



## Portable SHF Multi-Channel Equipment *Type HP 311*

COMMUNICATION FACILITIES, sometimes of a temporary nature, are often required quickly between two or more points, for example on large construction sites and pipe-line projects. Such requirements are fully met, over reasonable distances, by the Type HP 311 Portable SHF Multi-channel Equipment. This duplex radio link is suitable for single channel operation or with 1+1 or 1+3 portable carrier telephone systems, or more channels using fixed equipment.

The distance which may be covered by one link without repeaters, handling four channels and operating with a good line-of-sight propagation path, is approximately 25 miles (40 km). This figure rises to 30 miles when one channel only is required. Using back-to-back repeaters the link can be considerably extended.

Once the equipment has been set up it will operate satisfactorily for periods up to one week without further attention. Failure of the incoming carrier operates an external alarm.

### CONSTRUCTION

The Type HP 311 Equipment comprises a portable centimetric-wave transmitter/receiver, power supply unit, aerial system and tripod support, together with the necessary connectors and carrying cases. The transmitter/receiver is housed in a compact die-cast aluminium case, shockproof and hermetically sealed for protection against climatic extremes. The power supply unit is assembled in a similar case.

In operation the transmitter/receiver is mounted on a tripod which also carries two dipole aerials



each having a 16 in. diameter spun-metal parabolic reflector. Alternatively the whole unit can be mounted in a tree or on a mast where the site is obscured. The power supply unit is normally placed on the ground in the vicinity and connected to the transmitter/receiver by a 50 ft multi-core cable. All of the equipment may be dismantled and stowed in protective cases for transportation, the heaviest single item, the power supply unit, weighing 37 lb.

Full supervisory facilities can be provided by the use of a system control box which is inserted at a convenient point in the input circuit to the HP 311. This box also enables adjustment of carrier levels to be made by means of switched calibrated attenuators.

## CIRCUIT

The link operates in the band 4580–4860 Mc/s, with wide-band frequency modulation. The transmitter employs a Heil tube cavity resonator. The frequency-modulated output from the resonator is taken to the half-wave dipole aerial.

The receiver is a superheterodyne using a local oscillator of the same type as the sender oscillator. A very effective AFC circuit is incorporated. Separate aerials are used for transmitting and receiving, to permit full duplex-working. A metal screen fitted between the paraboloids minimises crosstalk.

Failure of the incoming carrier operates an alarm relay whose contacts complete an external bell circuit.

## DATA SUMMARY

**Type of transmission:** FM.

**Frequency range:** 4580–4860 Mc/s.

**Frequency response:** Within  $\pm 1$  dB from 1–60 kc/s. Not more than 3 dB down from 300 c/s to 80 kc/s referred to level at 1 kc/s.

**Distortion:** 2nd harmonic –45 dB, 3rd harmonic –50 dB, relative to fundamental, measured over 15 mile link at normal deviation.

**Aerial gain:** 23 dB relative to  $\lambda/4$  dipole.

**Power supply:** 100–125 V or 200–250 V, 45–65 c/s single-phase AC mains.

### TRANSMITTER

**Power output to aerial:** 250 mW at mid-band, not less than 150 mW at the limits.

**Frequency stability:** 2 parts in  $10^5$  per °C.

**Maximum deviation:**  $\pm 500$  kc/s.

**Input level:** –23 dBm in 140  $\Omega$  for max. deviation.

### RECEIVER

**Sensitivity:** For 200  $\mu$ V input the signal-to-noise ratio is greater than 55 dB.

**Output level:** +5 dBm into 140  $\Omega$  balanced, for max. deviation.

### Dimensions:

	Height	Width	Depth	Weight
<i>Transmitter/receiver</i>				
	12 $\frac{5}{8}$ in. (32 cm)	18 $\frac{1}{2}$ in. (47 cm)	5 $\frac{7}{8}$ in. (15 cm)	28 lb (12.7 kg)
<i>Supply unit</i>				
	12 $\frac{5}{8}$ in. (32 cm)	18 $\frac{1}{2}$ in. (47 cm)	5 $\frac{7}{8}$ in. (15 cm)	37 lb (16.8 kg)
<i>Tripod assembly</i>				
	Height: Open, 4 ft 6 in. (137 cm) Closed, 3 ft 0 in. (92 cm)			
	Weight: 25 lb (11.3 kg)			
<i>Paraboloid</i>				
	Diameter: 16 in. (41 cm)			
	Depth: 4 in. (10 cm)			
	Weight: 2 lb (0.9 kg)			

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