

## APPENDIX C:

# Calibrating the Antenna Analyst

The user will need to calibrate the Micro908 Antenna Analyst when first constructed. The instrument may also need to be recalibrated later, such as when new software updates are available that change the way in which calibration data are used, or when the characteristics of the DDS signal source change in any regard. In these cases, the instrument may be quickly and easily calibrated by following a short sequence of operations located in the “Calibrate” function, located beneath the CONFIG pushbutton.

1. Select the Calibrate function, located within CONFIG.
2. See “Calibrate now?” displayed in the LCD. Confirm by selecting “yes” with the dial. (Press the dial when “yes” is displayed.)
3. See “Open load” displayed on the LCD. Ensure that nothing is connected to the RF output jack, then confirm by selecting “yes” with the dial.
4. See a display of numbers representing the reflectometer channel voltages for  $V_f$ ,  $V_r$ ,  $V_z$  and  $V_a$ . Ensure that the first three hex numbers are generally “high” numbers above 90 (9x, Ax, Bx, Cx, Dx, or Ex), and that the last number ( $V_a$ ) is very close to zero (e.g., 04).
5. If the displayed numbers are in the acceptable range, as explained above, press the Dial to continue. However, if the “3 high and one low” condition of numbers is not present, or if any channel is very high in the hex number range of F0 to FF, then you cannot proceed with calibration and you should contact Support.
6. See “Shorted load?” displayed on the LCD. Place a short circuit on the RF output jack and select “yes” with the dial.
7. See “270-ohm load on?” displayed on the LCD. Place the supplied 274-ohm resistive load on the RF output connector and confirm by selecting “yes”.
8. See “Make SWR=5.4” displayed on the first line of the LCD, and a number on the second line. Adjust the dial to make the number on the second line be as close as possible to 5.4. Press the dial when this number is 5.4.
9. See “50-ohm load on?” displayed on the LCD. Place a 50-ohm load on the RF output connector and confirm by selecting “yes” with the dial.
10. See “Saving data” displayed on the LCD and the red BUSY LED will turn on for several seconds.
11. When the BUSY LED turns off, “Exit” will be displayed on the LCD. Confirm by pressing the dial and control will again be placed in the Impedance mode, with measurements being made using the newly-created calibration data.

### ***Aside: “What is being calibrated?”***

*In order to normalize the gains of the four reflectometer channels with respect to each other, the software creates “gain correction factors” for the  $V_r$ ,  $V_z$  and  $V_a$  channels. When each channel is multiplied by its respective correction factor, it will equal the value of the  $V_f$  channel, as determined under the specific conditions of open/short/50-ohm loads presented during the calibration sequence. These correction factors are then used during the normal operation of reading raw  $V_r$ ,  $V_z$  and  $V_a$  signals to compute the SWR, R and X values displayed on the LCD in Impedance mode. The correction factors are saved away to nonvolatile memory such that they can be used each time the instrument is turned on.*