An Outlook Reprint–

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Wireless Modem Update

One of the limiting factors for becoming wirelessly connected, or disconnected, is that only a few wireless modems have been available, and the cost of these devices has been high when compared to wired modems. There are other factors as well, but while wireless networks expand in coverage, software becomes available, and more potential users decide that the technologies are mature enough for at least a first experience with wireless, it has been difficult for potential users to find out who makes such wireless modems and who sells them. However, this month we welcome a host of new wireless products to the market. And these products will go a long way toward making wireless computing easier and more affordable. Some of them are being introduced by big names in the computing industry. This will help to ”ligitimatize” wireless computing.

First Things First

Because a wireless modem is or does a lot more than a wired modem, we need a more precise description of what the industry considers a wireless modem to be. A wired modem is a device designed to facilitate data transmission over a wired telephone network. The transport network is the phone circuit, and all of the electronics in a wired modem center around the conversion of computer output to tones that can be transmitted via the network to a modem on the other end of the circuit. There these tones are converted back into digital information that can be understood and manipulated by another computer.

A *wireless* modem, on the other hand, is more than simply a modem. A more accurate description would be that it is a modem coupled to a transmitter and receiver (transceiver). Thus the term ”wireless modem” is really a misnomer–but one that the industry prefers to use rather than ”a modem and wireless transceiver.” The basic difference between a wired and wireless modem is that the RJ-11 wired connection to the network is replaced by a wireless transmitter, receiver, and antenna.

Further, since each wireless data network operates on a different set of radio channels or frequencies, and each uses a different set of protocols, wireless modems must be built for use on specific networks. A RAM modem will not work on the ARDIS network, an ARDIS modem will not work on a cellular network, and none of them will work on a wired network.

The reason for the higher cost of wireless modems lies not with the modem itself; it is due to the transmitter and receiver components of the system. Building a radio transceiver into a tiny space (such as a PCMCIA card form factor) is not easily accomplished. It took a lot of money to design these systems and to build them. (One rule of thumb in the world of wireless communications is that the higher the frequency, the more expensive the radio.)

As time goes by, the cost of the radios will decrease, based upon customer demand for products, new technologies that provide cost savings, and, perhaps, new ways to combine functions and

features. The first transistor radio receivers sold for several hundred dollars and now cost under $5. And the first cellular phones cost well over $2,000 and now can be purchased for under $100. The price of wireless modems will come down as well.

The last point to consider with wireless modems is that they do not operate as stand-alone devices. They must be connected to a computer either through a PCMCIA slot or a serial connection and, therefore, must be designed to minimize interference from or to a large variety of computers. Older portable computers are more susceptible to causing interference or being interfered with by wireless modems, while many of the newer mobile computers are designed specifically to minimize such interference.

Moving to the Products

IBM is the first major computer industry vendor to announce new wireless modems. One of the most interesting aspects of this announcement is that IBM is not known as a radio company, it is a computer company. For whatever reason, IBM decided to invest in radio frequency technologies and has developed its own in-house expertise to produce wireless modem products. Of the four PCMCIA cards announced, three were developed and built in-house by IBM. The fourth (the RAM Mobile Data card) is OEM'd from Ericsson with input from the IBM design team.

The Cards

Three of the four cards in IBM's new family of wireless modems are designed and built for wide-area network communications. The fourth is for in-building and on-campus wireless LAN connections. Both the ARDIS and cellular modems are two-piece devices with modem and control circuits housed in one Type II PCMCIA card and the transceiver (radio) housed in a tethered case about the size of a Type III PCMCIA card.

The ARDIS Card

According to Motorola, the ARDIS wireless data network (owned by Motorola) now provides coverage to more than 10,700 U.S. cities and reaches more than 90 percent of the U.S. urban business population including Alaska, Hawaii, Puerto Rico, and the U.S. Virgin Islands. And Bell Canada provides ARDIS coverage in Canada. The network uses two different protocols_MDC4800 at a data speed of 4,800 bps, and RDLAP (Radio Data-Link Access Protocol) at a speed of 19,200 bps. (The 19,200-bps speed is available in several major metropolitan areas thus far). Because ARDIS was originally developed for use by IBM service technicians who worked on equipment inside buildings, the network's in-building coverage is good.

The IBM ARDIS modem supports PCMCIA standards release 2.01. It is compatible with both ARDIS protocols (MDC4800 and RDLAP), and it will be available in April of this year at a list price of $995. IBM also offers this device packaged for use in the IBM ThinkPad in place of the floppy drive. Both modules of the wireless modem system fit into a tray that is insterted into the floppy-drive cavity. Only the antenna protrudes from the computer. RF power output for this device is 0.8 watts (a little more than a handheld cellular phone at 0.6 watts, less than a Motorola InfoTac

ARDIS unit at 2.0 watts, and more than a Motorola Envoy with a built-in ARDIS radio at 0.6 watts). This version is priced at $895.

The IBM ARDIS modem is packaged with ARDIS Personal Messaging, a graphics-based application that provides facilities for peer-to-peer messaging, paging, fax, and desktop connectivity. Messages are delivered as soon as the receiver's modem is powered on and the application is activated.

The RAM Card

The IBM card for the RAM Mobile Data Network is OEM'd from Ericsson, the communications company that builds the Mobidem wireless modems that are presently in widespread use on the RAM system. The RAM network was also designed and built to provide good in-building coverage. According to RAM, it presently provides coverage to more than 7,700 U.S. cities, covering 90 percent of the U.S. urban business population.

