Just about as Cheap as you can get 10 GHz

Kent Britain WA5VJB

The guts from a RADAR detector, a Ramsey Electronics FR10, and a 2N2222 modulator puts you on the air.

The Ramsey FR10 is easily converted into a very sensitive 30 MHz wideband FM microwave I.F. The FR10 has two filters in the IF section, simply bypassing the second filter and letting the first 10.7 MHz filter do it's job makes the FR10 a 200 KHz wide receiver. I chose to reduce the tuning range of the receiver to about .5 MHz, but this was a personal choice. The NE-602 Mix/Osc IC can be crystal controlled. See the Feb 92 issue of 73 Magazine, page 21 for some suggested circuits.

Fig. 1 is the only mod you have to do, replacing FL2 with a .01 mfd cap makes the FR10 a wideband receiver. The .01 goes from pin 3 to pin 5 of U2.

Fig 2 is the audio stage. The FR10 is designed to drive a speaker and is far too hot for headphones. (On Gunnplexer systems you need headphones to prevent feedback). Omitting C35 (It was optional anywhay!) and adding the 330 Ohm resistor worked well.

Fig 3 was my tuning range mod. Replacing C12 with a 12-15 pf and adding another 12-15pf across L3 tightened up the tuning range. Replacing C12 with a 22pf will also work giving a 1 MHz tuning range and the ultimate would be the 73 Magazine mod using a 40.7 MHz xtal. Alignment is quick. Put the tuning control in the middle of it's range and listen to a 30.0 MHz signal while adjusting L3.

Fig 1 also has a mod suggested by Al Ward. The 3.9K resistor across the quadrature detector coil broadens the FM detector response and improves audio response with highly deviated signals.

The RF head in Fig 4 is the guts from a RADAR Detector. To retune the Gunn oscillator from 11.5 to 10.25 GHz you'll need either a Wavemeter, Spectrum Analyzer, or an EIP type microwave frequency counter. A friend with test gear is very valuable at this point.

The 1K resistor and 39pf capacitor in Fig 4 are typical values. I usually use a 10-80 pf trimmer and tweak for best sensitivity. The .01 to .1 uF cap across the Gunn Diode keeps down noise and VHF parasitics.

PSU It only takes .1 volt of audio to wideband FM modulate a Gunn oscillator. This modulator is simply a 2N2222 audio amp taken directly out of the ARRL Handbook. No ALC or compressor circuits are used. On 10 GHz FM you hear your own signal coming back, audio weak - speak up, too loud - back off the mike.

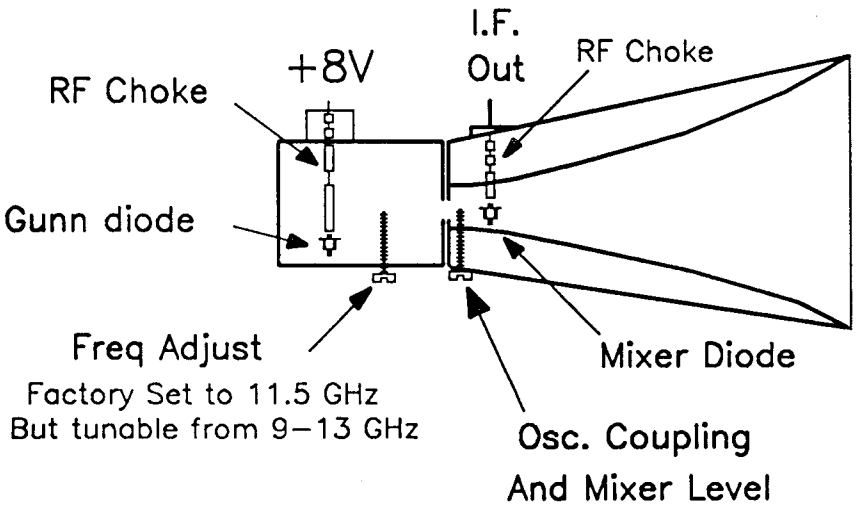
The 39 Ohm 2 watt resistor drops the 12 volts to 8 volts at the Gunn diode. This can be tweaked for best results and is a typical value. Varying the 12 volt source will give you a limited tuning range.

