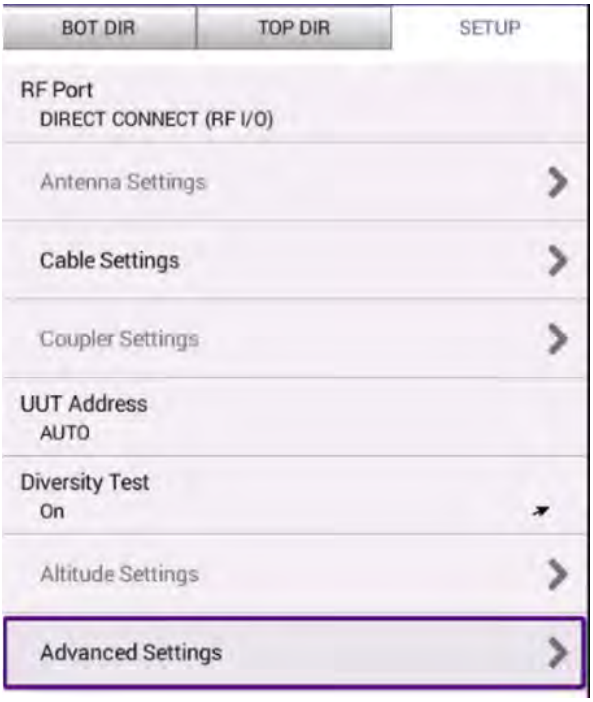
3.1.3. Direct to UUT

On occasion, the AVX-10K may need to be directly connected to the UUT bypassing the antenna and cabling. When using this setup, only the cable loss will factor into the setup parameters.

3.2. Common Setup Parameters

There are settings that are duplicated across many applications within the AVX-10K. This section will detail those common settings of applicable test applications from the SETUP tab. These include:

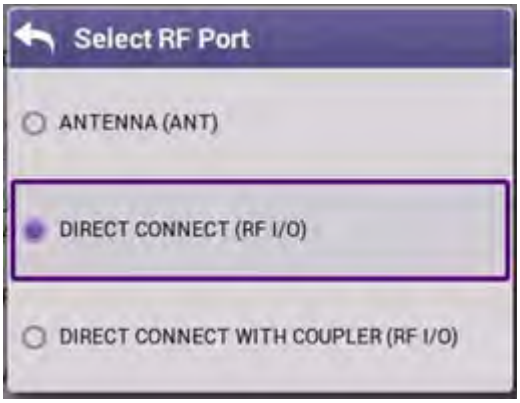
- “RF Port” (Antenna, Direct Connect, Direct Connect with Coupler)
- “Antenna Settings” (Range, Height, Gain [1.03 GHz, 1.09 GHz])
- “Cable Settings” (Cable Length, Cable Loss)
- “Coupler Settings”
- “UUT Address”
- “Position Settings” (Entry Method, Latitude, Longitude, Format)
- “Advanced Settings” (Check All UUT Capability, Verify Unit Setup Configuration)



All application-specific settings will be discussed in the associated application sections below.

3.2.1. RF Port

There are three methods for any typical test setup: Direct Connect with Coupler (RF I/O), Antenna (over-the-air), and Direct Connect. The RF Port setting allows you to select the test method.

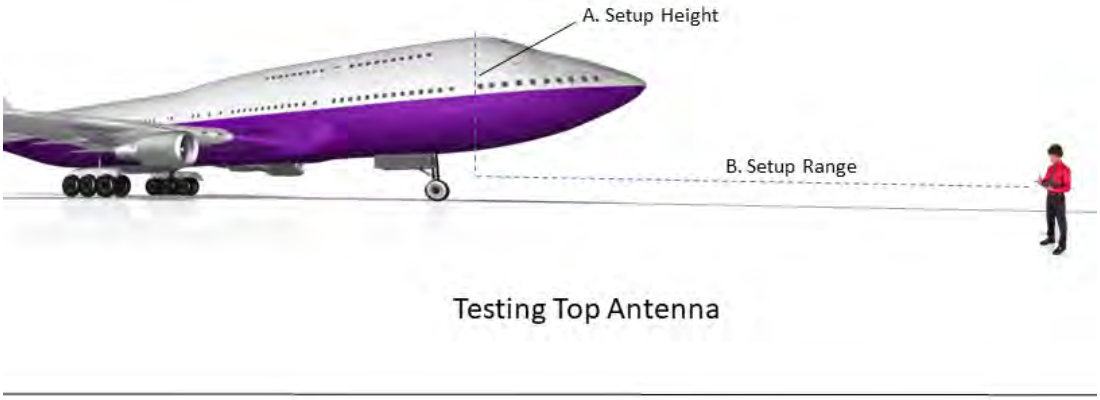


3.2.2. Antenna Settings

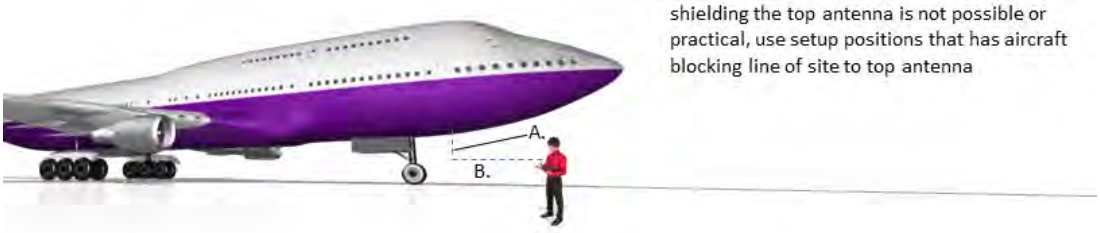
When ANTENNA is selected as the RF Port in use, applicable settings will become active. Set Top and Bottom Antenna Range and Height in accordance with the figure below. Values can be selected by scrolling the vertical bar or using the plus and minus keys.

> **Note:** Top and Bottom settings are both available only when Diversity Test (an application-specific setting) is ON. Otherwise, only Bottom Antenna settings will be available.

Figure 17: Antenna Settings.



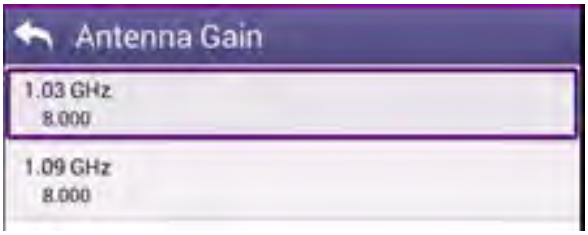
Testing Top Antenna



NOTE: When deselecting, terminating or shielding the top antenna is not possible or practical, use setup positions that has aircraft blocking line of site to top antenna

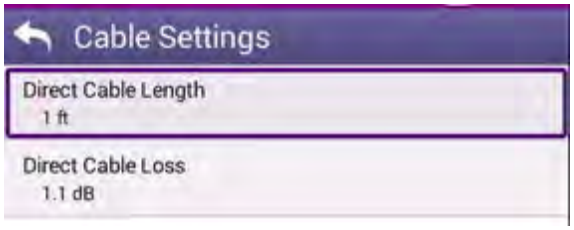
Testing Bottom Antenna

Set Antenna Gain values for 1030 MHz and 1090 MHz located on the back of the RF flat panel antenna.



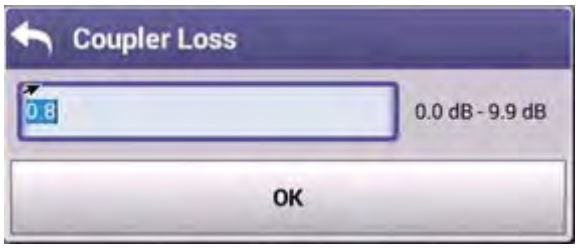
3.2.3. Cable Settings

The Cable Settings will be enabled when Direct Connect or Direct Connect with Coupler are selected as the RF Port setting. Setting the Cable Length will drive an estimated cable loss. If exact cable loss is known, entering the value will override the provided estimate.



3.2.4. Coupler Settings

Coupler Settings will be enabled if Direct Connect with Coupler is selected as the RF Port setting. Enter the loss of the coupler being used. These values should be listed on the coupler label.

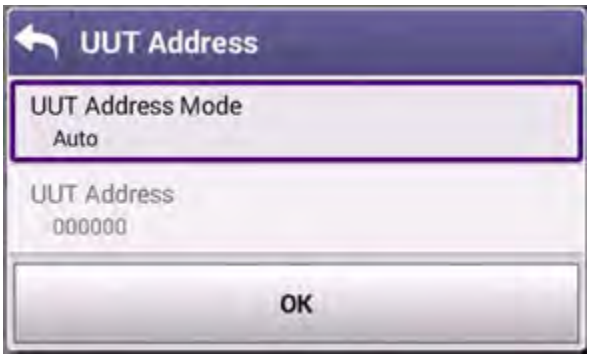


3.2.5. UUT Address

For transponder related tests, the Unit Under Test (UUT) Address can be set to Auto or Manual. If set to Manual, you may enter the 6-character Hexadecimal address of the device being tested. When set to Auto, the test will interrogate the UUT and use the address in the reply as the UUT Address.

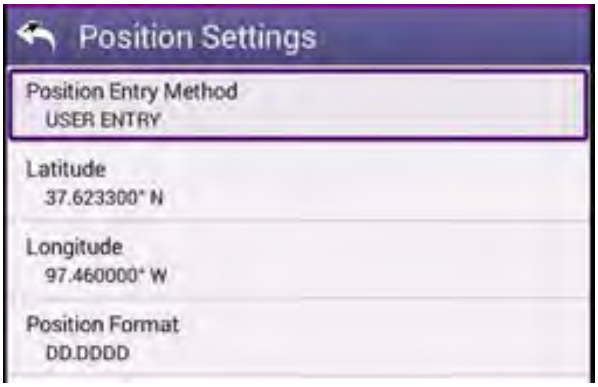
Note – for the UUT to respond to a MODE S ALL-CALL, the aircraft must be in the airborne condition.

Manual Mode is used to target a specific aircraft under test when the aircraft under test is being tested while on the ground or in a multi-path environment.



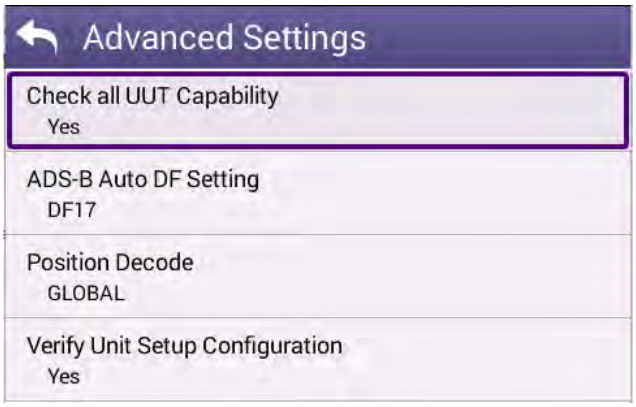
3.2.6. Position Settings

This setting allows you to set the position used for ADS-B and TCAS related testing. You can select USER ENTRY or VIA GPS RX. The GPS Receiver will allow you to use your local position. If needed, you can obtain your position using the GPS RX functionality of the AVX-10K. GPS Position Format can be set to be displayed in Degrees, Degrees Minutes, or Degrees Minutes Seconds.

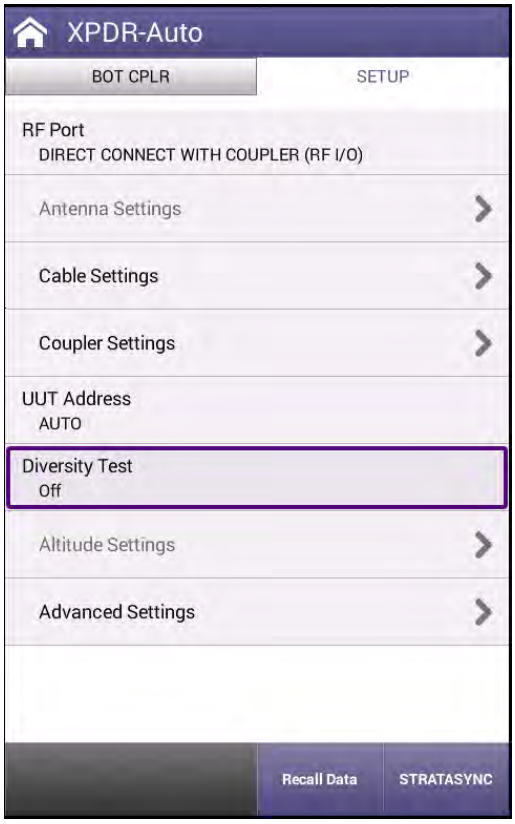


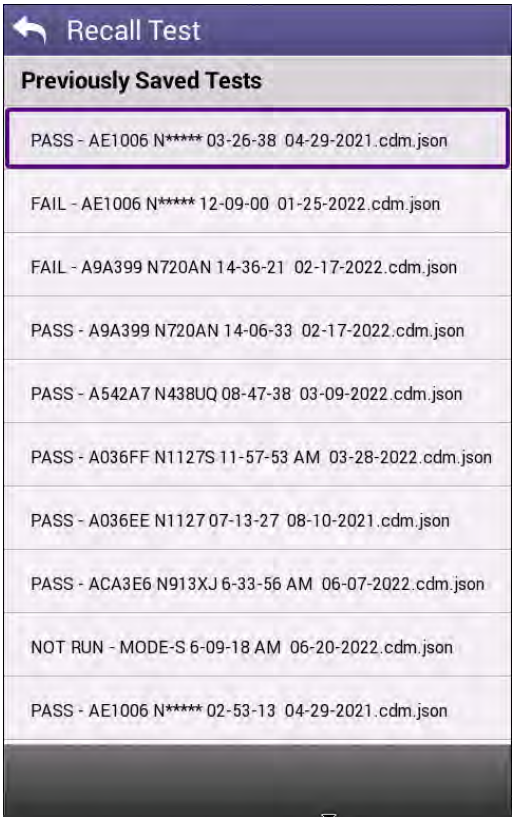
3.2.7. Advanced Settings

- **Check All UUT Capability –** for Transponder and ADS-B applications, all test parameters the UUT is capable of will be tested. This is typically always set to Yes.
- **ADS-B Auto DF Setting –** Choose DF17 (typical – for Mode S transponders) or DF18 (1090MHz emitters). Most often this should be left as DF17. The DF18 option is used for beacons placed on obstacles around airports or in vehicles that are travelling around aircraft.
- **Position Decode –** Choose Global (most common, decodes two consecutive squitters to determine position) or Local (uses one squitter and entered GPS LAT/LON position to determine position)
- **Verify Unit Setup Configuration –** when set to YES, this will cause a pop-up screen to appear after the RUN button is selected, allowing the user to verify the AVX-10K is set up correctly prior to running the test. Setting this to NO will disable this popup screen.

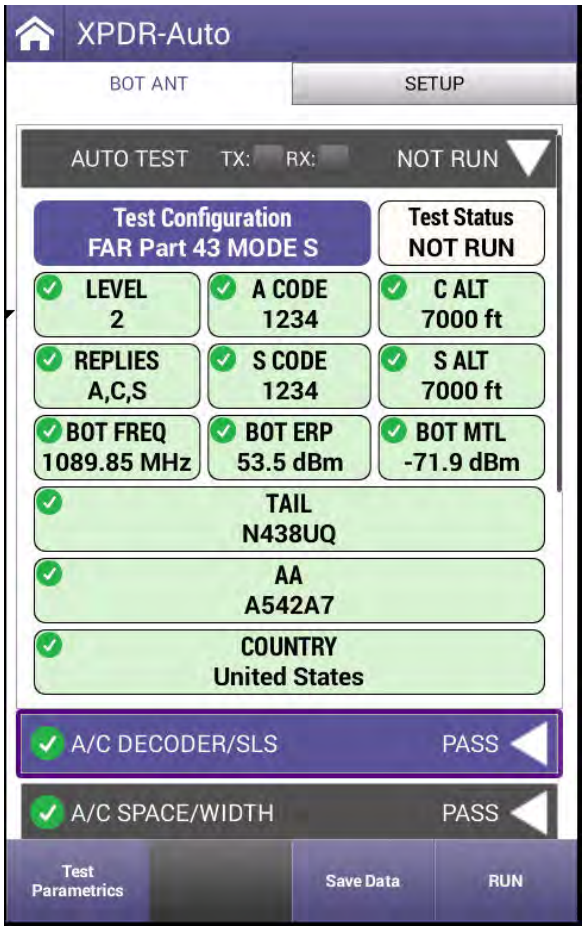


3.2.8. Recall Data Button





At the bottom of most SETUP screens is a “Recall Data” button. Pressing this button will bring up a list of Previously Saved Tests. You can select any of these tests and then press the LOAD key and the main screen of the associated instrument will populate the fields and display the data in the state that it was displayed when the SAVE was performed. This is an optional way to view report data.

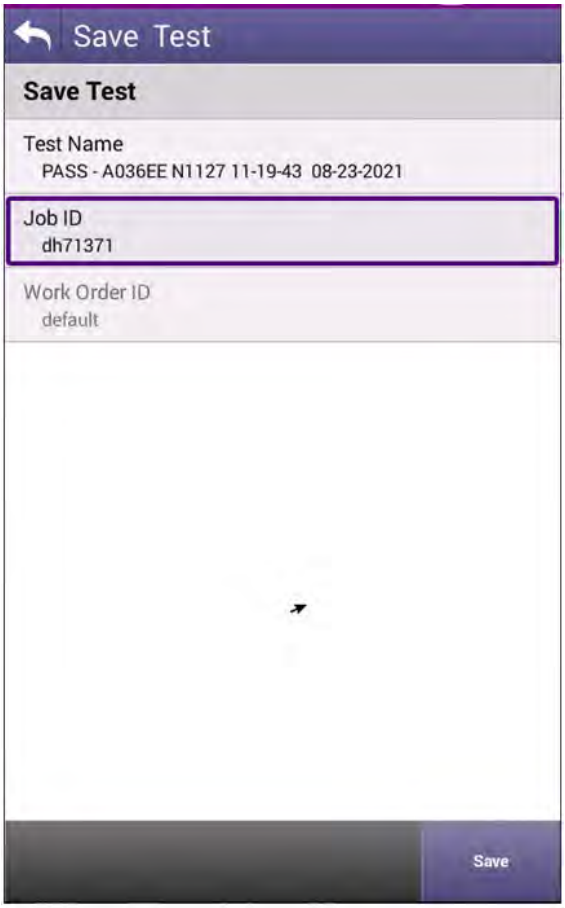


Note: Overall Test Status and Ribbon Title may show “NOT RUN”, but all of the fields below will be populated.

3.3. Managing Files / Reports via USB and StrataSync™

3.3.1. Saving Reports

After running a test or collecting monitored information, press SAVE to access the Save Test screen.



The Test Name can be overwritten or used as provided and saved locally by selecting the Save button. The Job ID field is an open comments field that can be used for report filtering and within the StrataSync™ application. Work Order ID is not used for this application.

Reports can then be saved onto a USB drive or sync'd with the StrataSync™ application.

