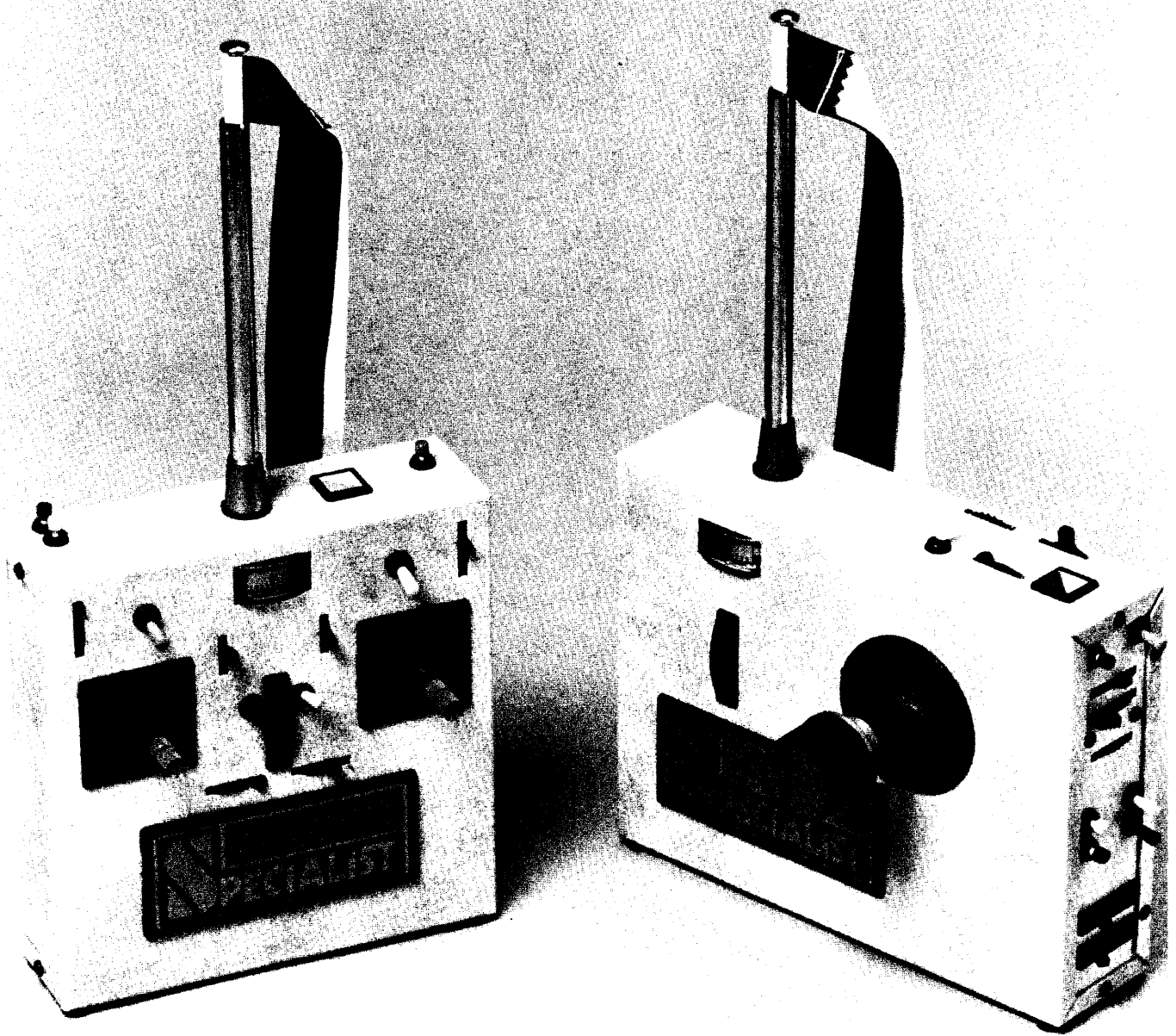


# **The new concept in high performance radio systems from *MILLCOTT***



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READ WHAT THE STAFF REPORT IN  
THE AUGUST 1977 ISSUE OF SCALE  
R/C MODELER SAYS ABOUT THE  
SPECIALIST!

