



## AV-10 PERSONAL RAMP TESTER USERS MANUAL

Sun Avionics, Inc. 2012

The AV-10 was designed to be a low cost easy to use small instrument that provides test signals for the following aircraft avionic equipment:

1. Generates VOR test signals at each 45 deg radial or at 0, 45, 90, 135, 180, 225, 270, 315 deg's from the station. Carrier frequencies 108.0, 110.2, 112.4, 113.6 MHz are selectable.
2. ILS test signals.
  - a) Localizer  
108.1 or 110.3 MHz carrier frequency center, 1/2 and full deflection right and left no 150Hz or no 90Hz modulation to check NAV flag
  - b) GLIDE SLOPE  
108.1 - 334.7, or 110.3 - 335.0 MHz carrier frequency center, 1/2 and Full deflection up and down, no 150HZ or no 90Hz modulation to check flag
  - c) MARKER BEACON  
OUTER, MIDDLE, and INNER marker beacon signals
3. DME test signal.  
108.00 =17X or 108.05=17Y MHz carrier selectable  
Generates a fixed 20NM signal to DME
4. TRANSPONDER A/C/S ADS-B
  - a) Generates MODE-A test signal and display's squawk code and reply percentage. Also allows sidelobe suppression check. If the transponder IDENT is activated then the AV-10 will display IDENT. The AV-10 sends about 75 MODE-A interrogations per second. The AV-10 sends 1030MHz P1 and P3 pulses spaced 8.0uS apart. The P2 sidelobe suppression pulse is the same amplitude as P1-P3 and sent 2.0uS after the P1 pulse if enabled. No P4 pulse is sent.
  - b) Generates MODE-C test signal and display's altitude and reply percentage. Also allows sidelobe suppression check. The AV-10 sends about 75 MODE-C interrogations per second. The AV-10 sends 1030MHz P1 and P3 pulses spaced 21.0uS apart. The P2 sidelobe suppression pulse is the same amplitude as P1-P3 and sent 2.0uS after the P1 pulse if enabled. No P4 pulse is sent.

c) Checks the Aircraft Transponders Transmit carrier frequency.  
The AV-10 sends MODE-A requests and displays a number that is representative of the magnitude of the received reply. By moving a filter about the nominal 1090MHz receive frequency the approximate transponder transmit frequency is determined. The filter can be moved 15MHz from 1090MHz in 1MHz steps.

d) Sends A/C/S ALL-CALL message.

ATCRBS MODE-A/C transponders will send a normal MODE-A reply. MODE-S transponders will send an S reply. The AV-10 will display the HEX Aircraft ID and a all 0's CRC error code for good received S reply. The AV-10 sends 1030MHz P1 and P3 pulses spaced 8.0uS apart. A 1.6uS wide P4 pulse is sent 2.0uS after P3.

e) Send MODE-S only ALL-CALL.

The AV-10 will send a differential phase-shift keyed (DPSK) MODE=S ALL-CALL interrogation. ATCRBS MODE-A/C will not respond since the interrogation starts with two 1030MHz pulses spaced 2.0uS apart that is seen as a sidelobe suppression. Since an all 1's ALL-Call address is sent, any MODE-S transponder will send a MODE-S reply. The AV-10 will display the HEX aircraft ID and all 0's CRC for a good reply.

f) ADS-B MODE-S ID SQUITTER

The AV-10 will listen for the ID-SQUITTER AND display the HEX ID and 0's CRC for good reply.

g) AIRCRAFT TAIL NUMBER SQUITTER

The AV-10 will listen for the flight number - tail number squitter and display the Tail number and the HEX ID.

h) LOCATION SQUITTER

The AV-10 will listen for the GPS derived location squitter and display the calculated LATitude and LONGitude in decimal degrees. Due to the way position data is sent, It takes at least 2 received squitters to calculate the position.

## WHAT IT'S NOT

Sun Avionics has done its best to provide a useful piece of test equipment but we do NOT recommend using the AV-10 to determine airworthiness of any avionic device. The appropriate use of the AV-10 is to be determined by you the owner or operator. Proper use also requires that the operator understand the operation of the avionics device he is testing. A great deal of information can be found on our website, the internet or from manufactures manuals. It is the operators responsibility to insure safe use of the AV-10.

## FRONT PANEL OPERATION

To operate the AV-10, turn on unit and wait for its self test to finish. It will display the software version then:

PUSH TO SEL MODE  
< VOR >

The AV-10 is controlled using the 3 keys just below the 2 line LCD display. The center key has two functions based on how long the key is pressed. A short normal press is used to select the currently displayed menu item. A long (approx 3 seconds) press causes the unit to stop the current operation and jump back to the < vor > beginning menu item. The Left and Right keys just move you through the menu's.

The blue LED just above the 2 line LCD display will turn on to indicate that the AV-10 is transmitting. connect the antenna to the BNC connector that is above the display. For VOR, ILS functions extend the antenna to full length since they run in the 100-400 MHz range. During DME and TRANSPONDER operation collapse the antenna to its shortest length.

## BATTERY REPLACEMENT

The AV-10 is powered by (4) AA batteries. Heavy duty alkaline or equivalent last the longest and should provide over 2 hours of continuous operation. To replace the batteries, remove the four rubber feet using a #1 phillips screwdriver to access the battery holder.

## TEST PROCEDURE

The transmit power of the AV-10 is very low at approximately 1/4 of one thousandths of a watt (0.25 milliwatt) so you will need to be close (15-20 ft) to the aircraft for testing. The power was designed to be very small so that the likelihood of interference is low and so that the sensitivity of the aircraft receivers can be checked. However, when using the AV-10, be sure that you do not interfere with any other aircraft or ATC system.

A good method to limit possible interference is to test inside of a metal hangar. Note that when testing the ILS marker beacon the AV-10 antenna will probably need to be within a inch of the aircraft marker antenna. The aircraft marker receiver was designed with 100 times lower sensitivity than your other receivers so that it only picks up the marker when the plane is close to the marker transmitter.

When performing transponder testing always do a MODE-A test first so that the

AV-10 can adjust its receiver to the current RF conditions. It is also the best way to find a good RF location near the aircraft. Sometimes moving only a foot will change the signal strength quite a bit due to reflections and shadowing of the signal.

## ABOUT CALIBRATION

The AV-10 has been designed using today's most advanced electronics. Sun's custom designed digital circuitry resides in a large gate array. The chip contains Sun's proprietary micro computer and what would have been a couple PC boards full of parts only a few years ago. The AV-10 design is digital where all timing and RF frequencies used in the unit are derived from one high precision crystal oscillator that is compensated to 1.0 part per million over 0 to 50 deg C.

There are no adjustable parts in the unit and it will never need calibration. Of course anything can and will break. If you suspect a problem check another aircraft to see if the problem persists. Make sure batteries are good (unit may act up as batteries fail). Check that a line of sight RF path exists between the AV-10 and the aircraft antenna. Contact Sun if needed.

For updated information, to ask questions, or send your comments please see our web site at: [www.sunavionics.com](http://www.sunavionics.com)  
e-mail us at: [sales@sunavionics.com](mailto:sales@sunavionics.com)

Thank you for selecting Sun Avionics equipment.