

# EXHIBIT 1004



US005994998A

# United States Patent [19]

Fisher et al.

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[45] Date of Patent: **\*Nov. 30, 1999**

[54] **POWER TRANSFER APPARATUS FOR CONCURRENTLY TRANSMITTING DATA AND POWER OVER DATA WIRES**

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[73] Assignee: **3Com Corporation**, Santa Clara, Calif.

[\*] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

[21] Appl. No.: **08/865,016**

[22] Filed: **May 29, 1997**

[51] Int. Cl.<sup>6</sup> ..... **H04B 1/00**; G08C 19/00

[52] U.S. Cl. .... **340/310.01**; 340/310.02; 340/310.08; 340/825.72; 375/257; 375/259; 455/3.1; 455/3.3

[58] Field of Search ..... 340/310.01, 310.02, 340/310.08, 825.72; 370/490, 487, 419, 442; 375/257, 259; 307/126, 128, 127; 455/3.1, 3.3

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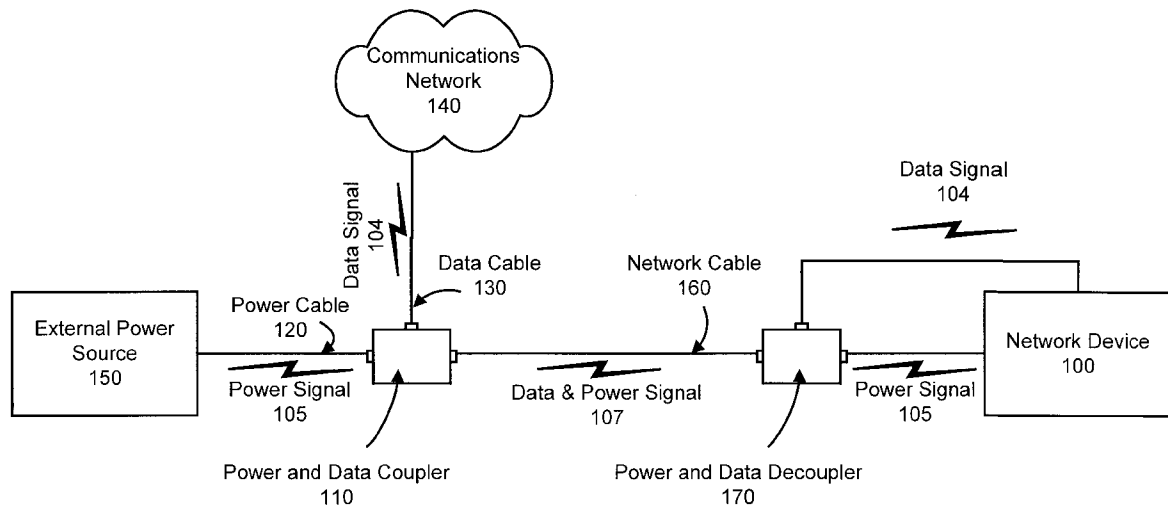
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[57] **ABSTRACT**

Electrical supply current, sufficient to power a wireless access point, is transmitted concurrently with a network data signal across a transmission line. A power and data coupler couples the network data signal and the power signal, received through a data input and a power input respectively, and transmits the coupled signal, to a distance of three meters or more, over the transmission line to a power and data decoupler. The power and data decoupler separates the power signal from the network data signal and supplies those signals to a power output port and a data output port, respectively, for use by a wireless access node. The power signal may be modulated at a low frequency relative to the frequency of the data signal, and the network data signal has a data transmission rate of one megabit/second or higher.

