King of the Pulse Generators

One-shot or a train, TTL or CMOS, this generator will fit the bill. It's just what your test bench always wanted.

Ronald A. Miara WA3RJS
8803 Enfield Court, #22
Laurel MD 20708

This handy pulse generator is built around two commonly available under-

one and ten times the range

value selected by S1. For ex-

ample, if S1 is set to 10 \mu s

and R1 is set to 10X (fully

10 \mu s, 100 \mu s, 1 ms, 10 ms,

and 100 ms. Variable resis-
tor R1 is then used to tune
the repetition rate between

Pulse generator.

Fig. 1.
counterclockwise), a pulse will occur every 10 μs. R1 may then be tuned up to ten times this value (10X, fully clockwise), in which case a pulse will be output every 100 μs.

Pulse width is similarly set with S2 and R4. S2 selects the same range values as S1, and R4 is used to tune the pulse width from one to ten times the value selected by S1. Pulse widths with duty cycles up to 90% may be set up. (Duty cycle is defined as the ratio of time the pulse is on to the time of a complete cycle, times one hundred. An ordinary square wave would then have a 50% duty cycle since it is on half the time of a complete cycle.)

To use the pulse generator as a one-shot, switch S3 is closed, disabling the output pulse train. Push-button switch S4 is then depressed and released to output a single pulse from U2.

Refer to the schematic (Fig. 1) to understand how the pulse generator works. Three NAND gates in U1 are configured with capacitors C1 through C6, variable resistor R1, and resistors R2 and R3 to form a square-wave oscillator. The frequency of this oscillator determines the repetition rate of the generator. The resistors were chosen to produce repetition rates in convenient decade ranges. The oscillator drives one-shot generator U2. Capacitors C7 through C12, variable resistor R4, and resistors R5 and R6 determine the width of the pulses output from U2. The values of these resistors and capacitors were also chosen to produce pulse widths in decade ranges. Since the oscillator driving U2 causes pulses to be output at a periodic rate, the output of U2 becomes the output of the pulse generator.

Construction of this unit is not critical. Short lead lengths and an all-metal enclosure should be used to ensure a clean and stable pulse-train output. U1 (74C00) should be CMOS, not TTL, to ensure that the oscillator will work. The accuracy of the pulse width and repetition rate depends on the tolerance of the resistors and capacitors used and how carefully the front-panel multiplier controls are labeled (from 1X to 10X). Since I normally use an oscilloscope to set up my pulse generator, I used simple front-panel labeling and rely on the scope for calibration of the pulse train. Simple front-panel labeling also keeps the cabinet size small since less space is required on the front panel. My unit is powered by four penlight batteries which drive a miniature three-terminal +5V dc regulator IC (LM309H).

The small size and low cost of this handy pulse generator should make it a nice addition to any ham's workbench.

The best bet is now sometime in mid-April, assuming no further problems arise.

Thanks to AMSAT Satellite Report.—DeTray WB8BTH, 73 Staff.

Late September brought amateur satellite enthusiasts something to cheer about for a change. On the 20th, the University of Surrey amateur scientific satellite (UoSAT) was rescued from oblivion when ground controllers managed to turn its telemetry beacons off for the first time since April. By the time you read this, UoSAT may already be back in operation.

The trouble with UoSAT (also known as UoSAT-OSCAR 9 or, more simply, US-9) began when both the 2-meter and 70-cm beacons were accidentally commanded on at the same time. The effect was to denote both receivers aboard the bird, making it impossible for UoSAT to "hear" instructions from the ground. Even the massive 26-dB-gain 2-meter EME array of K1WHS proved insufficient to break through.

After an enormous expenditure of time and effort, the spell was finally broken on 70 cm when the USOAT salvage team obtained the services of a little-used 150-foot dish antenna at SRI International in California. With a gain at 70 cm of 46 dB and an ERP approaching 12 kW, the big dish did the trick, though not without practically being rebuilt by the UoSAT gang in the process.

Fortunately, UoSAT seems none the worse for the experience. The satellite, which does not carry communications transponders, continues to send a steady stream of scientific data earthward. In addition to telemetry beacons at 70.05, 14.002, 21.002, and 28.510 MHz. An on-board TV camera may be activated as well.

Ever since the failure of the European Space Agency (ESA) Ariane rocket during its fifth flight (September 9), the date for the launch of AMSAT's Phase IIIB satellite has been anyone's guess.