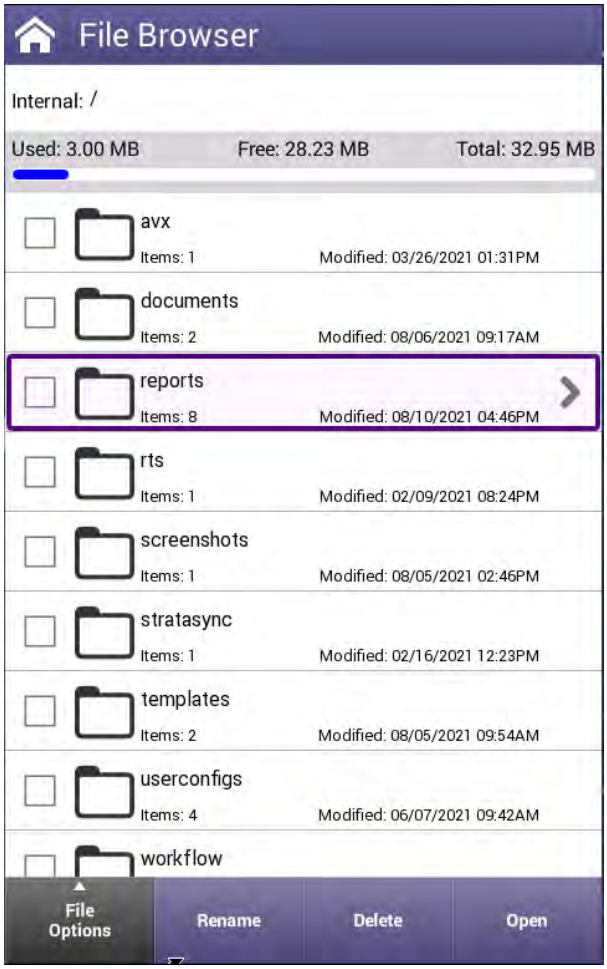
3.3.2. File Management

The AVX-10K file browser is used to open, rename, copy, or delete saved test result files, screen shots, or other files stored on the device.

Open the File Browser

Expand the System ribbon and select the File Browser icon.

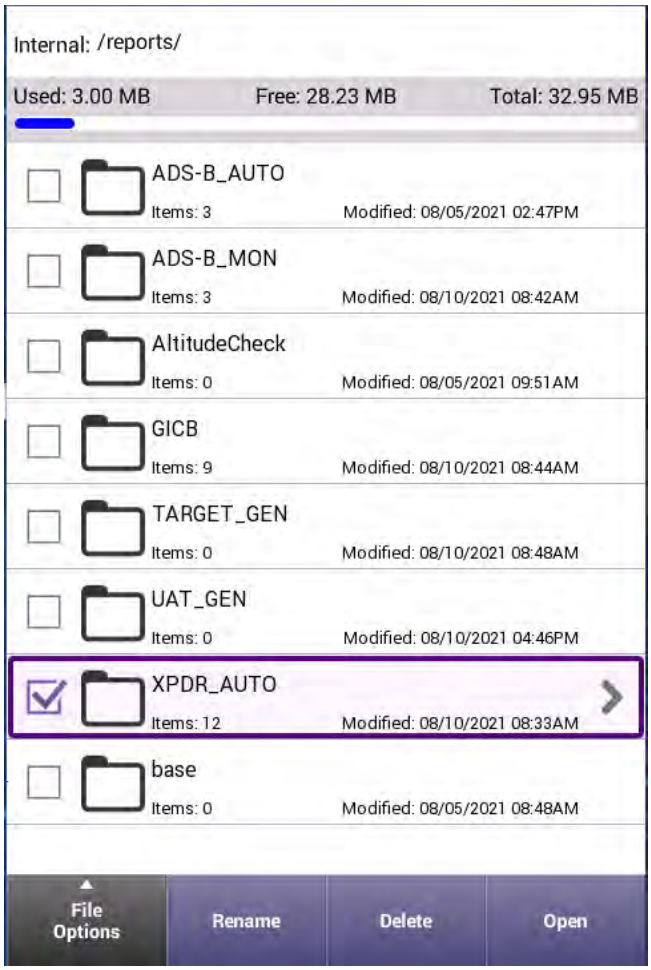
Use the up and down arrow keys to navigate folders or files.



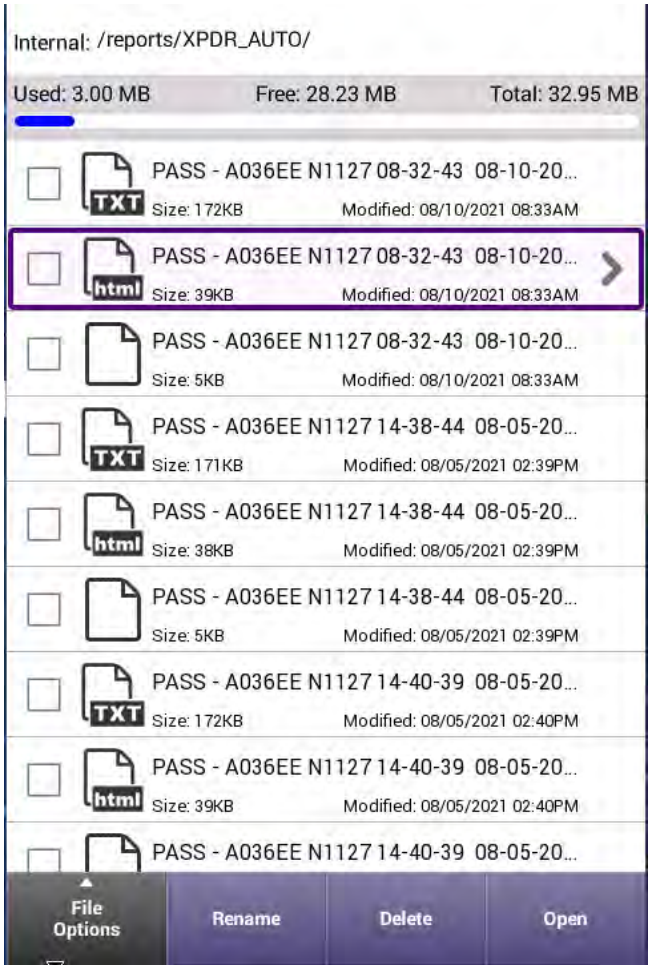
Opening a File or Folder

You can open a folder using any of the following:

- Check the box next to the folder and select Open at the bottom of the page
- Tap anywhere on the folder field you wish to open
- Using the up/down arrow keys and the OK button



Once opened, a list of test results are shown in TXT, HTML and .json formats.



TXT and .json formats can be exported and formatted by users for report generation in supporting programs. HTML format is readable on the device as shown below and as a downloaded file / test report. Note – in the tray there is a View Reports icon where all HTML reports can also easily be viewed on the device. This is the quickest and most concise way of viewing reports.


PASS - A036EE N1127 08-32-43 08-10-2021.html

Test Report

Date	8/10/2021, 1:30:03 PM (UTC-05:00)
Tech ID	kc01
Work Order	default
Test Status	PASS
Address	A036EE
Tail	N1127
Job ID	dhsquitterfix

AC DECODER SLS

Result	Bot Value	Top Value
DecoderA Inner Low	PASS	N/A
DecoderC Inner Low	PASS	N/A
DecoderA Inner High	PASS	N/A
DecoderC	PASS	N/A

Copy Files or Folders

1. Open the File Browser.
2. Select a file or folders. Multiple folders can be selected for download by checking the box next to the folder (for example, to copy multiple files to USB, or upload multiple files using FTP/ HTTP).
3. Press the **File Options** system key, and then perform one of the following:
    - Select **Copy**, navigate to another folder or drive, press the **File Options** system key, and then select **Paste**.
    - Select either **Copy to USB** if you are using File Browser or **Copy to Internal** if you are using the USB File Browser.
4. The file is copied and the File Browser menu appears.

Upload Files

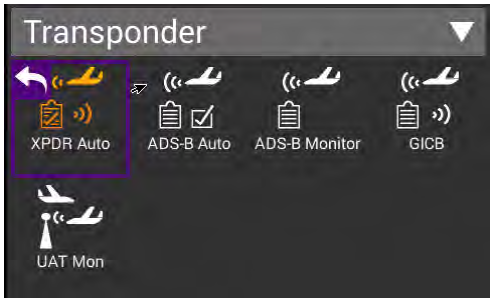
1. Open the File Browser.
2. Select a file or folder.
3. Press the **File Options** system key, and then select **Upload FTP/HTTP**.
    - The Upload settings appear.
4. Specify the Upload URL, Username, and Password.
5. Select and press the Apply button to start the upload.
    - When the upload finishes, a message appears stating that the selected files were uploaded.
6. Press OK to close the dialog window.

USB File Manager

When a USB drive is inserted into one of the USB ports on the side of the test set, the USB File Browser icon will appear in the system tray. All of the File management steps described above are available for this device.

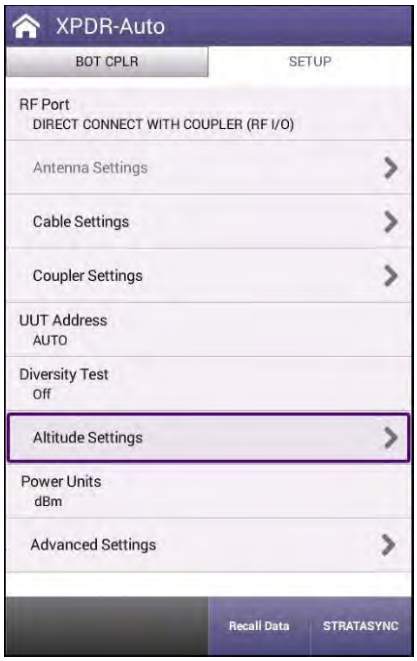
4. Transponder

4.1. XPDR Auto



4.1.1. Unique Setup

Refer to Chapter 3 for common setup items.



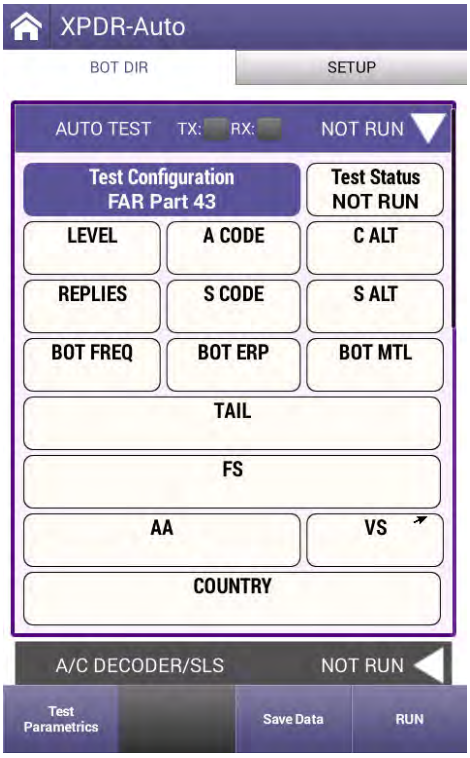
Setting	Definition
Diversity (on, off)	Set to 'On' to test both top and bottom antennas for a diversity system and Diversity Isolation Test
Altitude Settings	This item gets enabled when ALTITUDE CHECK is selected as the Test Configuration. Here you can enter various Altitudes that will get stepped through when running the ALTITUDE CHECK test.
Power Units	Allows for measured power to be displayed in Watts or dBm.

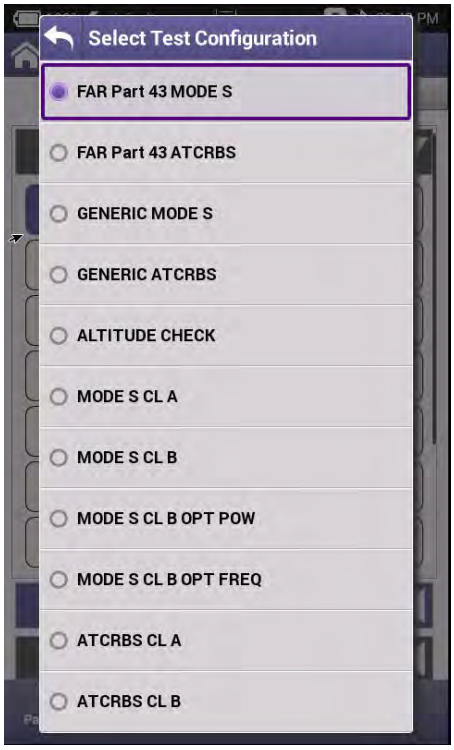
Setting	Definition
Advanced – RAD47	An Australian directive for civil aviation where the reply pulse width is between 0.35 to 0.55 us and amplitude variation (droop) is not greater than 1dB. Set to ON if applicable.

4.1.2. Run Transponder Auto Test

With the Transponder AUTO TEST ribbon expanded, you will see that the Test Configuration Box is shaded identifying it as an active field. By selecting this, it will show all available test configurations. Select desired test from the provided list.

Note: Transponder class and option identification are found on the transponder's TSO label.



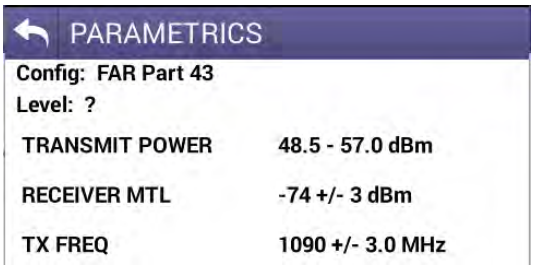


Configuration	Description
FAR Part 43 MODE S	Runs only the tests associated with FAR Part 43 Appendix F as required by 91-413 test requirements for Mode S Transponders
FAR Part 43 ATCRBS	Runs only the tests associated with FAR Part 43 Appendix F as required by 91-413 test requirements for ATCRBS Only Transponders

Configuration	Description
GENERIC MODE S	Tests Mode S transponders, specifically when the class of the transponder is unknown plus this test includes test requirements like EHS/ELS in addition to the FAR Part 43 Appendix F test.
GENERIC ATCRBS	Tests ATCRBS transponders, specifically when the class of the transponder is unknown.
ALTITUDE CHECK	Allows for altitude testing for up to 25 altitude settings.
MODE S CL A	Tests Mode S Class A transponders.
MODE S CL B	Tests Mode S Class B transponders.
MODE S CL B OPT POW	Tests Mode S Class B transponders equipped with Class A power option.
MODE S CL B OPT FREQ	Tests Mode S Class B transponders equipped with Class A frequency tolerance option.
ATCRBS CL A	Tests ATCRBS Class A transponders.
ATCRBS CL B	Tests ATCRBS Class B transponders.

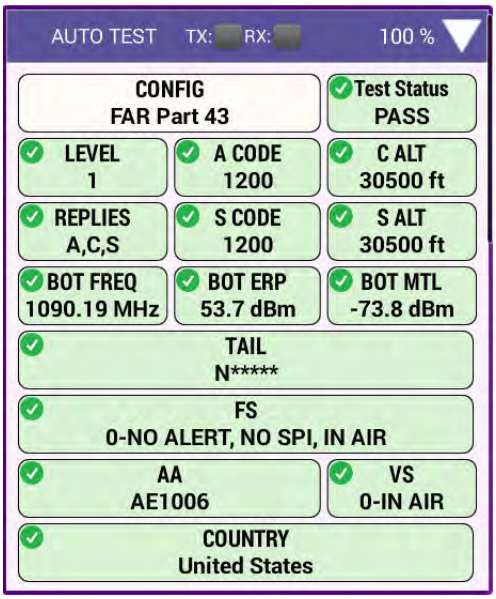
At the bottom of the page you will see the Test Parametrics button. 

By selecting this you will see the predefined limits applied to ERP, Frequency and MTL measurements for the test configuration selected.

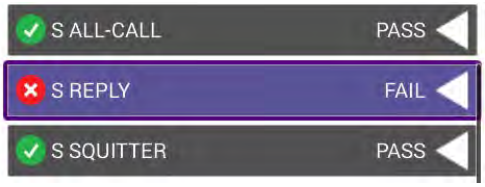


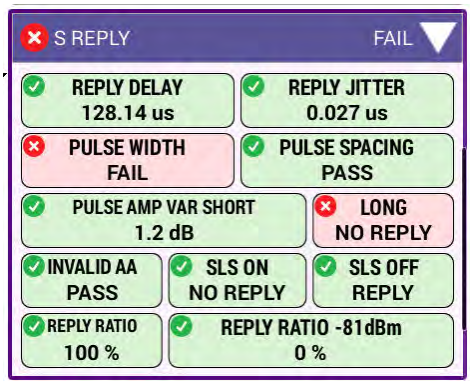
To run a complete test, select the Run button.

Once the test completes, the contents of the top summary ribbon will display pass/fail results.

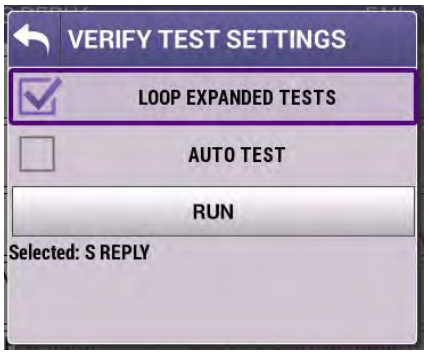


If any of the tests fail, you can open the associated ribbon to see the resultant failure.

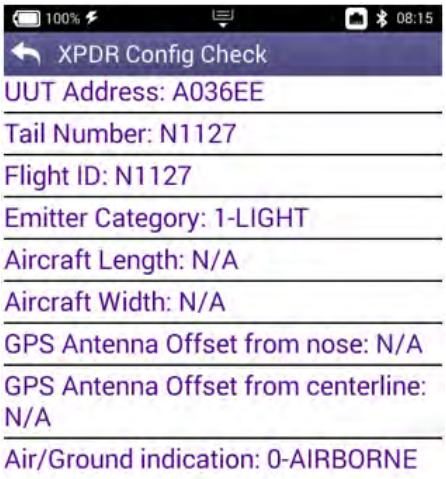




If any of the individual test ribbons are expanded and the Run button is selected, you will be asked if you want to loop on that specific expanded ribbon test, which will also include all expanded ribbons, or run a complete test. The expanded test options are listed below the RUN button.



After test completion, you can select the XPDR Config Check button to display specific decoded transponder configuration settings to ensure proper setup of the transponder under test. This is a beneficial tool for user verification of transponder configuration. For transponder configured fields, the AVX-10K only displays the decoded data and cannot determine PASS/FAIL criteria for these fields.

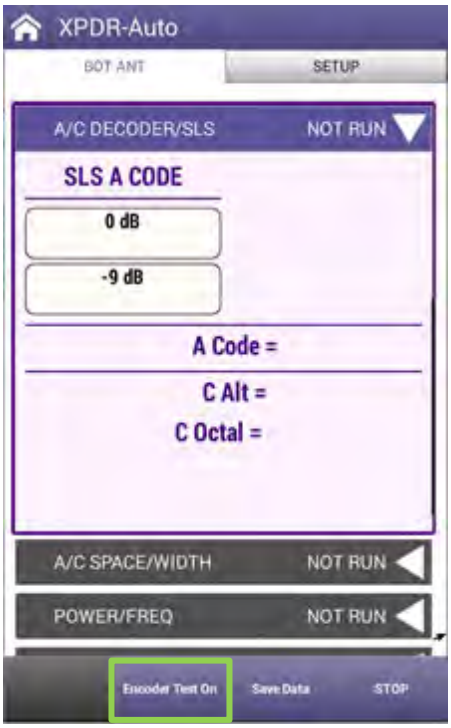


Note: In the test results, the nomenclature ITM refers to "Intermode". Intermode is when a Mode A or C Interrogation is tested along with a Mode S Interrogation. See Appendix A for more details on XPDR Auto Test Results.

4.1.2.1 Run Encoder Test

To capture altitude results with a faster interrogation rate, expand the A/C Decoder SLS ribbon, press the RUN button and select LOOP EXPANDED TEST. Press the RUN button then at the bottom of the

screen ensure that the Encoder Test On softkey is in the ON position. This setting will provide a faster interrogation rate to display the MODE C Altitude.

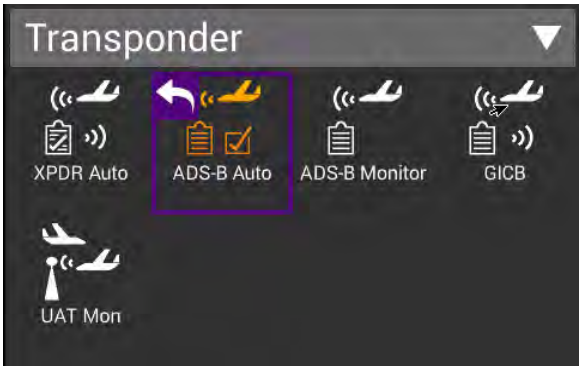


4.1.3. Common Test Results

Test Status Indication	Description
NOT RUN	RUN button has not yet been pressed
NO REPLY	UUT has not yet provided the information. UUT may be in ground state and will not reply to Mode S ALL-CALL. Transponders only replies to discrete interrogations when in ground state.
NOT CAPABLE	Test will not be run, as the UUT is not able to provide this information
PASS	Test concluded. PASSED.
FAIL	Test concluded. FAILED.

