

Microwave Bypass Systems, Inc.

**72 Sharp Street, Building C-8
Hingham, MA 02043
(617) 337-2005**

Market Position

Microwave Bypass Systems considers itself first and foremost a LAN company and secondly a radio company. It is known in the industry for its extensive experience in interconnecting complex, geographically remote networks. Microwave Bypass was first to market with a full bandwidth microwave wireless LAN solution and continues to lead in that segment with a significant market share. Among the company's major accomplishments is its enhancement of microwave technology to effectively double the maximum distance between microwave-linked Ethernet segments from 4.3 miles to up to 15 miles without having to install a repeater.

The company has firmly established itself in two fields: health care and education, and has a significant presence at military installations. One-third of the company's sales are to hospitals, particularly for teleradiology connectivity, such as linking up X-ray and CAT scan machines. The company is also experiencing increasing sales to school districts that need to connect the multiple sites under their jurisdiction to a central LAN or to the Internet. Requirements for full bandwidth and the expense of implementing wired solutions have been drivers in making microwave solutions attractive in these fields.

The company's major competition comes from leased lines and from fiber optics. Fiber optics has high bandwidth but is costly; single T-1 leased lines, while more convenient to install, carry on-going charges which can be expensive. They also do not carry the bandwidth needed for multimedia applications. The Microwave Bypass solution offers both ample bandwidth and attractive costs when considered over time, making it reasonable and cost effective.

Product Portfolio

The Microwave Bypass entry in the LAN market is a full-speed Ethernet microwave system which consists of indoor and outdoor components. The company manufactures each component of its system, including the radios, the interfaces and the bridges. Microwave Bypass's Ethernet microwave radios are a standard platform beginning at 10 Mbps and are field upgradeable to 20 Mbps Duplex Ethernet, as well as to a full 45 Mbps (DS3) channel. This provides flexible configuration options for future growth and saves the customer the cost of purchasing additional microwave radios.

System Components

A standard system design consists of the following hardware at the local site. Inside the building, a LAN-LINK 1000 Bridge connects to the Ethernet segment or hub. This bridge is in turn connected to an Etherwave Transceiver which is cabled to the Microwave Radio and a 2' parabolic dish antenna with a flexible wave guide. The microwaves are sent and received at the remote site by another exterior LAN Microwave Radio and antenna attached to an interior configuration that is identical to the one at the local site. This solution is transparent and acts as an extension of the Ethernet backbone or segment to which it is connected. The system claims a reliability rate of 99.999%. Microwave Bypass also offers T-Carrier (T1, T2 and T3), Token-Ring and video radios to meet other transmission requirements. See Figure 1.

The LAN-LINK 1000 Bridge

Microwave Bypass describes its bridge as a "garden variety" 802.3 full-speed Ethernet bridge with a protocol independent MAC layer. The innovation that Microwave Bypass brings to the bridging component is its LAN-LINK 1000-Duplex model, which permits infinite distance connection. This bridge is equipped with three 15-pin connections; one for transit only, one for receive, and a standard AUI network port. This design prevents the possibility of collisions across the link which would result from exceeding the Ethernet delay budget by separating the transmit and receive paths.

The Etherwave Transceiver

The Etherwave Transceiver serves as the interface between the Ethernet LAN and the wideband microwave radio. It acts as a standard 802.3 transceiver and supplies a 15-pin AUI connection to the network and two BNC connections to the microwave radio. The transceiver connects to the network via any standard 802.3 compatible bridge, router, or repeater for Ethernet retiming and to pro-

vide support for required internetworking functionality such as protocol routing and packet filtering.

