

AV-10 Calibration

Note; There are no adjustable components in the AV-10 design. The calibration is done yearly to insure that the unit is still functioning within specifications.

The following is performed during factory calibration;

Connect AV-10 output to a HP8568B (or equiv) spectrum analyzer using approx 3 ft RG58 coax. The analyzer must have a precision frequency standard that is accurate to $\pm 1 \times 10^{-7}$ Hz or better.

General info;

Sideband to carrier db for double sideband AM=20 $\text{LOG}(\%AM/200)$

$\text{DDM} = ((\text{Large } \% - \text{Small } \%)/100)$

ILS Localizer;

Set the HP8568B center freq to 108.1 and span to 2KHz. Select ILS localizer 108.1 and DDM=0 (CENTER) on the AV-10. Check that; Frequency=108.1MHz ($\pm 2.5\text{PPM}$ $\pm 1\text{PPM}$ aging per year) and that the power is -10dbm ($\pm 3\text{db}$).

With the center selected check that the 90 and 150Hz sidebands are equal ($\pm 1\text{db}$) and -20db ($\pm 1\text{db}$) from carrier.

Set 1/2 right on AV-10. Side bands -18.5 (± 1) db and -21.9 (± 1) db

Set Full right on AV-10 Side bands -17.2 (± 1) db and -24.2 (± 1) db

Set 150 Hz OFF and see that sideband gone.

Set 90 Hz OFF and see that sideband gone.

ILS Glide slope;

Change the HP8568b to 334.7MHz 2KHz scan and check the AV-10 glide slope signal for frequency accuracy $\pm 2.5\text{PPM}$ \pm aging, power=-17dbm $\pm 3\text{db}$, 90Hz and 150Hz AM mod sidebands -14dbm $\pm 2\text{db}$ from carrier and $\pm 1\text{db}$ of equal magnitude for center.

For 1/2 the sidebands should be -13.1(± 1) and -15(± 1) db down.

For FULL the sidebands should be -12.25(± 1) and -16.125(± 1) db down.

Set 150 Hz OFF and see that sideband gone.

Set 90 Hz OFF and see that sideband gone.

ILS Marker;

Check for 75MHz $\pm 5\text{ppm}$ carrier with -15dbm $\pm 3\text{db}$ power out. Check on/off AM mod as;

outer marker 400Hz $\pm 5\%$

middle marker 1300Hz $\pm 5\%$

inner marker 3000Hz $\pm 5\%$

VOR;

Select VOR mode and 108MHz freq on AV-10. Measure the center frequency and power. 108MHz $\pm 2.5\text{PPM}$ aging and -10dbm $\pm 3\text{dbm}$ in 10KHz analyzer BW. Using a modulation analyzer check that the 30Hz AM and 9960Hz subcarrier provide about 30% AM and that the on/off 1024Hz tone is giving about 10% AM mod. Check the Phase between the two 30Hz signals to insure they are within ± 1 degree of expected phase.

Check the other VOR frequencies and their power.

DME;

Use a 1GHz bandwidth Tek-7104 scope (or equiv). View the AV-10 output signal. The output will be pulse pairs spaced 12uS +/- .1uS for the 108.0 X mode and 36uS +/- .1uS for the 108.05 Y mode. The output power = -12dbm +/- 3db. Check the AV-10 with a known good DME for proper lock.

ADF;

Use the spectrum analyzer to check the ADF am signals. Freq within +/- 5ppm and output power -12dbm +/- 3db. On/off AM modulation.

Transponder;

Using the 1GHZ bandwidth above, scope view the AV-10 output and check power for -12dbm +/- 3db. The HP8568B analyzer can be used to check the carrier frequency by selecting the AV-10 MODE-A squawk mode and using the appropriate analyzer scan rate to determine the aprox output frequency.

Finally, all the transponder modes are checked using a known good mode-a/c/s-ES transponder.

If any of the above tests fail, the factory should be contacted for repair.