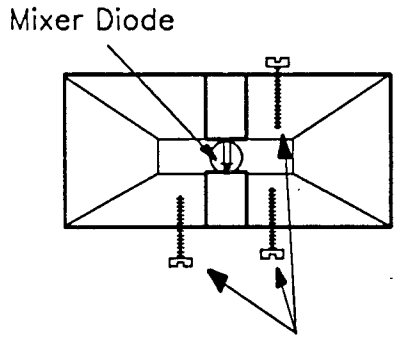
Use shielded wire between the modulator and Gunn diode to keep down hum and RF rectification.

More complicate and versatile PSU's (Power Supply Modulators) are described in the RSGB Microwave Newsletter Technical Collection and the RSGB Microwave Handbooks. This design was kept as simple as possible. P.S. Works with 24 GHz Gunns as well.

See ya on 10 GHz!

Typical RADAR Detector RF Section





These screws tune the rec. mixer for best operation on 10.525 and 24.1 GHz.

For 10.3 GHz transceiver service remove all screws.

But if you have 10GHz test equipment, try putting them back in, and adjusting for best performance.

Notes:

The Osc. Coupling and Mixer Level adjustment can be set for Max Power out or best Receive Sensitive. Normal setting is best rec.

Power output: 3–5 Milliwatts adusted for best rec.
10–20 Milliwatts tuned for best TX
10–30 Milliwatts when used as a Beacon or Source with the Mixer diode removed.

Normal IF out is 800 to 1200 MHz, but 30 MHz and even DC work just fine. (DC is for Doppler RADAR versions)

The ridged waveguide used in the mixer section and the horn antenna is very broad, and can be used from 9 to 33 GHz.

Title	RADAR Detector	
Size B	Number WA5VJB	Rev A
Date: 8/20/96		Drawn by: KEB
File Name: GUNN.PCB		Sheet 1 of 1

