



We look at the  
**MATHES**  
*five-function*  
system

**an interesting American outfit imported by WORLD ENGINES**

**T**HE LATEST radio control outfit to be imported by World Engines comes from Mathes Electronic Systems of Arizona. It is a functional yet attractive and quite distinctive looking outfit which offers light weight and small size with adequate power and first-class resolution. The transmitter features twin open-gimbal type stick units, LED (light emitting diode) battery indicator and centre-loaded aerial, while the airborne unit has a quite tiny receiver and small servos. The system has fixed frequency (plug-in crystals not being permitted in the U.S.A.), and is powered by rechargeable nicad batteries.

**TRANSMITTER**

The external layout of controls is traditional, with trims on the inner and lower sides of the stick escutcheons. The stick and trim action is smooth and even, centring being provided by cam action and expansion springs. The units themselves are mainly in black plastic, with no embellishment. The fifth function, (retract) is controlled by a tumbler switch at the upper left corner of the front face. The centrally located on/off switch is protected by a hinged cover which cannot be closed unless the switch is in the "off" position. A jack socket at the bottom of the case is provided for charging input.

The case itself is simple but very attractively designed, using folded brushed aluminium for the front, and black anodised and vinyl-clad aluminium for the back and sides. The two parts are held together with four Allen-head machine screws—neat and workmanlike. The unusual raised back sheet gives a very stylish and modernistic effect.

Inside, the electronics are carried on a glass-epoxy p.c. board only 1½ in. wide, and an interesting feature of the circuit is that it has three transistors working in parallel. All in-circuit trim controls are immediately accessible, and the layout in the case is tidy and uncluttered, with the nicads in a neat plastic container.

**Size:** 165mm wide, 140mm high, 40mm deep. Sticks project 30mm and aerial 55mm—extending to 1,160mm.

**Weight:** 765g.

**RECEIVER**

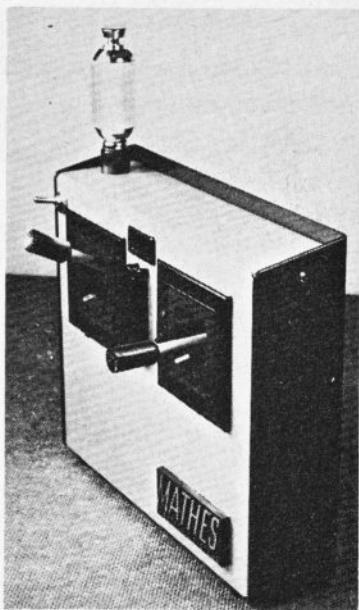
The Mathes receiver is among the smallest we have reviewed. It has flying harness leads and is of two-deck construction, using integrated-circuit decoders. It is enclosed in a plastic two-piece case, sealed with tape. The harness is a lesson in economy of wiring, for the aileron and retract servos take their power direct from the receiver power input connector, so that only two triple block connectors are needed and four wires saved.

**Size:** 45x30x21mm. Harness 75mm.

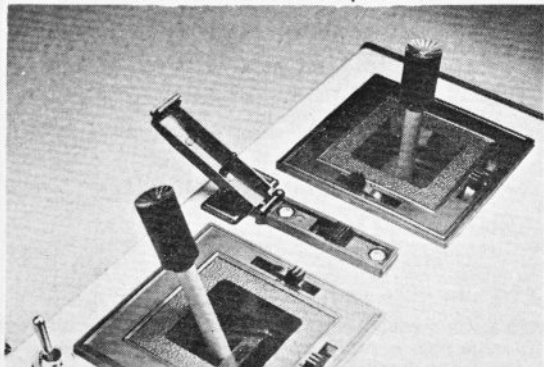
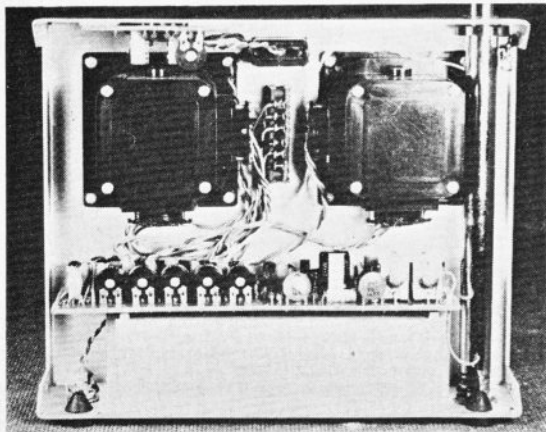
**Weight:** 45g.

