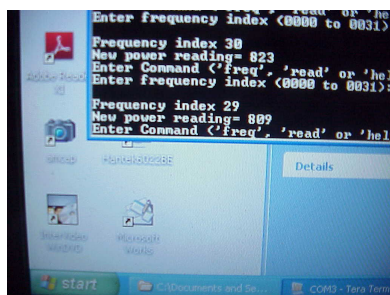


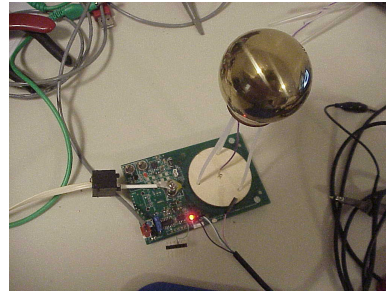
This Application Note demonstrates tuning the Starter Kit Transmitter and illuminate the receiver LED through 100-feet of extended one-wire outside the line of sight. The circuit values of this Application Note are slightly different from the Production version however it is good for learning (where Transmitter sensing resistor = 2.3 Ohms, Receiver RLIM_R = 0 Ohms, Receiver R_LED=100 Ohms. The Kit version uses 2.0 Ohms Sensing Resistor, RLIM_R=2.0 Ohms and R_LED=0 Ohms respectively for these three values).

Schematic of demonstration below is shown above

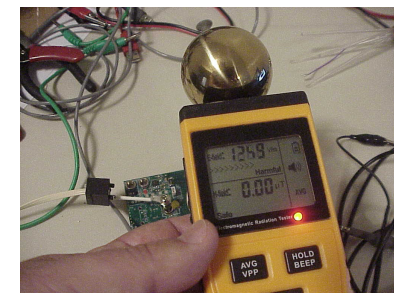


Using Teraterm and webcam, the Transmitter's frequency index is set to '0029' and it illuminate the

LED on the third floor with the transmitter on the basement floor (two phone cords with adapter used to connect them together, extending the length to 100 feet). Using a Pearson 4100 probe (10mA per division) and Tektronix Scope, observed the grounding wire current waveform at 25mA peak-to-peak at 8 MHz.

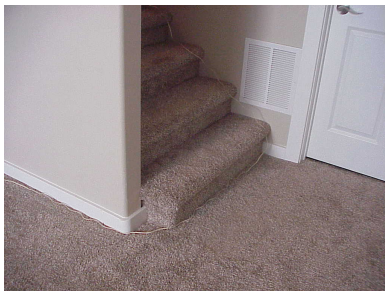


Note that while the Transmitter power is $5V * 0.3A = 1.5W$ (in the basement), the Receiver LEDs (on the third floor) are lighted through the 1-wire connection (100 feet of wire). The Transmitter's input power for all of its active circuitry and amplification, shown on the laboratory power supply in this condition is $5V * 0.3A = 1.5W$.

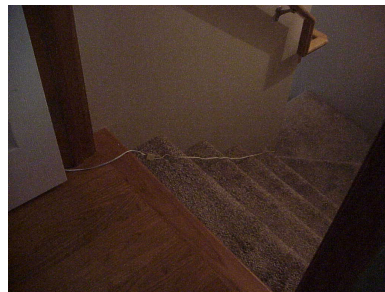


Field strength reading is $>950V/m$ on top of the Transmitter's scatteron and $>1200V/m$ beside the Transmitter scatteron globe while it is lighting the receiver on the 3rd floor, tuned to 8MHz.

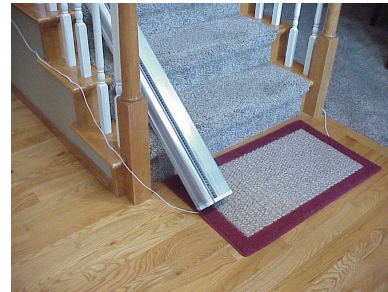
Let us follow the wire plugged-in to the "Yellow" banana-jack of the transmitter upstairs:



(1)

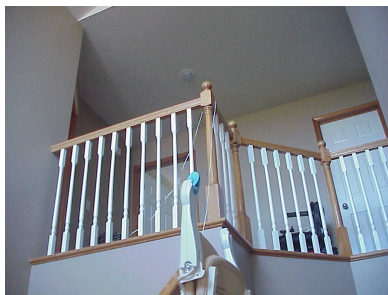


(2)