Ramsey FR-10 Mods

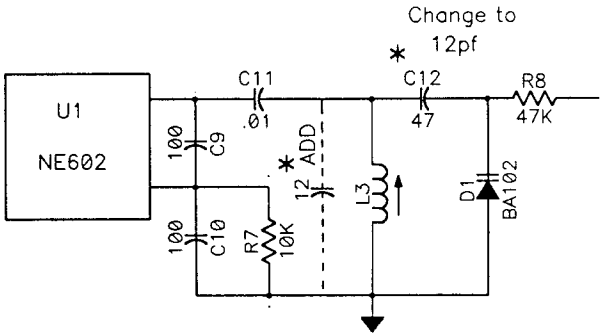


Fig 3

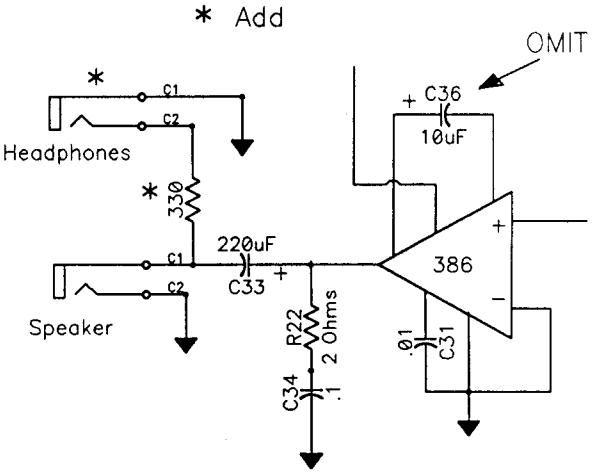


Fig 2

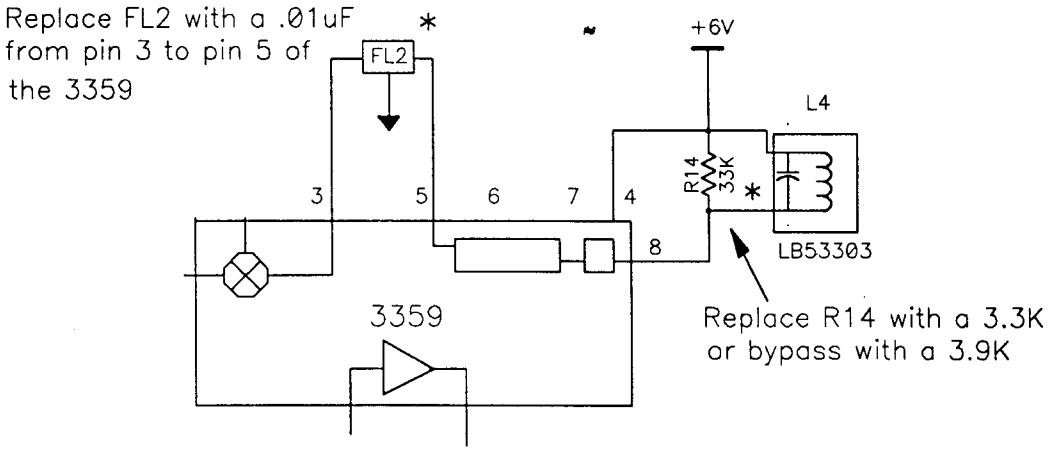
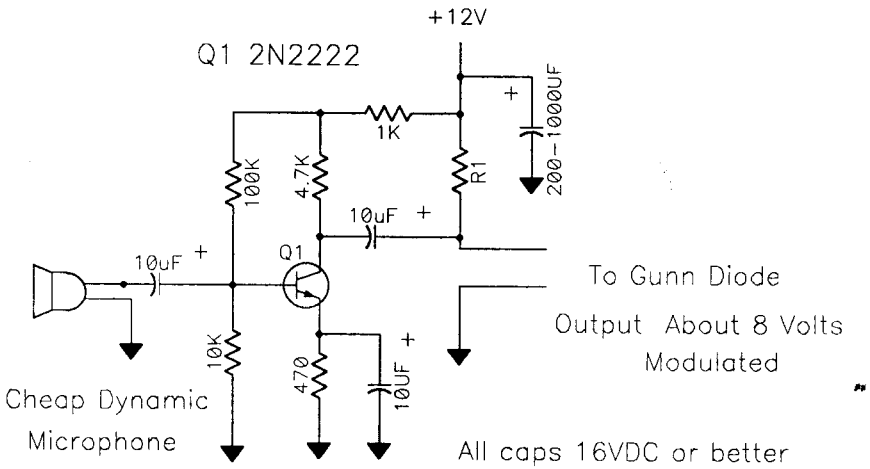


Fig 1

Cheap 10 GHz

WA5VJB

PSU Power Supply Modulator



R1 Selected for proper Gunn Voltage
33–39 Ohm 2 Watt for most Gunn Diodes

WA5VJB

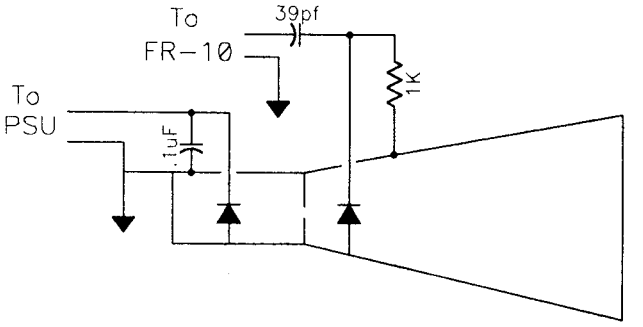
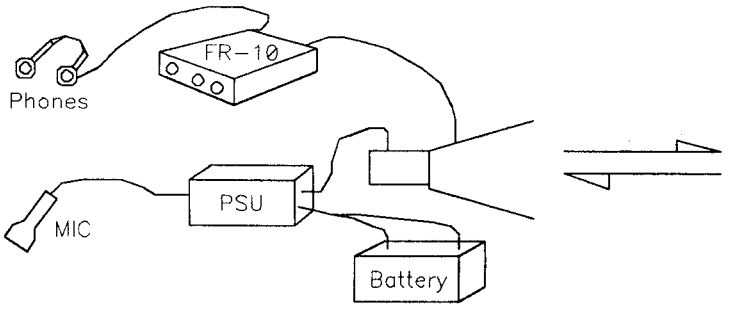
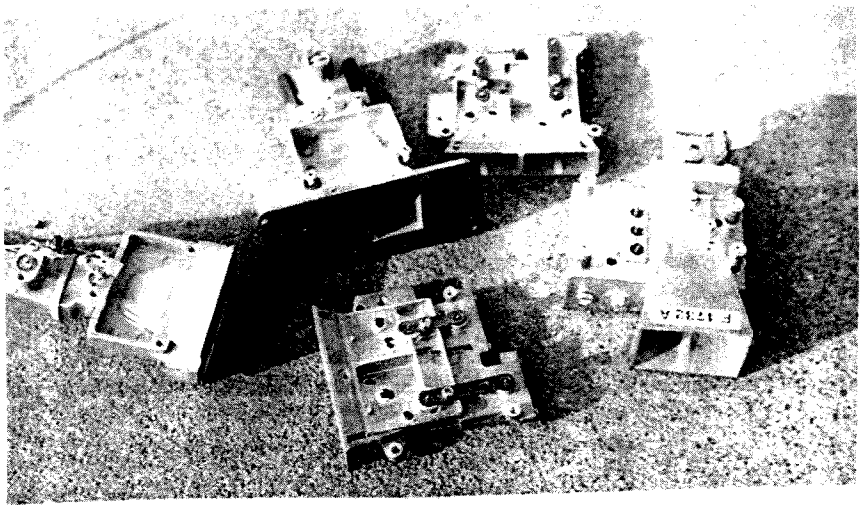


