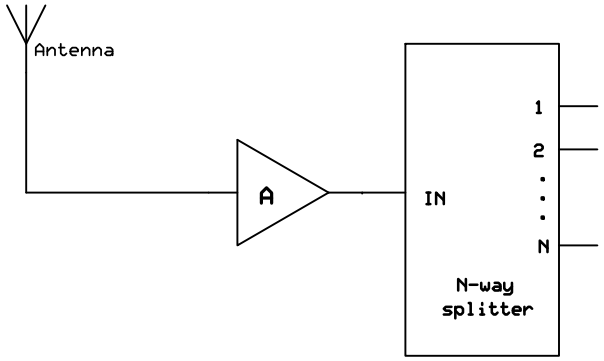


The splitter will have loss:

2-way	-3dB nominal
4-way	-6dB nominal
8-way	-9dB nominal

The amplifier should have corresponding gain, low noise, and high dynamic range

Its output impedance must match the splitter's input impedance (typically 50 ohms)

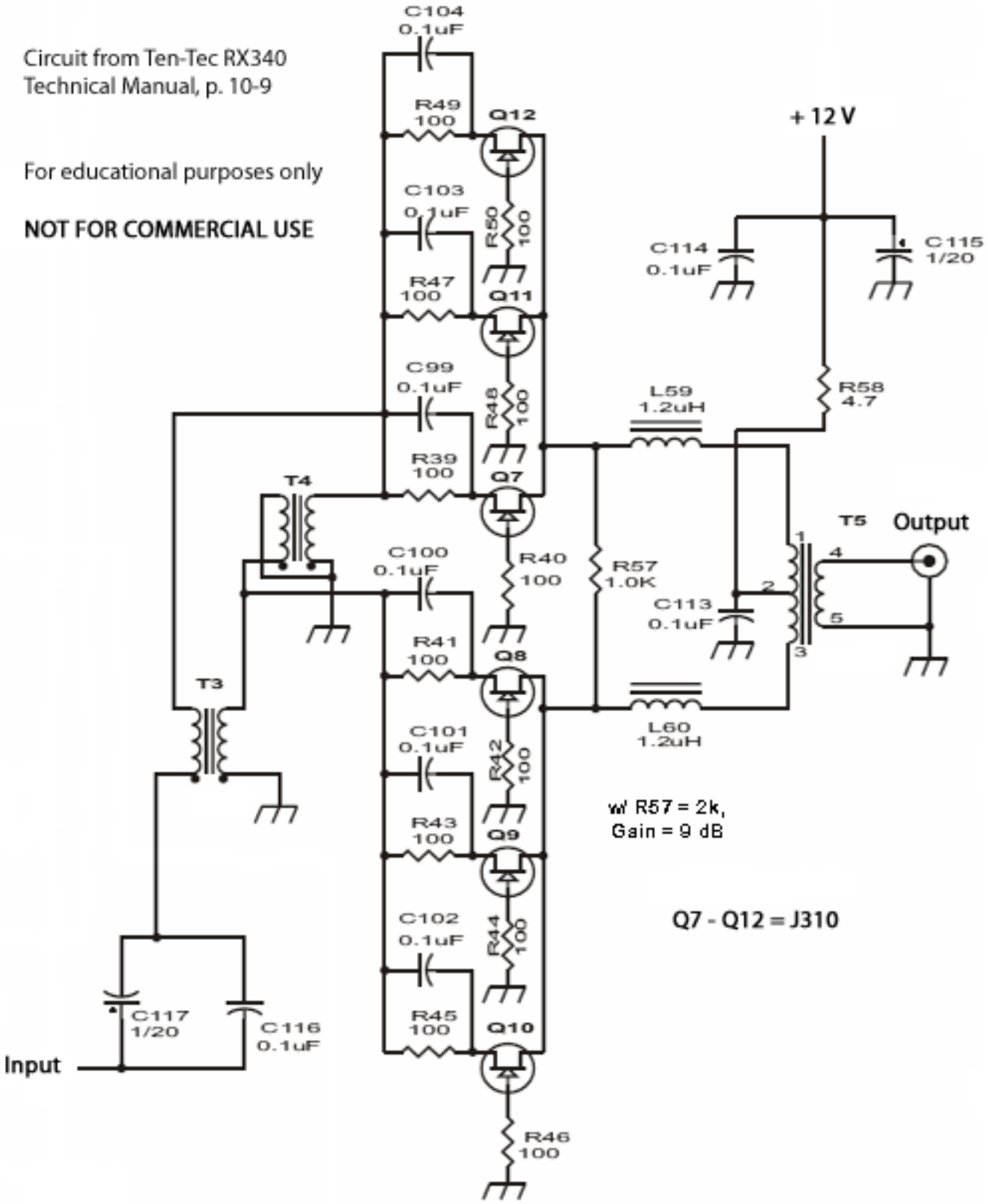
Multicoupler Scheme

with passive splitter

Circuit from Ten-Tec RX340
Technical Manual, p. 10-9

For educational purposes only

NOT FOR COMMERCIAL USE



Notes re: Ten-Tec RF amp

Schematic 340	331	Comment
L59	L64	[omit if desired]
L60	L63	[omit if desired]
C113	C121	[add 100 uF tantalum]
C115	C120	[change to 100 uF tantalum]
C117	C111	[match polarity to input DC potential]
T4	T2	
T3	T1	[transmission-line transformer]