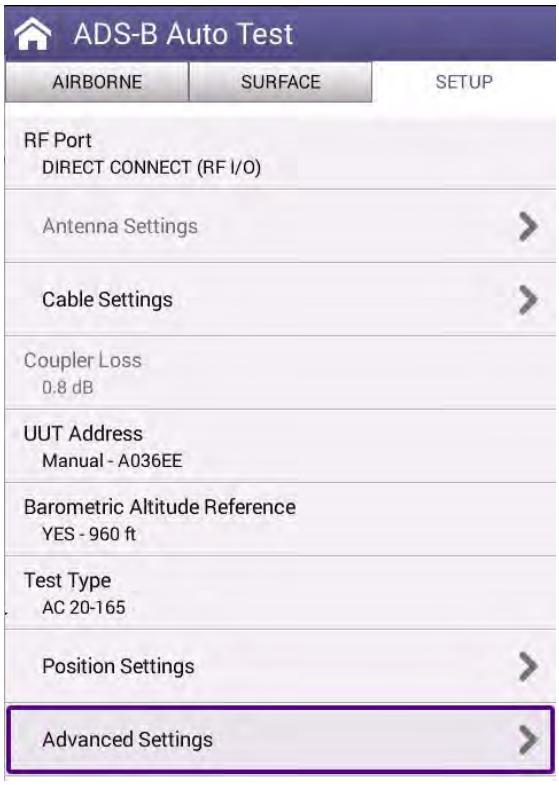
If you choose to save your test results, please refer to Chapter 3 for managing reports.

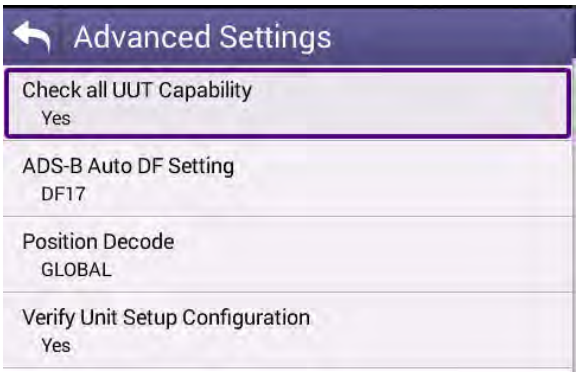
4.2. ADS-B Auto



4.2.1. Unique Setup

Refer to Chapter 3 for common setup items.

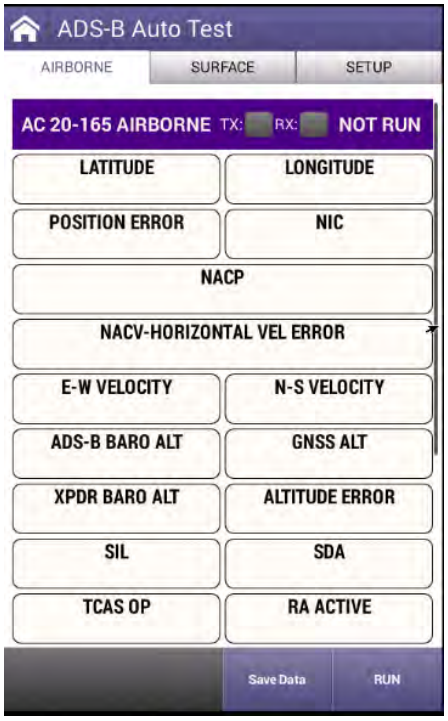




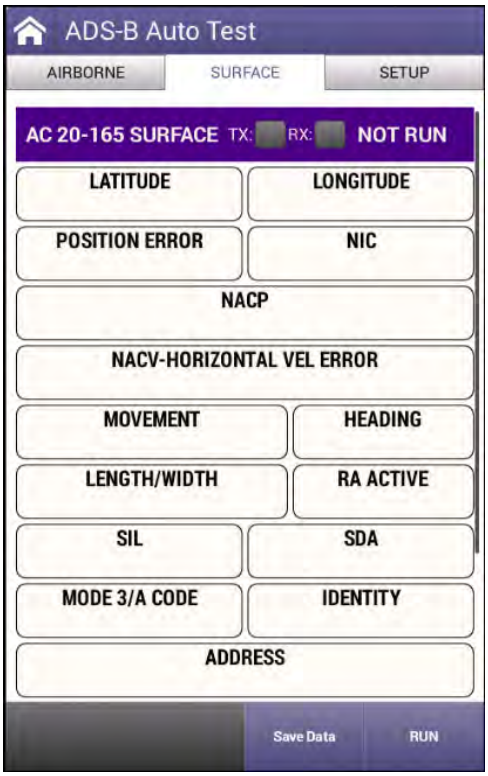
Setting	Definition
Barometric Altitude Reference	Set to 'YES' and enter test altitude for comparison to transponder reported barometric altitude
Test Type	Allows selection between AC20-165 FAA Advisory Circular for testing ADS-B installed systems and CS-ACNS applicable EASA requirements
Test Type > Aircraft Separation	If CS-ACNS test type is selected, select either 3 NM or 5 NM separation value.
Advanced – ADS-B Auto DF Setting	Choose DF17 (typical – for Mode S transponders) or DF18 (1090MHz emitters). Most often this should be left as DF17. The DF18 option is used for beacons placed on obstacles around airports or in vehicles that are travelling around aircraft.
Advanced – Position Decode	Choose Global (most common, decodes two consecutive squitters to determine position) or Local (uses one squitter and entered GPS LAT/LON position to determine position)

4.2.2. Run ADS-B Auto Test

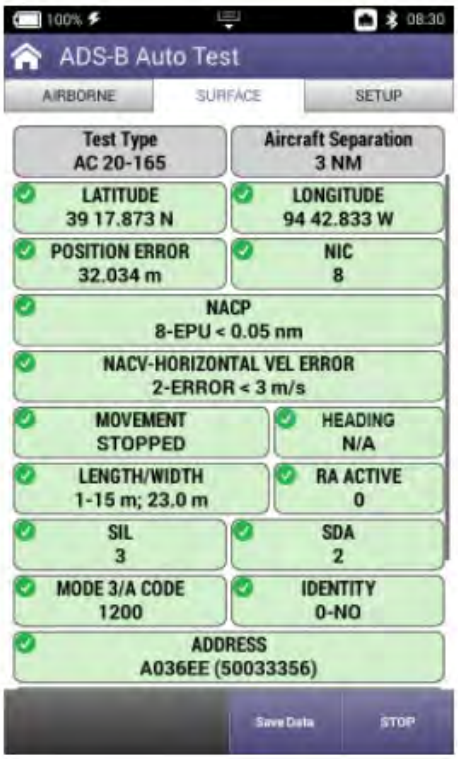
The ADS-B Auto test is a combination of Airborne and Surface testing. Once the test setup parameters have been entered, and with the Aircraft under test in the airborne state, move to the Airborne screen, and select the RUN key.



Once the Airborne tests have completed, move to the Surface screen, set the aircraft under test in the surface mode (weight on wheels) and select the Run button.



Once the testing completes successfully, the screens will look similar to this:



Note: If the HEADING field is displayed in yellow (typical), this is because the aircraft is stationary.

If you choose to save your test results, please refer to Chapter 3 for managing reports.

4.3. ADS-B Monitor

The AVX-10K provides flight line test capability for receiving (ADS-B Monitor mode), decoding and displaying full ADS-B DO-260/A/B DF17/DF18 extended squitter transmissions from Mode S transponders or DF18 extended squitters from 1090 MHz emitters.

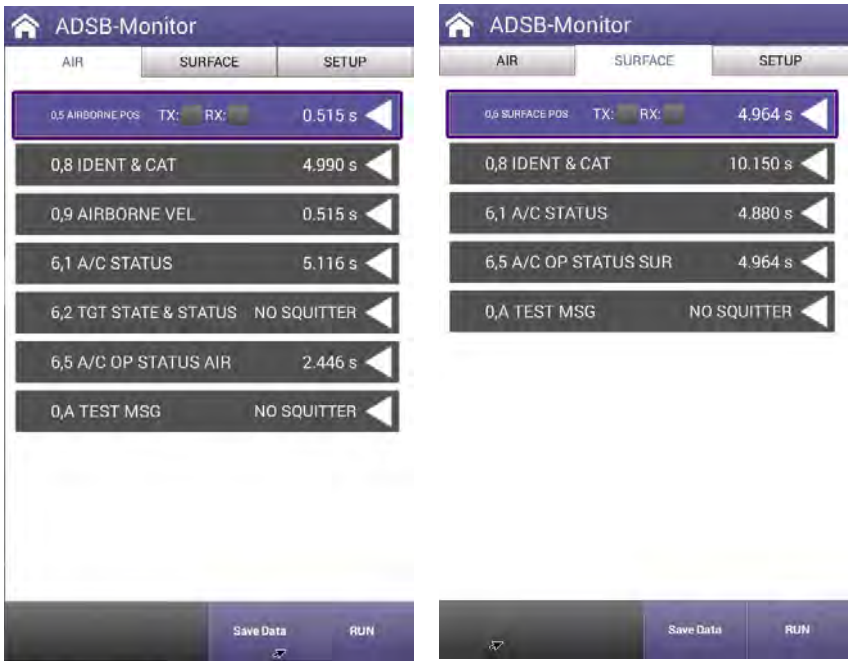
4.3.1. Unique Setup

Refer to Chapter 3 for common setup items.

Setting	Definition
Advance – ADS-B Auto DF Setting	Choose DF17 (typical – for Mode S transponders) or DF18 (1090MHz emitter). Most often this should be left as DF17. The DF18 option is used for beacons placed on obstacles around airports or in vehicles that are travelling around aircraft.
Advance – Position Decode	Choose Global (most common, decodes two consecutive squitters to determine position) or Local (uses one squitter and entered GPS position to determine position)

4.3.2. Run ADS-B Monitor

To monitor airborne or surface ADS-B messaging, press the associated tab and press the RUN key. For surface message monitoring, ensure that the test aircraft is in surface mode (weight-on-wheels is set to on).



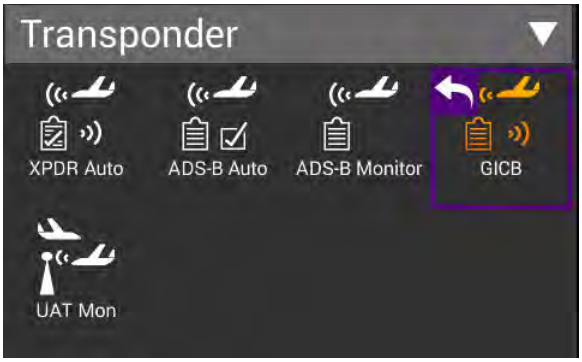
When running this test, the returned values can include:

- INTERVAL TIME (squitter has been captured)
- NO SQUITTER (squitter not captured)
- NO REPLY (no squitter was received)
- NOT RUN (test has not yet been run)
- BAD SETUP – This can happen for a number of reasons:
    1. An ADS-B Version Number earlier than DO-260B is being broadcast
    2. The RF input was overloaded at the beginning of the test (usually indicates that antenna range/height and/or cable loss values are incorrect.

If you choose to save your results, press the Save Data softkey and please refer to Chapter 3 for managing reports.

4.4. GICB

GICB mode fully decodes and displays all Enhanced Surveillance BDS register contents.



4.4.1. Unique Setup

Refer to Chapter 3 for common setup items.

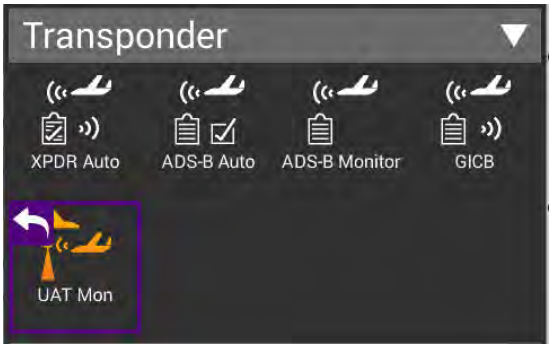
Setting	Definition
Advance – GICB Downlink Format	Choose DF20 or DF21. Typically left as DF20. This option is available for change due to the transponder specification.
Advance – Position Decode	Choose Global (most common, decodes two consecutive squitters to determine position) or Local (uses one squitter and entered GPS position to determine position)

4.4.2. GIBC Monitoring

The default mode (Simple Mode) will query for common GICB register values. Toggle the mode by pressing the Simple Mode key and the test set will query for all GICB registers (Adv. Mode).

If you choose to save your results, please refer to Chapter 3 for managing and viewing reports.

4.5. UAT Monitoring

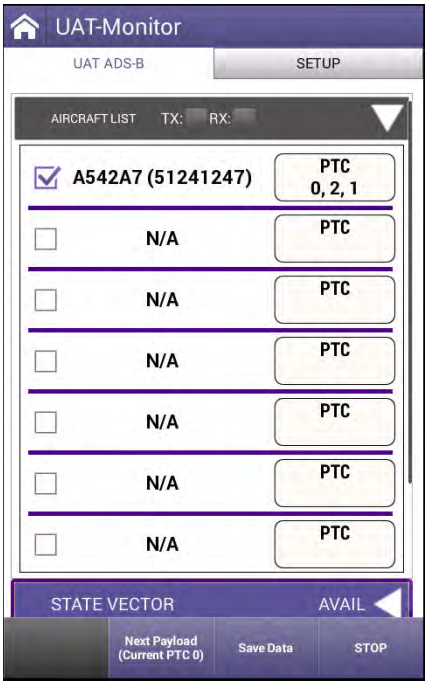


4.5.1. Unique Setup

Refer to Chapter 3 for common setup items. For the UAT Monitor application, there are no unique settings in the SETUP tab.

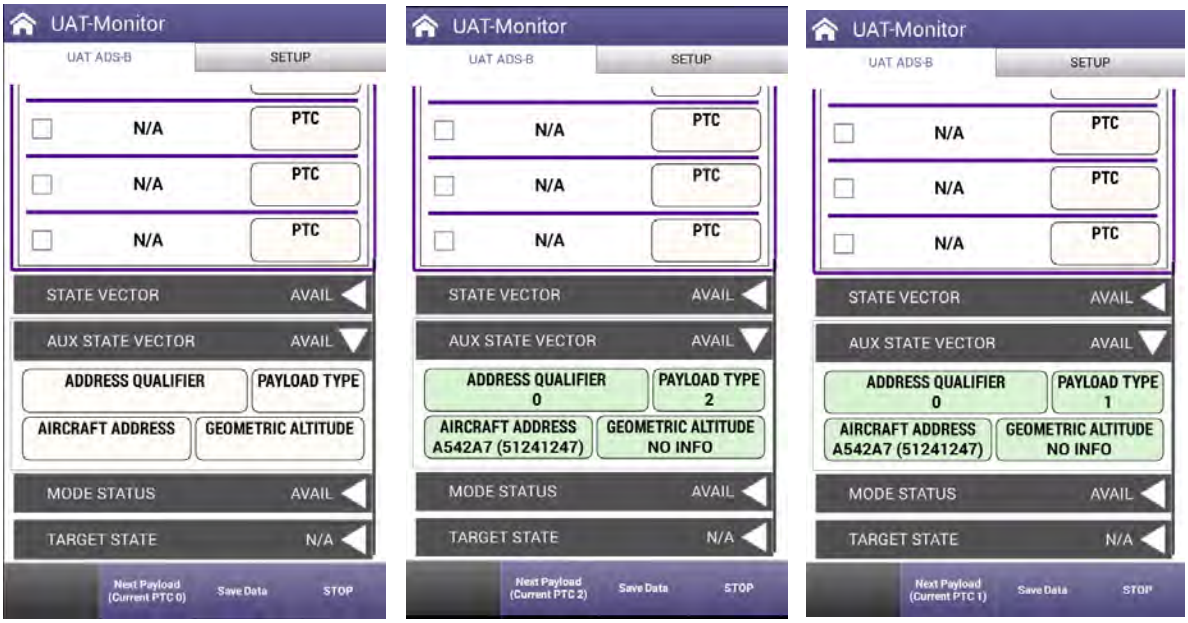
4.5.2. Run UAT Monitoring

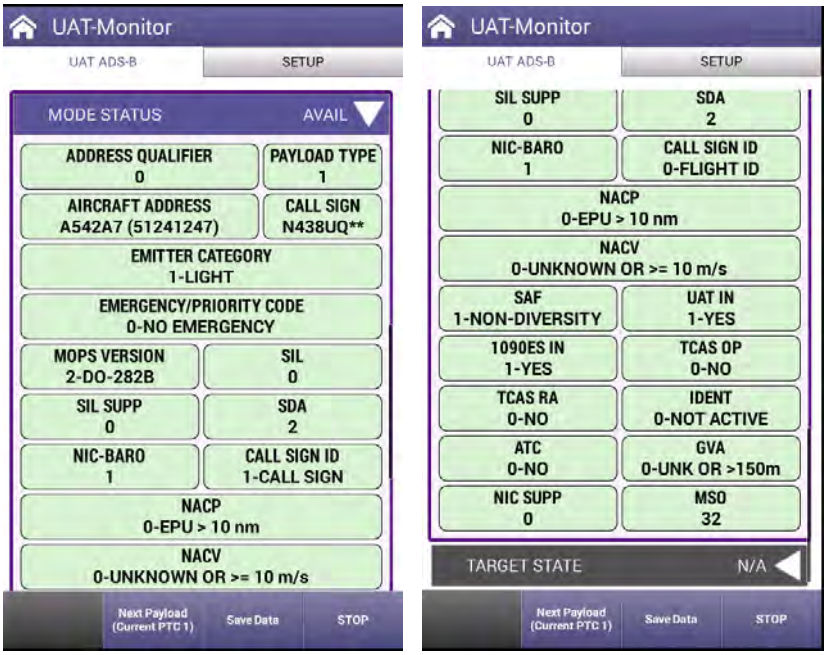
Press the RUN button to start received and decoding UAT Out information. Each unique payload will be displayed on separate lines under the Aircraft List tab.



Press the Next Payload softkey at the bottom of the screen to display details for each payload.

Any decoded information received from the UUT will be displayed in the associated tabs as shown here.





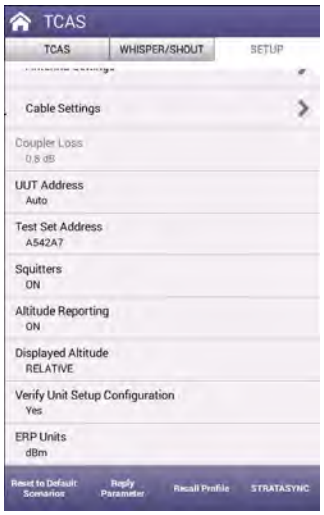
Press the Save Data button to capture and store the received information.

5. TCAS / Target Generation

5.1. TCAS

5.1.1. Unique Setup

Refer to Chapter 3 for common setup items. The following unique setup parameters are found on the SETUP tab for the TCAS application.



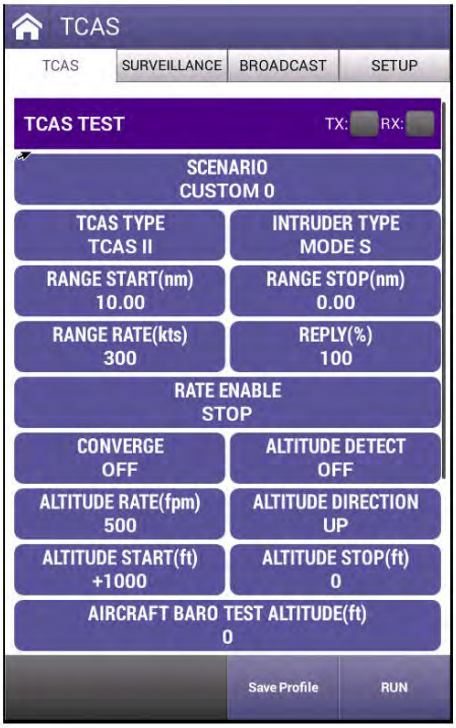
Setting	Description
Test Set Address	Enter a 6-digit Hexadecimal address other than the address of the unit under test.
Squitters	Toggles between ON and OFF
Altitude Reporting	Toggles between ON and OFF
Display Altitude	Toggles between RELATIVE and ABSOLUTE
ERP Units	Allows for measured power to be displayed in Watts or dBm

The main screen of the TCAS application also has a number of configurable parameters. These configurable fields have a blue background.