PHOTOS BY J. R. NAIDISH

At last, a radio that  
incorporates all the features  
needed for complex  
scale operations.

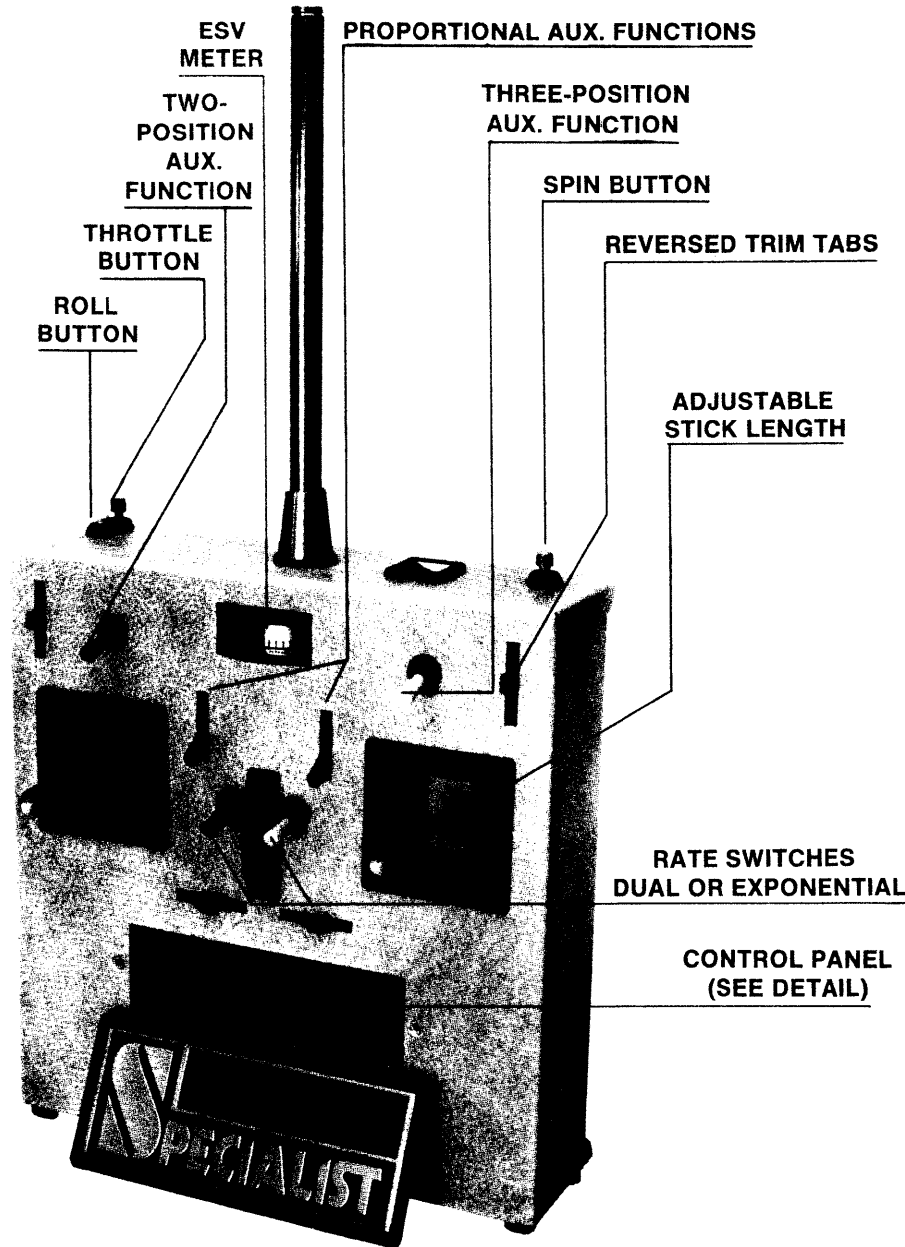
The name says it all, for  
it is truly "THE" control  
system for the scale flier  
who is a . . .