**32 Claims, 5 Drawing Sheets**



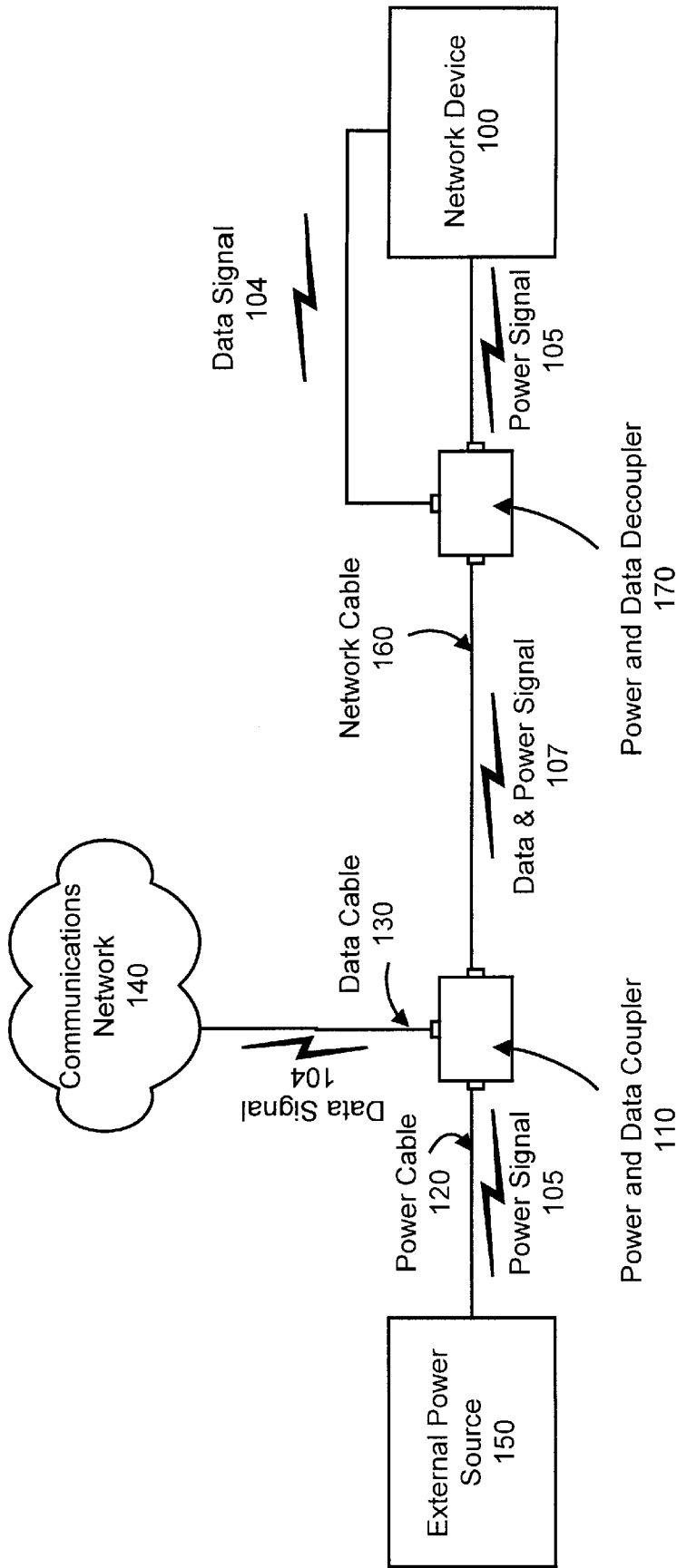


Figure 1

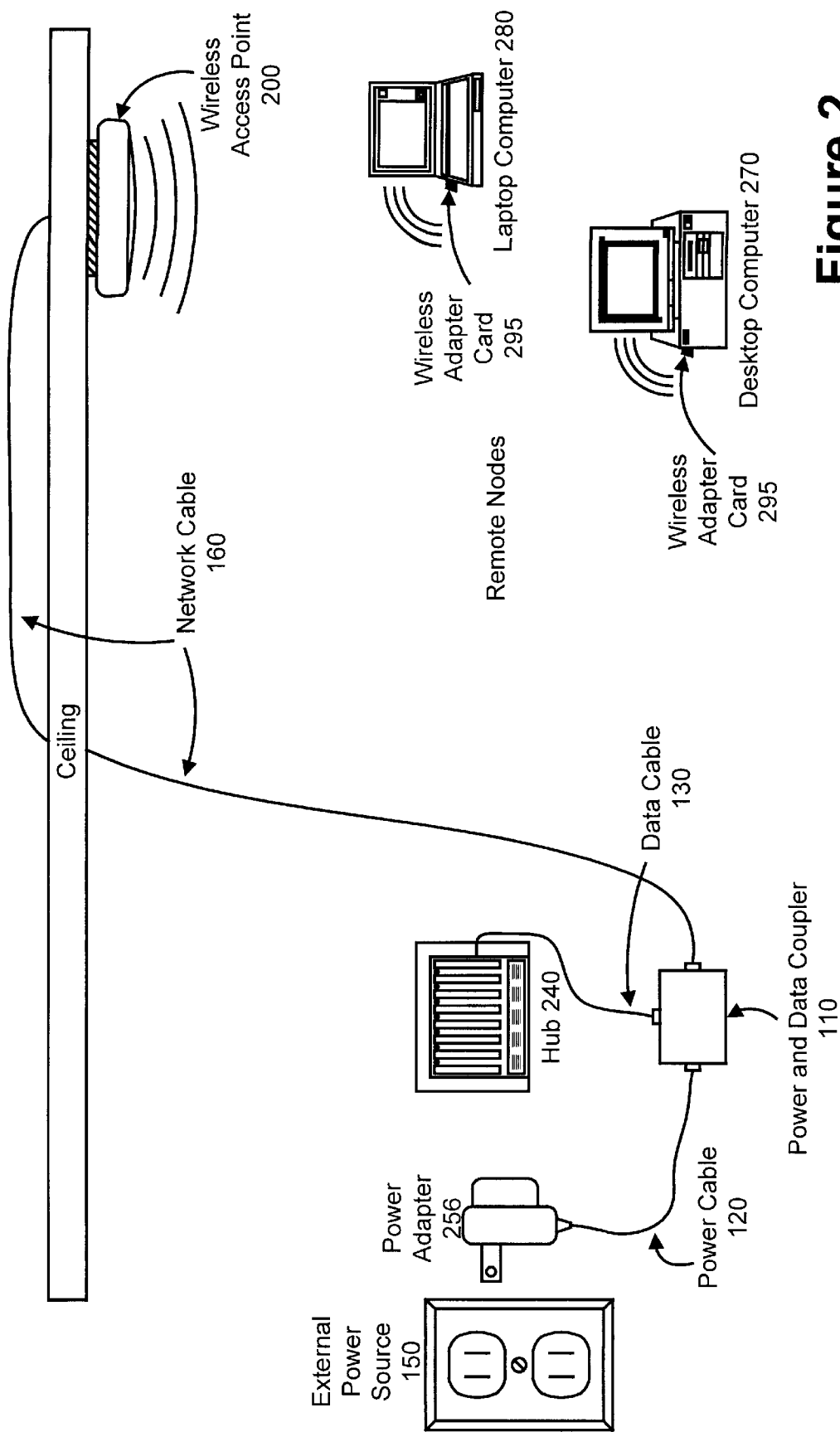


