



FSK Drive Unit *Type HD 12*

A RECENT ADVANCE in communications technique has been the inception of frequency shift keying. This system is becoming increasingly popular and its main advantages may be summarised as:

1. Increased signal to noise ratio.
2. High degree of protection against loss or corruption of message due to fading.
3. More efficient AGC action and considerable reduction in the possibility of errors in recording due to random noise.

The method employed is to radiate the carrier continuously and to shift its frequency between pre-set limits for 'mark' and 'space'. It has been found in practice that the effective overall gain over conventional on/off systems is of the order of 11 db. In order to provide this facility on existing transmitters, the Type HD 12 FSK unit has been produced and operates in conjunction with the ten-way crystal drive unit Type HD 11 described on page 225. The two units combined and assembled on a common frame form the Type HD 10 equipment.

All operating controls are mounted on the front panels and all connections are made by plug in connectors. Ready access is provided to all components by withdrawing the units from their mounting frame.

CIRCUIT

The frequency shift keying equipment consists essentially of a 2150 kc/s FSK crystal unit, together with a simple mixer in which the output of the FSK unit is combined with any one of five selected outputs from the ten-way crystal oscillator. The resultant RF keyed output, at any one of five frequencies in a band of 1.0–1.527 Mc/s, is



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passed to the harmonic amplifier stage of the HF transmitter.

The FSK unit uses the 'FMQ' principle, developed for frequency-modulated transmitters, in which a crystal working in series resonance is transformed by a quarter-wave network to appear

as a parallel impedance. The crystal frequency is then shifted in a definite and controlled manner by means of a balanced reactance modulator. Transition from mark to space is gradual with avoidance of band spread during keying. The amount of shift can be controlled as desired between 200 and 1000 c/s and means are provided also for dividing the basic shift by a value depending on the harmonic multiplication in use on the transmitter.

The FSK output from the oscillator is passed to an amplifier and thence to the mixer stage. This amplifier also acts as a detector for the heterodyne signal between the FSK crystal and another similar crystal used for monitoring and setting up purposes.

A mixer stage with amplifiers gives any one of five selected outputs in the band 1.0–1.527 Mc/s. The normal output is 1 V into an 80 Ω coaxial feeder. Sufficient selectivity is provided to ensure that all unwanted products are reduced to a minimum.

POWER SUPPLIES

The power supply unit is housed in the lower section of the assembly and comprises a full-wave rectifier circuit with stabilisation by means of a variable series impedance valve. A mains indicator lamp and fuses are provided.

Mains supplies to the Type HD 11 Unit when this forms part of a combined assembly Type HD 10 are taken from this power unit.

DATA SUMMARY

Frequency range: 1.0–1.527 Mc/s.

Overall stability:

Conforms to Atlantic City standards.

RF output: 1 V RMS into 80 Ω .

Carrier shift: Variable from 200–1,000 c/s (in the range 2–27.5 Mc/s.)

Keying potentials: ± 10 V (double current).

Hum modulation: Less than 0.5 %.

Power supply: 200–250 V, 50–60 c/s single-phase AC mains. Voltage regulation within ± 6 %; frequency tolerance $\pm 2\frac{1}{2}$ %.

Power consumption (combined unit Type HD 10): 200 Watts approx.

Dimensions:

	Height	Width	Depth	Weight
Overall	3 ft 1 $\frac{1}{4}$ in.	9 $\frac{1}{2}$ in.	2 ft	196 lb
Assembly				approx.
	(94.6 cm)	(24 cm)	(61 cm)	(89 kg)

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