



We look at the **SANWA** 6-function r/c
a super quality outfit imported by Irvine Engines

SANWA—one of Japan's largest manufacturers of domestic appliances—have entered the radio control field with a unit which, visually, truly merits the description different, this month's cover photograph showing how the stylist has transformed a 'box' into a product of the transistor age. However, transmitter styling never flew a model reliably—only the innards do this—and it was interesting to conclude that the design had all the hallmarks of full-blown modelling expertise, with the advantage of electronics produced with all the backing of a large company, under their exacting production-line

standards, and with all technical facilities to hand. As an example of engineering, the mechanics have the style and precision of a good Japanese camera, the choice of materials and their finish giving the working parts a smooth, precise action which is immediately apparent on operating the outfit.

The set tested is a six function system, with interchangeable plug-in crystals, a choice of standard or reverse mode rotary output servos, and the option of high powered proportional or progressive retract etc., servos.

Two, three, or four function units also available

in the same styling, but identified by transmitters of different colours. All are supplied with six sets of crystals and various accessories.

TRANSMITTER

Although the recessed control panel imparts a 'different' appearance, in fact the configuration is quite standard, with trims inside and underneath the main sticks; a meter, top centre, with neck strap attachment and on/off switch under; while the auxiliary controls are on the top of the case—retract switch right; control lever left. The sticks have ball fulcrums and hard plastic yokes, with metal scissors springs and transferable ratchet brake on throttle. The main stick ends are of soft plastic, with a slight resilience which is felt only when the stick reaches its stops. Trims have ratchet stops and lock in 29 increments. The on/off switch is a toggle type, with a lock action to prevent operation when on or off. A panel meter indicates output, and the case has vent panels at the rear to prevent overheating. On the back panel there is a blind grommet giving access to the crystal. Four screws retain the back which, when open, reveals a neat board of electronics, allowing clear access to the stick units at the front of the case. The inside of the matt black plastic and metal case is aluminium finished for screening. The RF coils themselves are sealed and screened, and the batteries are completely enclosed at the bottom of the case. A flush folding carrying handle doubles as a prop stand.

Size: 5½ x 6½ x 2¼ in.

Aerial: 5 in., extends to 43½ in.

Weight: 2lb. 2oz.

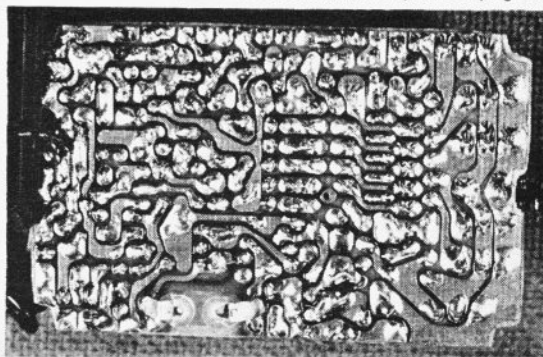
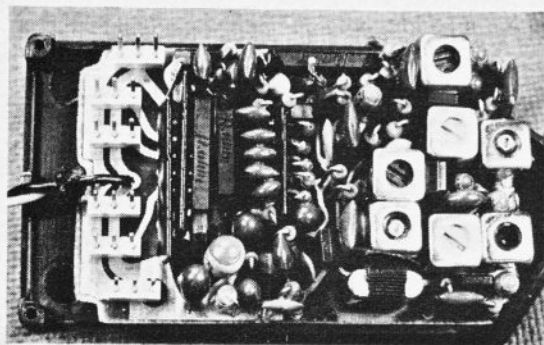
Stick effort: 2oz. at centre, to 3oz. at full throw.

RECEIVER

Of single deck construction, with i.c. decoder and through hole p.c. design, the outputs terminate in 3-pin polarised plugs, with moulded shrouds to protect the servo connections. A blind grommet gives access to the crystal, and the power cable terminates in a polarised plug. The



Heading shows the complete outfit, with carded crystals, harness, charger and servo trays. Close-up of receiver, above, shows crystal cover removed. Below is the "works" of the receiver, with p.c. board at right, about actual size.

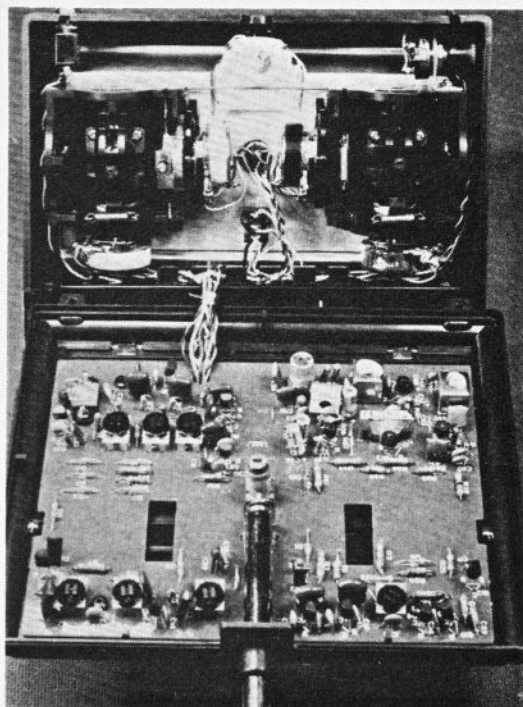




case is matt finished to match the transmitter, and is of two piece construction closed by four screws.