Figure 2

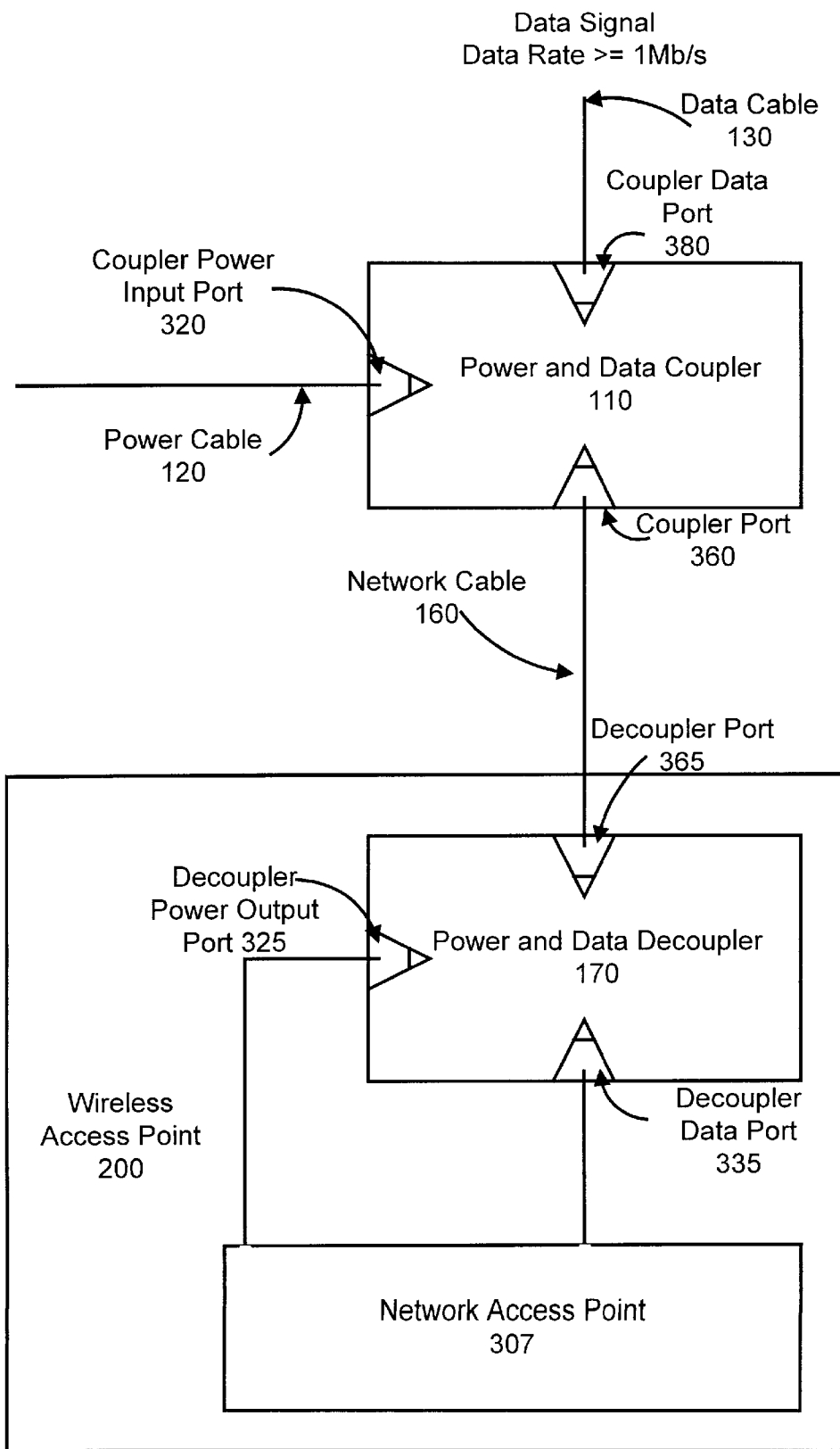


Figure 3

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