# SPECIALIST

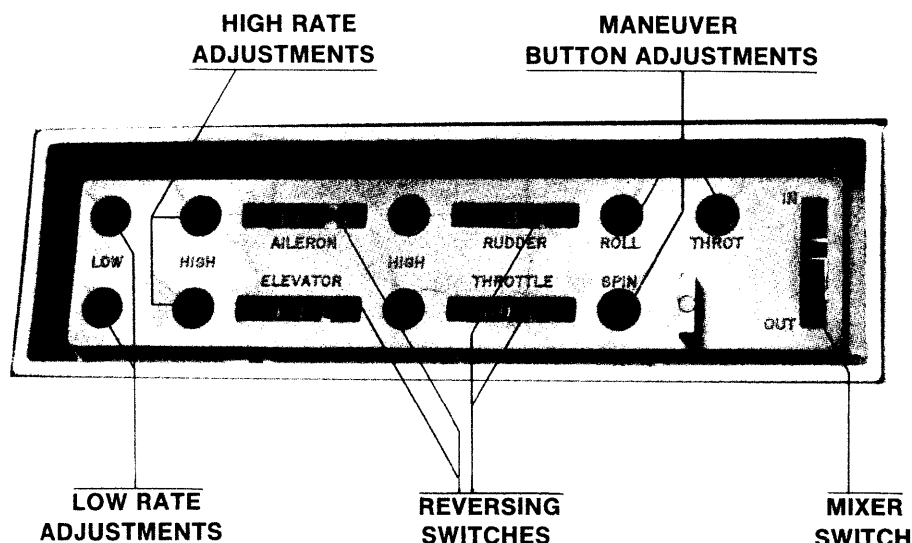
There comes a time, in every radio reviewer's experience, when he finds that he's been outdone. It's like the flight judge who starts out giving 9s and 10s, only to be stymied when the true pro puts in a near-perfect flight. We find ourselves, having so many times given praises to particular radios as "the best," "the ultimate," etc., unable to now find suitable words for the Specialist VIII. This radio is forcing us to revise our standards of excellence.

What is most striking about the Specialist is its exceptional flexibility—it truly approaches a universal control system. Although it is a standard production radio, the units have enough options so that you can literally tailor-make your own system. We scale fliers can appreciate that, since this is one of the few radios ever produced which





#### CONTROL PANEL DETAIL



attempts to come to terms with the unique needs of a radio to control a scale model. We realize that some of the Specialist features are not totally original, with many of them having been introduced on the Kraft Signature. But any further comparisons must end here, for this radio has taken all of this to its most logical conclusion. In using it, one is left with the impression that the Specialist VIII was designed as a flier's radio, from the word go.

Since there are so many "extras," we'll briefly enumerate the significant ones:

1. Eight full functions, configured as follows: four primary flight controls (two stick only at this time), two proportional tabs a two-position toggle switch and a three-position toggle switch.
2. Dual Rate and Exponential Rate features for aileron and elevator (more on this later).
3. Three full "flight-programmable" maneuver buttons (spin, roll and throttle).
4. Optional electronic mixer (in the Tx, not in the airframe).
5. Servo reversing capability on the Tx.
6. Custom-matched servos.
7. Frequencies of any Tx and Rx are identical, for total interchangeability.
8. All components hand-selected, and each unit hand-assembled.

Let's spend a little time discussing Dual Rate and Exponential Rate, since many fliers are unfamiliar with these features. Dual Rate is perhaps most easily understood if one can imagine flying a model in slow motion. By flipping the two switches adjacent to the Tx ON/OFF switch, the aileron and elevator sticks no longer produce full control surface deflection, but instead yield a preset amount (fully adjustable right on the Tx control panel) of throw on the servos. In the High Mode, everything is normal, of course. In the Low Mode, this reduced control sensitivity seems to make every control input yield a much smoother response on the aircraft. Any tendencies to overcontrol are almost automatically eliminated. We were amazed at how effortlessly rolls could be executed, when the elevator and ailerons are thus desensitized.

