Collins 651S-1 : Replacement of Display Units (tubes or Collins LED)

To find the green display tubes or the DL-747 LEDs has proven to be rather difficult so I came up with an alternative:

This solution is special in that it applies to receivers with the original green tubes or the later Collins LED module mod ***but here no modification to the receiver*** is needed!

The **7-segment displays** used are HER (high efficiency red) Agilent (HP) HDSP-H103 (14.2 mm high digits) common cathode types. They're made from AlGaAs material (not GaAs only) and produce about 600 ucd of light at 1 mA. This is a lot more than standard LED displays and thus allows the use of the original tube circuit to drive the LED elements! Unfortunately they're available red only, the green ones need 4 mA for the same brightness.

The **651S-1 circuit** from board **A14** provides about **1.5 mA** from the 25 VDC (nom) supply rail. The cathode is grounded (available on socket pin 9) and pin 6 is no longer used here so it does not matter whether the radio has been converted to LEDs or not (in the original tube circuit there is a 100 Ohm resistor to +5VDC - providing the filament voltage - while after the Collins LED mod +5VDC is directly applied to pin 6 to supply the module). So the „Warning“ sticker included with the Collins mod can be ignored at this point.

The wiring to the socket pins follows the segments: A=1, B=8, C=7, D=5, E=3, F=2, G=4, cathode=1. There are no other components required (no inverter IC as in the original Collins mod), the display works like the tube did, just no filament and nice and bright.

The **LED displays** are mounted individually on 9 pin base plugs (N.O.S.) using a blank drilled p. c. board and point to point wiring. The LED display is soldered to the board with cathode pins 3 and 8. The board surface is connected to pin 1 on the socket. Just watch orientation and position of the board when mounted on the 9 pin plug. The boards could be a bit closer to the front panel compared to my modules (e.g. in line with pins 3 and 7). The result is very satisfactory and no difficult disassembly or mod to the radio required. You can instantly go back to the Collins design.

The **decimal point displays** could be solved the Collins way by activating the d.p. on a LED module through a resistor (value t.b.d. depending on whether in the receiver the 100Ohm resistor is still in place or not to achieve matching light intensity) or using HER Agilent (HP) HLMP-1301 LEDs in place of the light bulbs in their original fittings (that's what I did to activate the d.p. original lamp displays). Replace the 150 Ohm series resistors to the +25 VDC rail with 2.7/3.3 kohm resp., this is a mod to the rx and requires some disassembly work to fit the LEDs.

For details refer to the pictures.