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# THE BELL SYSTEM TECHNICAL JOURNAL

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Volume 48

April 1969

Number 4

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## The L-4 Coaxial System

### Foreword

This issue is devoted to the development of a new broadband coaxial transmission system which provides a more efficient and economic use of bandwidth on existing and new coaxial cables than earlier systems. The new system, called the L-4 Carrier System, provides 3600 two-way message channels on each pair of coaxials. Improved methods of equalization control and fault location have been provided and new multiplex equipment to form the signal spectrum for transmission over the medium has been developed.

The wide bandwidth and high performance have been achieved by using solid state circuits throughout. In addition to new transistors and diodes, other new components have been designed to provide extreme transmission precision and stability; the latest techniques in network design and synthesis have been brought to bear on the problems of network, equalizer, and filter developments.

Refined system and circuit design analyses have been used to obtain the maximum possible performance from all system components. As a result, the new system has about four decibels less noise than earlier coaxial systems. The L-4 system is now in commercial service and the field of application is expanding rapidly.

The articles in this issue discuss (i) the overall system and its design problems, (ii) the design of line repeaters and their broadband amplifiers, (iii) the techniques developed for equalizing the system, (iv) the methods of controlling equalizers and the new fault location system, (v) the development of new transistors and diodes, (vi) the terminal equipment required to interconnect L-4 with other systems

and to provide interconnection between L-4 systems, (vii) the development of new power equipment for the coaxial line repeaters, and (viii) new outside plant developments including cable, manholes, and manhole apparatus.

Many people, too numerous to mention by name, throughout the Laboratories and other Bell System companies, have made significant contributions to the development of the L-4 system. Their efforts to bring the program to a successful conclusion and to complete the initial installation of the system between Miami, Florida, and Washington, D. C., on very short schedules must be acknowledged as having been outstanding and successful. Special mention must be made of the large and meaningful contributions of the late R. S. Graham (April 1915–October 1967) whose knowledge and efforts were so directly felt and appreciated in all aspects of the design of the L-4 System.

**R. H. KLIE**