Setting	Description
Scenario	Allows for selection of predefined scenarios and a provision for saving custom scenarios. When one of the predefined scenarios are selected, all the following parameters will be loaded with values.
TCAS Type	Select between TAS, TCAS I or TCAS II to emulate
Intruder Type	Toggles between ATCRBS and MODE S type of transponder to emulate
Range Start (nm)	Enter a value between 0 and 260 nautical miles
Range Stop (nm)	Enter a value between 0 and 260 nautical miles
Range Rate (kts)	Enter a value between 0 and 1200 knots (closure rate)
Reply (%)	Enter a value between 0 and 100% for reply rate
Rate Enable	Toggles between STOP and RESUME
Converge	Toggles between OFF and ON.
Altitude Detect	Toggles between OFF and ON. This can be used to bypass the Aircraft Baro Test Altitude entry below which will be disabled when this is set to ON. In that case, the altitude of the unit under test (UUT) is obtained from the squitter information. NOTE: This information will be available when testing over-the-air. When using a TCAS Coupler, the TCAS may not be able to get information from the Transponder. Obviously, this is not the case when testing combined TCAS/Transponder UUTs.
Altitude Rate (fpm)	Enter a value between 0 and 10000 feet per minute
Altitude Direction	Toggles between UP and DOWN
Altitude Start	Enter a value between -1000 and 126700 feet
Altitude Stop	Enter a value between -1000 and 126700 feet
Aircraft Baro Test Altitude	Enter a value between -1000 and 126700 feet. This is the altitude of the UUT and must match in order for targets to be painted.

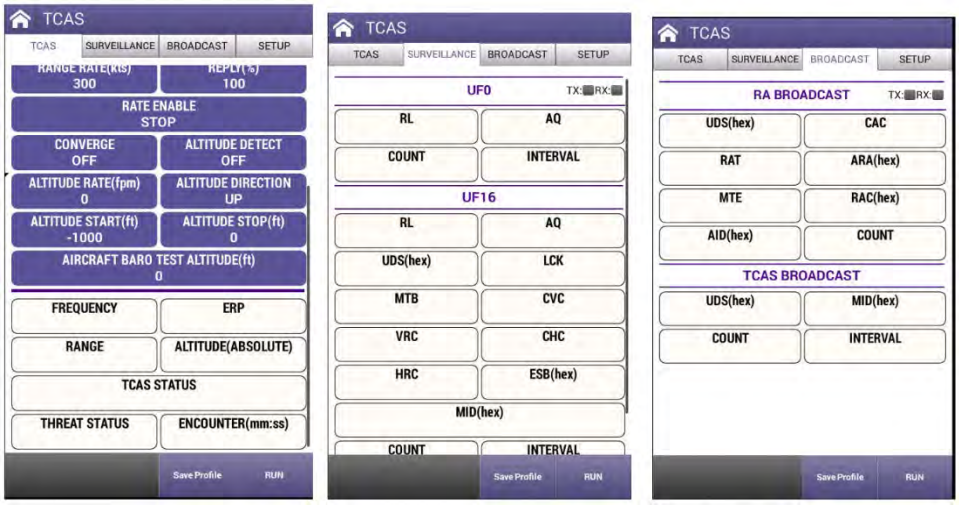
5.1.2. Run TCAS Scenario

This application will allow you to set up one dynamic intruder for TCAS testing. You can select from one of the provided scenarios listed or create one of your own and save it as a custom scenario for later recall. Any of the fields with a blue background are editable.

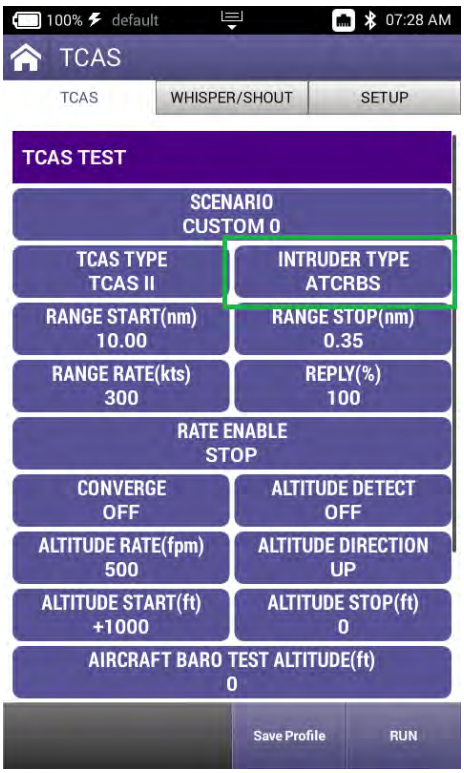

TCAS
TCAS
SURVEILLANCE
BROADCAST
SETUP
TCAS TEST
TX:
RX:
SCENARIO
CUSTOM 0
TCAS TYPE
TCAS II
INTRUDER TYPE
MODE S
RANGE START(nm)
10.00
RANGE STOP(nm)
0.00
RANGE RATE(kts)
300
REPLY(%)
100
RATE ENABLE
STOP
CONVERGE
OFF
ALTITUDE DETECT
OFF
ALTITUDE RATE(fpm)
500
ALTITUDE DIRECTION
UP
ALTITUDE START(ft)
+1000
ALTITUDE STOP(ft)
0
AIRCRAFT BARO TEST ALTITUDE(ft)
0
Save Profile
RUN

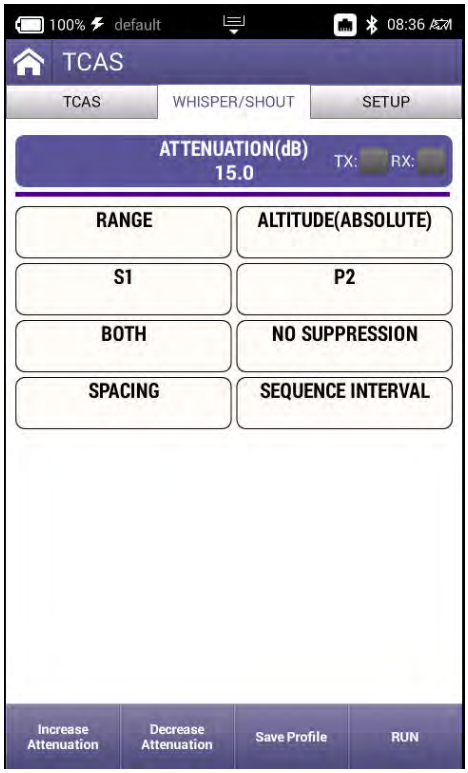

Scenario Settings
LAST SCENARIO RAN
+3500 FT COLLISION
-3500 FT COLLISION
+3500 FT FLY-BY
-3500 FT FLY-BY
+200 FT COLLISION
-200 FT COLLISION
+200 FT FLY-BY
-200 FT FLY-BY
CUSTOM 0
Archived Scenarios
Return

Press the RUN button to start generating the scenario. While running the fields with the white background shown here will be updating and will turn to a green background. You can click on the tabs or swipe right to view the additional data.

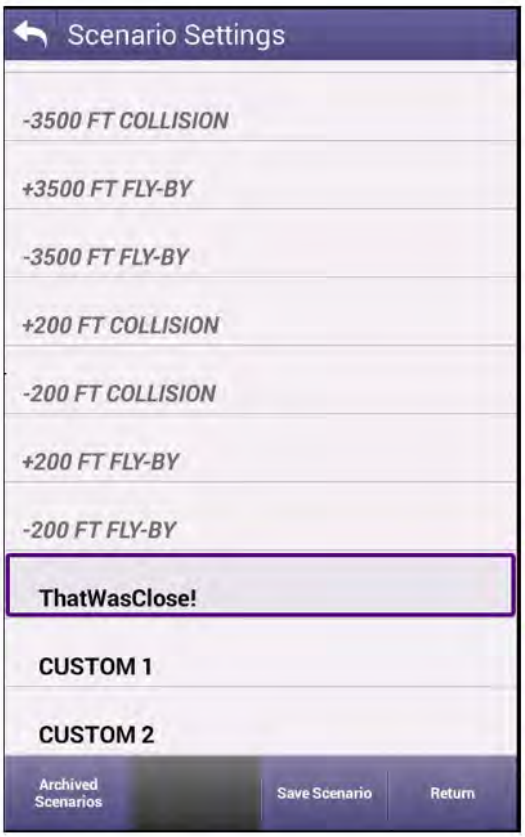


When the intruder type is toggled to ATCRBS as shown below, the SURVEILLANCE and BROADCAST tabs are replaced by the WHISPER/SHOUT tab where you can increase or decrease attenuation by pressing the associated buttons.

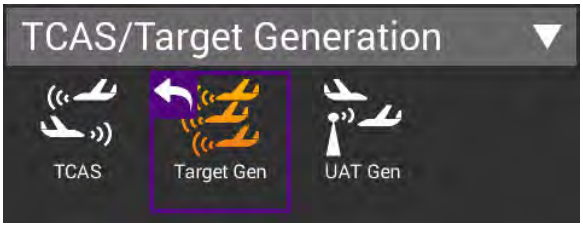

100% default
07:28 AM
TCAS
TCAS
WHISPER/SHOUT
SETUP
TCAS TEST
SCENARIO
CUSTOM 0
TCAS TYPE
TCAS II
INTRUDER TYPE
ATCRBS
RANGE START(nm)
10.00
RANGE STOP(nm)
0.35
RANGE RATE(kts)
300
REPLY(%)
100
RATE ENABLE
STOP
CONVERGE
OFF
ALTITUDE DETECT
OFF
ALTITUDE RATE(fpm)
500
ALTITUDE DIRECTION
UP
ALTITUDE START(ft)
+1000
ALTITUDE STOP(ft)
0
AIRCRAFT BARO TEST ALTITUDE(ft)
0
Save Profile
RUN


100% default
08:36
TCAS
TCAS
WHISPER/SHOUT
SETUP
ATTENUATION(dB)
15.0
TX:
RX:
RANGE
ALTITUDE(ABSOLUTE)
S1
P2
BOTH
NO SUPPRESSION
SPACING
SEQUENCE INTERVAL
Increase Attenuation
Decrease Attenuation
Save Profile
RUN

If you created a new profile, you may choose to save for later use by pressing the Save Profile button, selecting one of the custom fields and then pressing the Save Scenario button.



5.2. Target Gen



5.2.1. Unique Setup

Refer to Chapter 3 for common setup items. For the Target Generation application, there are no unique settings in the SETUP tab, however, the main screen of the TARGET GEN application has a number of configurable parameters. These configurable fields have a blue background.

Aircraft Under Test Setting	Description
Target Type	Select between ADS-B, ADS-R and TIS-B
ADS-B Type	Toggles between AIRBORNE and SURFACE and only available when Target Type is set to ADS-B
Latitude	Set to Latitude of UUT
Longitude	Set to Longitude of UUT
Heading	Enter a value between 0 and 359 degrees
Altitude	Enter a value between -1000 and 126700 feet

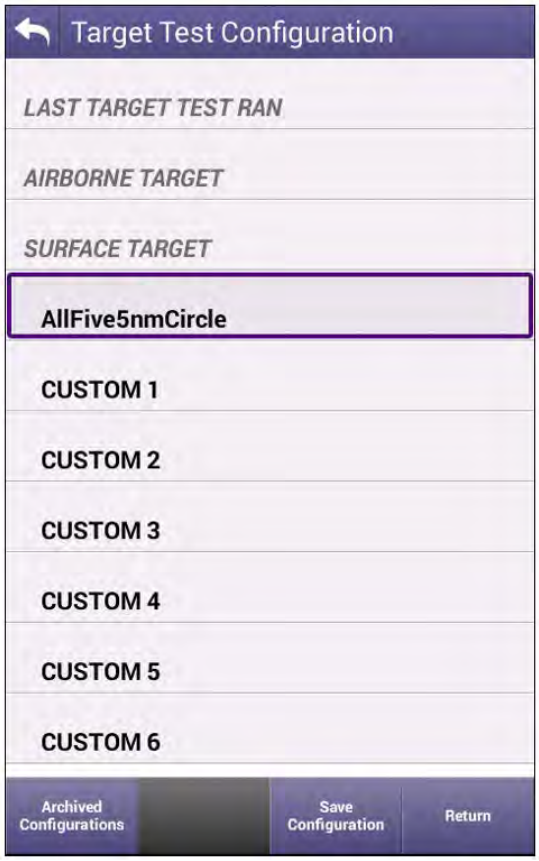
Target Settings (repeated for five targets)	Description
Flight ID	Enter up to eight characters
Aircraft Address	Enter up to 6 hexadecimal characters
Bearing	Enter a value between 0 and 359 degrees to define the bearing in relation to the UUT.
Range	Enter a value between 0 and 40 nautical miles to define the distance from UUT.

Altitude	Enter a value between -3500 and 3500 feet to define the vertical distance from the UUT.
Altitude Rate	Select between CLIMB, LEVEL, DESCEND

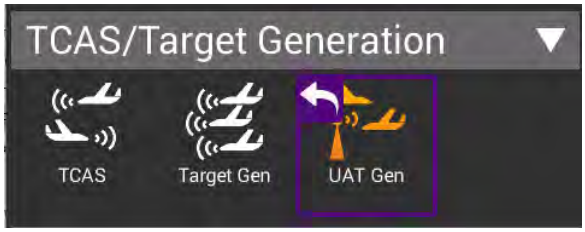
5.2.2. Run Target Gen

This application will allow you to set up to five static intruders for testing of ADS-B In Receivers. Any of the fields with a blue background are editable. The data in the Target settings are referenced from the Aircraft Under Test. Each Target can be disabled or enabled by toggling the button.

You may choose to save for later use by pressing the Save/Recall Configuration button, selecting one of the custom fields and then pressing the Save Configuration button.



5.3. UAT GEN



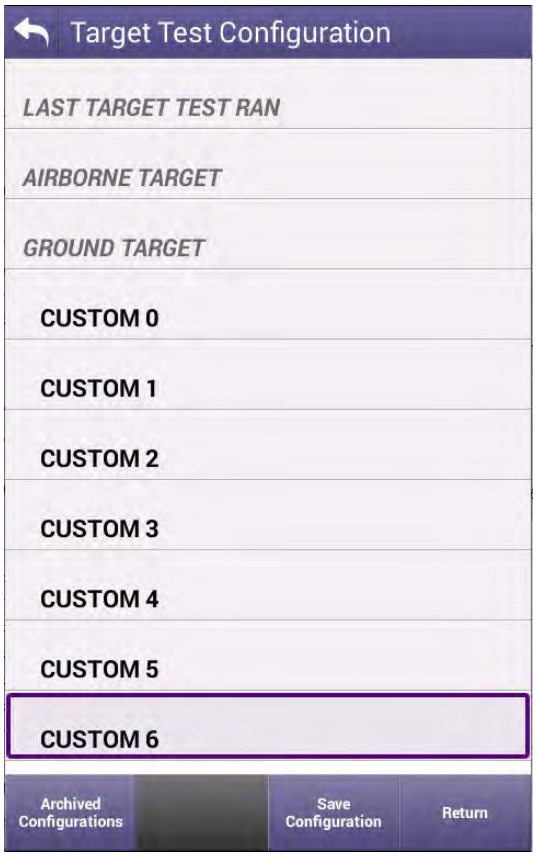
5.3.1. Unique Setup

Refer to Chapter 3 for common setup items. For the UAT Traffic Generation application, there are no unique settings in the SETUP tab, however, the main screen of the UAT GEN application has a number of configurable parameters. These configurable fields have a blue background.

Aircraft Under Test Setting	Description
Target Type	Select between ADS-B and TIS-B
AG State	Toggles between AIRBORNE and GROUND
Latitude	Set to Latitude of UUT
Longitude	Set to Longitude of UUT
Heading	Enter a value between 0 and 359 degrees
Altitude	Enter a value between -1000 and 126700 feet
Payload Sequence	Select between 1,0,2,0; 3,6,0,6; 1,4,4,4; 1,4,5,4; and 1,0,0,0
Site ID	Enter a value between 0 and 15

Target Settings (repeated for five targets)	Description
Flight ID	Enter up to eight characters
Aircraft Address	Enter up to 6 hexadecimal characters
Bearing	Enter a value between 0 and 359 degrees to define the bearing in relation to the UUT.
Heading	Enter a value between 0 and 359 degrees
Altitude	Enter a value between -3500 and 3500 feet to define the vertical distance from the UUT.
Altitude Rate	Select between CLIMB, LEVEL, DESCEND
Range	Enter a value between 0 and 40 nautical miles to define the distance from UUT.

This page also has a View Target Data button that allows you to view the setup data for all five targets. Also, the Save / Recall button can store any custom settings that you have entered or recall any previously saved (or factory defined) settings. To load a particular configuration, just click on the desired item and press the Return button. A screen will popup showing that the configuration is being loaded.



The configurable settings for the FIS-B data (click on the FIS-B tab to view, setup and run) include:

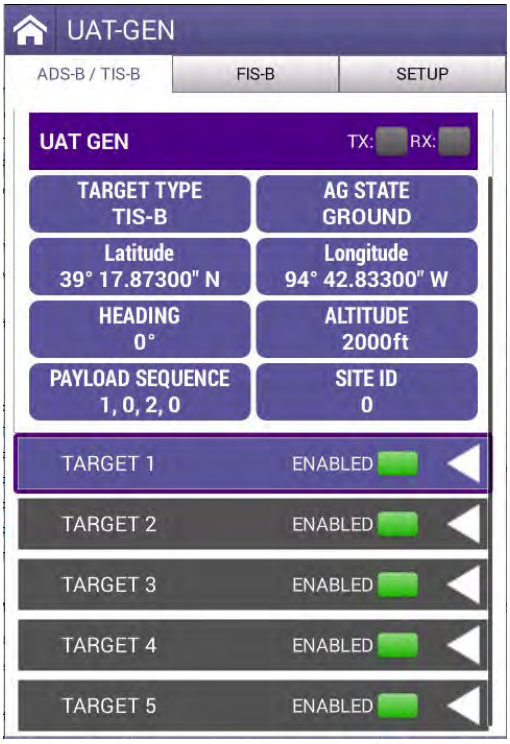
FIS-B Weather	Description
Report	Select between METAR and TAF (the predefined settings will be displayed in the Weather Data section at the bottom of the screen).
Day / Time	Allows setting Day to a value between 0 and 31; Hour to a value between 0 and 23; and Minute to a value of 0 to 59
Station	Select between KMCI, KAUS, KFFC, KBNA, and PANC
Slot ID	Select between a value of 0 to 31

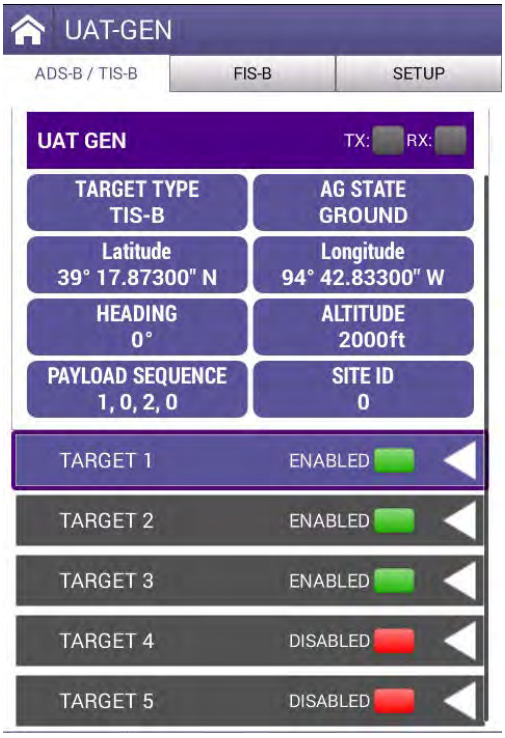
5.3.2. Run UAT Gen

This application will allow you to set up to five static intruders for testing of UAT-In Receivers.

