

Improvements to Regenerative Tuner Designs
Mark Connelly - WA1ION - 29 JUN 1992

Regenerative tuners / preselectors have the ability to provide gain and selectivity improvements that frequently allow the reception of weak DX signals that could not be detected otherwise. My previous regenerative tuner articles (e. g. APT-3, MWT-1, MWT-2) go into considerable detail on the value of this method and ways to implement it.

Ken Cornell of the Longwave Club of America has done much innovative research in this area. Variations of his designs are the basis of the RFE family of Regenerative Front-End cards - the heart of my MWT tuners. The most recent of these cards, RFE-C, has good performance with low-level signals. Signal generator / oscilloscope and urban spur tests on RFE-C indicate that its strong-signal performance could use some improvement. The major contributor to clipping / distortion on strong signals is the 2N3904 (or 2N2222) NPN output transistor, not the MPF102 input FET. The output transistor's main role is to transform the FET's output impedance (approximately 1K) down to 50 ohms and to provide a bit of voltage gain in the process.

My recent work with the BUF-A Buffer Amplifier circuit, using the National Semiconductor LH0033CG, pointed the way out of these overloading problems. A regenerative front-end just consisting of the FET and a few passive components can be put ahead of a BUF-A card. Thus the RFE-D card was born. This single-transistor regenerative front-end is only meant to be used ahead of the BUF-A, not to be operated alone. A schematic is shown in Figure 1. A physical layout drawing is not included because of the circuit's simplicity. Assembly may be documented more thoroughly in a future article on an updated tuner design (MWT-3). Figure 2 shows a typical application in a simple medium-wave regenerative tuner suitable for amplifying the RF from a loop, longwire, active whip, or phasing unit. The reader is advised to consult the article "BUF-A Buffer Amplifier Card: A Valuable Building Block for DX Projects", dated 15 June 1992, for full documentation of the BUF-A circuit.

Results using the RFE-D / BUF-A combination are a vast improvement over the RFE-C. Gain is higher and much more signal can be handled before distortion occurs. This set-up is more "crunchproof" than the front-ends of many receivers, largely because of the high Q achievable with regenerative tuning.

FIGURE 1: RFE-D REGENERATIVE FRONT-END CARD (SCHEMATIC)

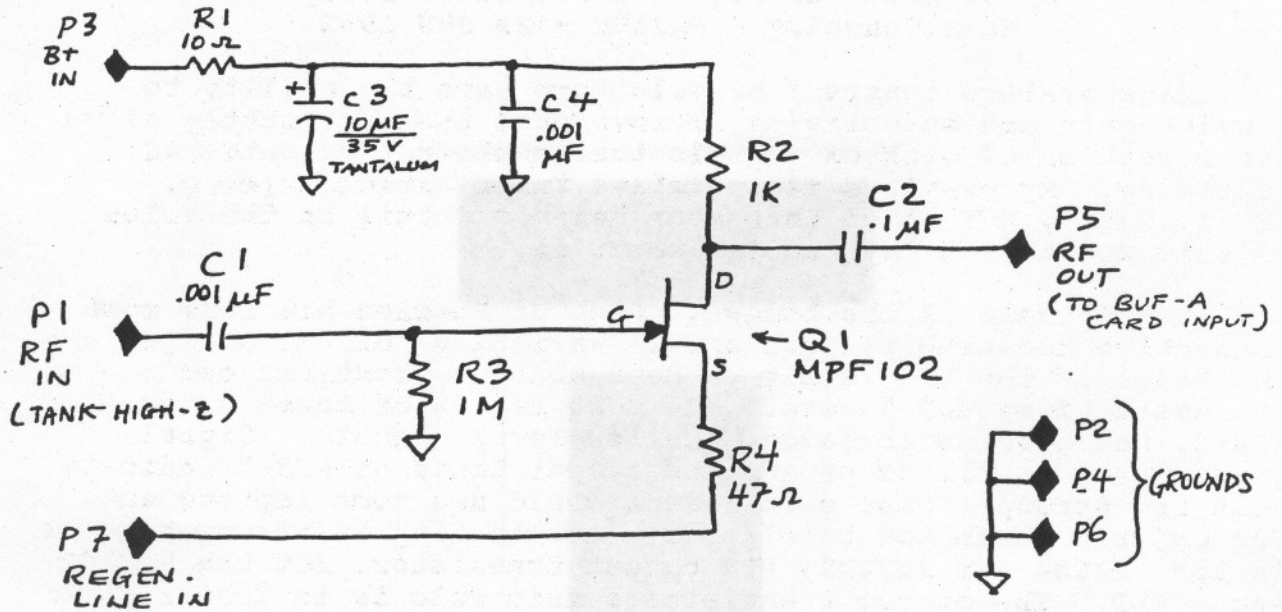


FIGURE 2: SIMPLE MEDIUM-WAVE TUNER USING RFE-D (SCHEMATIC)