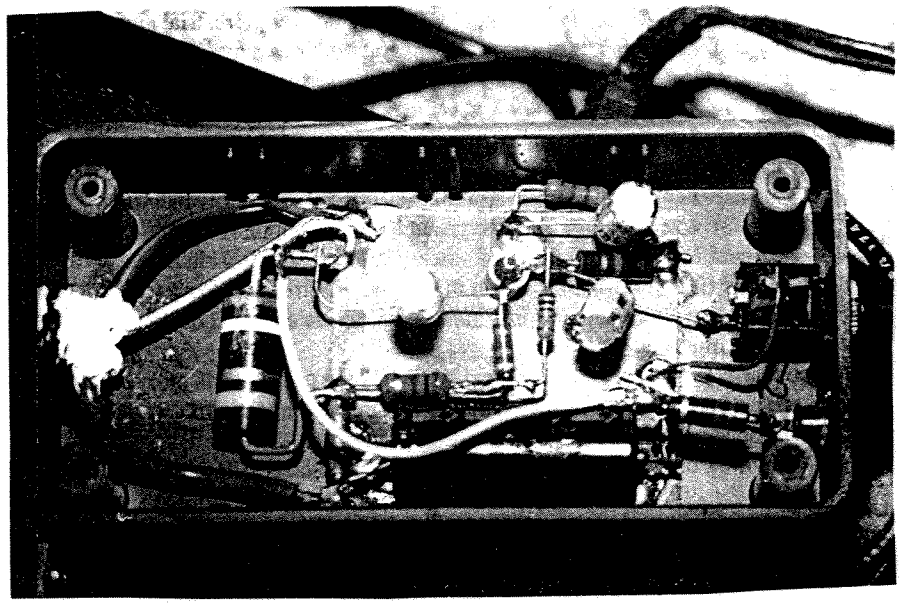
Fig. 4

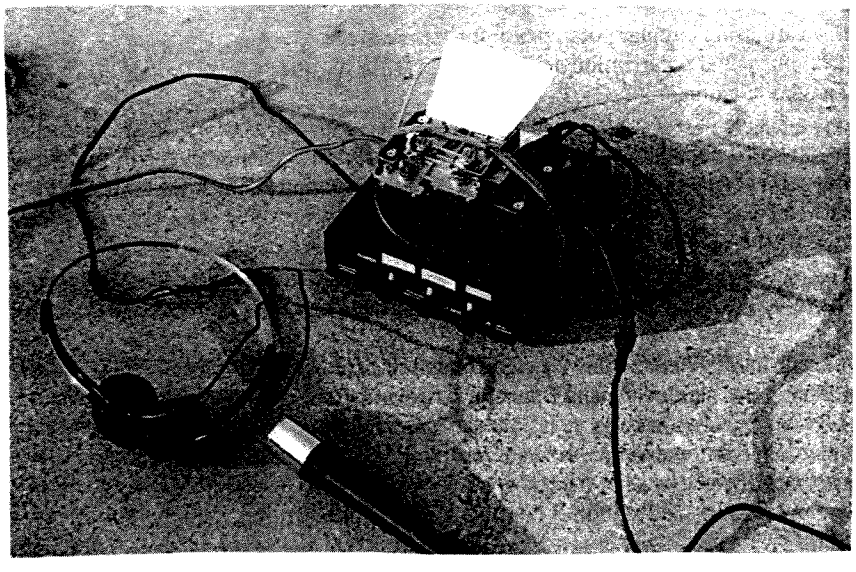




Radar Detector "Guts"

Power Supply Modulator





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