

MM-1/2 SERVICE NOTES

1.0 General

The Central Electronics MM-1/2 RF Analyzer is an effective tool for the preservation of a high quality SSB signal during day-to-day operations. With this instrument, an operator can evaluate his transmitter's performance and immediately recognize quality defects caused by over-modulation, RF feedback and parasitic/spurious emissions.

The MM-2 retains all of the operational features pioneered by the MM-1, but with the added capability of evaluating signals received off-air.

The earliest MM-1s were manufactured during the early 1950's and are, predictably, getting a bit tired. Since the last MM-2 was produced in 1962, all could stand a bit of maintenance. Fortunately, these repairs are relatively straightforward and are easily accomplished in the field.

2.0 Clean Up

It is recommended that the chassis be cleaned using a good degreasing solvent. I often use a mixture of lacquer thinner and alcohol (1:3 ratio). A small, stiff brush and a Scotch Brite pad can do wonders on even the grungiest chassis.

Clean all of the tubes and control knobs using a mixture of Mr. Clean and ammonia (2:1 ratio).

The front panel is best cleaned using the same mixture described above. Finish it off with a coat of high quality automotive wax (one without an abrasive cleaner!).

3.0 Component Replacement

While the components used in Central Electronics products were first-rate (with the exception of those pesky white-ceramic Chemtronic capacitors) a few have been known to cause problems after 40 or so years.

First, change the main power supply electrolytics: C-40, C-44, C-45 and C-46. Next, replace the sweep and audio oscillator micas: C-29, C-30A, C-38 and C-39.

You should also plan to replace the Sweep Adjust control, R-42. Note that this potentiometer should have an audio taper and not the typical linear taper.

I also recommend that resistors R-4, R-5 and R-73 (all 100K, 1/2W) be changed at this time. If your unit does not have C-42A installed (0.25uF, 400V) across R-5, now is the time!

Next, replace the Horizontal Amplifier coupling capacitor, C-17. Use a high quality part as sweep linearity may be affected. For safety sake, replace the AC line cord as this item is usually found to be in marginal condition.

4.0 Tube Condition

In my experience, the only tubes that absolutely need replacement after 40 years are the 6U8 Keying tube and the 12AT7 Sweep Oscillator tube. In a client restoration, I usually replace all tubes, with the exception of the 3BP1.

The 3BP1 has an exceptionally long service life and should only be replaced if there is an obvious burn on the display screen. Most complaints about poor trace intensity are not the cause of the tube, itself, but the result of other factors. These will be discussed later, in greater detail.

Should you need a replacement 3BP1, contact Fair Radio Sales as they usually have them in stock, at a very reasonable price.

The 5Y3 rectifier tubes are generally fine, but their directly heated cathode has been known to fail...by shorting to the plate! To circumvent the fireworks, try using 5AR4 rectifiers (which are indirectly heated) as a substitute. These work fine, except that the warm-up delay is quite a bit longer than that for the 5Y3. So, if you decide to make this substitution, don't be alarmed if after turning on the power switch nothing seems to happen even after 60 seconds!

5.0 MM-1/2 Problems

The most common MM-1/-2 problem is trace jitter. This is caused by sporadic leakage within the Sweep Oscillator timing capacitors, C-29 and C-30A. Replace these with 2700pF dipped micas. Additionally, I have often found that the Sweep Adjust potentiometer can have intermittents (due to many wipings over 40 years). If a shot of De-Ox-It doesn't cure the noise, then a replacement is needed.

A second, sweep-related complaint is that the edges of the horizontal trace become defocused, or that adjusting the focus control may sharpen the trace on, say, the left side of the trace but defocuses the right. Or, a third complaint may be that the trace fills the screen at high sweep rates, but may only cover a portion of the screen at slow rates. Or even that the trace cannot be focused into a thin, straight line with any potentiometer setting.

As hard as it may be to imagine, all of these defects can be the result of a single bad part: C-17. If this coupling capacitor develops leakage, you can spend many hours going around in circles. Do yourself a favor and just plan to replace it!

If after replacing C-17 some minor focusing problems persist, before changing or doing anything else, try adjusting the Blanking Bias Adjust potentiometer, R-63. With the MM-1/-2's Function Switch set to Manual, rotate R-63 until the trace just disappears. Then rotate R-63 in the opposite direction until the trace clearly appears. If instead of stopping, continuing to rotate the Blanking Bias Adjust will cause the trace to "bloom" and not focus into a sharp, thin line.

Should these efforts fail to produce the desired effect, it is likely that some or all of the display potentiometers have drifted in value. Verify these parts with a good quality ohmmeter. If any have drifted more than 10% in value those should be replaced.

In a properly working unit, the following voltages should be present:

R-9 Intensity control wiper: 30 volts to 76 volts, depending upon setting

R-7 Focus control wiper: 250 volts, properly focused

R-11 Horizontal control wiper: 867 volts

R-12 Vertical control: 800 volts