

Abstracts of Technical Articles by Bell System Authors

*Ultra-Short-Wave Receiver for the Cape Charles-Norfolk Multiplex Radiotelephone Circuit.*¹ D. M. BLACK, G. RODWIN and W. T. WINTRINGHAM. The requirements for an ultra-short-wave receiver for use in a multiplex radiotelephone link circuit are outlined. The technical details of a receiver designed to meet such requirements in the circuit between Cape Charles and Norfolk, Virginia, are described.

*Ultra-Short-Wave Multiplex.*² CHARLES R. BURROWS and ALFRED DECINO. The technical requirements of a twelve-channel ultra-short-wave multiplex system are discussed and the means of meeting them are described. The intermodulation between channels in equipment based on this design has been reduced to the point where it is possible to use twelve-channel radio systems in the toll plant. By employing a sufficient amount of envelope feedback, the transmitter can be operated with a high modulation factor without the use of spread sidebands.

*Airplane Vibration Reproducer.*³ G. R. CRANE. This paper describes a reproducer set designed for use in the reproduction for analysis of multiple track film recordings. It is capable of reproducing simultaneously 13 variable-area tracks recorded side by side on standard 35-mm. film. Recorded signals between 5 and 3000 cps are accurately reproduced and may be analyzed for frequency components, amplitude, and phase relation.

*Airplane Vibration Recorder.*⁴ J. C. DAVIDSON and G. R. CRANE. This paper describes a portable film recorder capable of simultaneously recording 13 variable-area tracks on 35-mm. film. It is intended for use in the analysis of airplane vibration or similar studies in which it is desirable to record disturbances (mechanical, acoustical, or electrical) from a number of sources in such a manner that the resultant record can be analyzed for frequency, amplitude, and phase relation. Film speeds of 12, 6, or 3 in. per sec. are available.

*Application of Sound Recording Techniques to Airplane Vibration Analysis.*⁵ J. G. FRAYNE and J. C. DAVIDSON. This paper describes methods which have been developed for analysis of the various vibration components present in airplane structures. The complex wave forms are recorded on standard motion picture sound negatives during flight. These films later,

¹ *Proc. I. R. E.*, February 1945.

² *Proc. I. R. E.*, February 1945.

³ *Jour. S. M. P. E.*, January 1945.

⁴ *Jour. S. M. P. E.*, January 1945.

⁵ *Jour. S. M. P. E.*, January 1945.

after proper development, are analyzed electrically, making possible a complete analysis on the ground and thereby reducing materially the time devoted to flight test, and also simplifying the process of analysis of complex wave forms.

*Ultra-Short-Wave Transmitter for the Cape Charles-Norfolk Multiplex System.*⁶ R. J. KIRCHER and R. W. FRIIS. Design features of an unattended ultra-short-wave double-sideband multiplex transmitter are described. Forty decibels of envelope feedback is utilized over the 12- to 60-kilocycle band of the twelve type-K carrier-signal channels which modulate the last stage of the transmitter. Accessibility of apparatus and ease in maintenance contribute toward obtaining maximum reliability of the equipment in commercial service.

*Paper Capacitors Containing Chlorinated Impregnants. Stabilization by Anthraquinone.*⁷ D. A. McLEAN and L. EGERTON. This paper shows anthraquinone to be an effective stabilizer for capacitors having paper dielectrics containing chlorinated impregnants when aluminum electrodes are used and d-c. potentials are applied. One half per cent of anthraquinone prevents formation of the usual carbonized brown spots in the paper, and diminishes corrosion of electrodes and instability of leakage current. It increases the life under accelerated testing conditions by factors of four to one hundred fold, depending upon materials used and conditions of test. This development has added appreciably to the reliability of paper capacitors containing chlorinated impregnants, particularly for military equipment where high temperatures and high voltages are often encountered simultaneously. Solubility of anthraquinone in the usual chlorinated impregnants is limited. Where greater solubility is desired, the more soluble chloro and methyl derivatives can be used.

*Reflex Oscillators.*⁸ J. R. PIERCE. This paper discusses qualitatively the behavior of reflex oscillators. Power production, electronic tuning, variation of frequency with resonator voltage, effect of modulation coefficient, and influence of load are considered. Two brief mathematical appendices are included.

*Cape Charles-Norfolk Ultra-Short-Wave Multiplex System.*⁹ N. F. SCHLAACK and A. C. DICKIESON. This paper describes the general features of a radio multiplex system which has been installed between Cape Charles and Norfolk, Virginia. The radio-frequency equipment operates in the vicinity of 160 megacycles. The system employs the 12 telephone channels of the type K cable carrier system which are in the frequency range 12 to 60 kilocycles.

⁶ *Proc. I. R. E.*, February 1945.

⁷ *Indus. & Engg. Chem.*, January 1945.

⁸ *Proc. I. R. E.*, February 1945.

⁹ *Proc. I. R. E.*, February 1945.