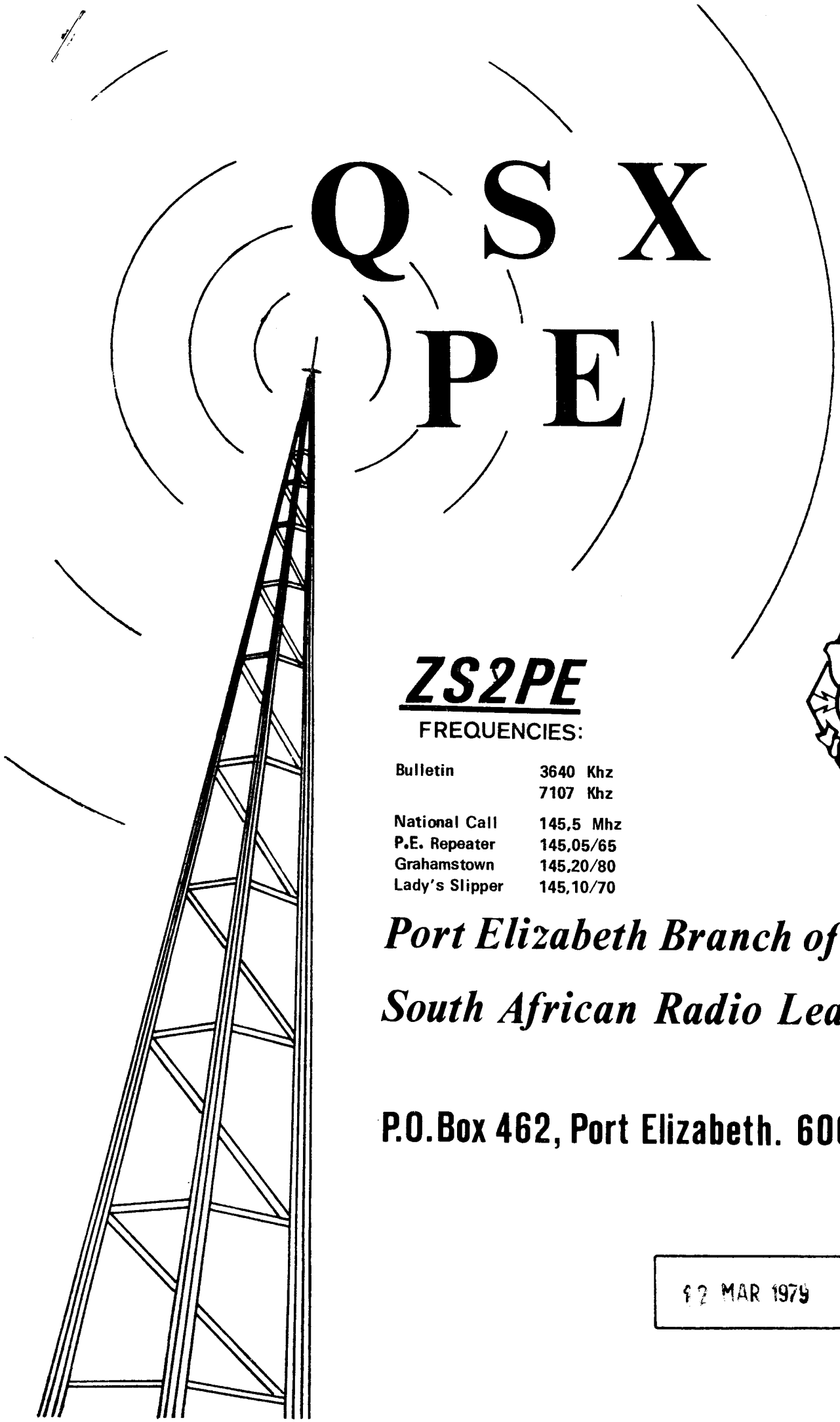
Q S X
P E



ZS2PE

FREQUENCIES:

Bulletin	3640 Khz
	7107 Khz
National Call	145,5 Mhz
P.E. Repeater	145,05/65
Grahamstown	145,20/80
Lady's Slipper	145,10/70

Port Elizabeth Branch of the South African Radio League

P.O.Box 462, Port Elizabeth. 6000.

NOTICE!

THE NEXT MEETING OF THE P.E BRANCH TAKES PLACE ON FRIDAY 16 MARCH AT Y.M.C.A - HAVELOCK STREET.

AT. 8 P.M.

GUEST SPEAKER = MAJ. GEN. T. COCKBAIN.

