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One-Shot Pulse Shaper Circuit

The problem:
Previously designed pulse shapers dissipate large amounts of power so that a long counting chain uses as few shapers as possible. This leads to temperature problems that are caused by energy losses in the coupling transistors that isolate scaler stages.

The solution:
A pulse shaper circuit that is basically a magnetic one-shot multivibrator consisting of two blocking oscillators and an inhibit circuit and that exhibits low power dissipation, self setting, and easy triggering.

How it's done:
The input stage, consisting of CR1, R1, and R2 is capacitively coupled to the base of Q1 through C1 to prevent drawing excessive power from it. The first blocking oscillator is made up of Q1, N1-2, N3-4, R3, R4, and CR2. When ein goes high, Q1 turns on and the first blocking oscillator begins to switch the core. Positive feedback from N3-4 to base of Q1 via N1-2 keeps the blocking oscillator on until the core saturates. The second blocking oscillator consists of Q2, N5-6, N7-8, R5, R6, CR3, and CR4. After the core has

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saturation, Q1 cuts off causing the voltage across N3-4 to reverse polarity, thus inducing a voltage in N5-6 that turns off Q2. The second blocking oscillator then turns on and resets the core.

The inhibit circuit consists of Q3, R7, R8, CR5, CR6, and C2 and inhibits the first blocking oscillator from turning on when the second blocking oscillator turns off. When Q2 turns off, Q3 is kept on by the discharge of C2 through R8 for a few microseconds, thereby inhibiting Q1 and preventing the pulse shaper from oscillating. Coils N11-12, N12-13, and N13-14 are used to fine-adjust the output coil N9-10. An inhibit input is provided at CR6 where a positive input prevents the pulse shaper from turning on.

Notes:
1. Because of its low power requirements, this pulse shaper can be used to buffer each subchain of three scalers. This contributes to ease in packaging and minimizes temperature and trimming problems.

2. Inquiries concerning this innovation may be directed to:
   Technology Utilization Officer
   Goddard Space Flight Center
   Greenbelt, Maryland 20771
   Reference: B68-10012

Patent status:
No patent action is contemplated by NASA.

Source: R.G. Radys of Hughes Aircraft Company under contract to Goddard Space Flight Center (XGS-11379)