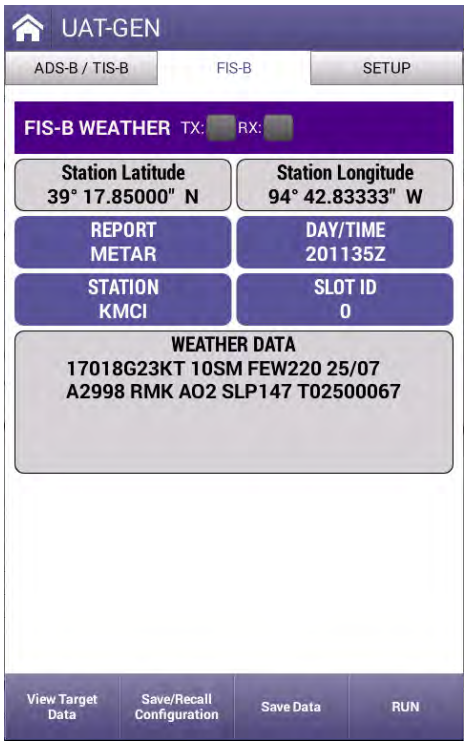
The UAT Gen application is dependent on precise timing parameters. Should this screen popup, it is a notification that the unit is likely past the calibration schedule. If that is not the case, press the OK button to continue with testing.

On the main page of the UAT Gen application, any of the fields with a blue background are editable. The data in the Target settings are referenced from the Aircraft Under Test. Each Target can be disabled or enabled by toggling the Enable/Disabled button.





FIS-B information can also be sent using this application by selecting the FIS-B tab, setting up the configurable parameters as defined above and then pressing the RUN button.

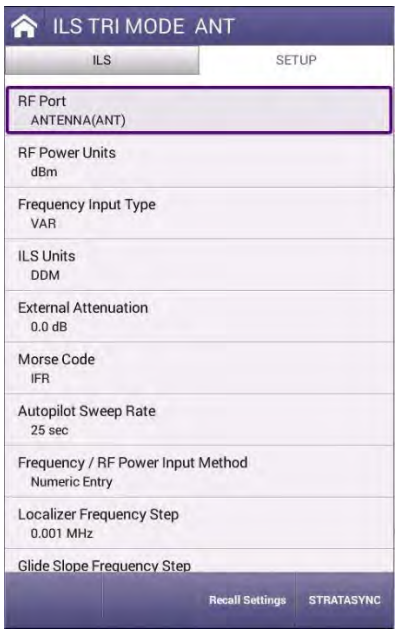


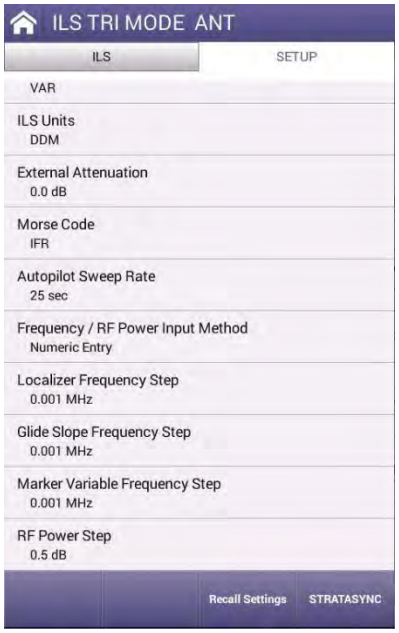
6. Navigation

6.1. Integrated Landing System (ILS) Operation

6.1.1. Setup

The settings for the ILS application are described in the table below.





Setting	Definition
RF Port	The ILS Instrument supports either over-the-air antenna testing or direct connection to the LRU.
RF Power Units	Can be set to dBm or V (Volts in 50 ohms)
Frequency Input Type	PRESET, CHANNEL OR VAR: PRESET provides a set of three fixed frequencies; CHANNEL allows the selection of any on-channel frequency; VAR allows selection of frequency in 1kHz steps (may not be available in every instrument setup)
ILS Units	This parameter determines the Localizer and Glideslope deviation units: DDM (Difference in Depth of Modulation) or µA (microamps)

External Attenuation	This parameter allows for compensation (0.0 to 22.0 dB) of an External Attenuator on the RF I/O Connector. This is used for extending the power monitor rating and range. If the External Attenuator is selected, the value is displayed on all Mode Screens in the EXT ATTN Field under the RF LVL Field.
Morse Code	Up to four characters that are used to transmit Morse Code for ILS Localizer
Autopilot Sweep Rate	This parameter allows the Localizer and Glide Slope DDM sweep rate to be set from 5 to 40 seconds in 5 second increments
Frequency / RF Power Input Method	This allows selection between Numeric Step and Numeric Entry. Numeric Step allows the Frequency and RF Power fields on the main screen to be adjusted in step values. Numeric Entry allows for any value in the defined range to be entered.
Localizer Frequency Step	Allows Localizer Frequency step value to be selected between 0.001 MHz, 0.010 MHz, 0.100 MHz, 1.000 MHz
Glide Slope Frequency Step	Allows Glide Slope Frequency step value to be selected between 0.001 MHz, 0.010 MHz, 0.100 MHz, 1.000 MHz
Marker Variable Frequency Step	Allows Marker Variable Frequency step value to be selected between 0.001 MHz, 0.010 MHz, 0.100 MHz, 1.000 MHz
RF Power Step	Allows step value to be selected between 0.5 dB, 1.0 dB, 10.0 dB

Recall Settings button: The Recall Settings button will recall the setup parameters from a list. These are settings that have been saved by the Save Settings button on the ILS Main page.

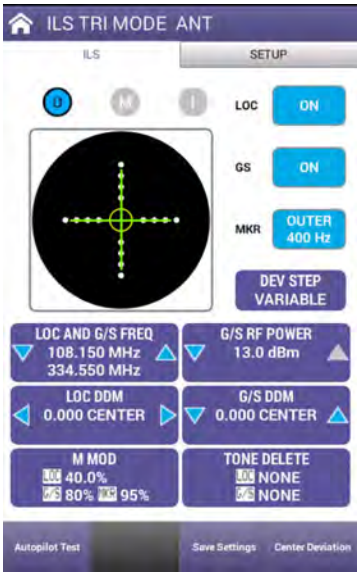
The main screen of the ILS application also contains configurable parameters. These configurable fields have a blue background. The available fields will be different based on the Instrument Setup detailed below.

6.1.2. Run ILS Application

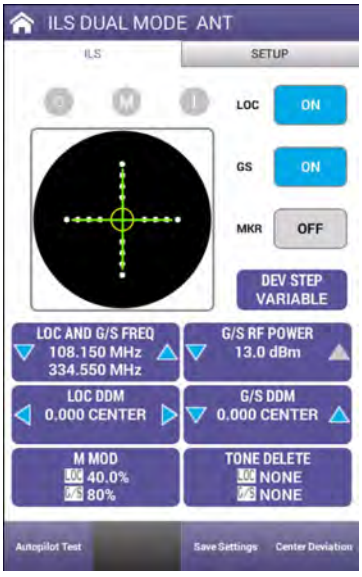
Once you enter the ILS Application, the ILS Instrument is running. Changes to the Instrument Setup can be made at any time. The instruments supported by the ILS Application include:

Setting	Definition
ILS Tri Mode	Localizer, Glideslope and Marker Beacon are enabled
ILS Dual Mode	Only Localizer and Glideslope are enabled
ILS Localizer	Only Localizer is enabled
ILS Glideslope	Only Glideslope is enabled
ILS Marker Beacon	Only Marker Beacon is enabled
Off	Nothing is enabled

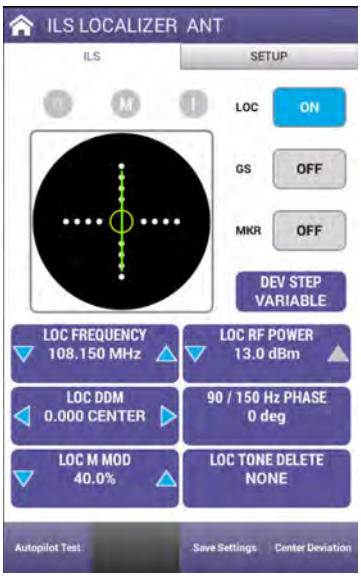
Below are examples of the screens in each mode:



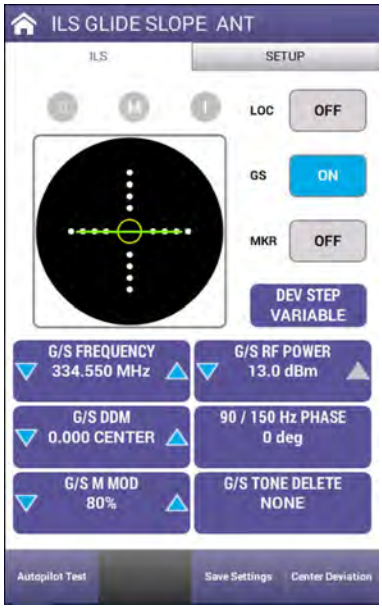
TRI-MODE: All Instruments On



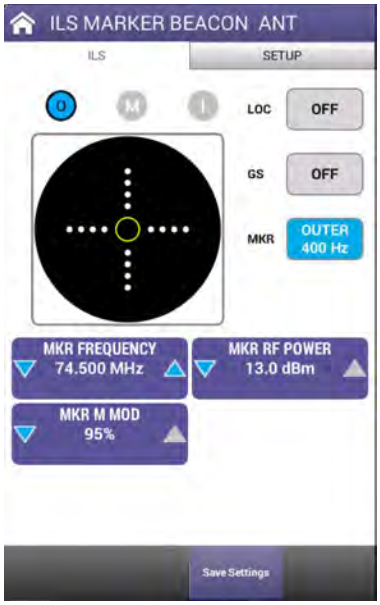
Dual Mode: Loc and G/S Only



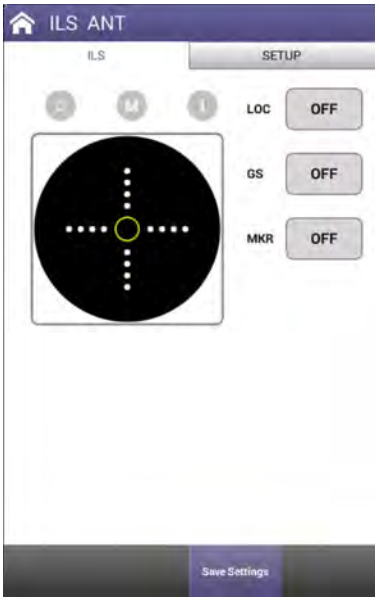
Localizer Only



Glide Slope Only

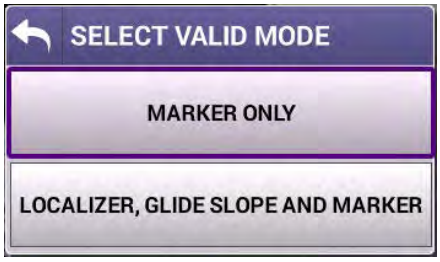


Marker Beacon Only



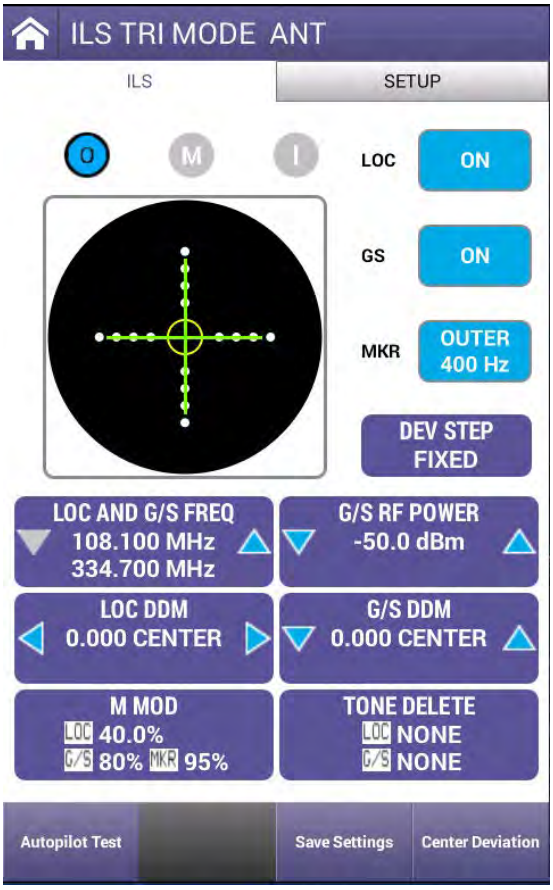
All Instruments Off

When turning Localizer, Glideslope, and Marker Beacon functions on and off, a “SELECT VALID MODE” popup might appear that helps to drive you to one of these available modes.



To review the configurable fields in the main body of the ILS Application, let’s look at the screen with all functionalities enabled (ILS TRI MODE). Each of the subsequent screens, will look similar to this screen or have a subset of the fields displayed.

Note: Tri-Mod (where all instruments are enabled) is only available when testing over-the-air.



Setting	Definition
LOC Button	Settings include OFF, ON, TONE, and MORSE
GS Button	Can be set to ON or OFF
MKR Button	Can be set to OFF, OUTER 400 Hz, MIDDLE 1300 Hz, or INNER 3000 Hz Can also be selected by clicking on the “O”, “M” and “I” indicators.
DEV STEP	Operation will depend on the setting of the ILS Units field in Setup. If set to DDM: FIXED provides CENTER, LEFT, and RIGHT deviation values at 0.00, 0.093, 0.155 and 0.200 DDM; VARIABLE provides CENTER, LEFT, and RIGHT deviation values from 0 to 0.4 DDM in 0.001 DDM steps. UNCAL is displayed when the LOC DDM field is a non-zero position value or when the M MOD field is NOT set to CAL and the LOC DDM field is a non-zero position value. If set to µA: FIXED provides CENTER, LEFT, and RIGHT deviation values at 0, 90, 150 and 194 µA; VARIABLE provides CENTER, LEFT, and RIGHT deviation values from 0 to 388 µA in 1 µA steps. UNCAL is displayed when set to VAR and the LOC DDM Field is in a Non-Zero position or when the M MOD Field is not set to CAL and the LOC DDM Field is in a Non-Zero position.
FREQ Control	This control is dependent on the Frequency Input Type setting in Setup. When set to PRESET, the UP/DOWN Arrow keys will cycle through the three preset channels (108.100/334.700, 108.150/334.550, 110.150/334.250). You can click in the center of the control to pull up a popup window for selection.

Setting	Definition
	When set to CHANNEL, the UP/DOWN Arrow keys will cycle through the list of valid channels. This list can be seen by clicking in the center of the control and the channel can be directly selected in this manner. When set to VAR, the UP/DOWN Arrow keys will change the value by the value of step size in either direction. The step size value can be changed by clicking in the center of the control. NOTE: VAR is not available for the TRI MODE Instrument setting and will work the same as CHANNEL.
RF POWER Control	The UP/DOWN Arrow keys will adjust the RF POWER Value by the step size and the step size can be adjusted by clicking the center of this control.
LOC DEV	The LEFT/RIGHT Arrow keys will cycle through seven DDM/ µA deviation steps: 0.200/194 LEFT; 0.155/150 LEFT; 0.093/90 LEFT; 0/0 CENTER; 0.093/90 RIGHT; 0.155/150 RIGHT; 0.200/194 RIGHT. Once you reach a value at the extreme, the Arrow key will change from blue to gray in color. Also – the Localizer can be modified by selecting the vertical bar on the display and moving it to the desired location. If DEV STEP is set to FIXED, the bar will snap to the nearest value.
G/S DEV	The UP/DOWN Arrow keys will cycle through seven DDM/ µA deviation steps: 0.400/343 DOWN; 0.175/150 DOWN; 0.091/78 DOWN; 0/0 CENTER; 0.091/78 UP; 0.175/150 UP; 0.400/343 UP. Once you reach a value at the extreme, the Arrow key will change from blue to gray in color. Also – the Glide Slope can be modified by selecting the horizontal bar on the display and moving it to the desired location. If DEV STEP is set to FIXED, the bar will snap to the nearest value.
M MOD	Opens a window with slider controls to allow adjustment of the Master Modulation Depth in 2% offsets for related enabled instruments. The Master Modulation control functions as a multiplier of the individual modulation components. The Master Modulation Depth is the sum of the Depths of Modulation (SDM) of the individual tone components.
TONE DELETE	Opens a window to allow the 90 Hz, 150 Hz, or both to be deleted for the related enabled Instruments.
90 / 150 Hz PHAZE	Only for Localizer or Glide Slope instruments. Select between 10, 15, 20, 25, and 30 degrees. This control changes the phase relationship between the 90 and 150 Hz modulation tones to simulate an aircraft in a turn.

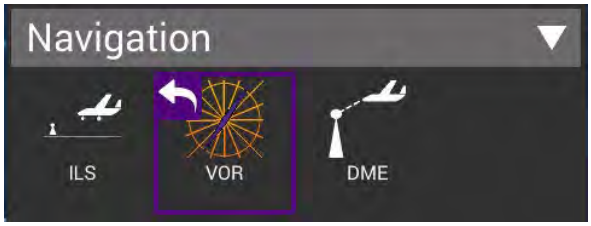
Autopilot Test button: This will allow selection between Localizer Only, Glide Slope Only, and Localizer and Glide Slope control and with toggle the Autopilot test feature on or off. The Autopilot feature continuously changes the associated µA (or DDM) in a predefined pattern. When enabled, you can change the LOC and GS AUTOPILOT MAX DEV settings.

Revert To Normal button: If any parameters have been changed and the indicators show “UNCAL”, pressing this button will “zero” all parameters back to their normal state.

Save Settings button: This allows all of the values on the main page to be saved for later recall as needed.

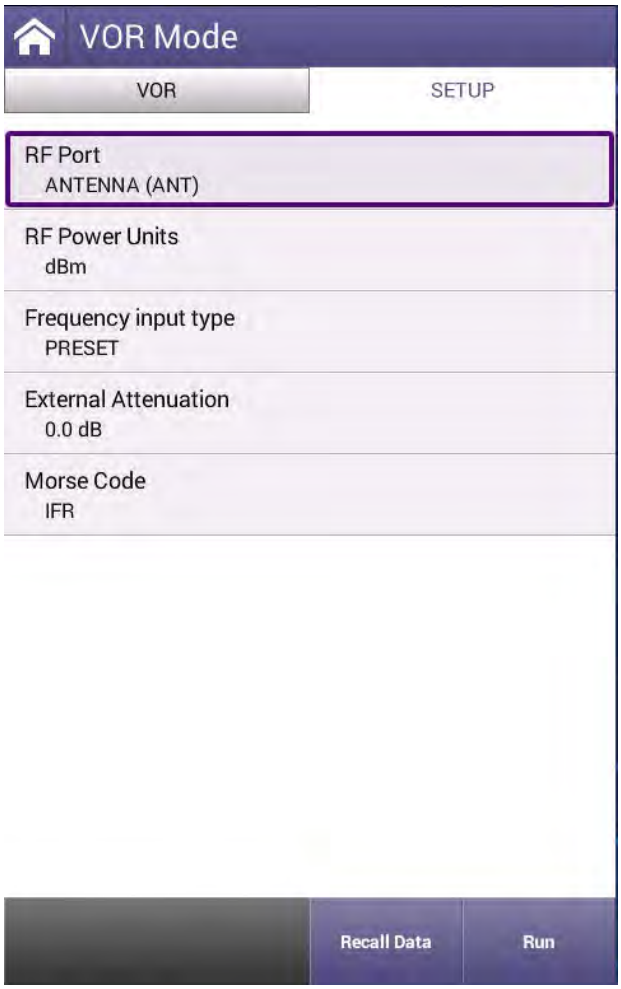
Center Deviation button: This sets the LOC and G/S offsets to zero.