For a scale ship, this control flexibility cannot be overemphasized. How many of us could be scoring higher at contests if that scale model didn't respond so violently to the controls? Reducing the throws mechanically at the servos and control horns is only a partial solution, since it's still necessary to maintain enough control for takeoffs, landings and violent maneu-

vers (spins, snap rolls, etc.). With the Dual Rate feature, a normal takeoff can be made with the Tx switches in the High Mode, then the amount of deflection can be reduced, by 25% or more, by flipping the switches. There is no shift in neutrals or trim at this moment of transition. You'll be amazed at how those "squirrely" models will tame down with this control mode capability.

The Exponential Rate feature achieves the same end, but the approach is different. Instead of reducing the total amount of servo deflection, the ratio of stick-to-servo motion is altered to give less servo travel around neutral stick. As the stick is deflected more and more, the servo begins to catch up, until they both meet again at the end of the stick travel. Thus, while 10° of stick deflection gives, say, 15° of servo transit in the High (normal) Mode, the same stick deflection in Low Mode might give only 8° (the exact amount is fully adjustable right on the TX).

The initial feel of flying Exponential Rate is most unusual . . . we might say almost weird. One's initial reaction is to mechanically move the sticks in the normal way, which makes it feel as if you have almost no control of the model. Once you adjust to the fact that your head is still in high gear, while the model is in second gear, the whole proposition becomes simple. You can really bang the sticks around (and be frankly sloppy in the maneuvers), yet the model does everything as if it were computerized. If you get out of sync, just haul in more stick and the model responds. With the sticks in the corners, the ailerons and elevator can be made "normal," or adjusted to almost any amount of control throw. This feature seems to almost turn contest jitters into a positive thing, since those little stick twitches are no longer obvious to the judges.

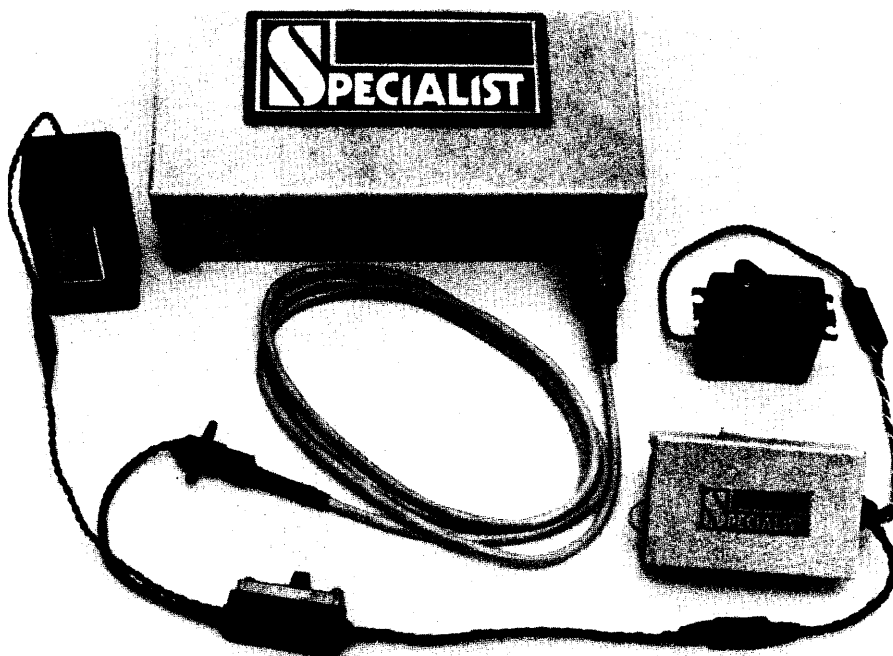
We can truthfully say that, once you've flown Dual or Exponential Rate, you'll wonder how you put up with the obvious drawbacks a "standard" radio imposes on the flier. This feature is significant in its ability to actually help compensate for the shortcomings of both pilot and aircraft. Don't be surprised if this one bit of electronic gadgetry doesn't add at least 25% to your flight scores, no matter how good you really are . . . and that's not a statement we make without the actual experience of observing a marked increase in our own performance.