THE SUBJECT WILL BE "RADAR-ELECTRONICS AND AIR DEFENCE SYSTEMS"

TOM (ZS2TC) IS AN EXPERT IN HIS FIELD, AND THE EVENING PROMISES TO BE AN INTERESTING ONE.

The Schizophrenic Triangle

—a split-personality radiator

Freddy Brown WA4JTJ
RFD 1, Box 267
Scottsville KY 42164

If you're interested in a multiband, inexpensive, easily built wire antenna system with DX capabilities, then here it is. It's inexpensive because it is made of available materials, such as wire and small variable capacitors for the matching section. This also contributes to the ease of construction. Because the antenna has a dual personality, or is bi-banded, I call it "schizophrenic."

The triangle antenna is a single loop of wire fed by a gamma match. In fact, the loop has two gamma matches (one for each band of operation). I first built a 40m triangle as described by Byron Self WB6UFW.[1] I operated this antenna for about a year with excellent results. A loop is very wide-banded. In fact, by use of the gamma match, the swr of this antenna never exceeded 1.3:1 at the band edges. The 40 meter loop is 1 wavelength long (140 ft.). After realizing this closed antenna loop would probably resonate with 15

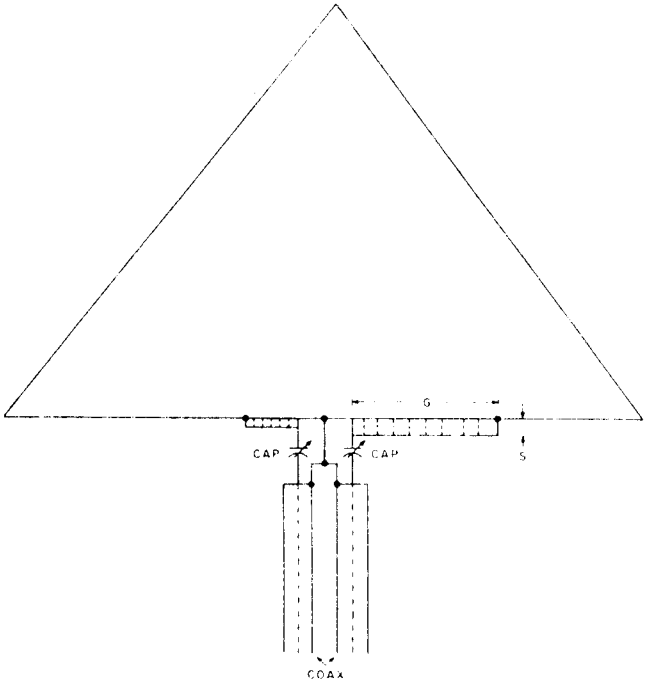


Fig. 1.

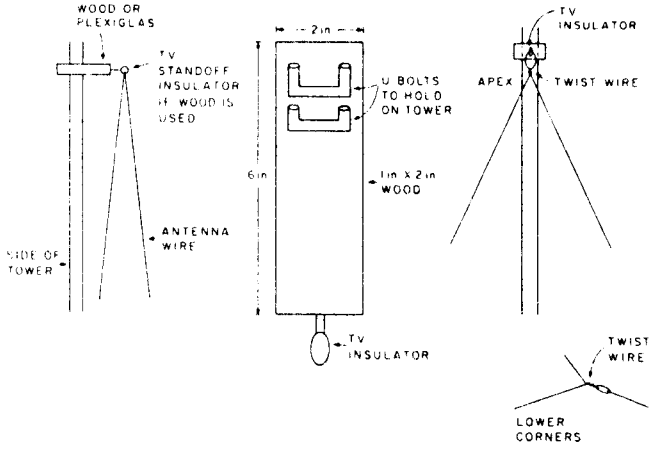


Fig. 2.

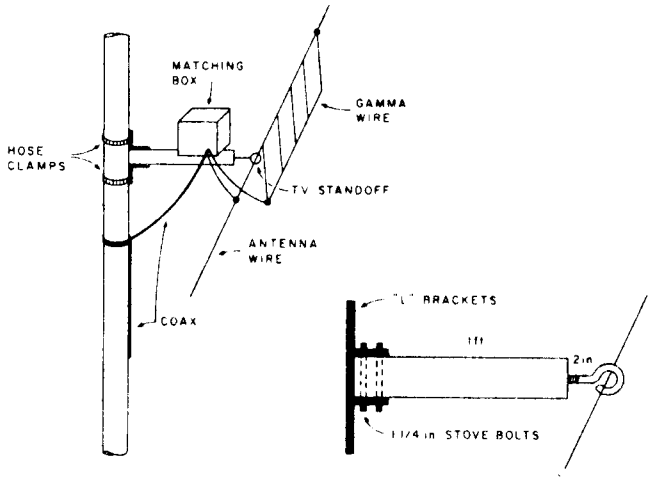


Fig. 3.