6.2. VHF Omnidirectional Ranging (VOR) Operation



6.2.1. Setup

The settings for the VOR application are described in the table below.



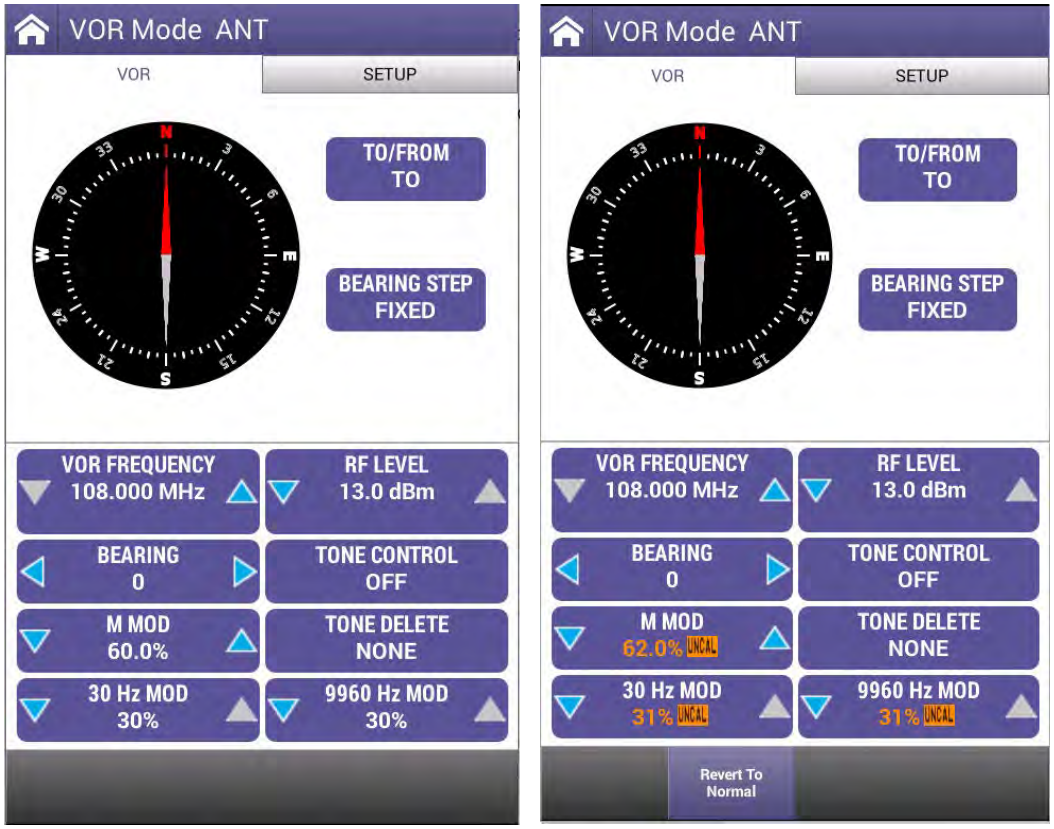
Setting	Definition
RF Port	The VOR Instrument supports either over-the-air antenna testing or direct connection to the LRU.
RF Power Units	Can be set to dBm or V (Volts in 50 ohms)
Frequency Input Type	PRESET, CHANNEL OR VAR: PRESET provides a set of three fixed frequencies; CHANNEL allows the selection of any on-channel frequency; VAR allows selection of frequency in 1kHz steps
External Attenuation	This parameter allows for compensation (0.0 to 22.0 dB) of an External Attenuator on the RF I/O Connector. This is used for extending the power monitor rating and range. If the External Attenuator is selected, the value is displayed on all Mode Screens in the EXT ATTN Field under the RF LVL Field.
Morse Code	Up to four characters that are used to transmit Morse Code for ILS Localizer

The main screen of the VOR application also contains configurable parameters. These configurable fields have a blue background.

6.2.2. Run VOR Application

Once you enter the VOR Application, the VOR Instrument is running. Changes to the Instrument Configuration can be made at any time.

Let's review the configurable fields in the main body of the VOR Application.

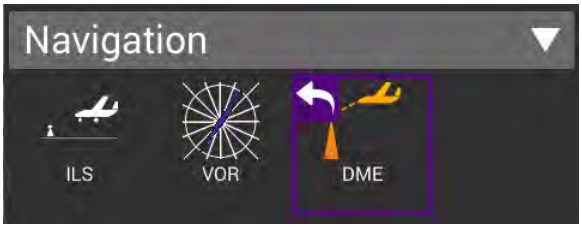


Setting	Definition
TO / FROM	Press to toggle between TO and FROM. TO sets the Bearing towards the VOR Beacon and FROM set the Bearing away from the VOR Beacon.
BEARING STEP	Toggles BEARING control between FIXED and VARIABLE. FIXED allows settings from 0 to 330 in 30-degree steps. VARIABLE allows for resolution changes down to 0.1 degrees.
VOR FREQUENCY	This control is dependent on the Frequency Input Type setting in Setup. When set to PRESET, the UP/DOWN Arrow keys will cycle through the three preset channels (108.000, 108.050, 117.950. You can click in the center of the control to pull up a popup window for selection. When set to CHANNEL, the UP/DOWN Arrow keys will increment, or decrement values based on the selected CHAN STEP SIZE. CHAN STEP SIZE is selected by clicking in the center of the control. Selections include .05/.15 MHz and .5/1 MHz. When set to VAR, the UP/DOWN Arrow keys will increment, or decrement values based on FREQ STEP SIZE. FREQ STEP SIZE is selected by clicking in the center of the control. Selections include 0.001 MHz, 0.010 MHz, 0.100 MHz, and 1.000 MHz. Allowable Range is from 107.0 MHz to 118.0 MHz.
RF LEVEL	The UP/DOWN Arrow keys will increment, or decrement values based on POWER STEP SIZE. POWER STEP SIZE is selected by clicking in the center of the control. Selections include 0.05 dB, 1.0 dB, and 10.0 dB. Range is from –67.0 to 13.0 dBm.

BEARING	This field depends on the setting of BEARING STEP. If BEARING STEP is FIXED, the UP/DOWN Arrow keys will update the value in 30-degree increments. Clicking in the center of the control will allow direct selection of a Bearing value from 0 to 330 degrees. If BEARING STEP is VARIABLE, the UP/DOWN Arrow keys will update the value in degree increments based on BEARING STEP SIZE. BEARING STEP SIZE is selected by clicking in the center of the control. Values can be 0.1, 1.0, 10.0, and 100.0. Range is from 0.0 to 360.0 degrees.
TONE CONTROL	Allows selection between OFF, TONE, and MORSE.
M MOD	Clicking in the center of this control opens a window with slider controls to allow adjustment of the Master Modulation Depth in 2% offsets from 0 to 110%. The Master Modulation control functions as a multiplier of the individual modulation components. The Master Modulation Depth is the sum of the Depths of Modulation (SDM) of the individual tone components.
TONE DELETE	This field allows the 30 Hz Reference, 30 Hz Variable, or both to be deleted. Press anywhere on this control for the popup selection window.
30 Hz MOD	This field controls the value of the 30 Hz Variable Phase modulation depth. Use the UP/Down Arrow keys to adjust the value in 1% steps or click the center of the control to popup a slide to select the value. Range is 0 to 30%.
9960 Hz MOD	This field controls the value of the 9960 Hz Variable Phase modulation depth. Use the UP/Down Arrow keys to adjust the value in 1% steps or click the center of the control to popup a slide to select the value. Range is 0 to 30%.

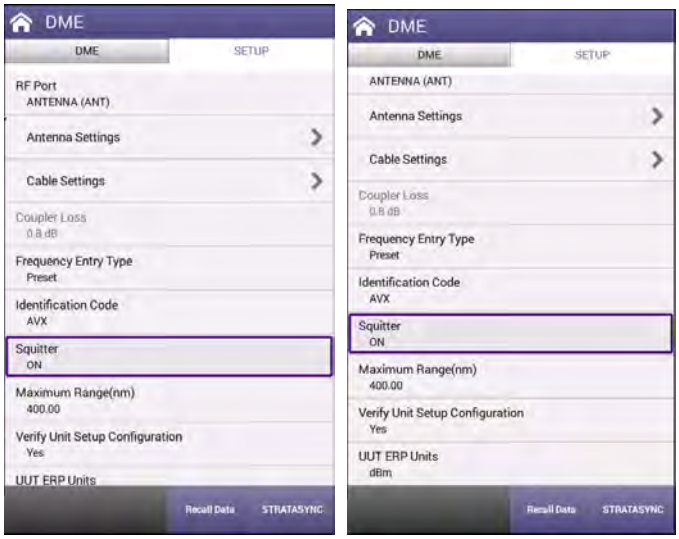
Revert To Normal button: If any parameters have been changed and the indicators show “UNCAL”, this softkey will appear. Pressing this button will “zero” all parameters back to their normal state.

6.3. Distance Measuring Equipment (DME)



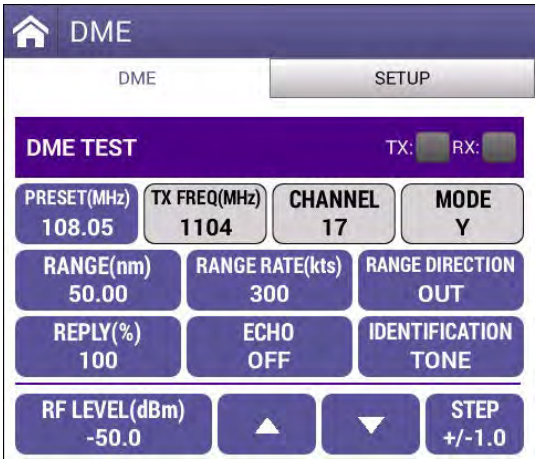
6.3.1. Unique Setup

Refer to Chapter 3 for common setup items. The settings unique to the DME application are described in the table below.

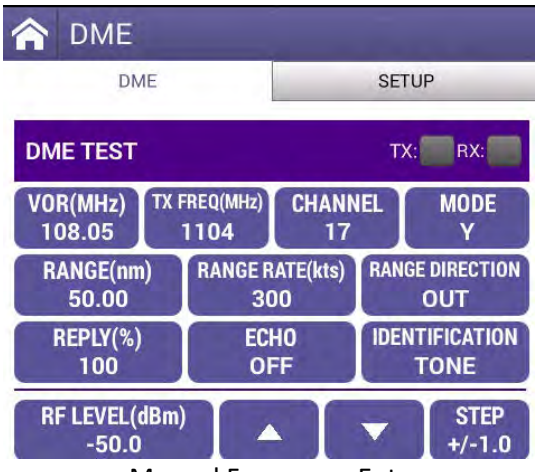


Setting	Definition
Frequency Entry Type	Allows selection of either Presets or Manual entry of Frequencies.
Identification Code	Enter the three characters that will be used for Morse code ident.
Squitter	Sets squitter output to ON or OFF
Maximum Range	Enter a maximum range value from 0 to 450 nm
UUT ERP Units	Allows for measured power to be displayed in Watts or dBm

The main screen of the DME application also contains configurable parameters. These configurable fields have a blue background. The available fields will be different based on the Frequency Entry Type detailed above.



Preset Frequency Entry

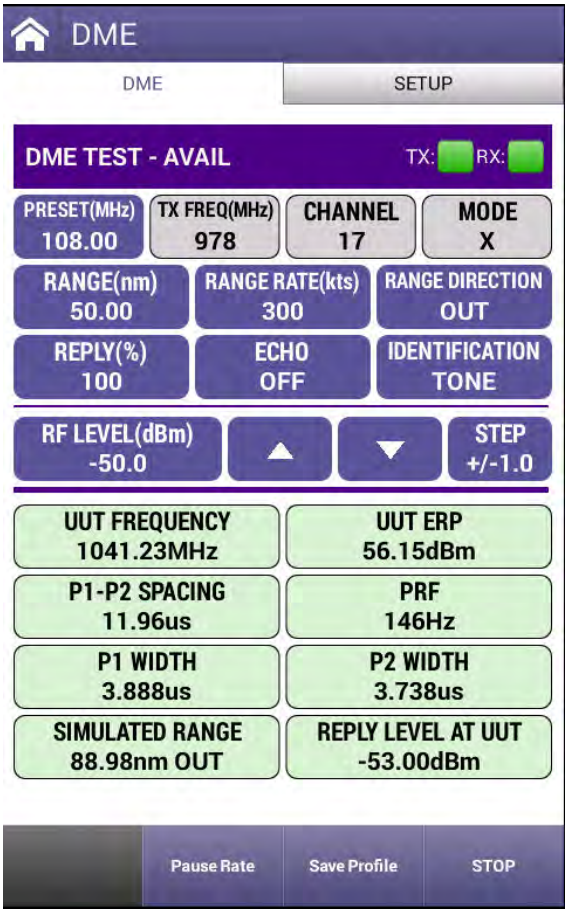


Manual Frequency Entry

Setting	Definition
Preset (MHz)	Will toggle between 108.05, 117.95 and 108.00. The paired TX Frequency, Channel and Mode values will change accordingly.
VOR (MHz)	When in Manual Frequency Entry mode, allows setting a value between 108.00 and 135.05. The paired TX Frequency, Channel and Mode will change accordingly.
TX FREQ (MHz)	When in Manual Frequency Entry mode, allows setting a value between 962 and 1213 MHz. Paired VOR Frequency and Channel will change accordingly.
Channel	When in Manual Frequency Entry mode, allows setting a value between 1 and 126. Paired VOR Frequency, TX Frequency will change accordingly.
Mode	When in Manual Frequency Entry mode, toggles between X and Y. Paired VOR Frequency and TX Frequency will change accordingly.
Range (nm)	Enter a value between 0 and 450 nautical miles.
Range Rate (kts)	Enter a value between 0 and 6500 knots.
Range Direction	Toggles between IN and OUT.
Reply (%)	Enter a value between 0 and 100 percent reply.
Echo	Toggles between ON and OFF.
Identification	Toggles between OFF, TONE and IDENT.
RF Level (dBm)	Enter a value between -67.0 and -2.0 dBm
Up / Down Arrows	Raises or Lowers the RF Level based on the Step value
Step	Toggles RF Level step values between 0.1, 1.0 and 10.0 increments

6.3.2. Run DME Application

Once your setup and configuration values are entered, press the RUN key. Once the test set starts receiving the DME pulse pairs from the UUT, the values shown in green below will be displayed. Press the Pause Rate softkey to stop simulated travel. Press the Save Profile button if you wish to save the received information.


DME
DME
SETUP
DME TEST - AVAIL
TX:
RX:
PRESET(MHz)
108.00
TX FREQ(MHz)
978
CHANNEL
17
MODE
X
RANGE(nm)
50.00
RANGE RATE(kts)
300
RANGE DIRECTION
OUT
REPLY(%)
100
ECHO
OFF
IDENTIFICATION
TONE
RF LEVEL(dBm)
-50.0
STEP
+/-1.0
UUT FREQUENCY
1041.23MHz
UUT ERP
56.15dBm
P1-P2 SPACING
11.96us
PRF
146Hz
P1 WIDTH
3.888us
P2 WIDTH
3.738us
SIMULATED RANGE
88.98nm OUT
REPLY LEVEL AT UUT
-53.00dBm
Pause Rate
Save Profile
STOP

7. Radio Test (COMMS)

7.1. VHF COM Amplitude Modulation (AM) (Reserved)

7.2. VHF COM Frequency Modulation (FM) (Reserved)

7.3. COM High Frequency (HF) Single Side Band (SSB) (Reserved)

7.4. COM SelCal (Reserved)

8. ELT

8.1. ELT 121.5 (Reserved)

8.2. ELT 243 (Reserved)

8.3. ELT 406 (Reserved)

9. Test Tools

9.1. VSWR

9.1.1. VSWR Test Function

The VSWR test function provides users with the ability to troubleshoot potential cabling and / or antenna issues.

- **Voltage Standing Wave Ratio (VSWR)** is a measurement that represents how well an antenna's impedance is matched to the radio or transmission line to which it is connected.

  The smaller the VSWR measurement, the better the antenna and transmission line match, and therefore less loss and better signal strength on the transmission line. The minimum VSWR is 1.0, which means no power is being reflected

- **Return loss (RL)** is the ratio of the reflected signal to the transmitted signal. A low return loss indicates less signal reflection and better signal strength. A high return loss indicates more signal reflection and less signal strength, indicating an issue along the transmission line.

  When Return Loss is selected, measurements are displayed in dB.

9.1.2. Scope of VSWR Test

This test is used to evaluate how well an antenna's impedance matches the impedance of the radio or transmission line to which it is connected.

9.1.3. UUT Parameters/Characteristics

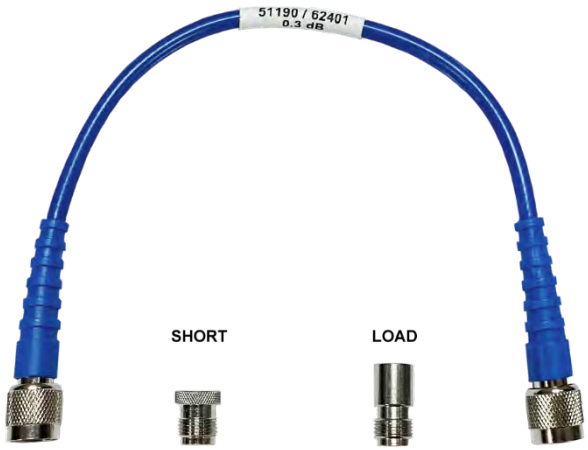
The example in this section assumes the following UUT (Unit Under Test) characteristics and settings. You will need to adjust settings according to the operational capabilities of the device you are testing. In this case, we will be showing a test of a Transponder antenna.

Frequency Range Settings: 900 to 1250 MHz

9.1.4. Equipment Needed for VSWR Test

The following equipment is required to perform the procedures defined in this section:

- Cable or antenna to be tested
- Calibration Kit (short cable with short and load – included with the AVX-10K)

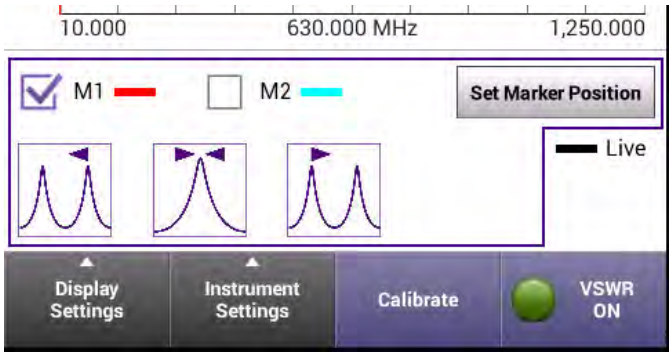


Run VSWR Calibration

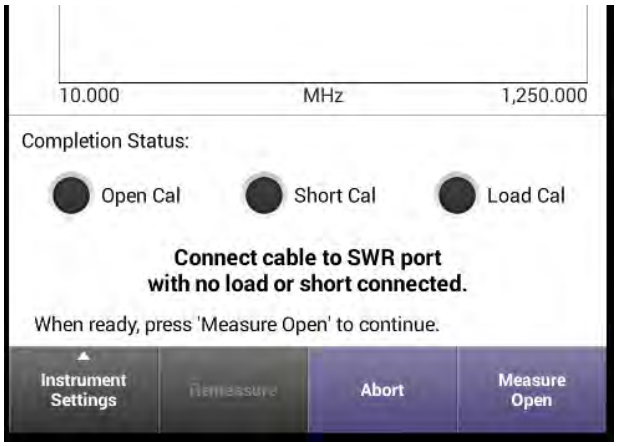
1. It is recommended that the VSWR calibration be performed prior to testing any antenna or cable.
2. Connect the short TNC to TNC cable to the AVX-10K as shown.