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The RF amplifier in a TenTec RX340 (see previous page) provides 6 dB of gain with input-referred noise approaching -130 dBm in a 3 kHz bandwidth, harmonics around -80 dBc at 100 mV input (-7 dBm), and enough headroom to shrug off nearly anything that doesn't melt your antenna. Run with a 12 V supply, the 1 dB compression point is greater than 4 Vrms input (+25 dBm). Followed by a passive splitter, it will make a state-of-the-art multicoupler. System gain will be ~ +3 dB with a 2-way splitter, 0 dB with a 4-way, and -3 dB with an 8-way.

See next page for a simpler FET matching method

For best performance, select FETs for Idss of 45-50 mA at 12 V (this needs to be pulse-tested with a duty cycle ~30%, to mimic in-circuit operating conditions and prevent overheating the FETs). 6 unselected FETs should work fine unless you are very unlucky in the draw. L59 and L60 can/should be omitted. You will need to wind or find three suitable ferrite transformers, one of which (T3) must operate as a 1:1 transmission-line transformer ("current-mode balun") at the lowest frequency of interest. I replace C115 with a 100 uF tantalum, and add another 100 uF tantalum in parallel with C113. Make sure all of the multicoupler outputs, including any unused outputs, are terminated in 50 ohms to maintain the rated isolation.

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The Ten-Tec RX-331 RF amplifier is similar, if not exactly the same. The part numbering is different, so the parts I referred to above are numbered differently on the 331 drawing. The operation of T4 (331 = T2) is more obvious on the 331 drawing. T3 (331 = T1) is the TEM-mode transmission-line transformer. Note that you need to match the polarity of C117 (331 = C111) to the DC level at the input.

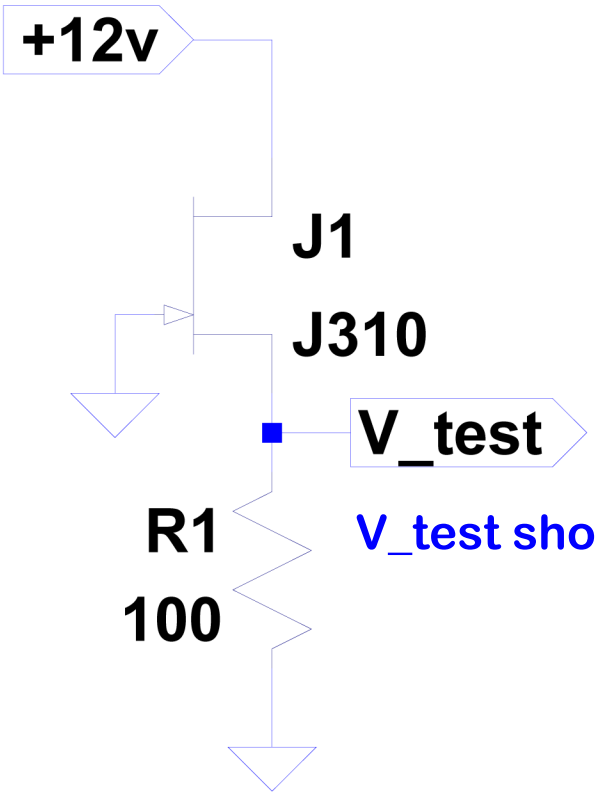
Ten-Tec used L59 and L60 (331: L64 and L63) to roll off the top end. These give slight peaking at 30 MHz (~ 1dB) and a -3dB point around 70 MHz. Without them, there is no peaking and the -3dB point is ~150 MHz (highly dependent on the transformers and the physical layout and shielding). I prefer no peaking, so I previously recommended omitting L59 and L60. However, they do provide some attenuation of broadcast FM and commercial VHF signals, so choose for yourself if you build one.

The performance of any individual unit will be very dependent on the three transformers and the physical layout and shielding.

Because the output impedance of the amplifier is well-defined, and the input impedance of a passive splitter is also well-defined (assuming that all outputs are properly terminated), it is easy to put passive filters or attenuators between the amp and the splitter if you so desire.

Full schematics at: http://www.tentec.com/pages/Receiver-Downloads.html

Use whatever your actual B+ voltage is



FET matching fixture

Match FETs to within 100mV