This card differs from the other two IBM wide-area offerings in that it is housed completely in a PCMCIA Type III card with a bubble extension at the end to house the battery and antenna. The unit delivers a full two watts of RF power to the antenna (the same power level as the original Ericsson Mobidem).

The RAM card is supplied with software from Research in Motion, called RAD I/O and RAD AT, as well as ZAP-it from Data Transmission Services, Inc. RAD I/O provides a graphical user interface for the Mobitex network and operates in the network's native MASC mode. RAD AT is also a graphical package, but it permits users to employ a superset of the standard AT modem command set for dial-up-like access across the RAM network. This AT command set complies with the PCCA AT modem standard command set and it will work with most existing modem communications packages. ZAP-it provides e-mail access to the Internet as well as a sophisticated, ore flexible fax package.

The IBM Mobitex modem for the RAM network will be available in April of this year and will carry a list price of $795. The unit uses the portable computer's battery to trickle-charge the self-contained battery, prolonging battery life for the modem while only slightly decreasing the life of the portable computer's battery. Since the RAM Mobile Data Network includes battery-saving protocols, the RAM modem is capable of sleep and battery savings mode during long periods of operation.

The Cellular Modem

As with the IBM ARDIS modem, the cellular unit is housed in two packages_a PCMCIA Type II card and an external transceiver that is connected to the card with a cable. This wireless modem system is also offered in a tray-mounted version designed to be installed inside the IBM ThinkPad series of computers in place of the floppy drive.

The cellular wireless modem supports three modes of operation: analog voice, analog data, and CDPD. This flexibility permits use of the extensive cellular network today and use of the new CDPD data-only services as they are rolled out in various cities. (The CDPD Forum projects that CDPD service will be available in 41 major metropolitan areas by the end of 1995.)

The cellular modem uses a Rockwell data pump and includes Microcom's MNP10 and Celeratis Technologies TX-Cel error-control protocols. This unit includes a small Jabra headset for voice

communications. Power output is 0.6 watts, which is the same as a standard handheld cellular phone.

The In-Building Card

IBM's entry into the wireless in-building Local-Area Network (LAN) market consists of more than just a wireless LAN card. IBM also introduced several different models of access point devices. The most basic system includes a single entry point and a PCMCIA card. The design of these products is such that multiple nodes can be supported, including overlapping coverage areas and node-to-node roaming of the portable computer.

The IBM system uses unlicensed spectrum in the 2.4-GHz band, making it usable not only in the U.S., but in many other countries as well. (The other unlicensed band commonly used for wireless LANs is the 902-928-MHz band which is available only within the U.S.) The system employs frequency-hopping spread-spectrum technology and is, therefore, more resistant to interference and more secure than other forms of data communications.

The card itself will sell for $445, and the IBM 8227 Access Point with integrated antenna carries a list price of $1,350. The same access point device with a directional antenna lists for $1,045. The products are shipped with Artisoft's LANtastic 6.0 which permits users to set up a new network easily or enables use as a universal client on existing LAN systems. The products are compatible with DOS, Windows, and OS/2 as well as LAN operating systems including Novell, IBM LAN Server, and LANtastic, through standard NDIS and ODI device drivers.

To be able to offer a wireless LAN PCMCIA product, IBM also needed to provide for the LAN connection. The access point product is employed to wirelessly connect two wired LANs where a wired connection is not practical. Further, the access point device supports both the IBM infrared and RF wireless LAN adapters, providing the capability to mix and match RF and infrared systems.

Comments

We applaud IBM for bringing these products to market. One of the key factors in the future success of the wireless data industry will be the availability of a variety of wireless modem solutions for each of the available networks. IBM has chosen to provide modems for all three nationwide systems in operation today, and has given its customers the flexibility to pick and choose between the various types of wireless connectivity.

If a user favors a combination of voice and data capabilities, the IBM cellular modem will provide a solution. If data-only communications are required, the customer will have three choices of products and networks_cellular, ARDIS, or RAM. Further, it is becoming increasingly clear that many companies are having a difficult time deciding on one network to meet all of their mobile requirements. With IBM's wireless modem product mix, users will be able to mix and match networks with products and support from a single modem vendor.

Price points for these devices are not out of line with either the other wireless modems on the market today, or with the degree of technology they incorporate. We do expect to see wireless modem prices drop over time, but taking into consideration that wireless cards include a complete

radio, the delta between a wired and a wireless modem card is not unreasonable.

IBM appears to be promoting these devices for ”vertical” market applications, yet it also provides for connection to the Internet and e-mail services. These connections will be of interest to the horizontal user community. IBM seems to feel that in order to attract horizontal users to wireless computing in large numbers, it will have to hit price points of under $500 for these modems_a worthy goal, and one that should be easily obtainable given sufficient sales volumes.

In the meantime, IBM's presence in this marketplace can only help to increase the interest in wireless data communications. Since we expect to see other vendors with products in these markets by the end of the year, we can expect to see a more rapid rate of adoption of wireless communications. This is good news for the networks and service providers, and, therefore, good news for end users.

IBM should have a decided advantage during 1995 since it is the only vendor we know of that will be offering wireless modems for all three wide-area wireless networks as well as for in-building LANs. When Motorola first announced its own PCMCIA card devices, it stated that it would offer LAN cards as well as cards for all of the wide-area networks. However, it now appears as though the ARDIS card that has been announced but is not yet available in the U.S and a cellular/CDPD card will be the only offerings we will see from the big M, leaving IBM the only full-line provider of wireless modems.

For Further Information

You can learn more about IBM's Wireless products Web Home Page at `http://www.raleigh.ibm.com/netprod.html#wireless`