

**CONCISE DETAILS OF
TRANSMITTER-RECEIVERS T.R.1196 AND T.R.1196A**

PURPOSE OF EQUIPMENT....	Airborne equipment designed primarily for F.A.A. It may be applied to multi-seater aeroplanes by incorporating amplifier A.1134 or other suitable instrument.							
TYPE OF WAVE	R/T and M.C.W.							
FREQUENCY RANGE....	4.3 Mc/s to 6.7 Mc/s in maximum of four "spot" frequency channels							
FREQUENCY STABILITY	Quartz crystal controlled.							
PERCENTAGE MODULATION	100 per cent.							
SENSITIVITY	Input of between 3 and 10 micro-volts modulated 30 per cent. at 1,000 c/s—output 50 milliwatts into 20,000 ohms. Less than 10 per cent. distortion for output of 140 milliwatts into 8,000 ohms.							
SELECTIVITY	5 kc/s bandwidth for 6 db attenuation. 35 kc/s bandwidth for 40 db attenuation.							
OUTPUT IMPEDANCE,	<table style="border: none; width: 100%;"> <tr> <td style="padding-right: 10px;">50 ohms (for 3 pairs of 150 ohms telephones)</td> <td rowspan="3" style="font-size: 3em; vertical-align: middle;">}</td> <td rowspan="3" style="vertical-align: middle;">Regulation assisted by negative feedback to prevent excessive rise with fewer telephones in use.</td> </tr> <tr> <td>200 ohms (for 3 pairs of 600 ohms telephones)</td> </tr> <tr> <td>8,000 ohms (for 3 pairs of 20,000 ohms telephones)</td> </tr> </table>			50 ohms (for 3 pairs of 150 ohms telephones)	}	Regulation assisted by negative feedback to prevent excessive rise with fewer telephones in use.	200 ohms (for 3 pairs of 600 ohms telephones)	8,000 ohms (for 3 pairs of 20,000 ohms telephones)
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AMPLIFIER CLASS	Class C in transmitter output stage, anode modulated.							
MICROPHONE TYPE	Electro-magnetic, type 21 or type 26 (Stores Ref.—10A/11994 and 10A/12571).							
VALVES	<table style="border: none; width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <i>Transmitter unit, type 22.</i> Crystal-controlled oscillator pentode V.R. 91. Output tetrode, V.T.501. Modulator pentode, V.T.52. </td> <td style="width: 50%; vertical-align: top;"> <i>Receiving unit, type 25.</i> R.F. and I.F. pentodes V.R. 53. Frequency-changer octode V.R.57. A.G.C. first A.F. and microphone amplifier pentode, V.R.56. Double-diode-triode output and 2nd microphone amplifier V.R. 55. </td> </tr> </table>			<i>Transmitter unit, type 22.</i> Crystal-controlled oscillator pentode V.R. 91. Output tetrode, V.T.501. Modulator pentode, V.T.52.	<i>Receiving unit, type 25.</i> R.F. and I.F. pentodes V.R. 53. Frequency-changer octode V.R.57. A.G.C. first A.F. and microphone amplifier pentode, V.R.56. Double-diode-triode output and 2nd microphone amplifier V.R. 55.			
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POWER INPUT	<i>Transmitter</i> 250 volts, 60 mA, H.T.; 6.3 volts, 1.3 amp., heaters. <i>Receiver</i> 250 volts, 35 mA, H.T.; 6.3 volts, 1.2 amp., heaters. <i>Total input</i> from aircraft supply to rotary transformer:—5 amps. at 13 volts or 2.5 amps. at 26 volts.							
POWER OUTPUT	Not less than .36 amp. into aerial of 100 μ F capacity and 5 ohms resistance. (.65 watt). Not less than .18 amp. into aerial of 45 μ F capacity and 5 ohms resistance. (.16 watt).							
STORES REF.	T.R.1196, 10D/325; T.R.1196A, 10D/369.							
APPROXIMATE OVERALL DIMENSIONS.	LENGTH 18 in.	WIDTH 11 in.	HEIGHT 7½ in.					
	Fixing centres in base identical with T.R.1133 and T.R.1143.							
WEIGHT	36 lb. including cables and the controller, electric, type 4.							
ASSOCIATED EQUIPMENT	Controller, electric, type 4. Crystal unit, type A. Connector set, type according to installation. Amplifier A.1134.							

TRANSMITTER-RECEIVERS T.R.1196 AND T.R.1196A

INTRODUCTION

1. The transmitter-receivers T.R.1196 and T.R.1196A are four-channel R.T. and M.C.W. instruments operating on frequencies from 4.3 Mc/s to 6.7 Mc/s and are designed for use in aircraft. A maximum of four "spot" frequencies may be preset prior to flight. Stabilization of frequency by quartz crystal control is provided in the transmitter and receiver.

2. The transmitter-receiver is intended to be worked into a short capacitative aerial ($100\mu\text{F}$) of a maximum length of 28 ft. giving a telephony air-to-ground range of 50 miles at an altitude of 2,000 ft., with an air-to-air range of 30 miles. When used in certain types of aircraft it may be necessary to load the aerial either inductively or capacitatively in order to cover the specified band of frequencies.

