

EMT

Radiomike Equipment

„Radiomike“ - the Wireless Microphone with Studio Quality

Cables between microphone and control room often severely restrict the movements of actors and reporters during recording and transmission. (The same applies to cameramen in motion picture and television work.) It is quite obvious that it would be highly practicable and desirable to create a wireless connection from the mike to the speech input equipment. One would think of a compact transmitter which could easily be carried by the actor or reporter and conceiled in his clothing. The signal from this transmission could then be picked up with a conveniently located receiver and from there be fed to the audio equipment. These considerations led to the development of the „Radiomike“.

The performance of a „Radiomike“ has to be equal to standard studio quality. Fulfilling this aim, required much research work and application of all the knowhow available. The result of these efforts is the studio quality of our „Radiomikes“ in contrast to the quality of radio communication equipment or wireless PA-systems.

„Radiomikes“ are basically required for two different applications:

a) to bridge short distances in halls, studios and on the stage (i. e. visual range)

b) to bridge medium distances during broadcasts and telecasts of special events in difficult terrain, where crowds gather etc. In such cases the point of reception will be the remote pickup van, either to record on the spot or to feed the signal to the studio.
On many occasions visual communication will not be possible and facilities must be provided to pass on suggestions, requests and instructions to the speaker or performer via a talk-back channel.

Two transmitters were developed to meet these requirements. They differ in radiated power rating and, therefore range, as well as in dimensions and weight. The miniature transmitter SK 1003 covers distances well up to 330 ft, has outside dimensions of 0.95" x 2.95" x 4.52" without microphone and weighs appr $6^1/_2$ oz. It can thus be readily concealed in the clothing (The illustration on the front page shows the unit carried openly by hand).

Distances up to 1100 yards are covered by using equipment RSE 300 as transmitter which weighs about 11 lbs and consists of the radio-microphone transmitter unit, the receiver of the talk-back channel and accessories (Fig. 1 and 2). A shoulder harness or case are available for carrying.

Nearly all microphones used are of the dynamic type. They are carried unobtrusively in the clothing, in the hand or around the neck. The microphones can be camouflaged by covering them with material of suitable colour or pattern.

In view of the absolute necessity for high transmission quality the radio system can only be frequency modulated. The „Radiomikes“ are designed accordingly. The quality objections do not apply to the talk-back channel which in the RSE 300 is designed for a. m. operation.

The transmitter frequency depends on local regulations. Application for allocation has to be made to the appropriate authority which also must be advised of the equipment purchase. Frequencies normally used are around 26. 33, 34 or 78 Mc. The allocated frequency must be stated on the order together with the frequency for any talk-back channels required. Frequencies between 35 and 50 Mc are preferred.

Naturally, the transmitter output is very low to keep the equipment weight down and to prevent interference with other services. This makes it necessary to do everything possible at the receiver end to provide fully satisfactory studio quality output from the very lowest field strength reaching the receiver. These additional facilities can be well justified, as aerial and receiver weights are not of great importance in this case.

The receiver must, therefore, have highest sensitivity at a signal-to-noise ratio better than 65 db and total harmonic distortion below 1 %. These specifications are met by our receivers types 11122 A, B, D1, and D2 which differ only in frequency coverage and are selected accordingly. However, the receivers must meet further special requirements which only apply to their use in „Radiomikes“. The first level control point, for instance, for the mixing engineer, is after the receiver. Excessive overmodulation is quite possible particularly during sports commentaries (with their infectious atmosphere) and this overdriving leads to spitting in conventional FM-receivers which is much feared, and difficult to remove. It was possible to dimension all receiver characteristics in such a way without affecting adversely the other desirable data that together with reasonable careful handling of the transmitter these effects can be avoided.

Due to the low transmitter energy arriving at the receiving position, and the enforced frequency choice, the aerial input voltage can vary considerably, particularly when the transmitter unit of the „Radiomike“ is moved. Movement of a few yards in unsuitable terrain, behind walls, etc., are sufficient to drop the field strength to inadmissible low values.

Diversity operation at the receiver end is, therefore, used on principle for all our „Radiomike“ installation. The same transmission is received by at least two receivers with their own aerials which are spaced by more than one wavelength from each other wherever possible. The audio outputs of the receivers are connected via an electronic switching arrangement, which in an ingenious way selects the stronger signal for utilization. The operational reliability is thus considerably increased or alternately, the permissable distance between transmitter and receiver substantially increased, of course it goes without saying that such switching produces no clicking noises in the modulation channel. Insufficient input signals at all receivers cause them to be switched off automatically to avoid transmission of troublesome noise, and a signal device indicates that this was caused by low input voltage and not by equipment failure.

Normally two receivers are employed and, for stage performances, installed on either side of the stage. More receivers are required and used for television plays, the shooting of films etc., or when the scene is played in several rooms. Large installations with up to four receivers can be produced in groups which are provided with a separate diversity selector unit. The receivers in remote pickup vans are installed for easy removal and can be positioned on the stage when the small „Radiomike“ transmitter SK 1003 is in use. Where the larger transmitter RSE 300 is employed the receiver together with its own aerial is placed about 100 ft away from the van. A portable 16 ft aerial is available for this purpose. The second receiver remains in the van on which the associated aerial together with the antenna for the AM-communication transmitter (Fig. 4) are installed.

Several „Radiomikes“ can, of course, be used for one transmission. This gives an opportunity to employ speakers at different places independent of each other. Several operating frequencies can be used where required.

Brief specification of Transmitters

	SK 1003	RSE 300
Carrier Frequency:	32.85 or 33.95 Mc	Fixed frequency between 88 and 100 Mc
Modulation:	FM	FM
Frequency Drift:	appr ± 15 kc after four hours continuous operation at temperatures between 20 and 25° C	± 5 x 10^{-4} at temperatures between -10° C and +40° C
Radiated Power:	appr 0.5 milliwatts	appr 0,3 watts
Frequency Deviation:	± 40 kc for an input voltage of 0.2 millivolts	± 40 kc for an input voltage of 0,2 millivolts
Max. Frequency Deviation (100 % Modulation)	± 75 kc	± 75 kc
Audio Amplifiers:	adjustable	adjustable
Audio Frequency range:	100-15000 cps ± 2 db	100- 8000 cps ± 1 db 40-15000 cps — 3 db
Pre-emphasis:	50 microsec	50 microsec
Total Harmonic:	1 % for 40 kc	2 % for 50 kc
Distortions:	deviation	deviation
Tubes and Transistors:	5 x OC 615 1 x OC 603 1 x OC 604	2 x 3 Q 4 1 x DL 92 1 x DF 91 3 x OC 71
Batteries:	9 volts transistor battery	90 volts battery 1.5 volts battery
Weight:	appr $6^1/_2$ oz	RSE 300 = $7^3/_4$ lbs Battery case = $5^1/_2$ lbs

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