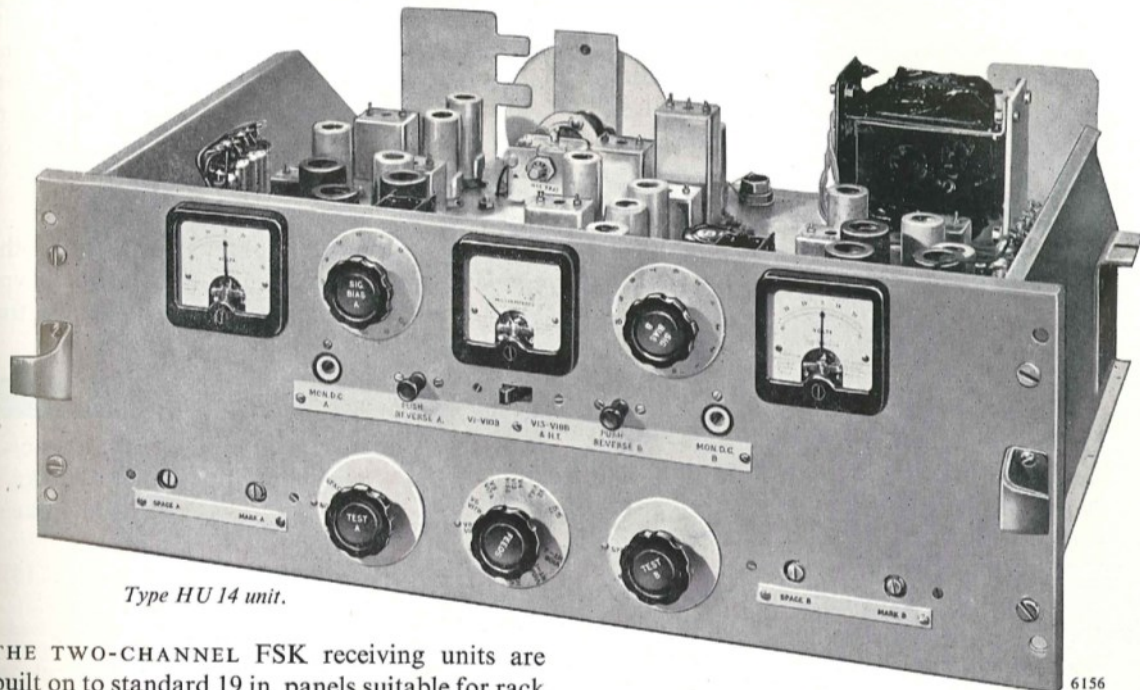




Frequency-Shift Diplex Receiving Units *Types HU 14, 14A and 14B*



Type HU 14 unit.

THE TWO-CHANNEL FSK receiving units are built on to standard 19 in. panels suitable for rack or cabinet mounting. The Type HU 14 is designed for fitting into Marconi diversity equipment Type HR 91, while the Type HU 14A is intended for use with the Types HR 11 and HR 13 receivers. The Type HU 14B unit is intended for adapting existing installations of Type CRD 150/22 equipment to diplex reception.

The unit is fed with the IF output from the main receiver and produces DC outputs suitable for operating two tone senders or a current output unit working with two teleprinters or two undulators. The DC output of either channel may be reversed in phase to cater for reversed keying procedure. A calibrated oscillator is incorporated for test purposes and also to facilitate setting up.

GENERAL

The FSK Diplex transmitter makes use of four frequencies, but only one frequency is radiated at any instant. The shift between adjacent frequencies is 400 c/s; the total shift therefore being 1200 c/s. The following tables give the two codes in common use.

Fre- quency	CODE 1		Fre- quency	CODE 2	
	Channel A	Channel B		Channel A	Channel B
f_1	Space	Mark	f_1	Space	Space
f_2	Space	Space	f_2	Space	Mark
f_3	Mark	Space	f_3	Mark	Space
f_4	Mark	Mark	f_4	Mark	Mark

The receiving equipment, therefore, must be suitable for decoding the signal and the Type HU 14 employs three discriminators, one for

channel A and two for channel B. These have centre frequencies corresponding to the mean values of f_1 and f_2 , f_2 and f_3 , and f_3 and f_4 .

The operation of channel A depends solely on discriminator A which gives a positive output on 'space' and a negative output on 'mark'. Two discriminators feed channel B, however, and these are, in turn, controlled from channel A by gating circuits so that discriminator B_1 operates on frequencies f_1 and f_2 , discriminator B_2 being cut off, whilst at frequencies f_3 and f_4 the reverse is true.

The Types HU 14 and HU 14B units each accept a single output from the associated receiver, taken from a point after the path selection stage. The Type HU 14A unit employs the same principle as the Type HU 14 but differs in detail because it accepts the diversity paths separately from the associated receiver and incorporates circuits for path selection at DC.

CIRCUITS

Type HU 14. The 100 kc/s input signals to the unit are fed to a pentode amplifier whose output is divided and coupled to three limiter valves, which feed three Foster-Seeley discriminators.

The channel A discriminator output is fed to a series of double-triode valves whose function is to shape and square the signal before it is finally amplified in a DC push-pull stage. An inter-stage low-pass filter removes unwanted noise components which are higher than the signalling frequency. From two points in this chain, two voltages having a 180° phase difference are fed off and applied to the suppressor grids of gating valves in channels B_1 and B_2 respectively. Either one of these valves conducts, therefore, depending on the output of the channel A discriminator. The combined output of the gates is then fed to a series of squaring and shaping valves in a similar manner to channel A.

When the transmitter is on 'rest' and no intelligence is being radiated, the highest radio frequency will be radiated and the receiving unit will 'mark' on both channels. This frequency is used for AFC control.

Test jacks are provided at various stages. A meter and its associated switch enables all valve feeds and HT voltages to be checked.

Power supplies are taken from the main receiving equipment, a filament transformer being the only component built into the FSK unit.

Type HU 14A

This equipment makes use of the discriminators and bridge circuits existing in the associated receiver (for single-channel FSK working) to obtain channel A, while channel B is derived by means of pairs of discriminators in the HU 14A unit, each pair operating on one diversity path. Otherwise the circuits are generally similar to those of the Type HU 14.

Type HU 14B

Designed to operate from a $75\ \Omega$ source, the circuit of this unit is similar to that of the Type HU 14 equipment, except that the centre frequency is 50 kc/s.

DATA SUMMARY

Input: Centre frequency: Type HU 14, 100 kc/s.
Type HU 14A, 10 kc/s.
Type HU 14B, 50 kc/s.

Level: from 10 mV to 1V.

Impedance: Types HU 14 and HU 14B,
 $75\ \Omega$;
Type HU 14A, $600\ \Omega$.

Output: 30–0–30 V DC on both channels at approx. $10,000\ \Omega$ output impedance.

Frequency shift: 400 c/s between adjacent frequencies; total shift 1200 c/s.

Keying speeds: Up to 100 bauds on Channel A.
Up to 50 bauds on Channel B.

Power consumption: 15 W at 230 V single-phase AC.

Dimensions:

Height	Width	Depth
$6\frac{3}{4}$ in.	19 in.	$17\frac{3}{4}$ in.
(17 cm)	(48 cm)	(45 cm)

Weight: Types HU 14 and HU 14B, 24 lb (10.9 kg);
Type HU 14A, 30 lb (13.6 kg).

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