TEST REPORT

By

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FLIGHT LINK KO-Digiace

THE name *DIGIACE* is not new to the UK, in fact in the past decade it has been imported by several wholesale and retail Houses. Unfortunately the import end has not been a total ray of sunshine and reflected unfairly on the product.

Flight Link Controls of, *dare we say it,* 'Analogue' fame are the current agents for this equipment in the UK, and judging by the effort being put into their new acquisition, intend to be so for a long time.

Certainly the latest *Digiace* system, the subject of this test report, has undergone major surgery, and can boast 'IC's in Tx, Rx and servos.

Tx which features the almost standard 'double U' construction case, is of dark brown satin anodized aluminium, the case halves being retained by dimples and holes making crystal changes a simple matter.

Attention to detail is apparent in that the stick assemblies are so moulded as to present a slot into which the printed circuit board fits, the sole fixing being the 2 screws to retain the on/off switch which incidentally operates from left to right and is not too clearly marked. We were pleased to see a neck-strap anchor point on the front of the case – a small but desirable feature which we note is being dropped from several contemporary systems.

The stick assemblies which are pleasant to the feel have all-chrome bezels and are adjustable for length.

Function is more the byword than eye appeal with this system.

Rx construction is of the 2 deck style with the RF section on one PC board and the decoder and output sockets on the other, the 2 boards being joined by 3 short bolts.

Again there has been thought in the construction of the Rx case with the PC boards securely slotted into the plastic mouldings, the two halves of the case being secured by screws.

Turning to the servos, they are above average contemporary size by some 10-15 per cent and surprisingly use a 22mm motor manufactured by a new name to us, *'Orion Electronics'* – needless to say of Japanese origin.

It is apparent from stripping down the servos that an output ball race is contemplated at some stage, as a PTFE sleeve the same size as a ball race is fitted to the output gear.

Power to the airborne pack is from a conventionally sized Ni-Cad pack which comes in for a small comment as it is wired for 4 wire operation whereas the rest of the system is 3 wire.

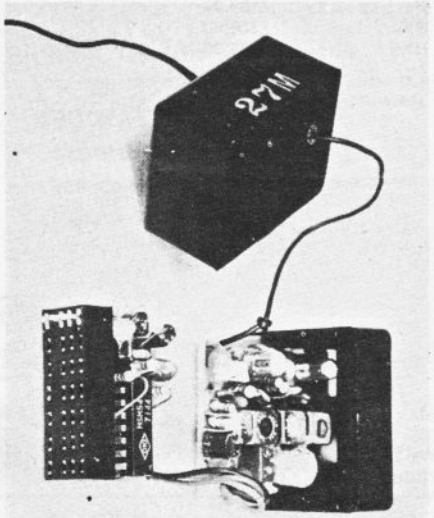
Plugs and sockets we feel are rather primitive by up to date standards. There being so many types to choose from, we found them both difficult and awkward to insert and there is no way of removing them apart from pulling on the wires.

We must thank *Flight Link Control* for supplying circuits to enable an accurate description of the system to be made.

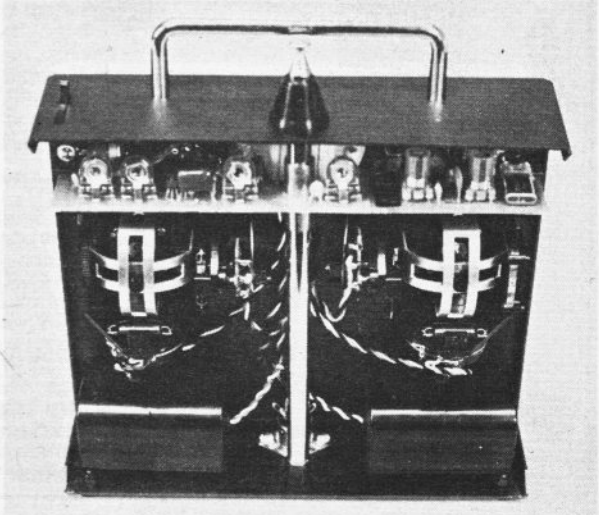
Transmitter

Surprise surprise! At last we have a *DIFFERENT* circuit! The RF section definitely contains more active components than we have seen for many a long day, the circuit being crystal oscillator capacitive coupled to the intermediate Buffer/Modulator stage. There is no provision to tune the crystal stage. Modulation is via the emitter of the buffer stage and again the output of the buffer is completely coupled to the output stage; both the buffer and the PA are parallel tuned into a base loaded aerial.