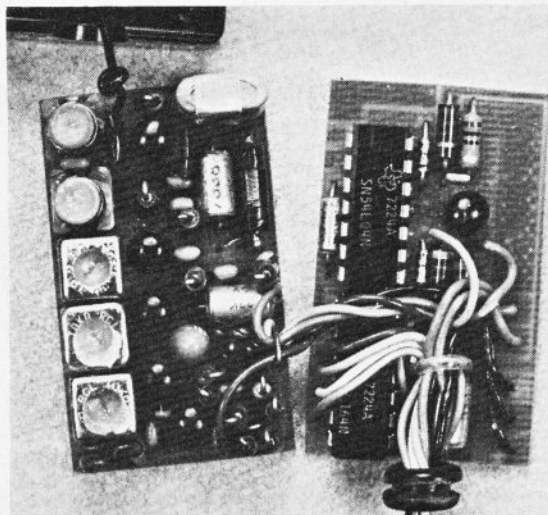
**SERVOS**

The three-wire i.c. servos have rotary output and a filled nylon gear train running on brass spindles. The output gear is fitted with stops. The electronics are built on two tiny p.c. boards, with the i.c. between. Resolution, power and speed are good, and the servos are



Transmitter has attractive styling (above), while the electronics (left) are carried "upright" on narrow board, with three paralleled transistors. Below: hinged switch cover will not close unless switch is in the off position.





quiet in operation. The output shaft is square and the removable triangular arm may be replaced with the larger two-arm versions which are supplied in the accessory pack.

**Size:** 38 mm plus 5mm lug each end, 38mm deep plus 5mm over arm, and 18mm wide. Cable 145mm.

**Weight:** 40g.

**Throws:** inner 7mm; outer 16mm. Arm inner 7mm; outer 21mm. Plus 6mm trim—other trims pro rata.

**Power:** 950g. at maximum throw; 1,600g. at minimum throw.

**Transit:** approx. 0.7sec., limit to limit.

**BATTERY SUPPLY**

The airborne nicad supply comprises four "pencil" type cells in a square section nylon box, which is taped together, and has its lead exiting from one end.

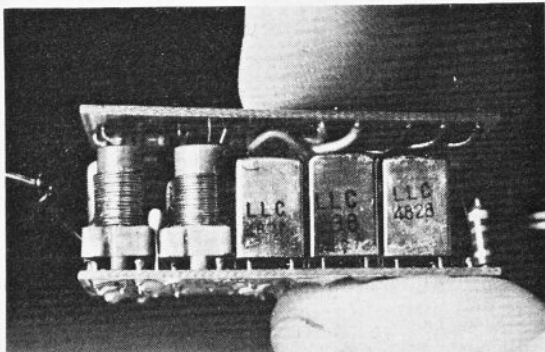
**Size:** 55x32x32mm. Cable 107mm to switch, plus 140mm to socket.

**Weight:** 105g.

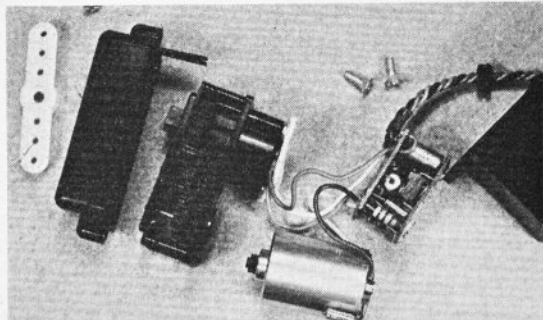
**HARNESS**

All plugs and sockets (block connectors) are of the three-pin, polarised, hollow, round shrouded type, gold plated, with leads sealed in. The multi-pole on/charge switch has an aluminium escutcheon and plastic cover. A

**Two-deck receiver opened to show component count—including i.c. chips (right). Decks are shown ready for case, above, right.**



Below: "exploded" view of servo, showing amplifier, motor, feedback pot, gear-train, case and output arm.



separate charge socket is provided, designed for fitting to the surface of the model's fuselage, and this has a neat swing-over closure cap.

**FLYING WEIGHT:**

System with 4 servos and trays: 325g. (Without trays: 318g).

**ACCESSORIES**

In addition to the alternative servo arms already mentioned, there is a comprehensive set of injection moulded servo trays—three single, one double and one triple, plus a bracket type aileron servo mounting plate. The servos are retained in the trays on moulded pegs by means of clamping plates, which in turn are held by the tray-mounting screws (two to each servo). Grommets, screws, a

special adjustable-throw arm and an aileron extension lead complete the airborne accessories. For the transmitter, a frequency ribbon is provided, together with a simple but effective U-section plastic clip for affixing to the aerial.

A dual charger is supplied, which allows the transmitter and receiver battery packs to be charged either simultaneously or individually. It has LED output indicators, with "Tx" and "Rx" inscribed above them, as appropriate. The sample submitted, and shown in our photographs, was for 120v mains input, but a slightly different version is supplied, for 220/240v input.

**DISTRIBUTION AND SERVICE**

World Engines Ltd., 97 Tudor Avenue, Watford, Herts. WD2 4NY.

**Rx nicads are pencil type. Below: relative sizes of nicad, servo and Rx.**