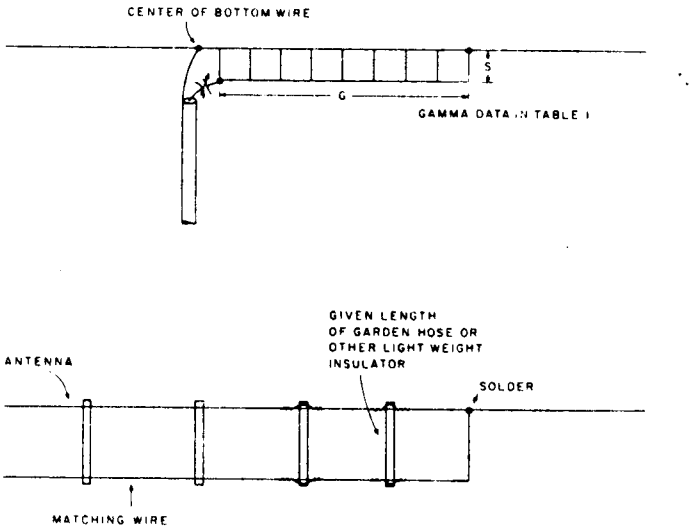


Fig. 4.

meter (21 mHz) excitation; I proceeded to build a 15m gamma match and attach it directly to the antenna. The same results were obtained on 15 meters — low swr and very wide bandwidth. Adding the second gamma match didn't alter the performance of the original antenna.

Shortly afterwards, I constructed a triangle loop for 80 and 10 meter operation. I simply computed the loop length for the middle of the low frequency band by using the formula: 1000/f(MHz). For example, 1000/3.6 = 278 ft. This is 1 wavelength for 80 meters and 8 wavelengths for 10 meters.

Construction Notes

I'm including diagrams from Byron's article to aid in the construction of the wire loop and gamma matches. These are Figs. 2-4. Fig. 1 shows the "schizophrenic" triangle with gamma matches attached. Solder the braid of the two 50- or 75-Ohm coaxial lines to the center of the loop. Solder the center conductor of the coax to one side of the capacitor and the gamma wire to the other side of the capacitor. I used a plastic freezer box to house the capacitor and applied silicone rubber sealant to waterproof the holes made by the exiting wires. I used a standard close-spaced 365 pF broadcast band capacitor, which has not arced yet with my 180 W transmitter.

Final Notes

I installed both loops on my 60-foot tower (Fig. 5), leaving room at the top for TV, 2 meters, and maybe a yagi or two later on. The loops should be kept as close to equilateral triangles as possible. Of course, I couldn't do this with the 80 meter loop on my 60-foot tower. Therefore, I stretched the horizontal side to 122 ft., and each slanting leg was 78 ft. long. This put the horizontal leg about 10 ft. above ground and the apex at the top of my tower. The whole loop is tilted a few degrees off vertical. I would expect that tilting the triangle would result in a lower angle of radiation.

One last point. A good antenna switch in the shack is desirable for quick band changes. ■

Reference

1. Self, "The 40-Meter Triangle," *QST*, Vol. LX, No. 5, May, 1976.

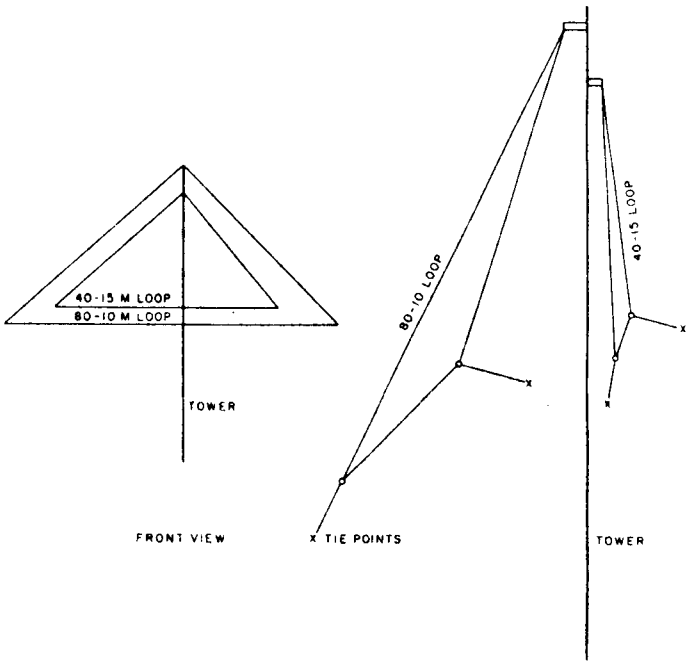


Fig. 5.

