

RCM PRODUCT REPORT:

PCS DIGITAL PROPORTIONAL SYSTEM

THE announcement of Proportional Control System's entry into the proportional control field was generally received with mixed emotions. RC'ers, anxious to go proportional, but held back by limited finances, must have been tempted by the three hundred dollar price tag. PCS was offering a five channel control system at a price that, in some cases, was half the cost of competitors. The tune changed — could a \$300 system be any good? Psychologically, at least, reliability was measured in dollars and cents. We cannot say that we were not beset by these same suspicions.

Our decision to purchase a PCS was based largely on our knowledge of the individuals behind the company — Cliff Weirick, a top notch flyer, a national champion and long time RC'er, and Jerry Pullen, a pioneer in R/C electronics and digital circuitry.

Our system was delivered within two weeks after placement of the order. We were somewhat disappointed when the box had been completely unpacked, and the beautiful girl pictured in the ad was missing! The control system, however, appeared to be as nicely made as the girl, but certainly not the type to curl up with on a cold winter night. A quick call to

PCS advised us that she was not part of the package!

From a technical viewpoint, our review will be brief, since we feel that this aspect of any review generally tends to confuse rather than inform the majority of readers.

Transmitter

The PCS transmitter is of the two stick variety, utilizing enclosed control sticks for the primary functions and a lever for auxiliary control (ours had open faced Kraft type sticks). An output reference meter is located on the front face, and a four section collapsible antenna is mounted on top via a screw-on connector, making it readily removable. The encoder portion of the circuitry forms five pulses, followed by a sync pause. The frame repetition rate varies with command given from 80 frames per second to 133 frames per second. In other words, each control position is transmitted at a minimum of 80 times each and every second and at a maximum of 133 times each and every second. The width of the sync pause is varied to control the auxiliary channel. The unit contains eleven quality transistors, and has an RF input to the final of

700 MW and an output of about 350 MW. Power is supplied by a 9.6V G.E. nickel cadmium pack, and the chargers for both the transmitter and receiver are built-in.

Receiver

The receiver is superheterodyne with a sensitivity of 1 microvolt and a selectivity of 3 kilocycles. The receiver contains an effective noise rejection circuit. Temperature stability was checked through a range of 0-140 degrees F without a miss. The decoder portion operates by means of ring counter logic.

Receiver, decoder construction is single deck, with an overall case size of 2" x 3" x 1", and a weight of 4 ounces. The unit is factory tuned and sealed. Power supply is 4.8V, 500 Ma nickel cadmium.

Servos

Kraft servo mechanics are used with PCS electronics installed. Resolution (centering) was accurate to less than 1% on the five servos tested. Total travel is 5/8" in a linear motion, with three take-off points provided. Output arm thrust tested at approximately four pounds. Individual servo weight is 3 ounces.

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System

As shipped, the PCS system includes transmitter, receiver, four servos, power supplies, built-in charger, switch harness and charge cords. All wiring is complete, ready to plug in and fly. As a convenience, two servos are supplied providing opposite travel with a given command, making installation to existing linkages extremely easy.

Testing

Initial bench checks consisted of plugging the various components together, flipping the switches and watching all the servos home in on their neutral position. The transmitter controls were wiggled and twisted as we watched all the servos running smoothly and quietly back and forth.

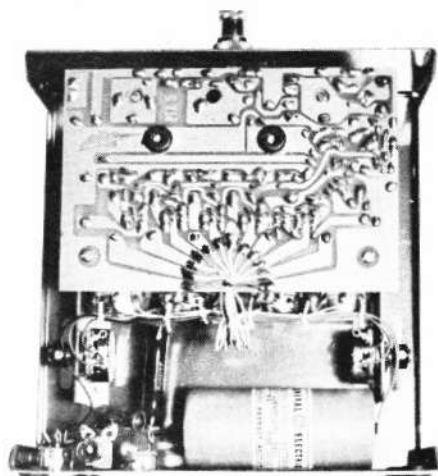
The system was quickly installed in our newly finished Antic. Following the instruction manual closely, we succeeded in doing most of the "don'ts." Perhaps the most flagrant violation was the use of full length wire pushrods on all surfaces — with metal keepers! Add to this the fact that the ship is literally held together with metal guy wires running every which way! On the bench, everything still checked out satisfac-

torily. PCS transmitter evidences excellent workmanship and quality control.

torily.

If ever you are in doubt about a new piece of equipment, there is one sure way to check it out prior to flight — take it to a club meeting! What those guys did to our PCS! Phase One: remove the transmitter antenna and start walking — "Ha, ha, only six feet and she's starting to chatter." Phase Two: install antenna but have it collapsed — "That's better, 30 feet and still solid." Then someone suggested coiling the receiver antenna inside the ship (Phase Four), range reduced to 25 feet. By now we were convinced, but the members had other ideas. Phase Five: "Hey — how about wrapping the antenna around the servos?" Range still 25 feet with transmitter antenna collapsed. This should be enough to convince the most diehard "propo-is-no-good" reed flyer. Not so! From the corner came another idea — "What happens if you leave the receiver antenna wrapped around the servos and then stick that noisy old electric drill down in the compartment . . . running? Bet it won't work then!" Needless to say there were no takers, but since we always fly with an electric drill and long extension cord, we agreed to try it. Under these adverse conditions, the system continued to operate with no loss of range or control! Maybe not a very scientific test, but nonetheless convincing. Not only did we get a unanimous approval to fly it, but also two more systems were ordered within the club!

