Macintosh: Integrated Services Digital Networks (ISDN)

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TOPIC ---

Do you have information on Macintosh connectivity via Integrated Services
Digital Networks (ISDN)?

DISCUSSION ---------------------------------------

Here is an introduction to ISDN and some interface possibilities.

ISDN

Integrated Services Digital Networks (ISDN) is a network architecture that
uses digital technology to support integrated voice, data, and image
services. It works through standard interfaces over standard twisted-pair
telephone wire. The ISDN concept also includes some services not yet
available, non-communications services, and services yet to be invented.
Current work on ISDN standards is the responsibility of a number of study
groups within the CCITT.

There are two types of ISDN channels: transparent and nontransparent.
Transparent channels may carry whatever the user chooses--voice or
high-speed data, for example--all independent of protocol. Non-transparent
channels have been assigned specific protocols for specific functions on
the network. The specified channels are:

B- (Bearer) A transparent digital channel of 64Kb, carrying circuit-mode or
packet-mode user information (like voice, data, facsimile, and user-multiplexed
information streams).

D- A non-transparent digital channel of 16 or 64Kb, used for signaling in
association with one or more B-channels. This is also used for telemetry and
for low-speed packet-switched data.

H- (high-speed) Transparent digital channels, roughly equivalent to
current T-carrier channels, for carrying circuit-mode or packet-mode user
information--like multiplexed data, data and voice, or facsimile--at rates
of millions of bits per second. Although H-channels have not been fully

defined, an H0 channel operates at 384Kb; an H1 channel operates at 1536Kb (H11), or 1920Kb (H12). A H4 broadband version has been proposed that would operate at 135Mb.

Two other channels were once proposed, the A- and C-channels. These channels were intended to accommodate analog connections and related signaling. CCITT committees view such channels as obsolete. Nevertheless, analog-link interfaces are defined by CCITT, so during the duration that analog lines exist and continue to be used, they can interface to ISDN networks.

Although ISDNs are generally not yet a "tariff" service in most states (they are not priced by the California or equivalent Public Utilities Commissions), ISDN lines are readily available and acquired via contracts from the (in the US) Regional Bell Operating Company or AT&T. Most ISDN links are a combination of B-channels in association with a single D-channel for signaling. Signaling includes call establishment, call progress monitoring, call termination, and enhanced telephone features. The heaviest users may require one or more H-channels. Two standard service plans are expected to be offered:

- BRI: A Basic Rate Interface provides two transparent 64Kb B-channels and one nontransparent 16Kb D-channel per interface (2B+D). BRI provides two voice or data connections, or one voice and one data connection over the B-channels along with one or more low-speed, low-priority, packet-switched data or telemetry exchanges over the D-channel. The total data rate is 192Kb, with 144Kb available to users.

- PRI: A Primary Rate Interface provides 23 64Kb B-channels and one 64Kb D-channel (23B+D). This service is based on the U.S. T1 specification of 1.544Mb. The European PRI equivalent is based upon the CEPT specification of 2.048Mb, providing 30 B-channels and 1 D-channel (30B+D).

ISDN circuits are usable with Macintosh products. Generally speaking, there is FUNCTIONALLY no advantage to using ISDN over other links in today's analog or digital worlds (other than two circuit-switched devices per line, as opposed to one with analog). Therefore, when trying to decide whether ISN or ISDN solutions are best, consider what services you require.

AT&T and other manufacturers supply terminal adapters and CSU/DSUs that (with the proper hardware and software) let the Macintosh connect to ISDN circuits. Because terminal adapters and CSU/DSUs support certain switches, protocols, and interfaces, you need to ensure that the interfaces you plan to use are compatible with the ISDN circuit.

Among the various ways to interface a Macintosh to an ISDN network are:

- Using a Hayes-compatible terminal adapter (like Universal Data Systems TA100, Infotron Passport ISDN Terminal Adapters) with the software (like MacTerminal).

- Using the recently announced Solana H-server or other bridge (TeleBridge, R-Server, Ethernet bridges, and so on) with the

appropriateCSU/DSU. These would provide a range of data rates,
    asynchronous or synchronous, 19.2 to 64Kb, or higher.

You can have terminal emulation with the first solution, whereas the second
lets you create an AppleTalk or Ethernet Internet. Other solutions exist or
will in the future.

DSU and CSU Units

DSU stands for Data Service Unit, which is an interface to digital links. It is
somewhat analogous to a "digital" modem. The DSUs translate the computer's
unipolar serial data to baseband bipolar signals. The DSU uses a DCE interface
to communicate with the terminal and then transmits the data in a special
format over the link.

CSU (Channel Service Unit) is sometimes required at the end of some links. The
trend today is to incorporate the CSU into the DSU.

For more information on manufacturers, check the Tech Info Library, under
"Telebridge," "Universal Data," and "Infotron."

Editor's Note 22 June 1992: Solana has discontinued business to our knowledge,
so we are unable to refer you to them directly for further information.
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