Figure 18: VSWR Calibration Setup Diagram

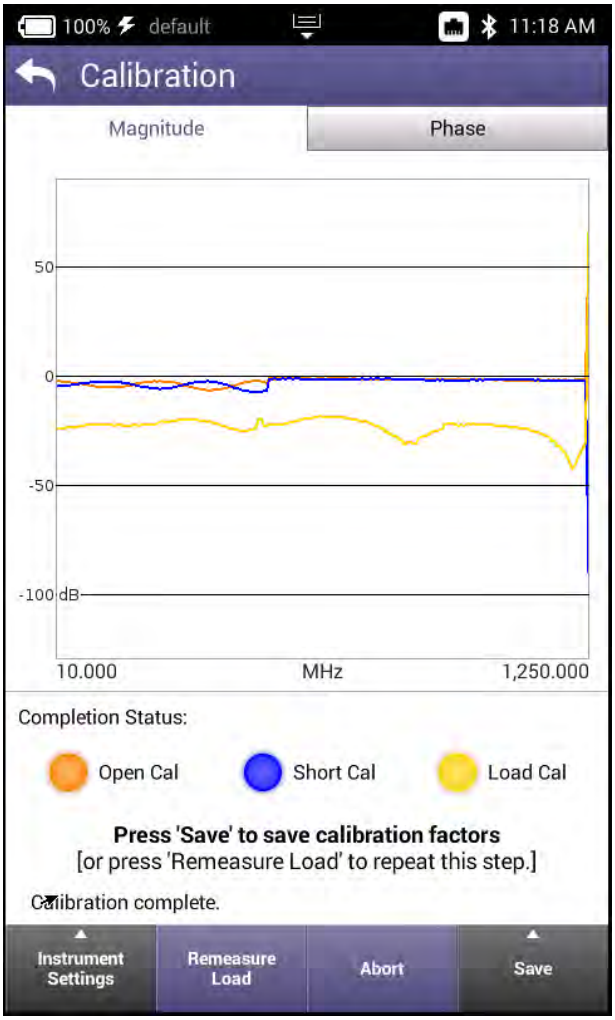
3. Power on the AVX-10K.
4. Select the Test Tools ribbon on the Home screen.
5. Select the VSWR/DTF application.
6. Select the VSWR tab.
7. Press the Calibrate soft-key.



8. Select External Standards. Select OK button to confirm.
9. Follow the instructions at the bottom of each screen to perform Open / Short / Load calibration. The “short” is the smaller of the two terminators. Press SAVE button to complete.



10. When external calibration has been completed, the calibration plot should resemble the following figure.



Perform VSWR Test

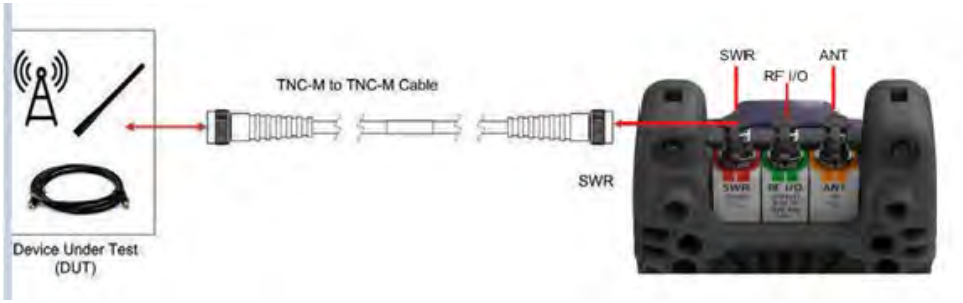


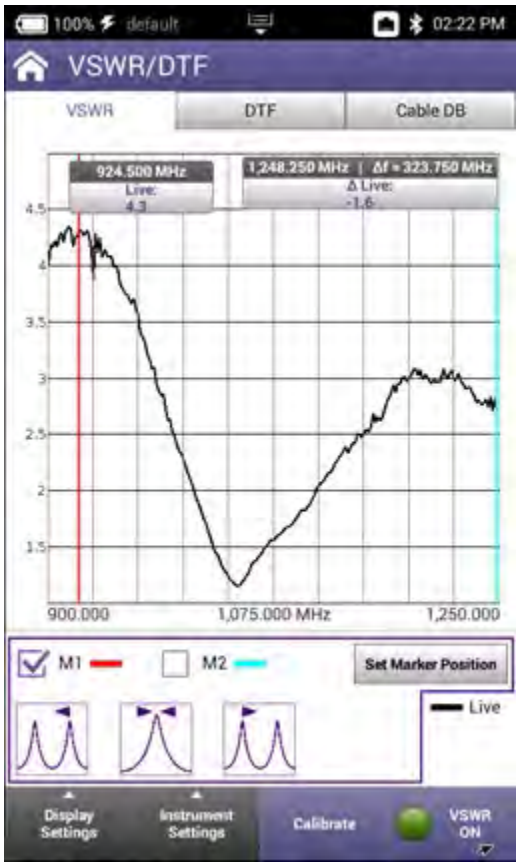
Figure 19: VSWR Test Setup Diagram

Configure the AVX-10K for VSWR Test

1. Power on the AVX-10K.
2. Select the Test Tools ribbon on the Home screen.
3. Select the VSWR/DTF application.
4. Select the VSWR tab.
5. Open the Instrument Settings menu.
6. Set the Start Frequency to 900 MHz.
7. Set the Stop Frequency to 1250 MHz.
8. Open Instrument Settings, set Measurement Mode to VSWR and press the OK button.
9. Ensure the VSWR soft key is set to VSWR On.

Review Test Data

1. Observe the VSWR trace.
2. This example shows an antenna that appears to be tuned well for 1030 MHz and 1090 MHz which indicates a good antenna. A poor antenna would have high VSWR values in this band.



9.2. Distance To Fault

9.2.1. DTF Test Function

Distance to Fault (DTF) is an analysis that is used to identity signal path degradation in cables and transmission lines that may be a result of conditions such as poor connections, damaged cables, or faulty antennas.

9.2.2. Scope of DFT Test

Distance to Fault (DTF) measurements, provides the capability to analyze, troubleshoot and identify signal path degradation in cables and transmission lines. Faults are a result of conditions such as poor connections, damaged cables, or faulty antennas.

This test is used to evaluate the following performance issues:

- The distance to fault of a coaxial cable.

9.2.3. Equipment Needed for DTF Test

The following equipment is required to perform the procedures defined in this section:

- Cable to be tested
- TNC adapter if applicable to interface with the AVX-10K SWR port

Perform DTF Test

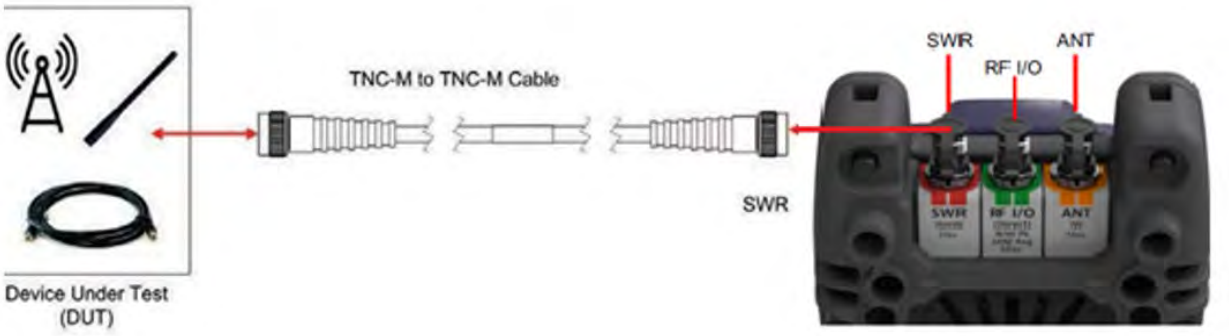
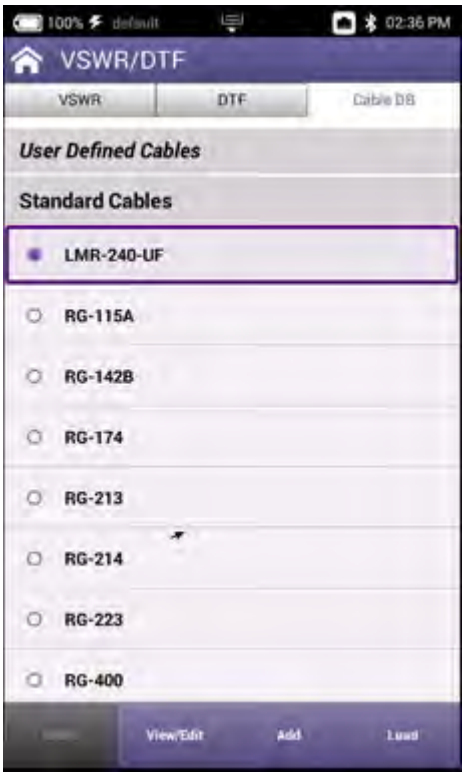


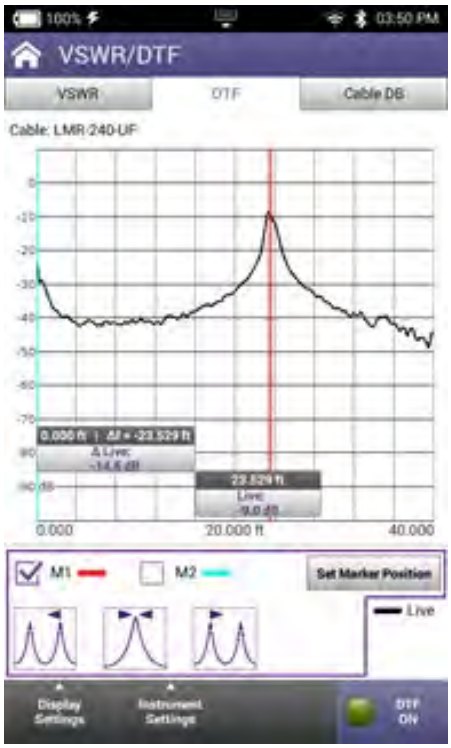
Figure 20: DTF Test Setup Diagram

Configure the AVX-10K for DTF Test

1. Power on the AVX-10K.
2. Select the Test Tools ribbon on the Home screen.
3. Select the VSWR/DTF application.
4. Select the Cable DB tab and select the appropriate cable type (or nearest proximity) for the cable being tested.



5. Select the DTF tab.
6. Open the instrument settings menu.
7. Set measurement mode to Return Loss.
8. Open the instrument settings menu and set the stop distance to a distance longer than the cable under test.
9. Close the instrument settings tab and ensure the DTF enable soft key displays DTF on.
10. The AVX-10K will display the DTF trace.



11. Set the marker to the peak which reflects a fault indication to determine the distance to fault. The markers can be moved manually or using the peak buttons at the bottom of the screen. The middle button is peak find and the adjacent buttons are next peak left or right (if additional peaks exist).

10. System and Utility Functions

10.1. Introduction

System and utility functions configure device parameters such as date and time, network, WiFi and Wireless access. The Test Set contains built-in signal generators and modulators for XPDR frequencies.

System and utility functions also support file management, user setup information and updating the device's software and firmware.

10.2. System Functions

System functions are accessed from the System Menu on the device's Home Screen. System Settings are discussed in Section 2.12.

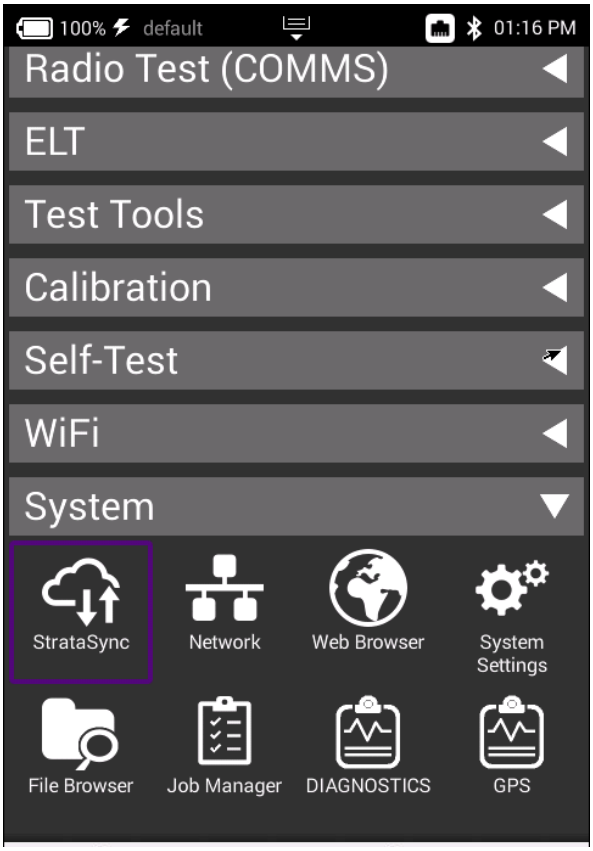
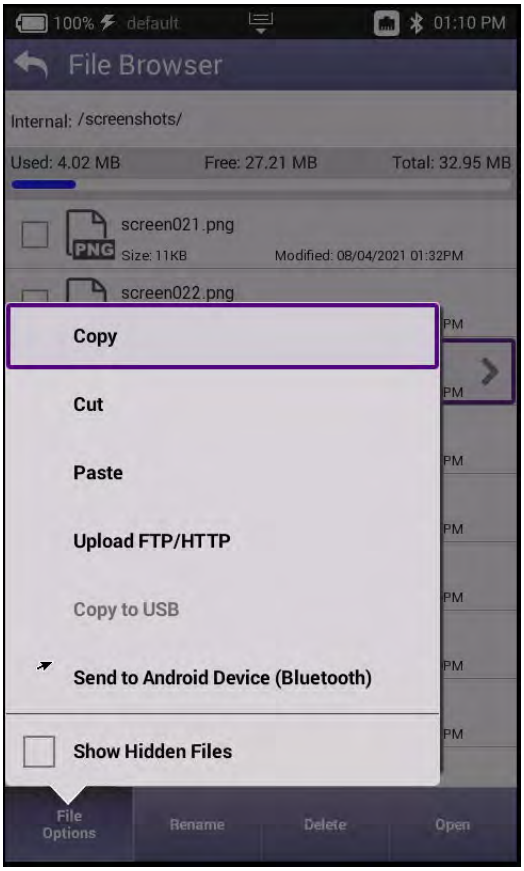


Figure 21: System Main Screen - System Menu

- **StrataSync™** – This application allows for reports to be pushed to the StrataSync™ server. It is recommended that synchronization be performed often to check for firmware updates.
- **Network** – You can select between WIFI or hard-wired connectivity and set all of the associated IP Address settings here. Toggling on and off can be accomplished here as well as from the system tray.
- **Web Browser** – This is a web browser.
- **File Browser** – Similar to a file browser on a computer. Additionally, you can select files to be copied to an FTP server that you specify. Once a file or group of files is selected, press the File Options button and enter the FTP server URL and associated username and password and click Apply. If a valid FTP connection is made, the files will be transferred.



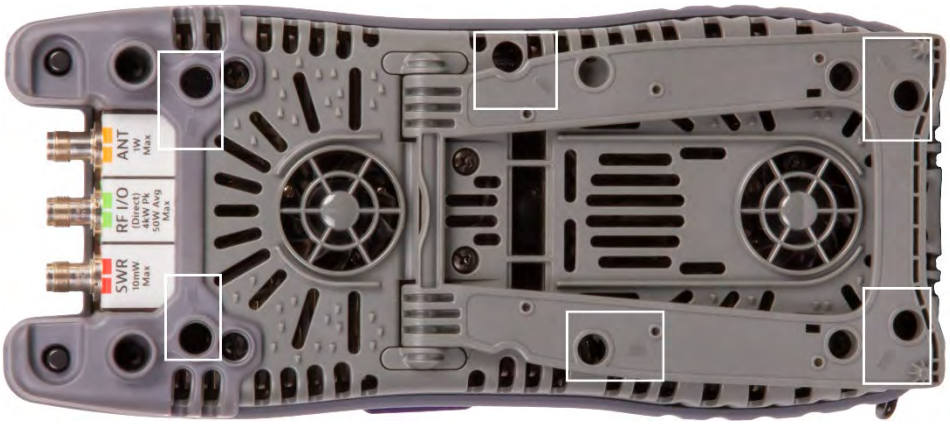
- **Job Manager** – Not used.
- **Diagnostics** – Allows a number of diagnostics messaging to be performed. This area is intentionally not fully documented as it is used mainly for troubleshooting purposes.
- **GPS**– Allows for User Entry or GPS Module Position Settings. These settings are used globally for associated applications.

11. Battery Replacement

Caution: Remove device from AC power supply.

To Remove the Battery.

1. Place the test set on a suitable work bench with the display facing down.
2. Loosen but do not fully remove the six flat blade, captive screws that secure the module to the base unit. The screws are identified with the battery symbol. There is no need to remove the eight phillips head screws as the back shell can stay mounted to the module.



Caution: Remove cover carefully to avoid damaging the PCB assembly and water seal. If module sticks to the base unit, insert a screwdriver where pry slots are provided and gently pry until module releases.

3. Disconnect the module from the base unit while carefully avoiding damage to the PCB assembly. If module sticks to the base unit, insert a screwdriver where pry slots are provided and gently pry until module releases.

4. Loosen the screw that secures the battery cover and remove the cover to expose the battery.

5. Push tab on battery cable connector clip to release and pull cable away from connector.

6. Remove battery from the device. Dispose of the old battery according to local regulations.

New Battery Installation Procedure

WARNING: The battery that came with the device is a Lithium-Ion battery. If the battery is not installed correctly it may explode. Use care when installing the battery to ensure the battery is properly inserted in the device.

1. Insert the new battery in the battery compartment.

Caution: When installing the new battery, use care to ensure wires are inside the compartment. Damage may occur if wires are pinched by the cover.

2. Align and connect the module to the base unit. Verify the module is flush on the base unit before proceeding.

3. Screw in the six screws to secure the Module Cover to the base unit.
4. Dispose of the old battery according to local regulations.

Appendix A. AVX-10K Result Test Limits

List of explanations for all tests.