Field checks proceeded without incident, as did the flight — in spite of us, our Antic, and all of its wires. With the exception of a brief checkout in a full multi stunt ship, the PCS has remained in the Antic (as have the wires and full metal linkages!). This combination has



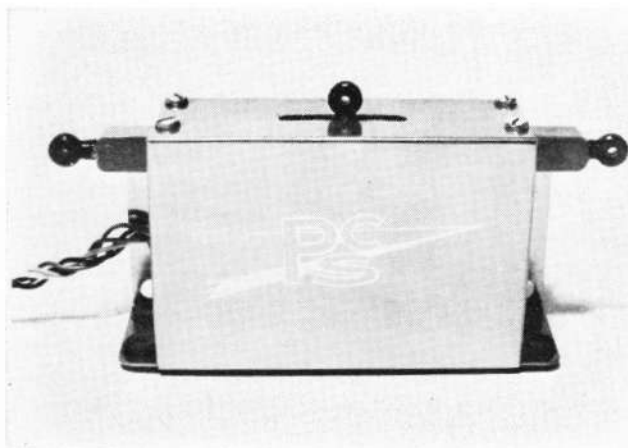
logged well over five hundred flights without the slightest or briefest loss of control, under any and all conditions of weather, temperature, and R/C traffic, and before hundreds of spectators.

Our toughest flight test, however, came at the Indiantown Gap Invitational, when we were called upon to fly, along with six other ships, in a pouring rain. The preciseness of control was demonstrated with low passes, inches from the ground across an entire field, along with touch and go's on one wheel, and placing the ship between two obstacles ten feet apart (the Antic wingspan is 7 feet!).

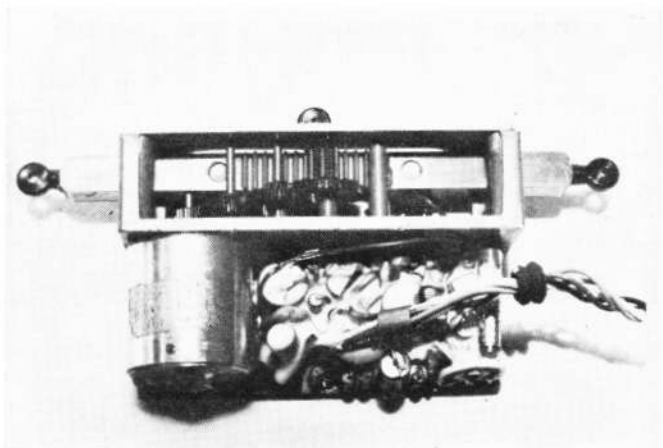
In all, five PCS systems have been under scrutiny. Only one of the five has been returned for service. This was due to accidental damage, otherwise known as "pilot error!" The system returned for service made the trip across country and back, was duly repaired, and was in the air, once again, the following weekend! We would assume that either PCS is giving superb service, or alternately, has very little service work to perform. Or, perhaps a combination of both.

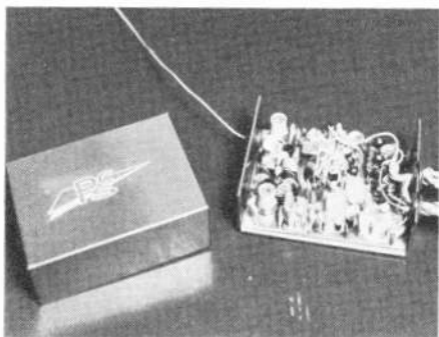
It should be mentioned that one of the systems, that belonging to Ray Smith of

Proportional Control System's digital servo.



Internal shot of the PCS servo. Note epoxy compound to protect components.





Interior of PCS receiver.

the DCRC, experienced some "glitching" during the glider altitude record. Verified range when the glitches occurred? A mere **four and one half miles!** How's **that** for a range check?

Prices and Availability

The PCS five-channel digital system is priced at \$299.95 for the complete pre-wired system. Available on either the 27 Mc, 52 Mc, and soon the 72 Mc bands, deliveries vary from one to three weeks, through your dealer or factory direct.

Findings — Recommendations

Our primary concern in equipment reviewing is performance. Our testing, although not proof positive, has shown the Proportional Control Systems' PCS-5 to be outstanding in performance, reliability, quality, and price. We understand that some difficulty has been sustained by a few PCS system fliers with regard to servos. Virtually every case has been traced down to dirty servo feedback potentiometers, and for this reason, a Servo Maintenance Manual is now available for the Kraft and PCS servo. The symptoms which indicate that this maintenance is necessary are a mild hunting of the control surface under engine vibration or a failure of a servo to neutralize accurately while flying. This condition is not dangerous insofar as a loss of control is concerned but indicates that servo "pot" cleaning is required. The Maintenance Instructions provided with each system should be followed after extended system use, and the manufacturer recommends this service to be performed in the area of each 75-250 flights.

PCS battery pack.