(3)

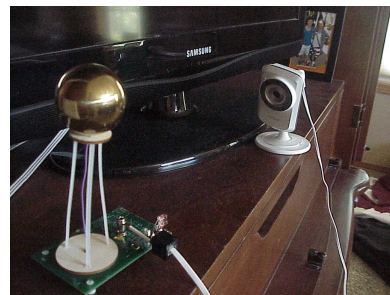
The grounding wire from transmitter to receiver is shown above, running along the basement floor away from the transmitter (1), up the basement stairs where there is an adapter visible connecting two wire lengths together (2), around the dining room under a mat and heading up the main stairs (3),



(4)

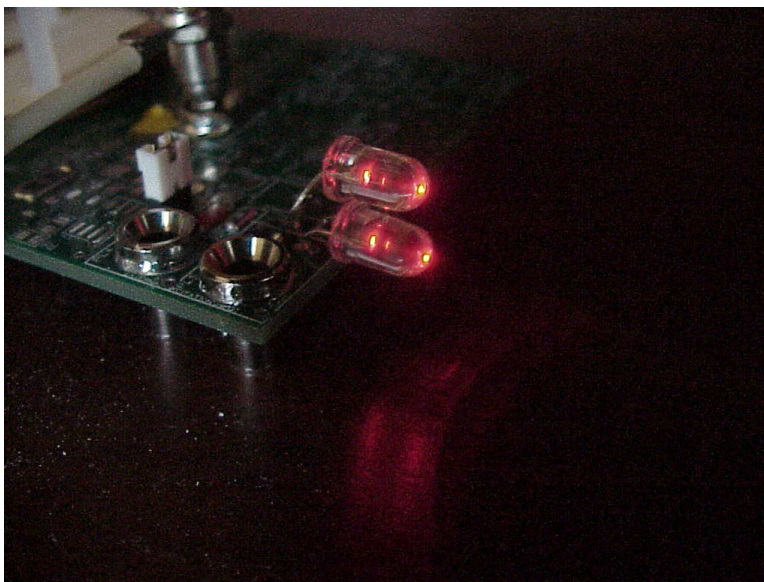


(5)

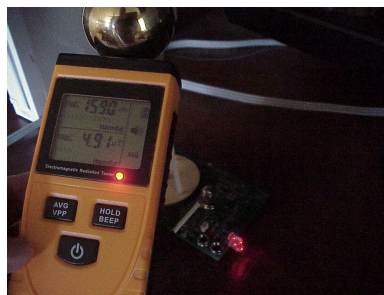
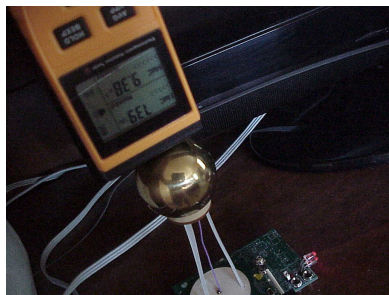


(6)

to the top of the main stairs over its banister (4), around the test area door jamb (5), and onto a shelf next to the webcam (6) used to observe and tune the receiver from the basement.



The Receiver LEDs are both lighted, evidence dual reflection off the wood surface, on the third floor and through 100 feet of wire from the basement. The return path for the current lighting the LEDs is through the scatteron.



Receiver field strengths were measured similar to those readings at the transmitter, $>700\text{V/m}$ on top of the scatteron and $>1500\text{V/m}$ beside the scatteron globe. Strange result when looked upon with conventional engineering wisdom, because the fields should fall as $1/\text{distance squared}$. The wavelength of 8 MHz is on the order of $\text{LAMBDA} = c/f = (3\text{E}8\text{m/s} * 1.3) / 8\text{MHz} = 49 \text{ meters}$, and $1/6$ of that length commonly referred to as the near field, is 8 meters. Therefore the distance of a 100 foot wire (30 meters) running up three floors is significantly more than 8 meters away from the transmitter yet the field strength has not decreased. The speed factor of 1.4 is a curious aspect of the scalar wave.