Loop information		Gamma data		
Band	Loop length for middle of band	G	S	Capacitor (pF)
80	277'9"	96"	6"	300
40	141'	73"	4"	200
20	70'5"	35"	2"	100
15	47'2"	27"	1.5"	75
10	35'8"	18"	1"	50
6	19'11"	10"	1"	30

Combinations	Loop length	Gamma data	Resonant frequencies
40m and 15m	141'	same as above	40m—7.100 MHz 15m—21.277 MHz
80m and 10m	277'9"	same as above	80m—3.6 MHz 10m—28.830 MHz

Table 1.

SSIAN SATELLITES

During the past month many Amateurs have focussed their attention on the two Russian satellites. Information was not readily available, but slowly filtered through from several sources. In this short article, we will attempt to summarize the information available to date.

Two satellites were launched from the Plesetsk site in Russia at 06h32 GMT on October 26th. The satellites, Radio 1 and Radio 2, were launched together with a scientific satellite in the COSMOS series. The orbit is estimated at approximately 1 700 km, which means that the range is increased between 500 and 650 km over that of OSCAR 7.

CONFUSION

Confusion existed over the band pass of the up and downlinks. At first it was thought that Repeaters R8 and R9 would trigger the transponder. This appears now not to be the case. R8 and R9 (145,800 and 145,825 MHz) will, however, still have to be re-allocated to fall in line with the new IARU band plan, which has allocated 145,800 - 146,000 MHz as satellite frequencies. ZR licence holders can, however, relax - they will not appear on 10 metres, when using R8 and R9.

Immediately after launch both Radio 1 and Radio 2 were operating, but after the first few test orbits, Radio 2 was placed in storage as a stand-by satellite. Both satellites are in a similar orbit, but by the end of this year Radio 2 will lag by half an orbit.

SENSITIVE TRANSPONDER

Russian Amateurs holding a technician class licence are restricted to 5 watts, hence the reason for the extremely sensitive transponder receiver. The recommended ERP is only 3 watts. The satellite will overload at 8 watts ERP and at 10 watts ERP switch off. The transponder is available for 24-hour use, but once overloaded for longer than 20 seconds will switch off. The command station UK3ACF will reactivate the satellite once it comes in reach of Moscow.

When the beacon sends RS RS at the end of each telemetry element, the transponder is operating. When RS is sent, it is switched off.

SUMMARY OF SPECIFICATION RADIO 1

Power requirements for uplink:

3 watts ERP activates AGC

5 watts ERP clipping starts

10 watts ERP max. power at horizon transponder will switch off.

Beacons:

Telemetry:	29,4005 MHz
Code Store:	29,380 MHz (not yet in full-time operation, but monitored in UK)
Uplink:	145,880 - 145,920 MHz
Downlink:	29,360 - 29,400 MHz
Orbit period:	± 120 minutes
Angle to Equator:	83^{o}
Orbit to orbitshift	± 30^{o}

South African Operation

During the first two weeks after launch the following stations operated Radio 1:

ZS2BD, ZS2EM, ZS3MV, ZS1BI,
ZS6AKV, ZS6BMN, ZS6H5.

Orbit Prediction

Computer print-outs for Radio 1, Oscar 7 and Oscar 8, are available from the Transvaal OSCAR Working Group at R1-00, covering approximately two months. Send your donation and specify for which satellite you require the information. The profits go into the Transvaal OSCAR Working Group Fund for further development and projects. Send your request and donation to S A R L, Transvaal OSCAR Working Group, P O Box 2327, Johannesburg 2000.

AMSAT NET

The OSCAR Group of the S A R L Technical Committee holds a net every Sunday at 11h00 SAST on 14,280 MHz. Listen to this bulletin for updated information on satellite communication. A local net on 144,300 with a retransmission of the bulletin is under consideration. For more details listen to the Johannesburg Branch Bulletin and the Johannesburg Technical Net.

NEWS FOR MOBILERS.

Ford readies electronic distributor

The distributor in a car may soon disappear entirely. It has already given up spark timing, and now electronics also looks like it is taking over its other job of channeling the energy from the ignition coil to the right spark plug.

