

# R.C.M. & E. TEST REPORT

## O. S.

## MINITRON

### 12 CHANNEL REED CONTROL SYSTEM

**A TECHNICAL OPINION  
BY W. PETER HOLLAND**

ONE'S first comment on commencing a test on this equipment is that the wiring diagram shown in the instruction booklet requires rather more than the usual amount of unravelling. It would have been much more clearly put in a rectangular layout. The fact that the instruction booklet is in basic Japanese could add to ones confusion. This diagram shows a separate battery pack for the servo supply and indicates that a separate switch and battery harness complete with plug and socket would be necessary. A tag board is also shown for connecting the main power wires, bias etc. The only pertinent section of the diagram which your tester was able to use was the receiver battery connection illustration, although here again it was simply a matter of chasing the appropriate wires, a thing normally done in strong disbelief of the printed word and accompanying illustration.

The first piece of information which requires clarification is the fact that there are two pink wires, a darker pink being the reed comb connections. This is led to one of the servo plug connections, there being two such sections of the harness, a third four pin (three used) plug and socket provides the power connections to the receiver via a double pole on/off switch. An earphone socket is wired in via the white and positive leads. This socket and one switch are provided, one has however to find a battery box and other parts of the system in addition to the servos. A separately packaged, 8 pen cell power pack was provided for the transmitter.

### Transmitter

The finish on the equipment is excellent and the control keys have a nice soft "feel" to them, it was found that the amount of pre-travel and the amount of over-travel, after tone is transmitted combined to produce just the right effect. Pre-travel varies between  $\frac{1}{8}$  and  $\frac{1}{16}$  inch measured at the top of the control lever. The over-travel amounts to  $\frac{1}{16}$  inch or a little more to enable one to give smooth



The complete O.S. Minitron 12 channel system as supplied direct from Japan, arrived in complete working order. System is provided with transmitter battery box, receiver connectors, switch and jack plug, plus frequency pennant.

thumb pulses without any "hard edges". The amount of effort required to make contact was 5 ounces and the amount of effort to achieve total movement of the key was 7.75 ounces.

### Construction

The construction is quite clean and straightforward and all components are mounted on a  $\frac{1}{16}$  inch glass epoxy printed circuit board with the components facing the back of the case in the majority of cases and a pair of toroidally wound chokes share the opposite side of the panel with the key switches, the latter providing a fixing point for the whole unit to the front of the case. A small steadying bracket is mounted at the bottom. The battery pack is wrapped in sponge rubber and is wedged in behind the circuit board. The tone adjustment pots are positioned in two banks of six and are numbered, although their position does not correspond to the key switches and reference has to be made to diagrams in the leaflet. There are five keying switches to provide the normal 10 channels, the additional two channels marked 'A' and 'B' are push-to-make, click action switches, a similar unit mounted at the top left hand corner of the case is used to check battery state. The meter normally reads output.

### Performance

#### Current.

13.5v. input from 8 pen cells in series . . .

Carrier: 48 mA

Tone: 94 mA—96mA depending on whether one or two

tones are transmitted, the current varies slightly according to the tone frequency keyed.

#### Modulation.

The oscilloscope display indicated modulation amplitude of approximately 150% carrier level amplitude. Display showed a chopped sine waveform cleanly produced.

#### Output.

As far as could be ascertained on the field-strength meter the highest level of output was on modulation and amounted to approximately 75 milliwatts.

#### Endurance.

The transmitter was operated continuously for 35 hours before operation became inconsistent.

#### Stability.

Temperature stability was excellent, the outfit being heated to 120°F. and cooled to 32°F. with no change in function. This was just a simple go, no-go check.

Voltage stability was measured by reducing the input and it was possible to reduce volts down to 3v. before the reeds failed to respond at fairly close range, receiver was mounted behind screen and aerial rolled and placed in a screening can.

## Physical Data

Size of Case		Projection of keys 1 in.
Height	6 $\frac{1}{2}$ ins.	Projection of handle 1 $\frac{1}{4}$ ins.
Depth	2 $\frac{1}{2}$ ins.	Projection of aerial when retracted 7 $\frac{1}{4}$ ins.
Width	5 $\frac{1}{2}$ ins.	Projection of aerial when extended 50 ins.
Weight 3 lbs (with batteries)		

## Receiver

The receiver is a quite compact flat little package in a stout aluminium case. Three I.F. cans are used and a rather larger than normal reedbank to accommodate the 12 tones was fitted. The components are all mounted on a  $\frac{1}{16}$  in. glass epoxy board held down by four screws fitting aluminium eyeletted-in fixing nuts in the p.c. board.

The case is in two pieces and is not fitted with any bolts or any other means of securing the two halves, these halves fit quite tightly and it was found in later tests that the receiver was not affected by "mechanical noise". We normally recommend that cases be bonded together to avoid this occurrence.

## Performance

#### Currents.

6v. input from four pen cells (manufacturer recommends a separate battery pack for the receiver supply, although we found that servos operated successfully on a common DEAC power supply).

No signal 7.5 mA

Carrier 7 mA

1 tone (high) 32 mA

(Low) 45 mA

2 tones (Mid range) 38 mA

#### Sensitivity.

Better than one microvolt.

#### Interference.

A worn and unsuppressed *Kako* motor was brought to within 3 inches of the aerial before interference reached a level where servos were triggered intermittently due to reed movement, a meter showed that the level of interference was at this stage quite high. Generally speaking, the receiver is not particularly affected by interference and normal servos operated successfully with the device.

