

- [54] **ENSEMBLE MODEM STRUCTURE FOR IMPERFECT TRANSMISSION MEDIA**
- [75] **Inventor:** Dirk Hughes-Hartogs, Morgan Hill, Calif.
- [73] **Assignee:** Telebit Corporation, Mountain View, Calif.
- [21] **Appl. No.:** 140,848
- [22] **Filed:** Jan. 5, 1988

- [56] **References Cited**
- U.S. PATENT DOCUMENTS**
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- "Information Theory and Reliable Communication", R. Gallager, John Wiley & Sons, New York 1968, pp. 383-431.
- Primary Examiner*—Jin F. Ng
- Assistant Examiner*—Randall S. Vaas
- Attorney, Agent, or Firm*—Townsend and Townsend

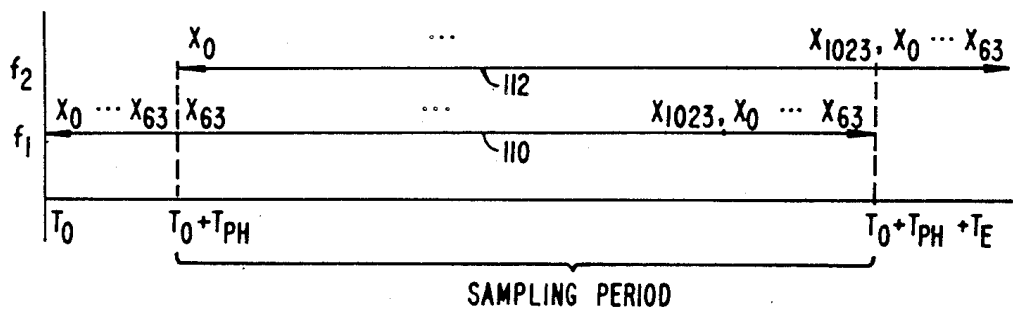
Related U.S. Application Data

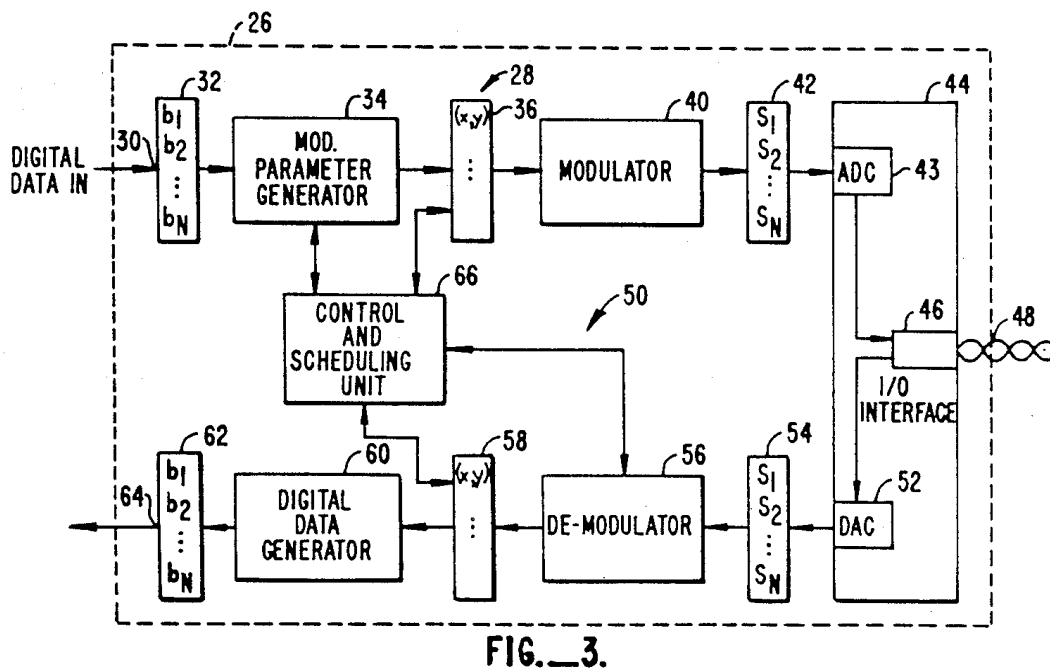
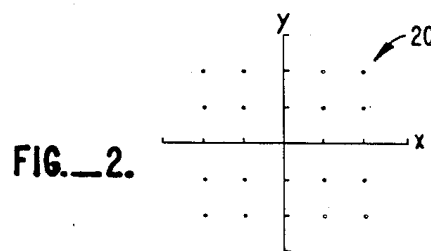
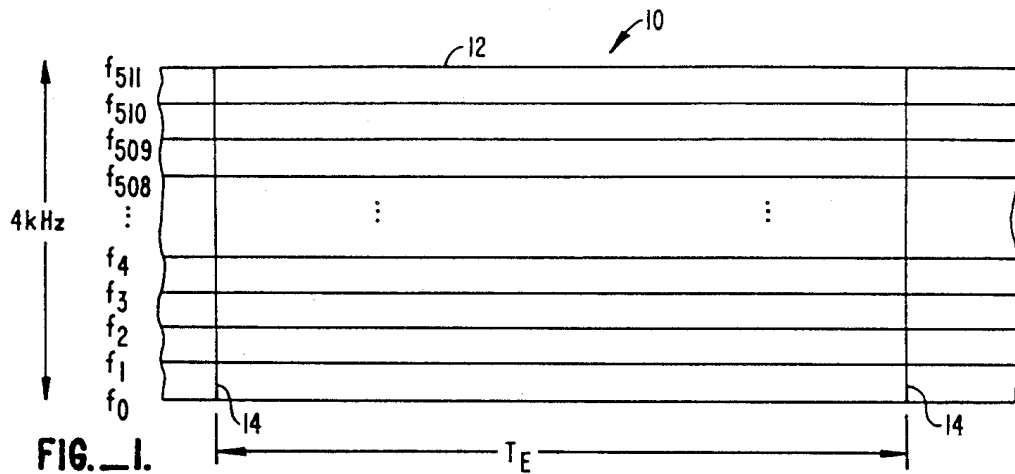
- [62] Division of Ser. No. 2,096, Jan. 12, 1987, Pat. No. 4,731,816, which is a division of Ser. No. 736,200, May 20, 1985, Pat. No. 4,679,227.
- [51] **Int. Cl.⁴** **H04M 11/00**
- [52] **U.S. Cl.** **379/98; 370/19; 375/39**
- [58] **Field of Search** 375/38, 39, 40, 58, 375/118; 455/63, 68; 340/825.15; 370/16, 19, 69.1, 70, 100, 106, 108; 379/93, 97, 98

