

Build a Spin Rate Sensor & a Rocket Direction Finder

for the transmitter described in May...

by **Richard Q. Fox**

The preceding installments of this series described a small, lightweight transmitter designed for use with model rockets. The transmitter operates on the 27 mc. Citizen's Band with an output of 100 mw, and was designed to telemeter the data from various plug-in sensors. A temperature sensor was described last month. This installment describes a spin-rate sensing module, and a radio signal direction finder for use with the transmitter.

The spin rate indicator is the simplest module to use with the transmitter. It consists of a photocell placed behind a hole cut into the side of the rocket body tube. When the sun hits the photocell, the cell's resistance drops, raising the pitch of the transmitter's audio output. When the photocell is pointing away from the sun, its resistance increases, thereby lowering the pitch of the transmitted audio tone.

While the rocket is in flight, the pitch of the transmitted signal will rise and fall as the photocell points towards and away from the sun. The transmitted signal may be tape recorded on the ground, and the spin rate of the rocket can be obtained by counting the number of rises and falls in the pitch per second (See figure 1).

Assembly

The spin rate indicator module can be easily assembled from parts available from Lafayette Radio, Syosset, Long Island, New York. Follow the wiring diagram and parts list for construction (See figure 2). Parts placement is not critical. The photocell will

cause the transmitter to produce only inaudible tones if the cell is exposed to full sunlight, so it is necessary to keep the face of the photocell partially masked in order for the transmitter to send an audible tone.

Direction Finder

The direction finder described here will

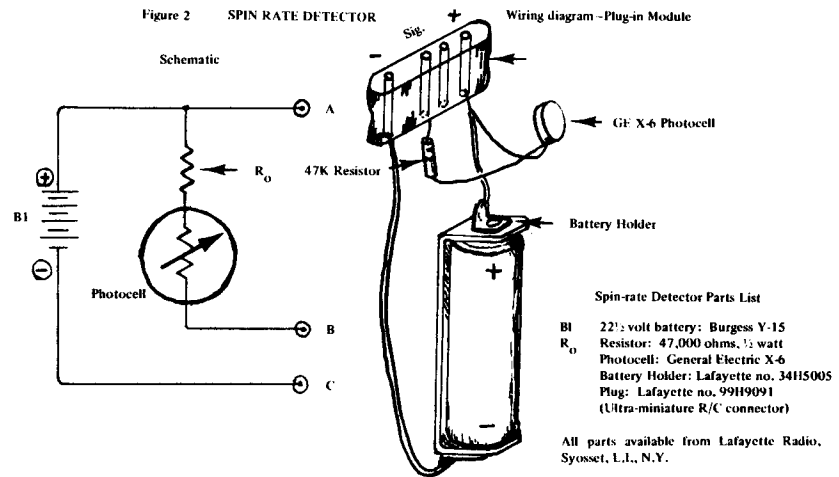
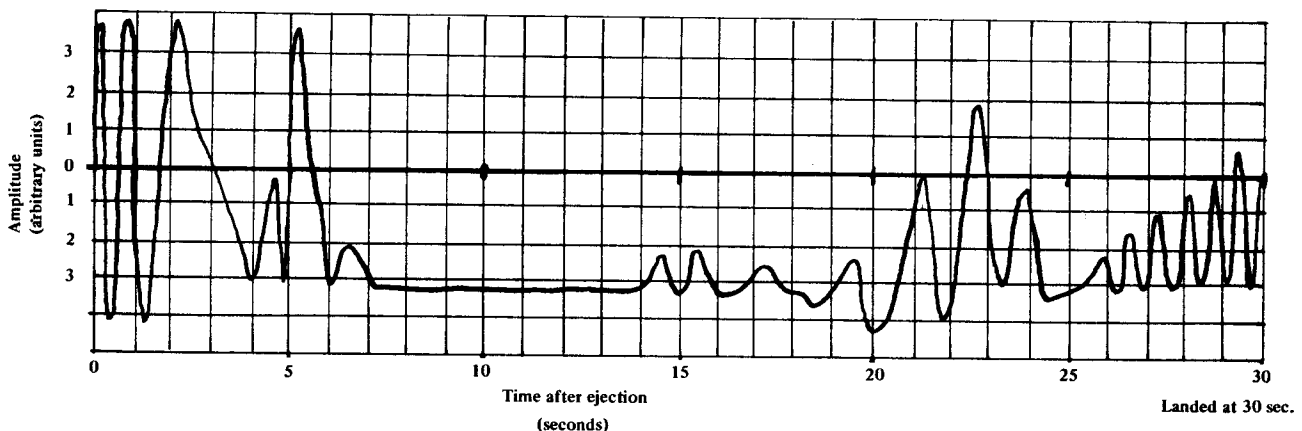


Figure 1

SPIN RATE

Transmitter and rocket hanging from 12 inch parachute.



occasions to recover rockets that drifted out of sight. In one case, a transmitter-carrying vehicle drifted into a woods. The direction finder led the way through the woods to the tree that the rocket was hanging from.

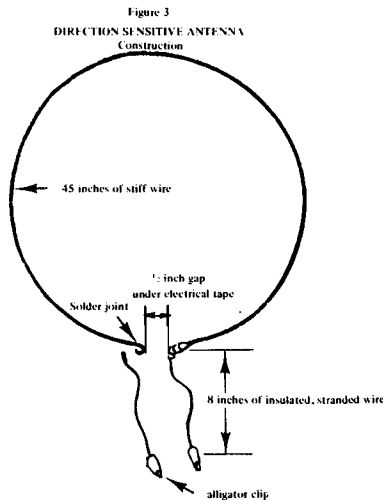


Figure 3
DIRECTION SENSITIVE ANTENNA
Construction

Construction

The direction finder is an antenna which is constructed from a 45 inch piece of heavy gauge wire, similar to coat hanger wire. The wire is formed into a circle, and 8 inch pieces of stranded hook-up wire are soldered to each end of the heavy wire (See figure 3). The two ends of the heavy wire are covered with tape and then taped against each other to form a circle (See figure 4). Alligator clips are soldered to the other ends of the stranded wire.

Use

One of the clips should be connected to the metal case of the receiver. (If the receiver case is plastic, the clip should be attached to the mounting hardware of the earphone jack.) The other clip should be connected to the end of the antenna, with the antenna fully extended. Turn the receiver on, and hold it upside down, with the direction sensitive antenna hanging from the receiver (See figure 4).

indicate where an operating model rocket transmitter is located. It is an extremely simple, cheap, external attachment which makes any receiver sensitive to the direction of origin of transmitted signals. The author has used the direction finder on several

Turn on the model rocket transmitter and listen for its tone on the receiver. With the receiver several hundred feet from the transmitter, rotate the loop antenna and listen for variations in intensity of the received signal. When the signal is the loudest, the transmitter will be in the plane of the antenna, and the antenna should be "pointing" at the transmitter. When the signal is weakest, the antenna will be "pointing" 90 degrees away from the transmitter.

When tracking down the location of a signal, rotate the antenna for maximum strength and walk in the direction indicated by the antenna's position. When you are so close to the transmitter that its signal starts to overpower the receiver, rotate the antenna for minimum strength. Positioning the antenna for minimum strength will allow accurate close range location of the transmitter.

Unfortunately, the direction finding antenna is bi-directional. It will not tell you whether the transmitter is in front of you or behind you. If the signal becomes weaker as you walk "towards" it, you're going the wrong way!

Next month: an accelerometer module for the transmitter.

MINI-ARSENAL

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