The "flight-programmable" maneuver buttons have been a controversial radio option which has certainly received its fair share of pros and cons. We must admit to having been against

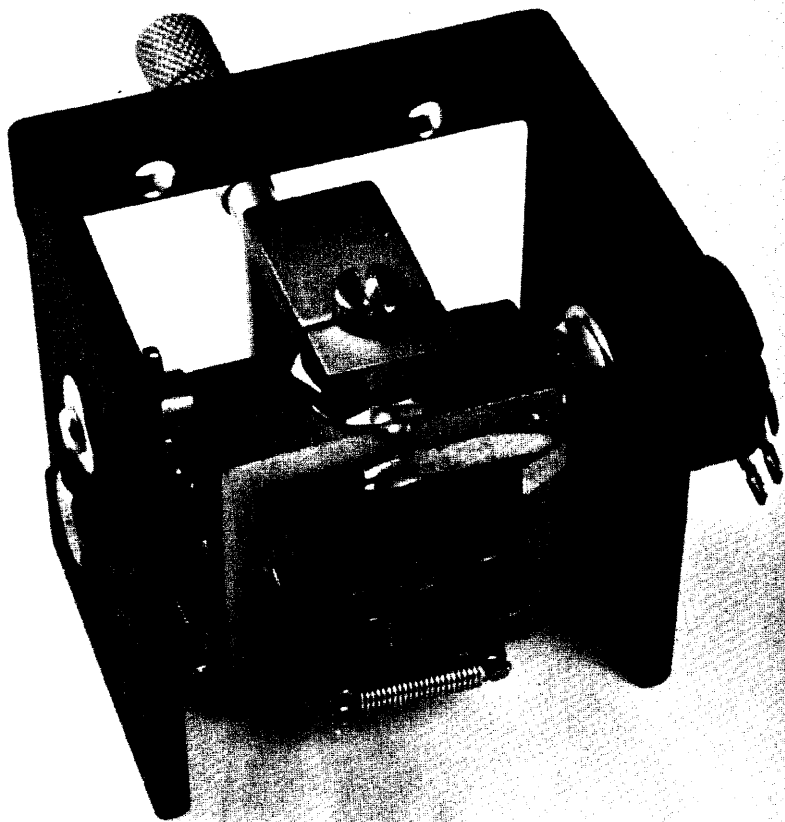


**Interior of the Specialist Tx is a thing of beauty. All boards are professionally executed, wiring harnesses carefully bundled, and even the wires to the gimbal pots are stress-relieved and heat-shrink protected. TTL circuitry is a major breakthrough in reliability.**

(LARRY GAYNOR PHOTO)



**The interconnect cable attaches from the Tx to the airborne charging jack. With the Rx switch off, the Tx's ESV meter reads airborne voltage. With Rx switch on, ALL the servos are driven directly from the Tx without generating RF.**



them, in theory, until we experienced them. Now we say that they're the best thing since canned beer!

The roll button does only one thing: it permits a consistently repeatable aileron deflection for precise rolling maneuvers. Since the amount of throw available from the button can be pre-set by the flier (right on the Tx panel), it opens up whole new vistas of improved flight scores. The button can be used for slow rolls, or pre-set to give the correct rotation for three consecutive rolls, or even blipped for snappy hesitation rolls. Once you've used this device, you'll realize why the huc and cry from those who oppose it—the button does make good rolls almost automatic.

The Specialist VIII is designed so that the aileron stick is electronically disengaged while the button is depressed, thereby eliminating any possibility of the pilot disturbing the proper roll rate. What makes the device so lethal in the hands of a competent flier is that it permits him to

**The Specialist gimbal assembly is the best we've tested to date. Slightly different way of relating the aileron to the frame gives good feel and superb centering.**

(LARRY GAYNOR PHOTO)

dedicate 100% of his concentration to getting the elevator (and maybe rudder) inputs exactly right. The maneuvers become a lot simpler when you can totally eliminate one whole control motion from your stick hand. Once we got the feel of using the buttons, our roll performance increased an honest 50% . . . suddenly we could string them together on a rail, from horizon to horizon.