[57] **ABSTRACT**

A high-speed modem that transmits and receives digital data on an ensemble of carrier frequencies spanning the usable band of a dial-up telephone line. The modem includes a system for variably allocating data and power among the carriers to compensate for equivalent noise and to maximize the data rate. Additionally, systems for eliminating the need for an equalization network, for adaptively allocating control of a channel, and the tracking variations in line parameters are disclosed.

2 Claims, 6 Drawing Sheets





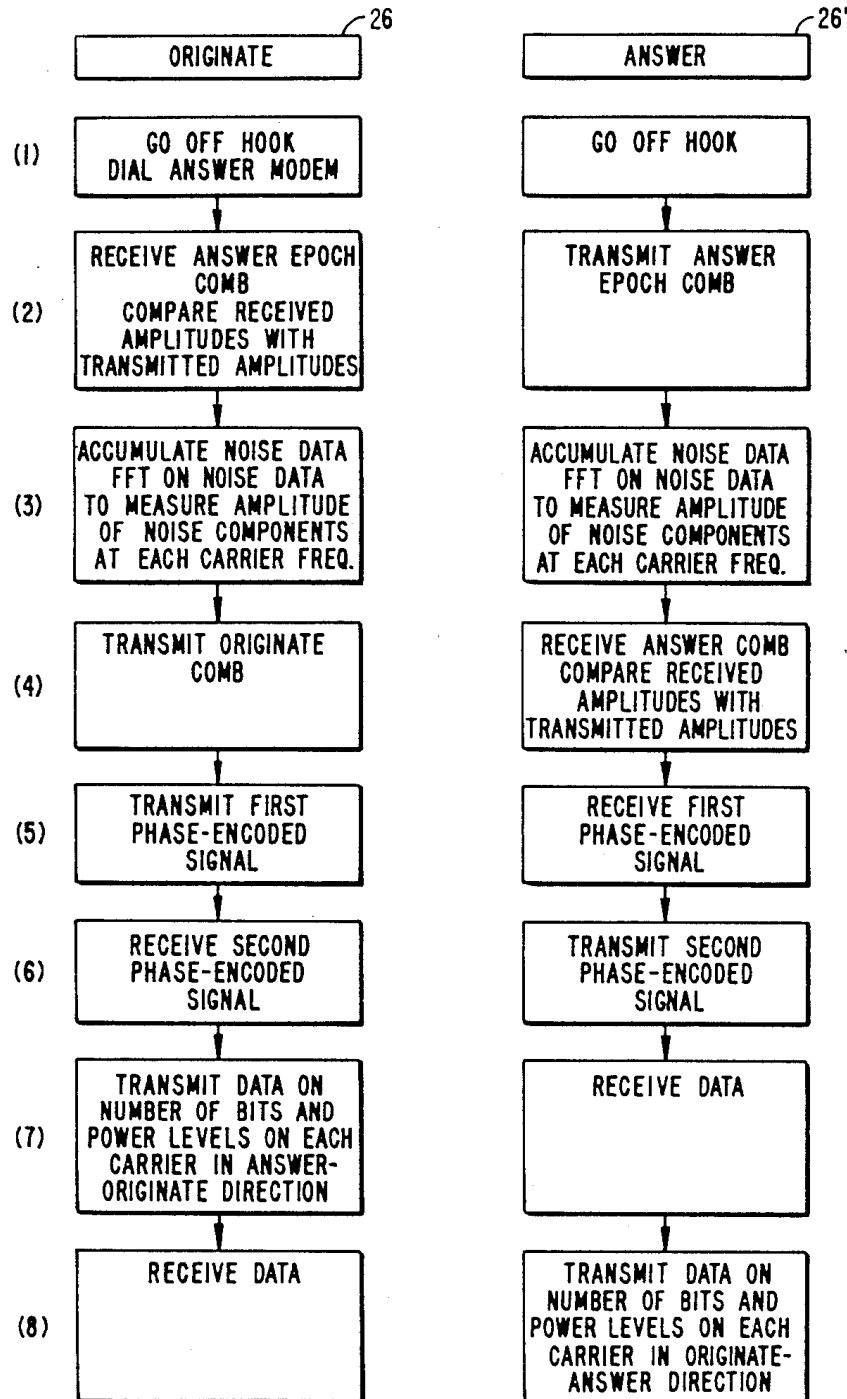


FIG. 4.

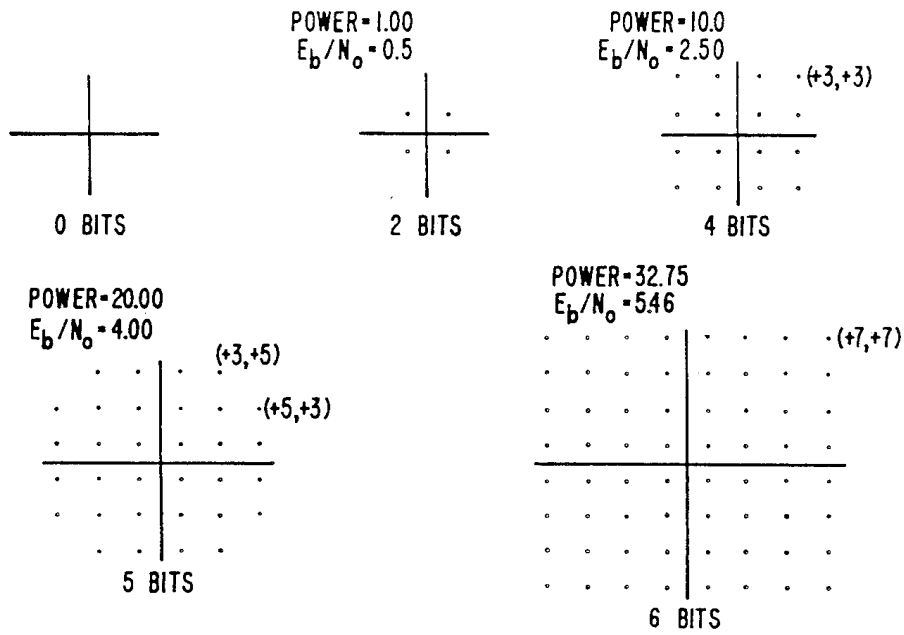


FIG. 5.

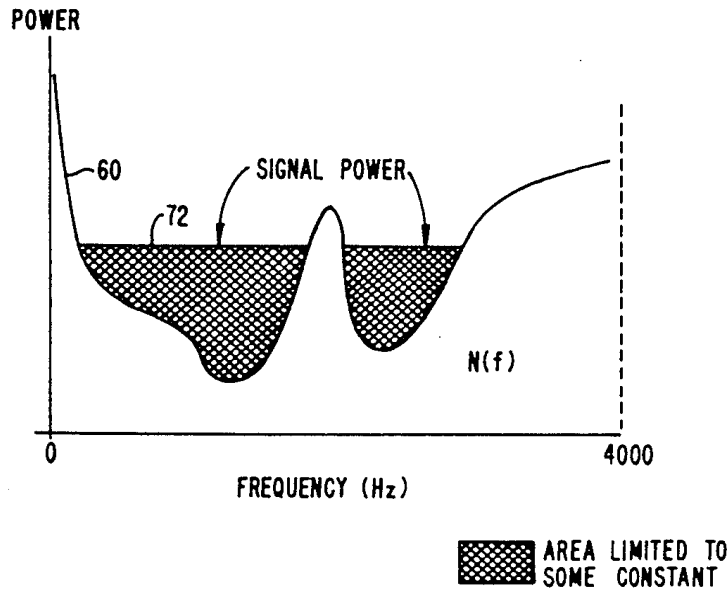


FIG. 6.

