Transmitter senses triple relative-humidity figures

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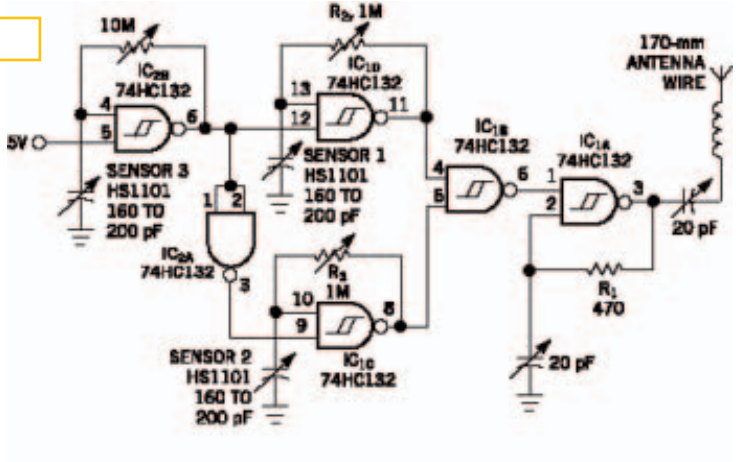
THE CIRCUIT IN **Figure 1** is a triple, relative-humidity sensor and radio transmitter. Sensors 1 and 2 form two gated oscillators with natural frequencies of 10 and 5 kHz, respectively, at relative humidity of 50%. The gated oscillators use variable resistances R_2 and R_3, respectively. Together, these two oscillators generate FSK-modulated outputs at output of IC_{1B}, Pin 6. The oscillator for Sensor 3 causes switching of the FSK signal at IC_{2B}. IC_{2B}'s natural frequency is 1 kHz at relative humidity of 50%. As the HS1101's capacitance changes from 160 to 200 pF (180 pF at relative humidity of 50%), the oscillator frequencies change by approximately ±20% for relative humidity of 0 to 100%). You can tune the RF generator, IC_{1A}, to the desired frequency of 27 to100 MHz for FM transmission. The following represents various ways to monitor the signals at the receiver end (not included in the design):

- Sensor 3 signal is the FSK-modulated signal at the receiver: 1 kHz±20% for relative humidity of 0 to 100%.
- Sensor 1 signal is the top FSK frequency, 10 kHz, on the carrier wave. It measures 10 kHz±20% for relative humidity of 0 to 100%.

Figure 1



Using FSK modulation, you can generate three independent relative-humidity measurements with one circuit.

- Sensor 2 signal is the bottom FSK frequency, 5 kHz, on the carrier wave. It measures 5 Khz±20% for relative humidity of 0 to 100%.
- The difference between the top and the bottom FSK modulating frequencies provides the difference in the relative-humidity signals.

You can replace the Sensor 3 circuit with any TTL oscillator circuit with a range of 100 Hz to 1 kHz. You can then generate the frequency from any other type of sensor. This frequency then becomes available at the receiver without affecting the relative-humidity signals from sensors 1 and 2. You can even use a TTL-based ASCII output to replace the Sensor 3 circuit to pass the ASCII data along with relative-humidity signals.

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