The spin button is perhaps more properly considered an elevator override. Once you've desensitized the model, via the Dual Rate or Exponential feature, there may not be enough elevator to ensure a proper stall entry for the spin. The spin button is normally adjusted to kick the elevator to almost maximum deflection. Simply re-

lease the button at the correct moment, and the exit from the maneuver is right on heading.

The throttle button, as with the other buttons, can be adjusted to actually reverse the servo direction, to add another dimension of flexibility to the control system. Thus, hitting the throttle button can give high throttle, low throttle, or any setting in between. So too, the aileron button can be set to roll either to the right or left; and the spin button can be set to any amount of up or down elevator. Just think, with a little experimentation, hitting all three buttons in the proper sequence could give a perfect Lomcevak every time (now where did we hide those Chipmunk plans?).

While these features are very exciting, we're most impressed with the Specialist VIII because of its optional electronic mixer. Our test system had this option, and we had a field day dreaming up all sorts of scale applications for it. Since the mixer is in the Tx, linkage problems in the airplane are almost nonexistent. Everything from V-tails, to coupled ailerons and rudder, and coupled flaps/ailerons add spice to those scale projects which require special installations (don't they all?).

One small fly in the ointment is that the switch to disengage the mixer is built into the Tx control panel, and a screwdriver or tuning wand is needed to get to it. We can't fault Milcott for this, since it would be tragic to accidentally disengage the mixer on a V-tailed ship. But what about those who want coupled aileron/rudder? If you want to use this to help coordinate the turns, then you can't readily disconnect it for takeoffs and rolls, etc.

We discussed the matter with Milcott, and they informed us that the flier will have several options on the mixer. The user can order a mixer which is uni-directional, so that flaps would influence elevator (for example), yet the elevator commands wouldn't give a flap response. Also, they would gladly make one of the toggle switches the actuating device for the mixer, or even install a separate switch elsewhere on the Tx.

We reviewed the Milcott MC-1 servo in the December '76 issue, and we're even more impressed with the ones that come with the Specialist (these are a more refined version). The amplifiers in these units are designed so that the servo motor actually turns on-and-off approximately one time for each degree of rotation. No, the servo doesn't jump in short bursts, but it does track with unparalleled accuracy, and the on-off set up gives constant torque in any output

arm position. No more sloppy or sluggish servos at the extremes of throw. If you think that your present servos are the tightest and most powerful you will ever find, try a Specialist servo . . . you will be amazed at what true precision and power really are. Each servo is hand-built and peaked for maximum performance, so that there's no longer that one doggy servo that inevitably winds up on throttle.

We've spent so much time discussing some of the sophisticated features of this unit (and we haven't even mentioned them all), that we're going to now turn to the quality of the system, and our user's evaluation.

We have long maintained that it's the little things—those extra touches—that separate mere construction from true craftsmanship. It's the attention to detail that makes the real difference between radios today. If the small things are done well, chances are that the major items have been properly executed. The Specialist VIII shows all the desirable traits of a carefully built, hand-made radio. The gimbals are all metal, of steel and anodized aluminum, and are specially designed by Millcott. The sticks themselves are adjustable in length, with the twist of a wrist. You'll just have to experience these gimbals yourself, for to describe them as smooth and precise is to not say enough about them. If they gave gold stars to the radio with the best quality open gimbals, this one would take the prize.

Just a peek at the inside of the Tx is a pleasure, for one finds there some of the finest handiwork to be seen in the R/C industry. Not only are the components well laid out, but the as-

sembly is what one might expect of a piece of multi-million dollar NASA space equipment. All components are hand picked, and each unit is built as if the guy who assembles it will be using it in his own plane. The receiver reflects this same emphasis on quality, with a rugged aluminum case and a very thick PC board (mounted on a metal stand-off), to ensure good performance in the rugged environment of a model.

