Connecting 56 Kbps Lines to Macintosh (7/93)

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TOPIC ---

I have some conflicting information that I hope you can clarify. If I have a 56 Kbps line with line drivers at each end point and a V.35 or RS-232 connection, can I take a cable and tie that line directly into the serial port of the Macintosh? The Macintosh supports RS-232 / RS-422, may it also act as a router with the appropriate cable? If I can't connect directly, do I then need a device which will connect me from a synchronous 56 Kbps line to an asynchronous line for a Macintosh? If such devices are necessary what are they?

I have been told I must use a bridge with an RS-232 or V.35 connector to an Ethernet connection, and this will take me from synchronous to asynchronous and onto my network. I know someone with a 56 Kbps line, who claims to make the connection from a CSU/DSU (basically same as line driver) to the back of a PC running Novell Netware without such a bridging device. Please provide some additional insight on this.

DISCUSSION ---

In the present most "leased" lines are digital (DDS or Digital Data Service) and range in speeds from 56 Kbps to 1.544 Mbps. These lines can accept a pure digital signal without the need to use a modem to modulate the signal for compatibility with voice grade (3000HZ maximum) lines. Even though you don't have to modulate the signal on digital lines, you still have some requirements to meet before you can interface a asynchronous RS-422/3 signal from a Macintosh to the DDS line.

The DSU/CSU (Data Service Unit/Channel Service Unit) serves the same basic purpose for a DDS line as a modem does for an analog line. The DSU performs a basic binary encoding (there are several different encoding schemes) function to make the signal compatible with the digital line. This usually just means that the binary signal is encoding in such a way as to limit the number of consecutive 0's present in the data. The CSU function is the channel manager. A T1 line is capable of 1.544 Mbps, but it is not a single data path, it is comprised of 24 DS0 channels. Each channel is capable of 56 Kbps. You might have noticed that 24 x 56K is not equal to

1.544 Mbps. It has to do with how framing bits are used, basically with DS1 (T1) you have 1 framing bit for each of the 24 channels.

8000 samples per second * [(8 bits per sample) * 24 samples] + 1 framing bit = 1.544M/bps

Each DSO is comprised of:

8000 samples per second * [(8 bits per sample) - 1 bit for framing] = 56K/bps

Most DSU/CSU devices have RS-449 or V.35 interfaces. This is because RS-232 is limited to 20 Kbps whereas these newer interfaces are capable of speeds of up to 2 Mbps. V.35 connections are limited to synchronous while RS-449 can accommodate either synchronous or asynchronous data. Some newer DSU/CSU devices provide an RS-232 port (see description of a couple of devices below). RS-232 is capable of supporting either synchronous or asynchronous data.

Another consideration is whether a Macintosh can actually send and receive reliable 56 Kbps data using its built-in serial ports. The fact is that even with no other communications or processing occurring on a Macintosh, you can only expect to reliably receive data at 9600 baud. This varies with different Macintosh models with the IOP equipped Macintosh computers performing the best. I would not recommend using a Macintosh as a router for LAN based connections as well as for high speed serial based connections.

There is however a NuBus based product that provides access to 56 Kbps DDS lines. This removes the burden from the processor and provides several options for connecting to DDS lines and CSU/DSU devices. The board is designed and sold by MultiAccess Computing (more info below). They provide an ADEV that allows you to use it as a standard interface for routing AppleTalk over a switched or dedicated 56 Kbps link.

To locate a vendor's address and phone number, use the vendor name as a search string.

UDS Motorola takes wraps off asynch DSUs for PCs. (DU170 F/R, SW56II F/R, TA120 F/R asynchronous data service units) (Product Announcement) Network World Nov 23 1992 v9 n47 p9(2).

UDS Motorola introduces the $1,250 DU170 F/R, the $1,150 SW56II F/R, and the $1,395 TA120 F/R asynchronous data service units/channel service units. The new devices, termed digital modems by the company, are designed for personal computers that use the same communications software as dial-up modems. The products allows PCs to support switched 56 Kbps services using asynchronous communications ports. The two-wire DU170 is compatible with Northern Telecom Inc.'s Datapath technology, the four-wire SW56II is designed for use with AT&T's Accunet Switched 56 service, and the TA120 works with Integrated Services Digital Network Basic Rate Interface service. The new products also support dial-up frame relay service when

connected to a Northern Telecom DMS-100 central office switch.