3. A push-button-operated electric controller affords facilities for the remote control of frequency in flight. The controller incorporates a three-way key switch by means of which the equipment may be set to TRANSMIT, RECEIVE, or RECEIVER ATTENUATED. The RECEIVER ATTENUATED position is used to reduce the receiver noise level in the absence of a signal in order to minimise interference with normal intercommunication. A two-pin socket is included to enable "press-to-transmit" facilities to be provided if desired. In addition to the four push-buttons, one controlling each channel, a fifth button enables the equipment to be switched off.

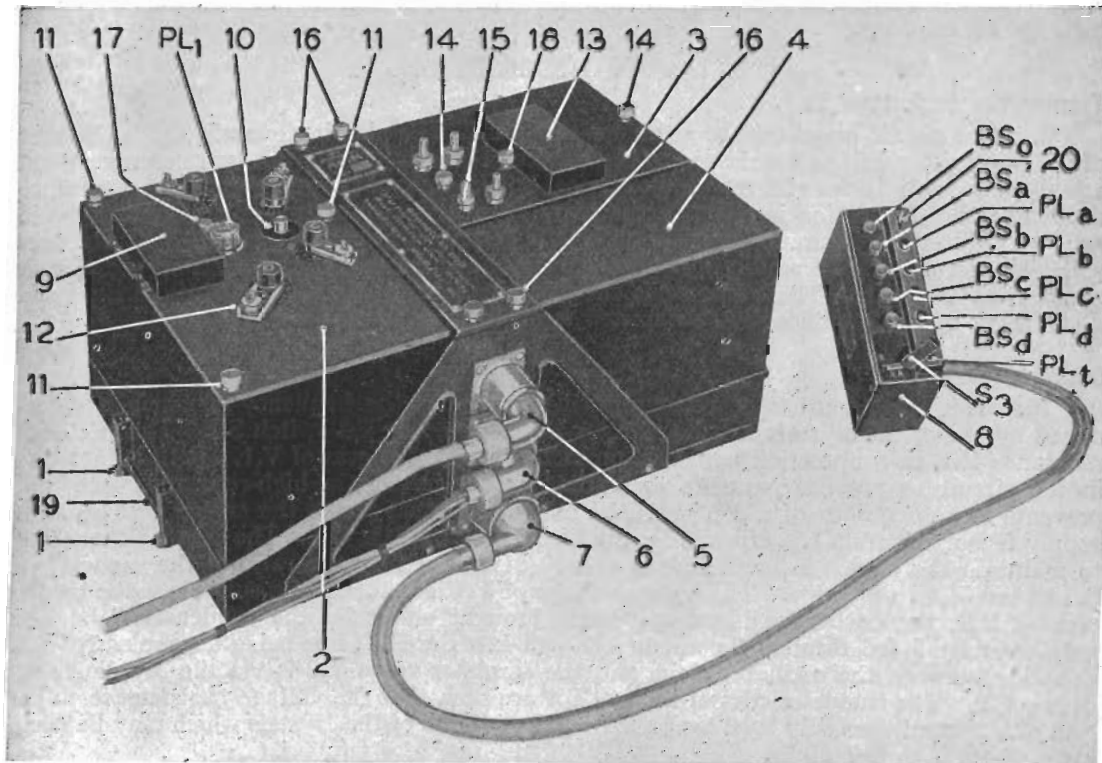


Fig. 1.—Transmitter-receiver T.R.1196 with controller, electric, type 4.

4. The transmitter-receiver consists of a main mounting chassis carrying three quickly detachable units: the transmitter unit, type 22; the receiving unit, type 25; and the power unit, type 87 (24-volt), or type 104 (12-volt). The type 87 power unit is used in the T.R.1196, and the type 104 forms part of the T.R.1196A. The main chassis has a transverse centre section carrying the plugs and sockets required for connexion between units

and to external apparatus. For the T.R.1196 a chassis assembly, type 7 (24-volt) is used, and for the T.R.1196A the chassis assembly, type 8 (12-volt).

5. The transmitter circuit consists of a crystal-controlled oscillator stage, working on the crystal fundamental frequency, a modulator stage and a r.f. amplifier stage. The transmitter output circuits are used as input tuned circuits for the receiver. A key-operated relay transforms the modulator to a feedback oscillator for tone modulation.

6. The receiver circuit comprises r.f. amplifier, octode frequency-changer, I.F. amplifier, A.G.C. amplifier, and a.f. amplifier. The double-diode-triode in the last stage is used as detector, A.G.C. rectifier, and output valve. The a.f. stages of the receiver are also used as a microphone amplifier to provide sub-modulation of the transmitter and I/C by electromagnetic microphones, type 21 or type 26, used at three positions in the aircraft. Where an increased number of positions is required, the amplifier A.1134 or other suitable instrument may be used as an alternative I/C amplifier. Slight link changes permit the use of 150-ohm, 600-ohm, or 20,000-ohm impedance telephones.

7. The power supplies for the transmitter-receiver are derived from a power unit incorporating a three-commutator rotary transformer with input and output smoothing components. The power unit, type 87, has a nominal 24-volt input and the power unit, type 104, an input of 12-volts nominal. The input to the power unit is derived from the aircraft general electrical system.

8. The general appearance of the transmitter-receiver together with the control unit, and the leads to the aircraft electrical supply, microphone and telephone is shown in fig. 1. The overall dimensions of the complete instrument are, approximately, 18 in. wide by $7\frac{1}{2}$ in. high by 11 in. deep.