

## TRAC Back Theory of Operation

7/6/03

The TRAC Back product consists of a set of two position sensors, a microcontroller, a voice playback IC and audio amplifier, and a RF amplifier.

The TRAC Back RF transmitter consists of three sections, the Microcontroller based carrier generator, a BJT differential pair for RF amplification, and a BJT variable current source for amplitude modulation.

The 1640 MHz carrier is generated via a pulse width modulation output of the microcontroller. This carrier is digitally synthesized by dividing down the 19.6608Mhz microcontroller clock by a factor of 12. This results in a carrier of 1638.4kHz. This RF carrier is input into the BJT differential pair amplifier. The amplifier is DC biased via the BJT variable current source attached to the emitters of the differential pair. This transistor is DC biased to achieve an RF output stage power dissipation of slightly less than 100mW. AM modulation is achieved by varying the bias current of the differential pair. The audio output from the voice generation section is applied to the base of the current source transistor, which in turn causes the variation in the differential pair bias current.