The whole of the RF section PC Board unplugs from the encoder PC board, so as to enable easy changing of RF boards for the differing bands of the various countries to which the system is sold.



Left: very small receiver is laid out on two P.C. boards; one contains the IF section the other the IC decoder and block connector. Short lengths of lead interconnect the two boards. Right: transmitter is tidily arranged. The RF section to the RH side of the board is a separate plug-in unit – can be exchanged for alternative frequency bands for overseas trips.



Having studied the encoder circuitry, and bearing in mind the system is 6 function we can only say 'think there must be a harder way'.

There are 7 discrete transistors and their associated components, plus what we suspect is an 8 bit IC shift register. Why all the complications of an IC when there are enough discrete components on the board to do it without, we do not understand.

Another thing which is puzzling is the pulse length timings. They are definitely non-standard to just about all contemporary timing. From the test figures it can be seen that the neutral is 1.88 m.s.±.5 m.s. when 'standard' timings are 1.5 m.s.±.5 m.s. Don't plug in other makes of servos as damage could result. Power supply is from two packs of 4.8V in series to give 9.6V.

Receiver

As stated, the Rx layout is well thought out. Circuitry is again slightly different in that the crystal oscillator is fed via a small capacitor to the base of the mixer stage. The RF front end being the conventional double tuned variety.

The IF section of the circuit is again conventional with AGC connected to both stages of IF amplifiers, the output of the IF being amplified before being used as the AGC control.

After demodulation the signal is fed via a diode clipping circuit into discrete transistor sync. and clock stages, before being fed to the IC decoder chip (the same type incidentally as used in the Tx).

Looking at the waveforms again suggests that this is an 8 bit shift register: as the type number is unfamiliar to us we cannot confirm this opinion.

The outputs of the IC go direct to the socket block of the Rx.

Output pulses are +Ve going.

Servo

We are impressed with the robustness of the servo mechanics. The gears of which are pleasing being particularly clean and adequately sized mouldings. We were surprised to find a 22mm motor and were disturbed to find a paper based feed back potentiometer connected in the variable resistor mode, rather than as a potentiometer.

The IC amplifier is the *Signetics NE543K* round type. One of the first IC amplifiers to be generally available. Components around the amplifier are of standard size none of the special micro miniature components made necessary by some of the ultra small servos being offered.

As expected, the test results show up the IC as being of the type which falls out of saturation under high loads (see RCM&E servo report). However, the speeds of response are competitive. It is felt that the servos were somewhat overdamped in their response characteristics and a little tweaking of the amplifier would be beneficial.

Workmanship and finish of the servos are of a high order and with the well spaced components on the PC board, servicing should present no problem.

General

The system is a basically sound piece of equipment but it is felt that the manufacturer could benefit from a good look at contemporary designs and incorporate at least some of the more recent refinements now being offered.

The aerial is of the fully retractable type, the last stage sliding in a collar on the Tx PC board.

Test Results

Tx Timings	Min.	N'ral	Max.	Trim
1 Aileron	1.35	1.85	2.25	±.1
2 Elevator	1.35	1.85	2.24	±.1
3 Throttle	1.35	—	2.25	±.1
4 Rudder	1.40	1.85	2.20	±.1
5 Switch (Retract)	1.28	— ,	2.40	—
6 Pot (proportional aux.)	1.50	—	2.50	—

The frame time was 20 m/s (50 Hz) fixed.

Servo

Output of Rx Decoder +Ve pulse 3.8V. Rise time 0.1μ sec.

Servo rotation +33°−34°. We consider this time to be near enough to standard timing of ±35° not to correct for movement.

IC NE543K
Motor ORION ELECTRONICS (Japan)
Just stalled load 26oz/in.

