

Frequency Doubler and 10MHz Reference Distribution Amplifier

G4JNT Dec 2013

This 10MHz doubler and distribution amp takes in 5MHz from a frequency standard and delivers several 10MHz mutually isolated outputs.

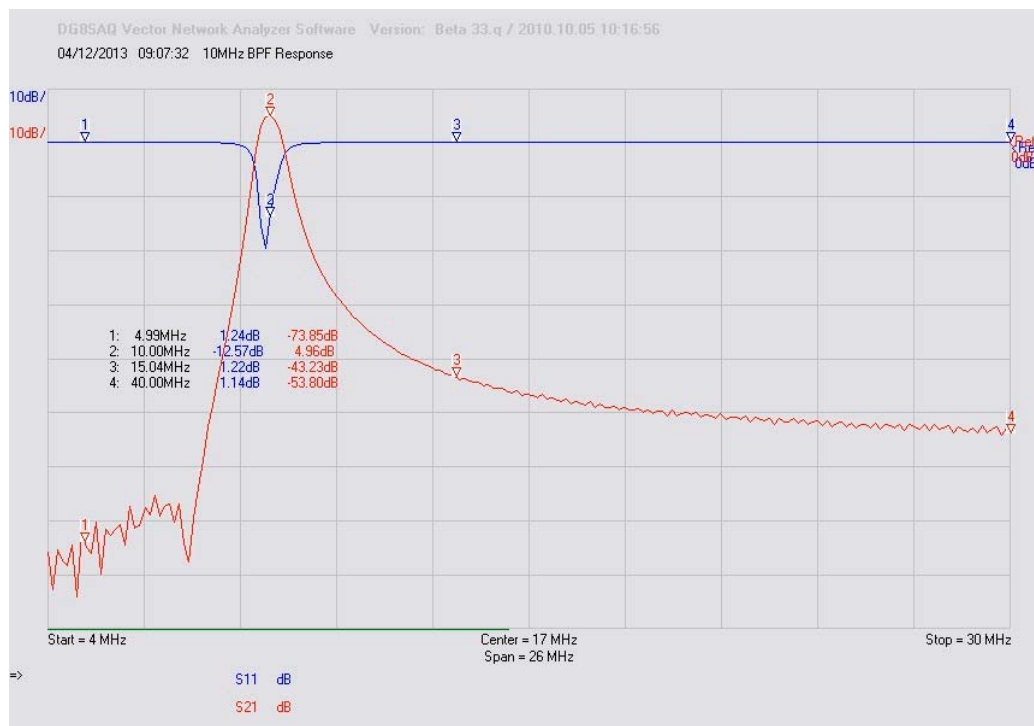
A diode full-wave frequency doubler suppresses even order products, this is followed by a three section bandpass filter. 5MHz leakage at the output of the amplifiers is better than -80dBc, at 15MHz it is about -75dBc.

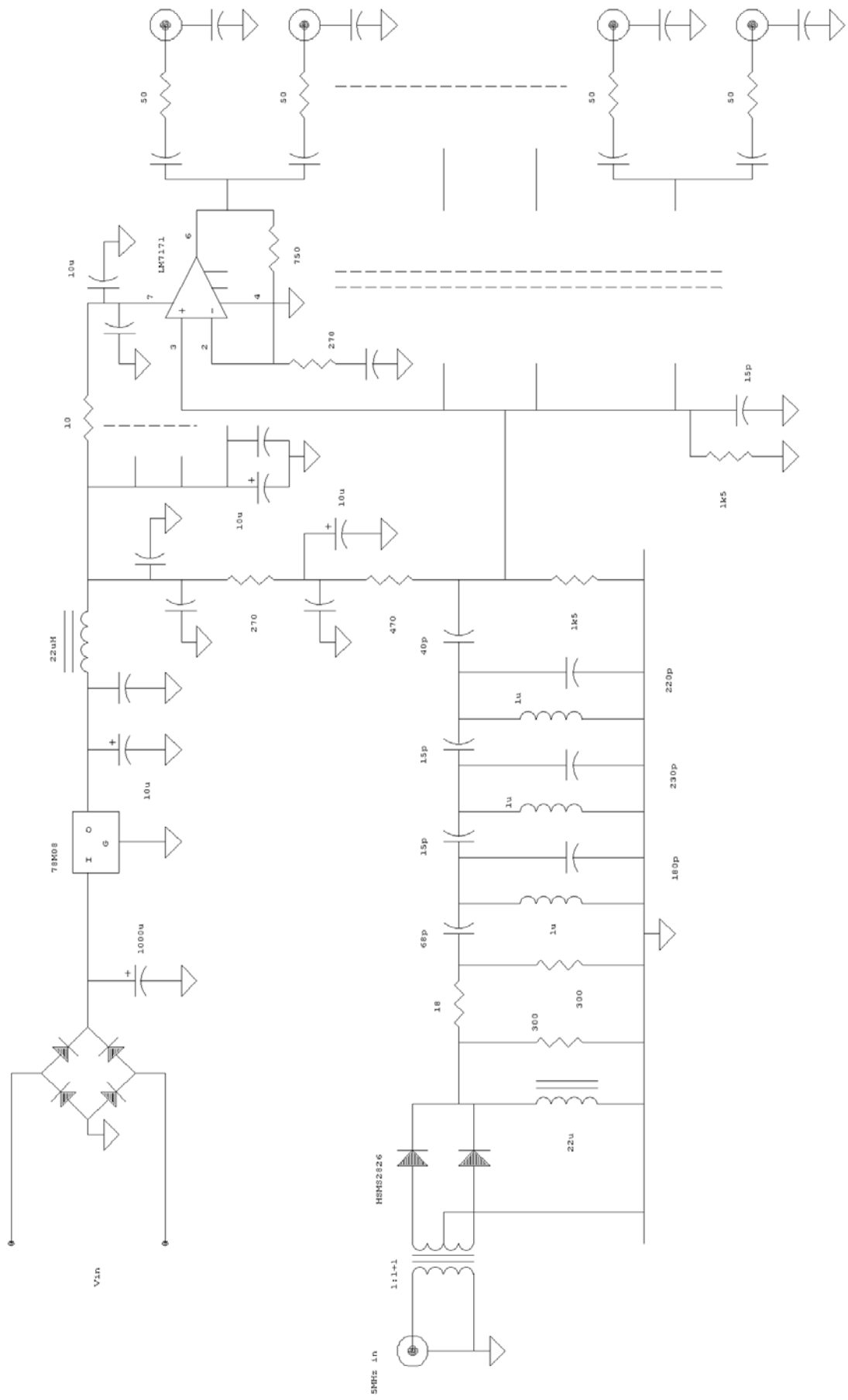
The amplifier stages are based around LM7171 high speed opamps. Since these chips can drive a 50 ohms load, the configuration here allows each one to drive two matched outputs. Output amplitude is +5dBm per port, but can be altered by adjusting the feedback resistors up to around +10dBm each. As the amplifiers are essentially high input impedance, advantage is taken to provide "voltage gain" in the filter stages by matching to a higher output impedance – around 300 ohms

Interport isolation is essential here as I have a few items of test equipment that put logic generated noise back out of their 10MHz reference input ports. This was very noticeable on the old distribution amp based around a passive splitter with only 20 - 30dB port-to-port isolation when used to drive a synthesizer chip directly.

In this design, isolation between ports driven from separate op-amps is unmeasurable (although that between each port on a common chip is only in the region of 20dB)

Each output BNC is isolated from ground at DC to prevent hum loops and DC flow.





Unmarked caps 100nF