57.6 KBPS APPLETALK BRIDGE DEMONSTRATED ON MCI NETWORK

Reston, VA, January 10, 1990--Digital Access Corporation of Reston, Virginia today successfully demonstrated a coast-to-coast bridge between AppleTalk LANs that runs at 57.6 Kbps in the asynchronous protocol on MCI's Switched 56 digital network.

Today's demonstration marked the first time the standard 57.6 Kbps asynchronous rate had been achieved on a public network.

The 57.6 Kbps bridging capability allows two AppleTalk LANs to be connected cross-country at the highest net throughput rate available in the industry today. With two networks bridged, any Macintosh computer on one network can reach and transfer files to any Macintosh computer or peripheral device on the other network. At the 57.6 Kbps rate, computers on separate, but bridged networks operate like devices co-located on the same LAN.

The capability will also allow a remote Macintosh or MS-DOS computer to dial into an AppleTalk LAN and transfer files at 57.6 Kbps, which is also like being installed on the LAN.

Because the capability uses digital carrier circuits, transmissions are practically error free. (Carrier circuits are engineered to an error rate of one in 10 million bits, the approximate equivalent of one erroneous character in Tolstoy's WAR & PEACE.)

The 57.6 Kbps capability is based on Digital Access Corporation's T-Zero system. It interfaces to a Shiva TeleBridge, a product of the Shiva Corporation of Cambridge, Massachusetts, that transmits 57.6 Kbps traffic to the telephone network. The T-Zero system, which is compatible with most existing digital PBXs and T-1 transmission facilities, formats asynchronous traffic for transmission over a standard dial-up digital network.

According to Thomas D. Miller, Digital Access's Vice President for Marketing, the T-Zero system is unique, and more than doubles the potential market for Switched 56 telecommunication services.

"The T-Zero is the only transmission system in the industry that supports asynchronous data transmission at speeds through 57.6 Kbps," Miller says. "All microcomputers are inherently asynchronous and most are already capable of 57.6 Kbps communications. Off-the-shelf communications software such as Procomm, Microphone, and others already support the 57.6 Kbps option. "Thus," Miller asserted, "with more than 10 million of these machines installed in American business, There is a far larger and more immediate market for digital communications services like Switched 56, than telecommunications carriers have begun to penetrate."

High speed, asynchronous interfaces are cost-effective, according to Miller. "With an asynchronous interface, the existing microcomputer serial port and a current communications software package is all that is required

to run at high speed." Further, the T-Zero system's ability to format 57.6 Kbps asynchronous traffic for transmission across synchronous networks eliminated any requirement for an additional conversion board or modification to the microcomputer. Immediate installation of the bridge capability is possible at locations with T-1 access facilities to MCI's long distance network.

The AppleTalk bridging capability is being marketed by Digital Access and its distributors. The company is a Certified Apple Developer.

Contact MultiAccess Computing for more information on their NuBus card.

Digital Access Corporation this month released a dialing interface to its Switched 57 system, a technology that enables users to connect Macintosh computers to any digital communications unit and transmit data at up to 57.6 Kbps.

The main component of Switched 57 is the SA-57, a 57.6-Kbps asynchronous to synchronous converter available in two configurations: a Mac RS-232 serial port version or a network interface version that requires a LAN gateway such as Shiva Corp.'s EtherGate bridge. The SA-57 converts the user's 57.6 Kbps and 38.4 Kbps asynchronous data to a synchronous 56 Kbps or 64 Kbps data stream for transmission across digital telecommunications circuits such as Switched 56 and ISDN (Integrated Services Digital Network), and digital data service (DDS) circuits. A data service unit (DSU) or ISDN terminal adapter is required for each SA-57.

Six new dialing options, as well as three previous non-dial, dedicated options, are now available. Users can choose an RS-232, V.35 or RS-449 synchronous port on their Shiva's TeleBridge is required when using the SA-57 as a telecommunications server on a LocalTalk network. On stand-alone Macintosh computers, a serial interface card such as Creative Solutions Inc.'s Hurdler Serial Board is required to support 57.6 Kbps output. The Macintosh IIfx, which drives its serial port at higher speeds, does not need the additional card.

The SA-57 also has added support for the standard AT-command set and flow control functions. Macintosh users can use telecommunications packages such as Software Ventures Corp.'s MicroPhone II when dialing across high-speed connections.

The SA-57 comes in both desktop and rack-mounted versions.

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