Load in oz/in.	Time in secs.	
	Against Load	With Load
0	.4	.375
2	.325	.35
4	.425+.2	.35
8	.45+.3	.325
12	.49+.5	.325
16	.55+.2	.3

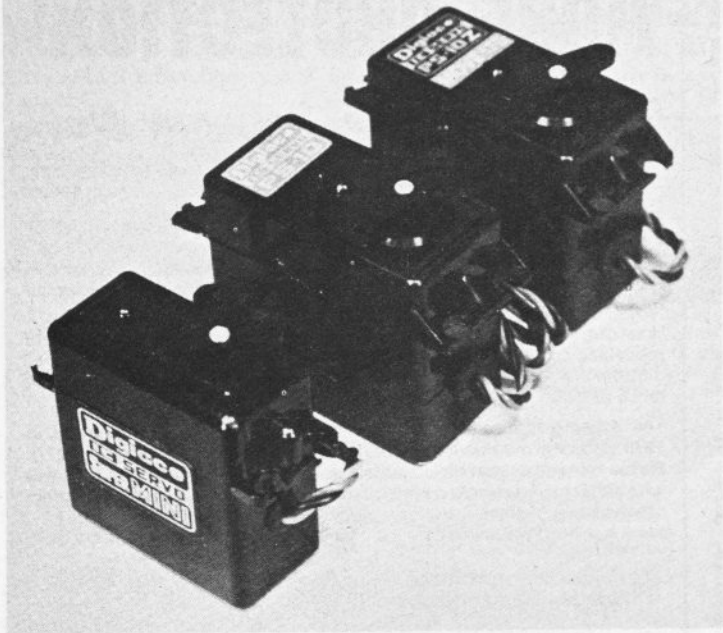
From the above figures it can be seen that the servo response maintains a good speed/load performance but, when the load starts to approach the final part of the curve, shows the IC chip to be coming out of saturation. In fact it also shows signs of under shoot as previously mentioned and it is felt the amplifiers are slightly overdamped.

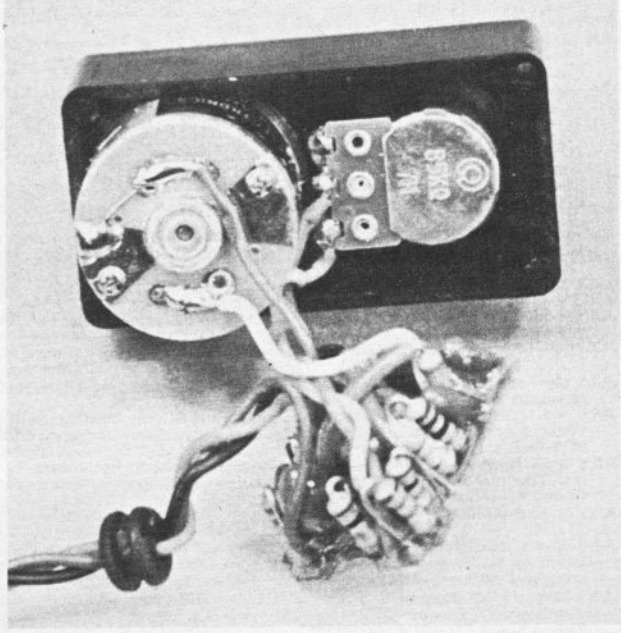
Conclusion

Compared with contemporary imported equipment from Japan, we feel the system could do with a certain amount of face lift; however, the technical performance is competitive. Value for money – yes.

Price: £189.00 inc. VAT.
Distributor: Flight Link Control, Bristow Works, Bristow Road, Hounslow, Middx.

Below left: in addition to the servo tested by the author (centre) a Super Mini and Retract type are available. Right: inside the standard servo – nicely moulded gears and case but a paper laminate base is used for the feedback pot.





Make it Legal . . . get your R/C licence!

Just in case some newcomers to the hobby are not aware, operation of radio control equipment requires a licence. This costs £2.80, but it covers a five-year period, so at 56p per year, the licensing fee can't be described as expensive. Licence application forms are obtainable from: *The Home Office, Radio Regulatory Dept., Waterloo Bridge House, Waterloo Road, London, S.E.1.*