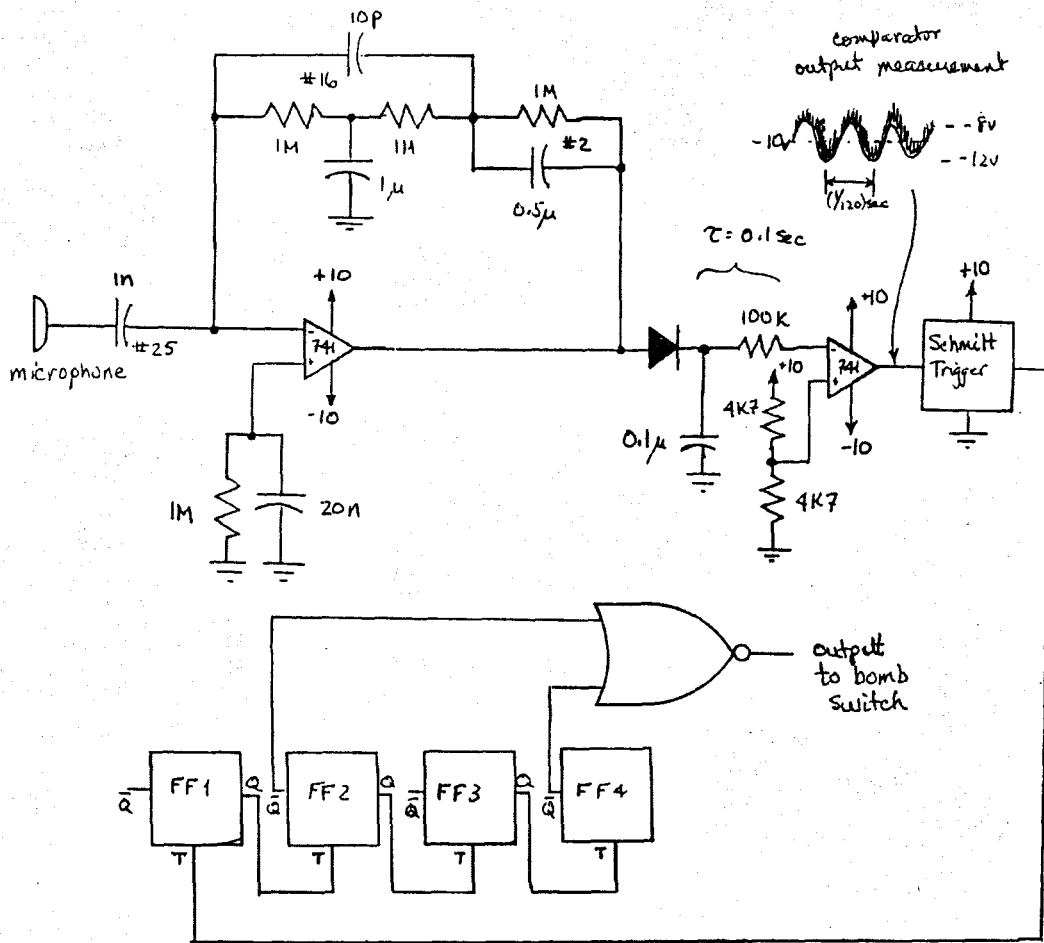


# Sherlock Holmes: The Final Problem

(Instrumentation Systems)

"It's elementary, my dear Watson." Ever since the students in ENAG 601 came to Sherlock Holmes with the package they had received from Professor Moriarty, Holmes and Dr. Watson had studied in detail the obviously homemade instrument. What diabolical devilment could Moriarty possibly be up to? What relationship was there between the nefarious nabob and the nervous neophytes who waited in the nippy night?



*Moriarty*

"It is lucky for us that Professor Moriarty is less of an instrumentation intellect than Professor Johnson, or we'd all be sorry," said Holmes. "This is obviously part of an explosive device gone awry. The first section is supposed to be a bandpass filter with a transfer function of

$$\frac{100s}{\frac{s^2}{435,200} + \frac{0.02s}{659} + 1}$$

The output of the filter is then supposed to be rectified by the diode and low-pass filtered with the resistor and capacitor. The output of this filter is checked by the comparator to see if it exceeds a 7v threshold voltage. If it does, then the Schmidt trigger produces a pulse, which is counted by the digital counter. The combination of digital gates assures that when the counter reaches 12, a switch is turned on.

"How diabolical of Moriarty. He planned to use the device to trigger an explosion on the twelfth peal of Big Ben. But his own cleverness concealed his childish understanding of analog and digital circuitry.