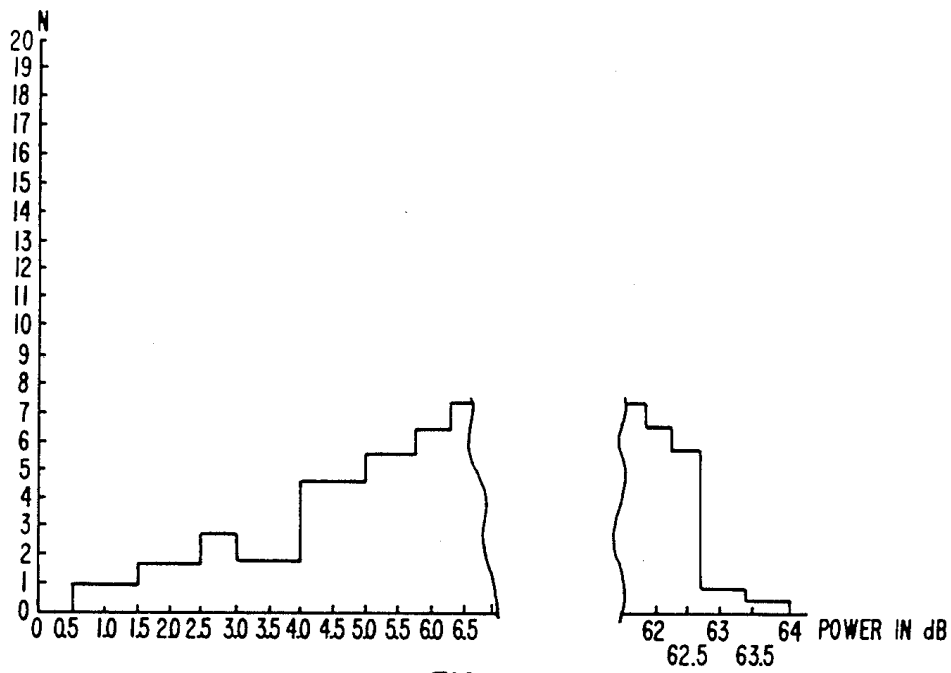


FIG. 7.

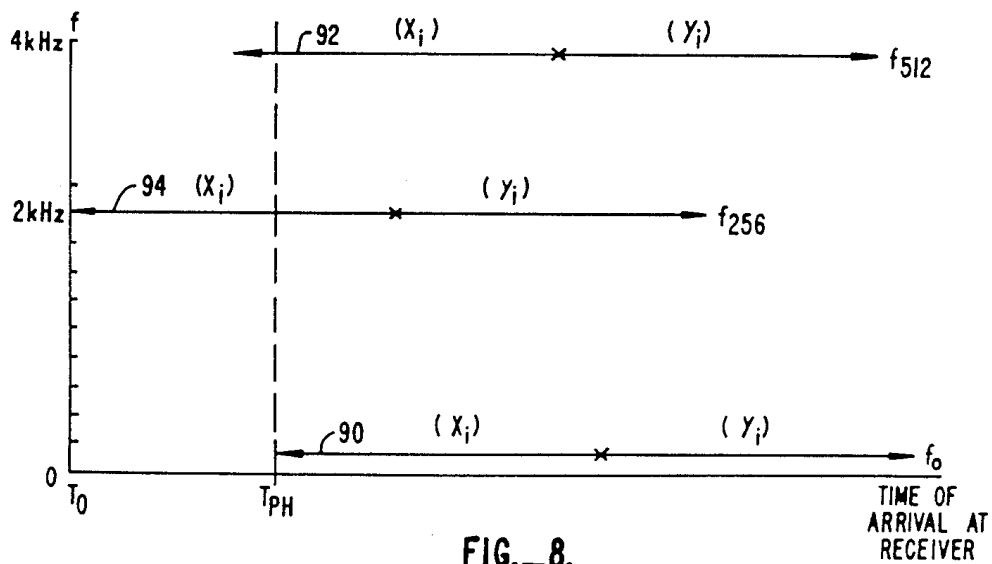


FIG. 8.

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