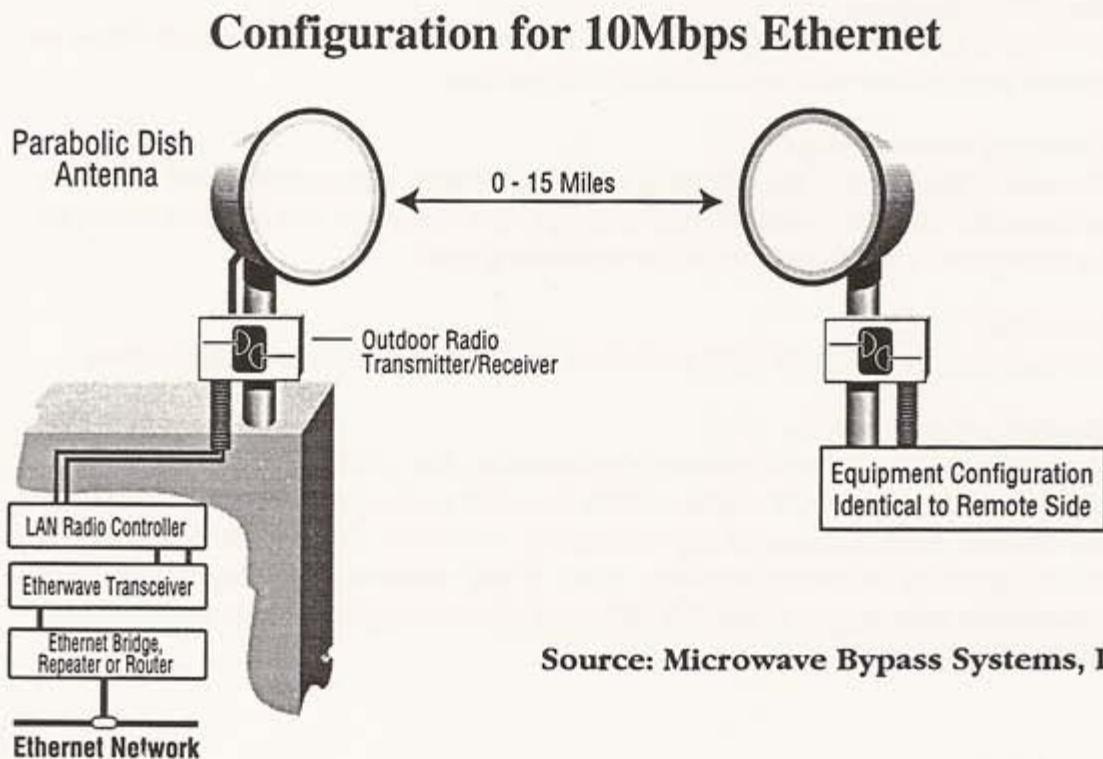
Front panel LEDs provide information on transmit and receive data, collision detection and power. The Etherwave may be ordered with an SNMP MIB-II option, which lets the Etherwave and LAN connection to be managed remotely.

The Etherwave LAN Radio

The microwave component of the Microwave Bypass solution is the Etherwave LAN Radio. It operates in the 23 GHz frequency band, is fully compliant with 802.3 standards and can span distances of up to 15 miles. Greater distances may be achieved through the use of Ethernet and radio repeaters.

The radio is designed specifically for the end-user LAN environment. A comprehensive display of signal meters, LEDs, and alarms enables even those network administrators who have no prior experience with radio LANs to operate

Figure 1: Microwave Bypass Etherwave LAN System



Source: Microwave Bypass Systems, Inc.

and maintain the system with ease. The monitoring devices built into the Ethernet LAN Radio provide thorough, accurate operational statistics which ensure long-term reliability. The LAN radio connection is capable of being remotely managed through the network. In addition to Ethernet, the radio may also be equipped with a Bell Standard T1 or E1 module for up to 24/30 voice/data channels, providing multi-channel voice and data service at a low incremental cost.

Customer Support

Pre-installation service, a key to successful system operation, is provided by Microwave Bypass and consists of a site survey, system design, path profile and statistics, frequency coordination and FCC or international licensing. Complete turn-key installation, including alignment, final test and cutover (verification of the operation of the LAN via the microwave connection), is also provided. Ongoing support, which is optional, includes on-site customer training, systems support documentation, a 24 hour engineering hotline, a spares depot maintenance program, and service and maintenance agreements or per diem, on-site service. Microwave Bypass guarantees both response time and repair time for its products.

Sales/Distribution

Microwave Bypass sells and distributes its products primarily through VARs and systems integrators who specialize in networking.

Alliances/Partnerships

Microwave Bypass has no alliances or partnerships. Recognizing the need for and benefits of these types of relationships, the company has singled this area out for special concentration in the upcoming year.

Financials

The company is privately held and does not disclose financial information.

Aberdeen Conclusions

Microwave Bypass is, in Aberdeen's estimation, the unchallenged leader in the Ethernet microwave LAN market. With its solid technology, product robustness and current market share of approximately 75%-80%, the company should be able to retain its forefront position. One of the company's strongest and most competitive advantages is the full Ethernet speed support that its products provide.

Aberdeen considers the company's approach to servicing its customers to be one of the strongest in the field and an invaluable add-on for anyone considering a microwave system. Microwave Bypass, in fact, has probably not grown as fast as it might have because of its commitment to providing exceptional service to all of its customers. This has meant that sales have only been permitted to grow at a rate that does not exceed the company's ability to service those sales.

Another impediment to the growth of Microwave Bypass has been the fact that its products have been ahead of the marketplace. Aberdeen believes that it is time now for the company to make a concerted effort to educate the market in the benefits its solutions can provide. Two additional areas that call for special attention are its alliances and partnerships, which are currently non-existent, and channel penetration, which can be improved by better advertising, education and cultivation. Developing appropriate alliances and partnerships would open up a wide array of new channels, which Aberdeen believes is essential for Microwave Bypass's continued and sustained growth.