# MB-1 Quick-Start Guide - V2

(modified with permission from AD5X)

The following steps will get you up and running quickly.

1) If not previously done, initialize the MB-1 software by holding in both M1 and M2 while applying power. Keep M1 and M2 pressed until you see "**SYS RESET, PLS WAIT**". The initialization operation takes a few seconds.

2) First we'll set up the analog panel meter. Follow the steps below:

    a. Select the Panel Meter menu using the UP/DOWN buttons until you see P1 in the lower left hand corner of the display.

    b. Turn the Panel Meter ON by applying short presses of M2 until you see TUNE.

    c. Use the UP/DWN buttons to select the DEMO mode (DEMO will show on the bottom line of the display. Then push M1 repeatedly until the **Full Scale** demo mode is selected (bottom line left side will show **DEMO-FS**).

    d. Adjust the FWD trim pot (Crossneedle Meter Internal) on the left side panel until the FWD needle reads full scale (20).

    e. Adjust the REF trim pot (Crossneedle Meter Internal) on the left side panel until the REF needle reads full scale (5).

    f. Turn DEMO mode OFF by tapping M2.

3) Now set up the 7-segment LED displays. One suggestion is to display forward power, reflected power, SWR, and the coupler selected. You can select other parameters and their desired order. D1, D2, D3 and D4 are the upper left, upper right, lower left, and lower right displays respectively. Follow the steps below:

    a. Press the UP/DOWN buttons until you see D1 (or D2, D3, D4 or D5) in the lower left corner of the LCD display. This is the 7-segment configuration menu.

    b. Tap M1 until D1 is displayed. Then tap M2 until MD=TUNE is displayed. This is forward power.

    c. Tap M1 until D2 is displayed. Then tap M2 until MD=REFL is displayed. This is reflected power. Tap M3 so Z=OFF (leading zeros are turned off).

    d. Tap M1 until D3 is displayed. Then tap M2 until MD=SWR is displayed. Tap M3 so Z=OFF (leading zeros are turned off).

    e. Tap M1 until D4 is displayed. Then tap M2 until MD=COUPLER is displayed. This is the coupler currently selected for your measurements. Tap M3 so Z=OFF (leading zeros are turned off).

4) Now we'll set-up the external MB-HF1 coupler. The MB-HF1 calibration settings are preloaded in the Coupler port 1 table. You only need to adjust the Coupler 1 FWD and REFL side panel trim pots at a single power point using a multimeter. Follow the steps below:

   a. Press the UP/DOWN buttons until you see the coupler menu. This will probably be shown as COUP5 BANK= VIRT. ***BANK=VIRT*** indicates the virtual couplers are currently selected.

   b. Tap M2 to change to real couplers (***BANK=REAL***). Then tap M1 until coupler 1 is selected. The bottom line will display **COUP1 BANK=REAL TRIM**.

   c. Verify that the MB-1 displays "TUN" (forward power) and "REF" (reflected power) on the LCD. These should be displayed if you are using the default LCD settings.

   d. Connect your transmitter to the MB-HF1 Coupler TX port, and a 50Ω dummy load to the MB-HF1 LOAD port. If connected, disconnect the RCA cable from MB-1.

   e. The following measurement must be made with the coupler unterminated, since that is the condition under which the coupler was benchmarked.

      Apply RF power and adjust the transmitter until the multi-meter reads the DC voltage of one of the FWD power benchmark calibration points printed on the coupler. For example: 50 watts = 7.96 volts. This measurement can be made at the FWD RCA port of the MB-HF1 RCA jack. ***Remove transmit power.*** Do not modify the RF power setting of your transmitter since the steps below assume the same power level used above.

   f. Connect the MB-HF1 coupler to the MB-1 meter head using the RCA cable. ***Apply transmit power.*** Since you know the value of the applied FWD power (50 watts in the above example), adjust the FWD port right-side panel pot until the MB-1 "TUN" display on the LCD reads that power. ***Remove transmit power***. Do not modify the RF power setting of your transmitter since the steps below assume the same power level used above.

   g. You must now adjust the REFL coupler trim pot. Swap the coax cables going to the MB-HF1 TX and LOAD connectors so transmitter FWD power will be measured by the coupler's REFL port.

      Place the MB-1 in the Reflected Channel Calibration mode with a long press of the M2 button. The Yellow LED on M2 will flash to confirm that you that you are in this mode. Note – in this mode disregard all measurements except the "REF" power measurement on the LCD.

      Note: For maximum accuracy the MB-1 filters are set to a very long time constant while in the Reflected Channel calibration mode. To ensure that the trim pot is adjusted correctly while in the Reflected Channel Calibration mode, the Constant signal indicator feature is automatically activated. This causes the green LED on M1

to light once the filters have reached their final value. Therefore, after adjusting the Reflected Channel pot, wait for the Constant Signal indicator (green LED on M1 to light. If the reflected power numeric reading does not match the intended setting, continue to adjust the pot, checking the displayed value each time after the Constant Signal indicator illuminates.

h. Remove transmit power.

i. Turn off the Reflected Channel Calibration mode with a long press of the M2 button.

5) Press M1 (long hold) to save all settings to the power-up set – you will see three LED flashes on the DOWN LED confirming the duration of the long press. Reconnect the transmitter, coupler and load. The MB-1 is now ready for use.

**Alternate Alignment Procedure using a Reference Meter**

If you have an accurate external reference power meter, it may be used in place of the multimeter calibration procedure described above. Simply place the reference meter in series with the MB-HF1 coupler, and use the reading on the reference meter (instead of the DC voltage reading) to establish a known power level. With the exception of using the reference meter in place of the voltage measurements, the calibration procedure is the same as above.

**Alternate Alignment Procedure using a Laboratory Grade Instrument**

If you are lucky enough to get your hands on a calibrated laboratory grade instrument, you can perform a custom calibration on the MB-1 coupler and achieve a level of accuracy that virtually tracks that of the reference meter. See section 5 in the User Manual for details.