Graham Baker, ZL1TOF

UHF TV Masthead Pre-Amplifier

In celebration of 50 years of the BATC, this article has been reproduced from the latest edition of CQ-TV. For further information about the BATC, see their advertisement on page-165 of this issue ... Editor

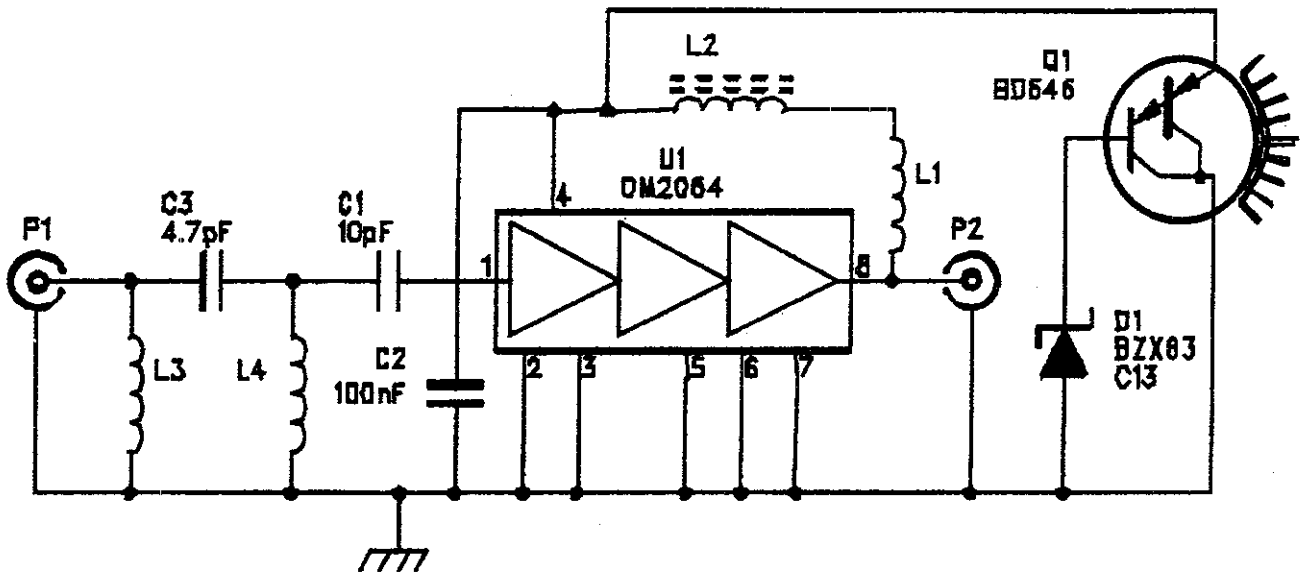
As narrow band aerials and amplifiers, normally used for amateur television, are not suitable for broadcast reception I erected a commercial UHF TV aerial and diplexer.

The next step was to get a decent pre-amplifier close to the aerial to deliver an adequate signal to run a number of TV outlets.

The Spectrum low-noise pre-amplifier has too little gain to deliver the necessary signal level and adding another stage such as the Wellington VHF premium performance pre-amplifier just increases the intermodulation distortion.

Commercial amplifiers have used the OM350 and OM361 devices since the early 1980s. These devices have noise figures of app. 7dB. Newer types of device are available and cost no more than the old types. The OM2064 (RS Components: 284-589) has a gain of app. 28dB and a noise figure of the order of 4.4dB. Under test it gave 107bBuV (-2dBm) for -60dB intermodulation in a three-tone test.

The device can be laid on a sheet of copper or brass with the ground connections bent into an L shape and soldered to the sheet. The other connections may then be made self-supporting or supported on small pieces of PCB glued to the ground sheet.



UHF Masthead Pre-Amplifier

I produced a double-sided PCB for the OM2064 with 75 strip-lines and BNC connectors at each end.

All the capacitors are 3.2 x 1.6mm surface-mount types. The amplifier is powered via the coaxial cable and mounted in a die-cast box (Farnell: 301-528 or DSE: H-221) as are the commercial models.

During testing I noticed ghosting on the VHF channels. Because the amplifier is broadband (40 to 860 MHz) it was amplifying the distorted VHF signals picked up by the UHF aerial and fed them through the diplexer into the receivers. A high-pass filter at the front end of the amplifier cured this problem. The shunt regulator was added for protection against a too high supply being applied.

Coil details:

L1 and L2 are constructed together, 3 turns of 0.35mm wire on a ferrite bead (DSE: R-5400) and 3 turns close-wound on a 3mm mandrel.

L3 and L4 are 1.75 turns of 0.5mm wire on a 3mm mandrel, spaced 1.5mm above the PCB surface.

The coils L3 and L4 must be mounted such that there is no mutual coupling.

A second amplifier was also constructed using the same design but utilising F-connectors. Using a spectrum analyser the high-pass filter was aligned to roll-off at as high a frequency as possible with minimum attenuation at 443 MHz. This amplifier is in use for amateur television reception and exhibits good performance.