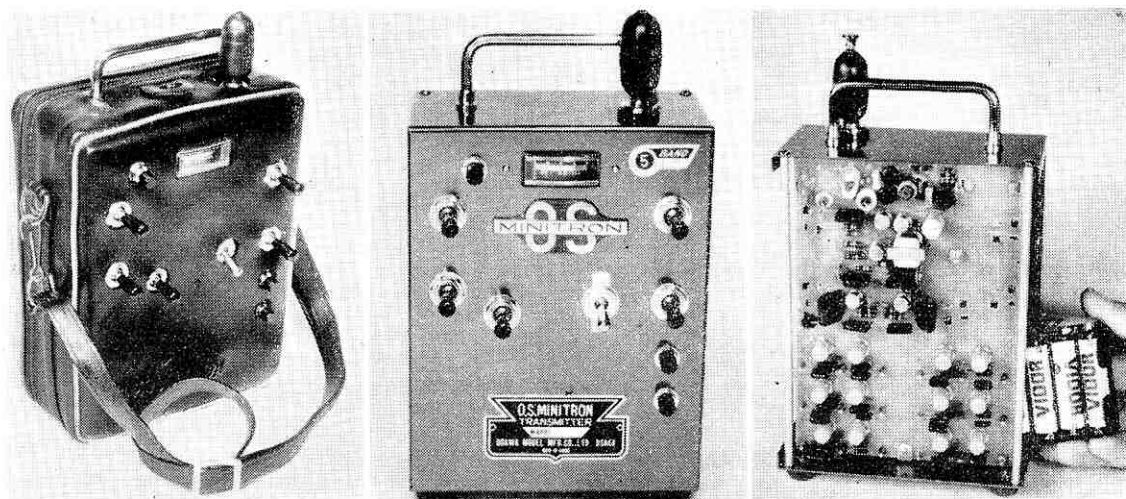
The reedbank seems well constructed, uses un-plated steel reeds and responds to A.F. frequencies from 340 to 580 c.p.s. It was noticed that reeds numbers 5 and 6 were almost the same length, and in fact careful examination of the reedbank showed that some pairs of reeds were more closely spaced in terms of audio response than the others. In one particular case quoted, it was necessary to adjust the tone from between 419 to 426 cycles per second to prevent the adjacent reed responding.

The tone adjustment pots on the transmitter have an average range of 30 c.p.s. so that adjustment is relatively easily facilitated. At close range however, it was noticed that both these reeds did strike even though the contacts were adjusted for the optimum performance.

## Interference from other sources

The receiver was affected by close range operation of a superregen monitor though this might be expected with other superhet outfits. Similarly it was found that the same monitor was affected by the receiver when at close range.

Extreme left: the transmitter is supplied with imitation leather case cover and strap. Cover prevents those unsightly scratches from ruining the case appearance, and also prevents fingers from becoming really frozen on wintry days. Centre: transmitter with cover removed, showing control layout. Note battery test button adjacent to meter. Below: transmitter component board. Note neat control pots.



The 12 channel superhet receiver, showing tightly packed components on single p.c. board. Connectors, jack plug and switch are provided with unit.

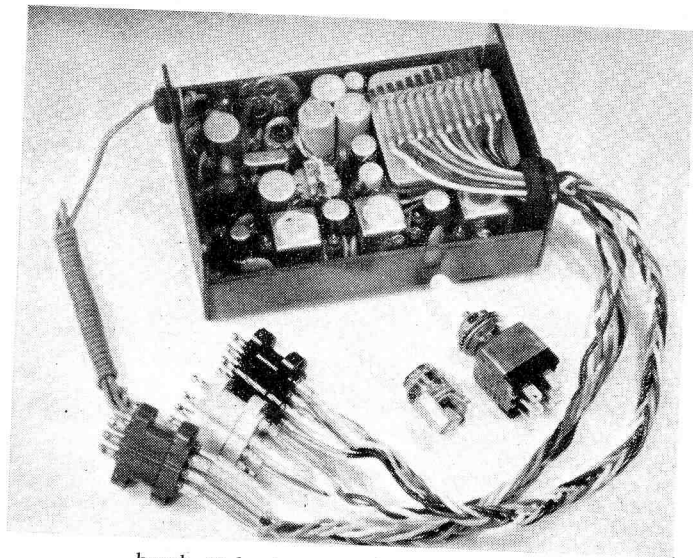
### Manufacturer

Ogawa Model Mfg. Co. Ltd., Hirano-baba, Higashiumiyoshi, Osaka, Japan.

### British Importer

E. Keil & Co. Ltd., Russell Gardens, Wick Lane, Wickford, Essex.

**Price £75 11 0**



### Stability

#### Temperature.

The receiver was heated and cooled as described in the Tx. section of this test where it will be seen that the system functioned correctly.

#### Voltage Stability.

Rx. voltage was reduced to 4v before operation became intermittent. Sensitivity was reduced to  $8\mu\text{v}$ .

### Physical Data

Length: 3 ins.  
Width:  $2\frac{3}{16}$  ins.  
Depth:  $1\frac{1}{16}$  ins.  
Weight:  $4\frac{3}{4}$  ozs.

### Generally

The complete Tx./Rx. outfit represents a good standard of construction, handles nicely and performs, on the

bench at least, extremely well. Flight tests were precluded in view of shortness of time available for the production of this test. Range is 900 yards. The harnessing system is quite workable and the plugs and sockets used are of a good fit and showed no signs of intermittent contact even when subjected to prolonged vibration on the test analyser. We would normally have recommended a turn of Sellotape round these plugs and sockets, but they held well after several hours of vibration.

The modeller has to solder up some sections of the harness, but as this largely depends on the source of servos the advantages of a complete harness system might have a restricted one to a choice of one or two different makes of servos instead of a more widely selected range. This, perhaps is why the manufacturer indicates that a separate battery pack be used for the servos. We found no interference problems by using a common battery pack.

Although instructions in this wiring diagram are Japanese, it is not too difficult to trace.

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