And talk about little touches that yield performance, this is the only radio we know of that uses three separate types of connector plugs, each one tailored to its specific application in the airborne system. A very nice feature is the Tx/Rx cable interconnect, which not only monitors airborne battery voltage (the Tx meter is an ESV), but can also be used to operate the servos directly from the Tx (without generating RF in either the Tx or Rx).

A feature that any flier will appreciate is that the four primary servos can be installed in the airframe with total disregard for direction of travel. The Tx panel permits reversing a servo's throw at the flip of a switch. Thus, one can put the servos where the pushrods are optimized. This also is most advantageous when using the same Tx for two airborne installations. There are no "regular" and "reversed" servos to worry about.

The overall performance of this radio frankly surprised us. Not only were all the gadgets and gizmos a revelation, but the basic integrity of the unit was beyond our expectations. The transmitter signal trace on a scope is picture perfect, with almost no spurious signal generated. There are re-

dundant and failsafe-type circuits throughout, so that dumb things like partial battery failures won't mess up one's model. During our flight tests, we intentionally collapsed the Tx antenna, and proceeded to fly a normal flight without a hint of trouble.

We found that, with the assistance of a friend to tweak the various pots on the Tx panel, we could totally trim out a new ship in the air . . . on the first flight. In about eight minutes, we had all the button settings where we wanted them, the sensitivity of the controls just as we like them, etc. How many times have you spent an entire afternoon doing landing after landing, to give a few turns on the clevises, then taking off again to see if things were right?

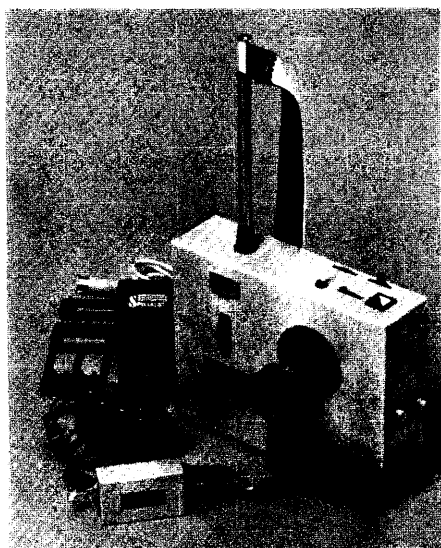
As we said, the radio is in a class by itself. For the serious scale flier, or for the flier who wants the ultimate link from thumbs to control surfaces, the Specialist VIII is one radio to which you should give more than passing attention. This system has introduced a new standard of excellence, to the extent that we really feel apologetic about our tendency to shower hyperboles of praise upon it. To rate it as anything less than excellent would be a failure to recognize all that goes into making this the superb radio that it is.

Because of the myriad features of the Specialist VIII, we have had to gloss over much of it. We, therefore, urge you to check with your local dealer for more information, or contact the manufacturer directly. The Specialist VIII is manufactured by Millcott Corp., 1420 Village Way, Unit E, Santa Ana, CA 92705. Phone (714) 547-3055.

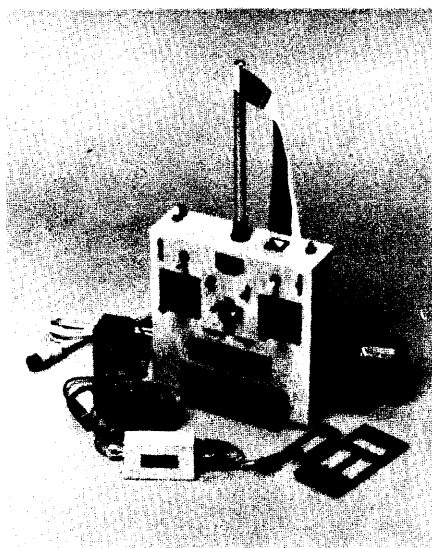
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## THE SPECIALIST SYSTEM

### SINGLE-STICK EIGHT



### TWO-STICK EIGHT & SIX



### SINGLE-STICK THREE