Field name	Test performed
Autotest summary ribbon	
Level	Level of the transponder being reported by the transponder being tested No FAR reference
A code	Mode A code being reported FAR 43 Appendix F paragraph (g)
C code	Mode c code being reported FAR 43 Appendix F paragraph (g)
C ALT	Actual altitude being reported FAR 43 Appendix F paragraph (g)
Replies A,C,S	Are Mode A,C and S replies being received FAR 43 Appendix F paragraph (g)
S code	Mode A code being reported in the Mode S reply FAR 43 Appendix F paragraph (g)
A ALT	Mode S altitude being reported in the Mode S reply FAR 43 Appendix F paragraph (g)
BOT Frequency	Frequency of the bottom port replies test criteria- For class A transponders: 1090.00 MHz +/- 1 For class B transponders: 1090.00 MHz +/- 3 FAR 43 Appendix F paragraph (a)
BOT ERP	For class A transponders: >+51dBm For class B transponders: >48dBm Transponders must not exceed +57dBm FAR 43 Appendix F paragraph (d)
BOT MTL	ATRCRBS: -73 +/- 4 Mode S: -74 +/- 3 FAR 43 Appendix F paragraph (c)
TAIL	Tail number of the aircraft being tested No FAR reference
AA	Announced address of the transponder being tested FAR 43 Appendix F paragraph (h)
Country	Origin country reported by the transponder No FAR reference

Field name	Test performed
A/C Decoder/SLS ribbon	
SLS A Code 0dB	Replies <1% when P2 is equal in amplitude to P1. FAR 43 Appendix F paragraph (b)
-9dB	Replies >90% when P2 is -9dB down from P1 FAR 43 Appendix F paragraph (b)
A code	Display of Mode A code and pulses present FAR 43 Appendix F paragraph (g)
C ALT	Display of Mode C altitude and pulses present FAR 43 Appendix F paragraph (g)
A/C Space and Width ribbon	
Mode A ATCRBS ALL-CALL	No reply to Mode A ALL-CALL FAR 43 Appendix F paragraph (h)
Mode C ATCRBS ALL-CALL	No reply to Mode C ALL-CALL FAR 43 Appendix F paragraph (h)
Power and Frequency ribbon	
Mode A MTL	-73 +/- 4 dBm FAR 43 Appendix F paragraph €
Mode A ERP	For class A transponders >+51dBm For class B transponders >48dBm Transponders must not exceed +57dBm. FAR 43 Appendix F paragraph (d)
Mode A frequency	Frequency of the bottom port replies test criteria- For class A transponders: 1090.00 MHz +/- 1 For class B transponders: 1090.00 MHz +/- 3 FAR 43 Appendix F paragraph (a)
A-C MTL DIFF	Difference between Mode A and Mode C MTL FAR 43 Appendix F paragraph ©
Mode C ERP	For class A transponders: >+51dBm For class B transponders: >48dBm Transponders must not exceed +57dBm FAR 43 Appendix F paragraph (d)
Mode C Frequency	Frequency of the bottom port replies test criteria- For class A transponders: 1090.00 MHz +/- 1 For class B transponders: 1090.00 MHz +/- 3 FAR 43 Appendix F paragraph (a)
Mode S MTL	-74 +/- 3 FAR 43 Appendix F paragraph €

Field name	Test performed
Mode S ERP	For class A transponders: >+51dBm For class B transponders: >48dBm Transponders must not exceed +57dBm FAR 43 Appendix F paragraph (d)
Mode S Frequency	Frequency of the bottom port replies test criteria- For class A transponders: 1090.00 MHz +/- 1 For class B transponders: 1090.00 MHz +/- 3 FAR 43 Appendix F paragraph (a)
Mode A ITM Reply CAP	Intermode Reply Capability- Verify that the mode S transponder only replies to a mode S ALL-CALL FAR 43 Appendix F paragraph (i)
Mode C ITM Reply Cap	Intermode Reply Capability- Verify that the Mode S transponder only replies to a Mode S ALL-CALL FAR 43 Appendix F paragraph (i)
Mode A ITM Reply ADDR	Intermode Reply address for Mode A FAR 43 Appendix F paragraph (g)
Mode C ITM reply ADDR	Intermode Reply address for Mode C FAR 43 Appendix F paragraph (g)
Mode S ALL-CALL Capability	Displays the capability of the transponder from the DF11 reply FAR 43 Appendix F paragraph (h)
Mode S ALL-CALL Address	Displays the address in the ALL-CALL reply FAR 43 Appendix F paragraph (h)
Mode S ALL-CALL Reply Status	Indication if the transponder replied to the Mode S ALL-CALL FAR 43 Appendix F paragraph (h)
S Reply ribbon	
Invalid AA	Indicates if the transponder replied to an interrogation with an incorrect Announced Address. FAR 43 Appendix F paragraph (f)
S Squitter ribbon	
DF11 Period	Time period between DF11 acquisition squitters FAR 43 Appendix F paragraph (j)
Diversity Isolation	If turned on the AVX-10K will determine if the Isolation between the top and bottom channels is within tolerance. Disabled by the operator if not a diversity transponder.

Field name	Test performed
	FAR 43 Appendix F paragraph €
UF4 ribbon	
DF4	Was the reply to this interrogation a DF4 FAR 43 Appendix F paragraph (g)
AC	Displays the Altitude Code in the DF4 FAR 43 Appendix F paragraph (g)
Mode C ALT Compare	Compares the Mode C altitude to the Mode C altitude contained in the DF4 reply FAR 43 Appendix F paragraph (g)
AA	Announced Address in the DF4 reply FAR 43 Appendix F paragraph (g)
DF11 Address Compare	Compares the Announced Address in the DF4 with the Address in the DF11 squitter. FAR 43 Appendix F paragraph (h)
UF5 ribbon	
DF5	Was the reply to this interrogation a DF5 FAR 43 Appendix F paragraph (g)
AC	Displays the Mode 3 Code in the DF5 FAR 43 Appendix F paragraph (g)
Mode C ALT Compare	Compares the Mode 3 Code to the Mode 3 code contained in the DF5 reply FAR 43 Appendix F paragraph (g)
AA	Announced Address in the DF5 reply FAR 43 Appendix F paragraph (g)
DF11 Address Compare	Compares the Announced Address in the DF5 with the Address in the DF11 squitter. FAR 43 Appendix F paragraph (h)
UF11 ribbon	
DF11	Was the reply to the UF11 a DF11 FAR 43 Appendix F paragraph (h)
AA	Displays the Announced Address in the DF11 FAR 43 Appendix F paragraph (h)
UF20 ribbon *	
DF	Displays the DF reply to the UF20 FAR 43 Appendix F paragraph (g)

Field name	Test performed
Mode C ALT Compare	Compares the altitude from the Mode C reply to the altitude in the reply from the UF20 FAR 43 Appendix F paragraph (h)
DF11 Address Compare	Compares the address from the DF11 squitter to the address in the DF20 reply FAR 43 Appendix F paragraph (h)
UF21 ribbon *	
DF	Displays the DF reply to the UF21 FAR 43 Appendix F paragraph (h)
Mode A ID Compare	Compares the Mode 3 ID from the Mode 3 reply to the ID in the reply from the UF21 FAR 43 Appendix F paragraph (h)
DF11 Address Compare	Compares the address from the DF11 squitter to the address in the DF20 reply FAR 43 Appendix F paragraph (h)

Note: These tests are dependent on the transponder's ability to respond to a UF20 and UF21. May result in a "NO REPLY"

Appendix B. Caveats and Statements

Notifications

Every effort was made to ensure that the information in this manual was accurate at the time of printing. 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.

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

- **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.

- **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: www.viavisolutions.com/en/terms-and-conditions.

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 AVX-10K Flight Line 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.

Safety and Compliance Information

Proof of Conformity

When applicable, compliance information for the product (Declarations of Conformity, etc.) are provided in printed form and ship with the unit.

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

Symbols and Markings

When the following symbols and markings are found on the instrument , these symbols will be placed in product documentation, where they are applicable:

Toxic Symbol

Indicates a toxic hazard. Item should only be handled by Qualified Service Personnel. Dispose of item in accordance with local regulations.

Explosion Symbol

Indicates an explosion hazard. Item should only be handled by Qualified Service Personnel. Dispose of item in accordance with local regulations.

ESD Sensitive

Indicates item is static sensitive. Item should only be handled by Qualified Service Personnel.

Voltage Symbol

This symbol represents hazardous voltages. It may be associated with either a DANGER, WARNING, CAUTION, or ALERT message.

Hot Surface Symbol

This symbol represents a risk of a hot surface. It may be associated with either a DANGER, WARNING, CAUTION, or ALERT message.

WEEE Symbol

This symbol, located on the equipment, battery, or the packaging indicates that the equipment or battery must not be disposed of in a land-fill site or as municipal waste, and should be disposed of according to your national regulations.

CE Compliant

This Marking indicates the item meets the conformity requirements of the European Union.

UKCA Compliant

This Marking indicates the item meets the conformity requirements of the Great Britain (England, Scotland and Wales). A copy of the UKCA Declaration of Conformity is available upon request.

Korea Certification

A급 기기 (업무용 방송통신기자재)	이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Class A Equipment (Industrial Broadcasting & Communications Equipment).

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.

GITEKI Certification (Japan)

当該機器には電波法に基づく、技術基準適合証明等を受けた特定無線設備を装着している。

電波法により5.2/5.3 GHz帯は屋内使用に限ります

The Giteki certification includes two types namely Technical Standards Conformity Certification and Construction Design (Construction Type) Certification.

- **Technical Standards Conformity Certification**
  Certify and test for conformity of an equipment for each unit to which the certification mark “Giteki” and ID number is granted. Applicable to small production and prototype production.
- **Construction Design/Type Certification**
  Certify “construction design” of an equipment and test per model to which the “Giteki” mark and ID number is granted. The Certification does not limit the quantity of the equipment as long as the equipment is manufactured by the same design and the manufacturing method is applied as the certified model.
  The Specified Radio Equipment connected to telecommunication network requires compliance to technical standards conformity in both Japan Telecommunications Business law and Japan Radio Law.

Attention Symbol

This symbol represents a general hazard. It may be associated with either a DANGER, WARNING, CAUTION, or ALERT message.

Note Symbol

This symbol indicates a note that includes important supplemental information or tips related to the main text.

Safety Definitions

This Operation Manual uses the following terms to indicate conditions or activities which are potential safety hazards:

Term	Definition
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 Hazards

- Equipment Usage

WARNING: Operating this device in a manner not specified in accompanying documentation may impair the safety protection built into the device.

This device is designed and tested to comply with the requirements of 'IEC/EN 61010-1, 3rd Edition 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.

- Toxic Hazards

WARNING: Lithium

- A Lithium-Ion battery is used in this device. 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.

- Electrical Hazards

WARNING: Improper grounding of equipment can result in electrical shock. To ensure proper grounding, this device should only be connected to a grounded AC Power Supply.

The instrument is provided with a protective grounding lead that conforms with IEC Safety Class I. The supply lead must always be connected to the power supply via a grounded contact in order to maintain the grounding protection. The instrument must be properly grounded to prevent damage to the device from electrostatic discharge (ESD).

WARNING: Residual Current.

The supply filter contains capacitors that may remain charged after the instrument is disconnected from the power supply. The residual energy is within the approved safety requirements; however, a slight shock may be felt if the plug pins are touched immediately after removal.

Caution: Input Overload.

Do not overload input connectors. Refer to product Safety and Compliance Specifications or the product data sheet for maximum input ratings. Refer to product labeling and safety documentation for maximum input ratings.

Caution: UPON COMPLETION OF ANY MAINTENANCE ACTION; ALL assemblies, cables, connectors, plastic fasteners, gaskets, fingerstock, and miscellaneous hardware must be configured as installed at the factory in order to satisfy the safety and EMC compliance standards.

Caution: ESD-Sensitive Components

- THIS EQUIPMENT CONTAINS PARTS SENSITIVE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD)
- Internal components are **ESD** sensitive and should only be installed, removed and/or serviced by Qualified Service Personnel.
- THE POWER SUPPLY ASSY, MULTI-FUNCTION PCB ASSY, RF ASSY AND PROCESSOR PCB ASSY CONTAIN PARTS SENSITIVE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALL PERSONNEL PERFORMING TROUBLESHOOTING PROCEDURES SHOULD HAVE KNOWLEDGE OF ACCEPTED ESD PRACTICES AND/OR BE **ESD** CERTIFIED.

- **Federal Communications Commission (FCC) Notice**
  This product 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 product 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 product in a residential area is likely to cause harmful interference (see section “Electromagnetic Interference (EMI)” on page xii).
  The authority to operate this product 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 Class A digital apparatus complies with Canadian ICES-003.

  Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.
- **Low Voltage Directive Compliance**
  This product was tested and conforms to the Low Voltage Directive, 73/23/EEC as amended by 93/68/EEC.

- **WEEE and Battery Directive Compliance**

  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.

  Information and instructions for returning waste equipment and batteries to VIAVI can be found on the VIAV website in the WEEE section of the VIAVI Standards and Policies web page at: https://www.viavisolutions.com/en-us/corporate/legal/policies-standards#sustain.

- **CA 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.

  VIAVI's position statement on the use of Proposition 65 chemicals in VIAVI products can be found in the Hazardous Substance Control section of the VIAVI Standards and Policies web page at: https://www.viavisolutions.com/en-us/corporate/legal/policies-standards#sustain.

- **Ordering Information**

  This publication is a product of the VIAVI Technical Publications Department, issued as part of the AVX-10K Flight Line Test Set.

  The material number associated with this manual is 22135254. This manual is available on the VIAVI website in PDF format.

  The part number for a published guide in CD format is: 22141759.

Appendix C. Safety Data Sheets

Safety Data Sheets

- **Rechargeable Lithium-Ion Batteries**

Safety Data Sheet
Lithium Ion Batteries

1. Identification

Important note: As a solid, manufactured article, exposure to hazardous materials is not expected with normal use. This battery is an "article" pursuant to 29 CFR 1910.1200 and, as such, is not subject to the OSHA Hazard Communication Standard and no SDS is required. Although not legally required, this Safety Data Sheet contains valuable safety information for lithium ion batteries and is provided as a service to our customers.

Product name:
Lithium ion cells and batteries (various types including cylindrical or prismatic lithium ion cells, lithium ion polymer cells, and batteries made from these cell types)

Manufacturer:
VIAVI Solutions

Address:
6001 America Center Drive, 6th Floor, San Jose, CA 95002

Phone:
(408) 404-9000

Emergency contact (Chemtrec):
1-800-424-9300: US and Canada / 1-703-527-3887: International

2. Hazard(s) identification

There are no hazards when measures for proper handling and storage are followed.

In case of damage to a battery cell, there is danger of release of hazardous substances including a highly flammable gas mixture and dangerous levels of heat.

In case of fire, there is danger of release of hazardous combustion byproducts (smoke).

Lithium ion batteries are not considered hazardous by the OSHA Hazard Communications Standard 29 CFR 1910.1200.

3. Composition

These materials are fully contained within the battery cells, and do not present a hazard unless the battery has been damaged.

Anode	Lithium Cobalt Oxide ($LiCoO_2$)
Electrolyte	Lithium Hexafluorophosphate ($LiPF_6$) dissolved in a mixture of ethylene carbonate ($C_3H_4O_3$) and diethyl carbonate ($C_5H_{10}O_3$)

Other materials, such as the battery housing and the electrical insulation, are not hazardous under normal conditions but may emit hazardous chemicals such as carbon dioxide, carbon monoxide and formaldehyde in a fire.

4. First aid measures

Under normal conditions these batteries are not hazardous, but under unusual circumstances they can become hazardous. The battery can produce hazardous chemicals if the internal cells rupture or vent, and burning the battery will produce hazardous levels of heat and dangerous combustion byproducts (smoke).

After inhalation	Ensure plenty of fresh air. Consult a physician.
After contact with skin	Wash off immediately with soap and plenty of water. Consult a physician if irritation continues.
After contact with eyes	Rinse eyes immediately with plenty of water, including under the eyelids, for at least 15 minutes. Seek immediate medical treatment from an eye specialist.
After ingestion	Drink plenty of water. Call a physician immediately.

5. Fire fighting measures

Remove the batteries from the fire fighting area if you can do this without risk.

For a small fire use dry chemical, CO_2, water spray, or regular foam.

For a large fire use water spray, fog, or regular foam.

Fire fighting personnel should use a self-contained breathing apparatus.

Detailed information on fighting a lithium ion battery fire can be found in Guide 147 (Lithium Ion Batteries) of the US DOT Emergency Response Guide.

6. Accidental release measures

Under normal conditions this section does not apply.

If the cells rupture or are damaged they can vent hazardous substances. In that case:

- Use personal protective clothing.
- Avoid contact with eyes, skin and clothing.
- Avoid breathing fumes.
- Do not discharge hazardous substances into drains, surface water, or ground water.
- Take up mechanically and send for disposal.

7. Handling and storage

Do not crush, puncture, or otherwise damage the battery. Do not incinerate. Do not short circuit. Do not expose the battery to extreme temperatures.

Store in a dry place, at temperatures between -40C (-40F) and 60C (140F). Exposure to extreme high temperatures can cause the cells within the battery to vent (releasing chemicals that might become hazardous).

8. Exposure controls and personal protection

This section does not apply. Exposure controls and personal protection are not needed under normal day-to-day conditions.

9. Physical and chemical properties

Lithium ion batteries can produce hazardous temperatures when damaged. This can start a fire, or it can contribute to the intensity of a fire. This can ignite other nearby batteries. Once ignited, the cells burn with an intense and very hot flame.

Excessive internal pressure (such as from a fire or other high temperature) will cause the cells to vent, discharging the highly inflammable electrolyte. This can easily cause a fire to flare, and it might cause an explosion.

When burning, lithium batteries will generate dangerous gasses including carbon monoxide, carbon dioxide, formaldehyde, and small amounts of hydrogen fluoride (HF).

The electrolyte may form a small amount of hydrofluoric acid on contact with water.

10. Stability and reactivity

Lithium ion batteries are chemically stable.

Keep away from open flame, hot surfaces, and sources of ignition. Do not puncture, crush or incinerate cells.

If cells are punctured, crushed or incinerated, hazardous decomposition byproducts include carbon monoxide, carbon dioxide, formaldehyde, and small amounts of hydrogen fluoride (HF).

11. Toxicological information

Lithium batteries are harmful when swallowed. Seek immediate medical attention if swallowed.

Under normal conditions no toxic substances are exposed.

Keep away from open flame, hot surfaces, and sources of ignition. Do not puncture, crush or incinerate cells.

Under normal conditions there are no toxicological effects.

12. Ecological information

Ecological damage has not occurred and is not expected to occur under normal conditions.

Keep away from open flame, hot surfaces, and sources of ignition. Do not puncture, crush or incinerate cells.

Do not flush into surface water or sanitary sewer system.

13. Disposal considerations

Lithium ion batteries are not classified as hazardous waste, but they should be recycled. They contain materials that can be recovered and reused.

Dispose of properly. For further information consult VIAVI Solutions.

14. Transport information

For transportation purposes, lithium ion batteries are considered dangerous goods. All lithium ion batteries used in all active VIAVI Solutions products comply with requirements defined by ICAO, IMDG, US DOT, ADR, UN Model Regulations, and IATA DGR (63rd Edition, 2022). All lithium ion batteries used in all active VIAVI Solutions products meet the international requirements for transport by land, sea, air, and rail.

- These batteries have been tested for safety in transportation, as defined in the UN Manual of Tests and Criteria, Section 38.3. Test summaries are available on request.
- These batteries have a Watt hour rating no greater than 100 Watt hours.
- When purchased separately from the product for which they provide power, these batteries have a SoC (State of Charge) no greater than 30%. This is required for air transport of batteries that are packed separately from the product. This is not required for other modes of transportation (only air) and is not required when the batteries are contained in the product or packed with the product (in the same package).

The shipper must also be aware of other requirements that are defined in the international regulations such as the nature of the packaging materials, the per-package quantity limit, the required labeling and external marking on the package, the shipping documentation, and the training requirements for packing and shipping personnel.

The shipper must also be aware of national restrictions and the shipping company's internal policies. These may affect where a package can be shipped by what mode of transportation as well as what shipping companies can transport the shipment.

It is prudent to contact the shipping company ahead of time.

For air transportation:

UN shipping name	UN ID	Packing Instruction	Hazard class	ERG code
Lithium ion batteries	UN 3480	PI 965	9	12FZ
Lithium ion batteries packed with equipment	UN 3481	PI 966	9	12FZ
Lithium ion batteries contained in equipment	UN 3481	PI 967	9	12FZ

When shipped separately from the product for which they provide power, these batteries meet the requirements defined in IATA DGR (63rd Edition, 2022) Packing Instruction 965, Section IB. The shipper should be aware that PI 965 Section II is no longer valid. Section IB requires

additional package labelling, shipping documentation, and formal training for packing and shipping personnel.

When these batteries are shipped with or contained in equipment, they may be shipped under Section II of either PI 966 (batteries packed with equipment) or PI 967 (batteries contained in equipment).

For sea transportation:

All lithium ion batteries used in all VIAVI Solutions products meet the international requirements for shipping by sea.

Consult the IMDG for other requirements (packaging, documentation, training, per-package quantity limit).

Consult your shipping company or freight forwarder ahead of time.

For ground or rail transportation:

All lithium ion batteries used in all VIAVI Solutions products meet the international requirements for shipping by ground or rail.

Consult national regulations for other requirements (packaging, documentation, training, per-package quantity limit).

Consult your shipping company or freight forwarder ahead of time.

15. Regulatory information

All lithium ion batteries sold by VIAVI Solutions have been tested and found to comply with the requirements of the UN Manual of Tests and Criteria, Section 38.3.

Batteries may also have other certifications, such as UL 2054 or IEC/EN 62133 (for CE mark). Consult the markings on the battery for additional certifications.

16. Other information

Much of the information contained in this SDS (Safety Data Sheet) is taken from the MSDSs provided by the lithium ion cell manufacturers, and from the US DOT Emergency Response Guide. VIAVI Solutions is not responsible for the accuracy of this information.

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English

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**