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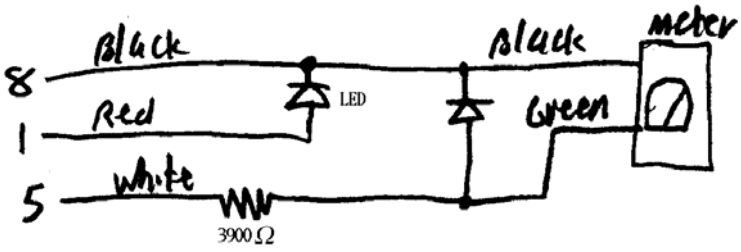
Homebrew S-Meter for AOR AR-8600

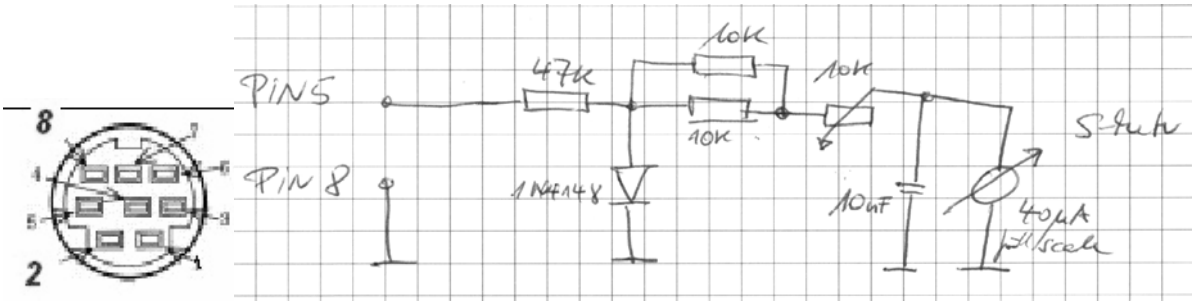
Recently I was able to acquire second hand an AR8600 Mark II wideband receiver from AOR and after some use I recognized that I would like to have a larger S-Meter for a better assessment of the received signal strength.

I checked on the internet and found that AOR is offering an external S-Meter called AOR ASM8600. However the price they ask for is quite high and therefore I decided to see what I could do myself.

I got in contact with Tom Nelson, who owns an ASM8600, and he was kind enough to open his device and confirm my assumption that there is really not much inside the ASM8600. Besides the meter itself it includes only a series resistor of 3900 Ohms and a silicon diode. Actually there is an additional LED included which is used for backlighting the display. Below please find a picture of the ASM8600 and a sketch of the circuit.



I checked my drawers for surplus electronics parts and found a nice large moving-coil instrument with a 40um full scale reading. It even features a mirror behind part of the scale which makes the reading of the needle quite easy. I developed the small circuit which you find in the sketch below to attach it to PIN5 (RSSI output) and PIN8 (ground) of the ACC port of the AR8600.

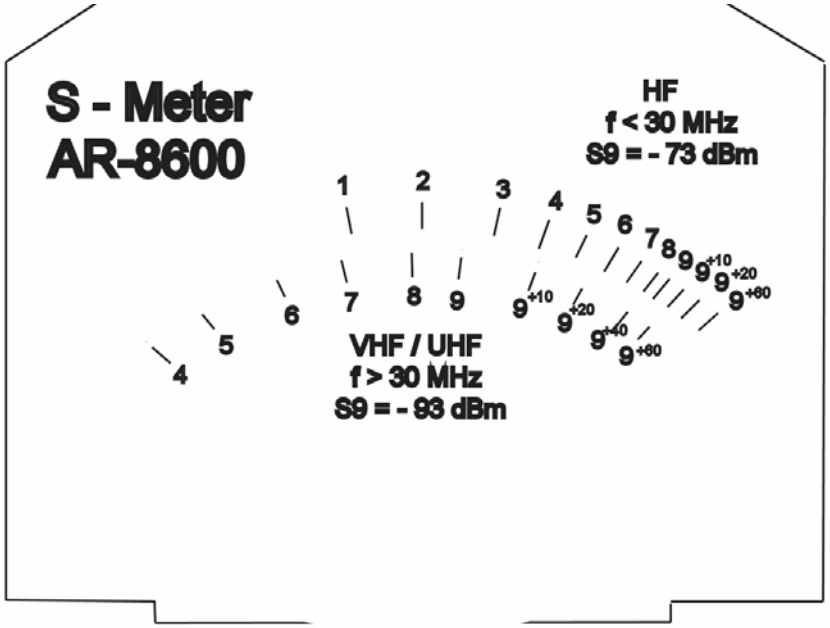


The general definition of the S-meter scale is a function of frequency. At frequencies below 30 MHz the reference value S9 corresponds to an input power level of -73 dBm. At frequencies above 30 MHz S9 corresponds to an input power level of -93 dBm. Each step to a lower level equals a reduction of the input power of 6dB which is ¼ of the previous power level. You can find the levels in the table below.

Display	Input power level <30 MHz [dBm]	Input power level >30 MHz [dBm]
S9	-73	-93
S8	-79	-99
S7	-85	-105
S6	-91	-111
S5	-97	-117
S4	-103	-123
S3	-109	-129
S2	-115	-135
S1	-121	-141

I attached my homebrew S-meter to my AR8600 and used a signal generator to calibrate the scaling. To make it look better and also easier to read I decided to re-draw the scale using my PC and printed it on a while sheet of

paper. This paper is then attached to the original display using a double-sided adhesive tape. You can find my scaling in the picture below. Maybe some of you can re-use it for your own purpose.



A small window in the middle of the scaling reveals the mirror behind the scale. You can see the final result of my home-brew S-Meter in the next picture. None of the parts hat to be bought so I guess I achieved my goal to keep it a real low cost approach.

By the way: my S-meter shows consistent results using an un-modulated carrier and in conjunction with the different demodulator settings except for using WFM. The reading is constant (as it should be) using all other demodulator settings. However in WFM mode, which I use only to receive FM broadcast stations around 100 MHz, the reading is quite different. I am curious to get feedback from other users whether they made the same observations.

I always appreciate any feedback and suggestions for improvements. I am also very interested in any other hints with respect to the use or improvement of the AOR AR8600 wideband receiver. Many thanks in advance.

Best regards

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