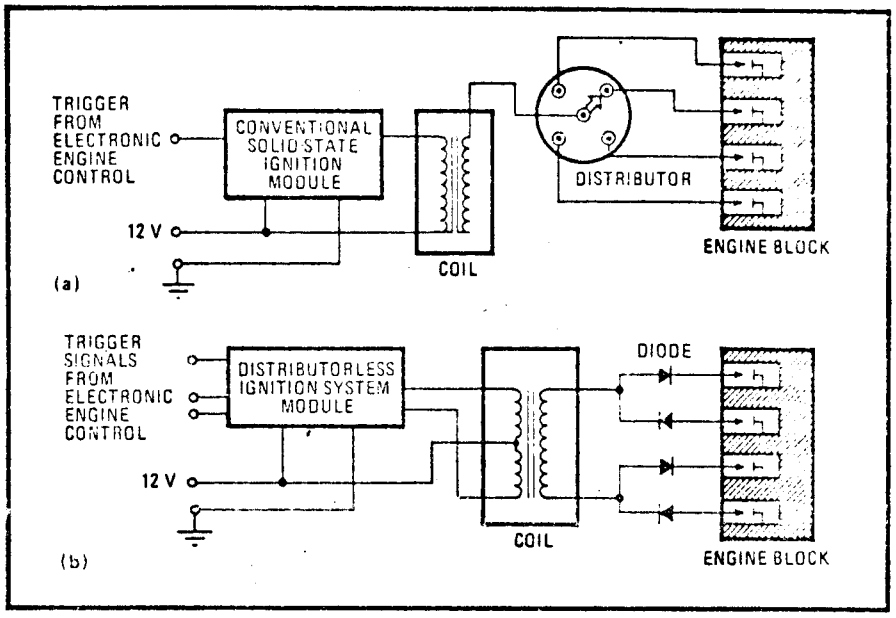
Ford Motor Co., for one, is developing an electronic system for the channeling task. The two controls together will completely replace the distributor and its need for periodic maintenance. They will also free up space under the hood and rid the car of a significant source of radio-frequency interference.

Electronic engine controls such as Ford's existing unit supply the spark-advance signal, traditionally done by a spinning assembly of springs and weights in the distributor base. That signal shifts the time that the spark plugs fire as engine speed and manifold vacuum varies—a technique that boosts the car's performance and fuel economy while staying within federally mandated emission levels.

Experimental. Ford's new module, still in the experimental stage at its Dearborn, Mich., laboratories, directs the ignition energy to the proper spark plug and cylinder. That is now done by the spinning rotor as it hits contacts in the distributor cap.

The firm will not discuss projected costs or production plans for its distributorless ignition system, as it is called. But it is being designed for four-cylinder engines, and, since it relies on an engine computer for its timing signals, it probably will first show up when the company starts using electronic engine control on its smaller cars.

Since the unit does away with the distributor rotor, it should lead to a more reliable ignition system. "Assuming the electronic components don't fail, the customer is left with just an occasional spark-plug change," says David F. Moyer, who is director of Ford's Systems Research Laboratory.



Replacement. Rotating distributor of conventional ignition system (a) is being replaced by new Ford system (b). Diodes and special coil route energy to the spark plugs.

Ford is also concerned about the rfi generated as the spark jumps from the distributor rotor to a terminal on its stator—the primary rfi source in a car. "We feel that such legislation is almost a certainty in the U. S.," Moyer says. With the new system, sparking occurs only inside the cylinders.

More. But as cars acquire more electronics, rfi becomes more of a problem: "The electronic engine control has seven sensors connected by long wires to the processor," he says. "Those leads act as antennas, and there can be significant coupling of ignition energy into the onboard computer."

Cars currently use a solid-state module to excite the primary winding of an electromagnetic ignition coil. The high voltage output of the coil's secondary winding is distributed by the rotor to the engine's spark plugs. With a four-cylinder engine in mind, Ford uses two independent, parallel ignition circuits and a coil with two primary winding and two opposite-polarity, high-voltage terminals in the single secondary. Each of these terminals is connected to two spark plugs through a pair of high-voltage diodes arranged in back-to-back polarity.

The new module alternately energizes each primary winding. When the current in the first primary winding switches off, opposite polarity voltages are generated at the secondary's two terminals, firing two spark plugs. The polarity of the rectifiers determines which plugs are fired. When the second primary switches off, the polarity of the terminals reverses, and the other two plugs fire.

The cylinders are paired so that when fired, one cylinder is in its compression stroke, the other in its exhaust stroke. This is a peculiarity of the system, required by the way it is designed. "Firing a spark plug during the exhaust stroke does not affect engine performance or emissions," Moyer says.

Ford is also working to further simplify its distributorless ignition. By adding a double-pole double-throw switch, it will be able to alternate the direction of the current in the coil. That way, the ignition coil could be built with a single primary winding instead of two. □

DE CHRIS ZS6AVC