Size: $2\frac{1}{2} \times 1\frac{1}{8} \times 13$ -6in.
Cable: 6in. long.
Weight: 2.25 oz.

Carrying handle folds down to form prop-stand. Right: a look inside the transmitter.



SERVO

Although orthodox in general layout, there are several interesting innovations incorporated in these units. Instead of the usual grommets, the lugs are completely enclosed in soft rubber, with brass eyelets inserted to prevent them being overcompressed by the mounting screws. The output discs have breakaway arms with, in the standard unit, six numbered spacers. A 'trainer disc' has four breakaway arms, designed to fail in a shock condition, to prevent damage to the servo gears. The gears themselves are plastic, of wide tooth face and highly finished. There is a stop on the output gear, which is fixed directly onto the pot. shaft and runs in a wide thrust bearing in the lid. The gearbox has practically no gear float and the resolution is first class. The i.c. amplifier is designed for positive pulse at 1m.sec. neutral. Once the units have reached command position there is no buzzing at all. The output shaft is parallel splined and provides 32 positions for trim purposes.

The high power servos are slightly larger physically, but of similar outward appearance. The progressive (retract) version has lower gear ratios, but the high power standard servo, intended for use on extra large models and so on, has similar speed characteristics to the standard type. All the cases are in the same matt finish and are formed from a hard, but not brittle, plastic. Two servos in each directional mode are provided.

Size: $1\frac{1}{8} \times 1\frac{1}{8}$ in. each end lug $\times 1\frac{1}{2}$ (plus $\frac{1}{4}$ in. over disc) $\times 1\frac{1}{8}$ in.
Harness: 6in.

Power: 3.5lb. outer hole.
Transit: 0.45 sec. limit to limit approx.
Throws: $\frac{1}{2}$ in. outer hole; plus $\frac{1}{4}$ in. trim. $\frac{1}{8}$ in. inner hole; trim pro-rata.

High Power servo: $\frac{1}{4}$ in. longer, $\frac{1}{8}$ in. wider; weight 2 $\frac{1}{2}$ oz. 4 $\frac{1}{2}$ lb. at $\frac{1}{2}$ in. throw.
Retract servo: as above but over 8lb. power at $\frac{1}{4}$ throw (180 deg.).

POWER PACK

The nicads are available in three forms. The standard is a flat in-line pack of 4.8v. pencil type units, but a square four cell unit, in a rigid plastic case, is offered as an alternative—both have 500 type cells. For low capacity installations there is a four cell 225 type pack available.

500 Type—size: $2\frac{1}{2} \times 2 \times 2\frac{1}{2}$ in. or $1\frac{1}{2}$ sq. $\times 2\frac{1}{2}$ in.
500 Type—weight: 3.6oz.
225 Type—size: $1\frac{1}{2} \times 2\frac{1}{8} \times \frac{1}{8}$ in.
225 Type—weight: 2.2oz.

HARNES

The plugs and sockets feature mechanical polarisation by means of their moulded form, they are completely shrouded and the contacts are spring loaded and isolated from mechanical stress, all wires are crimp secured by a solderless method. It is not possible to miss-connect or force the pins.

ACCESSORIES

Provided as standard with the six function outfit are—neck strap, two servo trays stamped from 3mm. ply, servo mounting screws, exten-

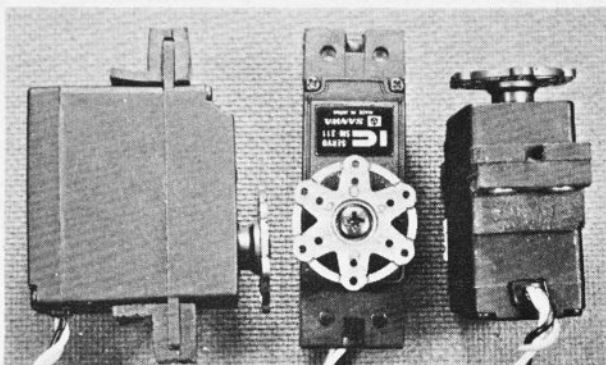
sion lead for servo, six pairs crystals and appropriate frequency pennants, battery charger which recharges both (or each) battery separately, LED output indicators showing which batteries are being charged.

AIRBORNE PAYLOAD

500 nicad version: (four servos)—13.9oz.
225 nicad version: (two servos)—8.6oz.

SALES AND SERVICE

Irvine Engines, Unit 8, Alston Works, Alston Road, High Barnet, Herts.



A photographic three-view of the SM-311 servo. Below: gear-train and electronics.

