GPi and Super-Fast Modems: Overview (2/95)

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TOPIC ----------

This article describes the GPi (General Purpose input) line of the serial port on a Macintosh computer and how it works with super-fast modems.

DISCUSSION ----------

What is GPi?

GPi is a signal pin that is used on the serial connector of a DIN-8 (DIN-9 on Geoport enabled Macintosh computers). It was intended to provide a way for the Macintosh to support communication devices that needed to pass along pacing information (an external clocking signal).

This signal was typically needed several years ago by modems that were synchronous serial modems. This "class" of modems is typically used for specialized purposes, as into tying into certain computer data networks or directly into a remote communications controller.

Today, the vast majority (98% or better) of personal computer remote communications are done via asynchronous modems. The need for GPi to be used as a synchronous external clock input is rare. Asynchronous serial modems today go as fast as 28,800 bps over the communication link, and if the data going over that link is highly compressible, it is theoretically possible that the actual data rate (because of the gain in compression) can approach 115,000 bps.

However, there is a more practical use for the GPi control line - hardware handshaking. Hardware handshaking is a method of signaling used between hardware devices (computer and modem) to pace the "conversations" over the serial line to help ensure that characters and other information do not get "dropped". Typically speaking, most Macintosh computers that are communicating serially to a modem only require a special cable called a "high speed hardware handshaking cable" to speak at serial port speeds of 9600 bps or higher.

In Macintosh computers that support the GPi connection, the GPi line goes to the “Data Carrier Detect” or DCD signal line of the serial control chip. It is located at pin 7 on the DIN-8 serial connectors, and connects to the DCD input of the Z8530 Serial Communications Controller (SCC). Some machines that do not support GPi include the Macintosh Plus, Macintosh Classic, and Macintosh LC. On these machines, pins 7 of the DIN-8 serial connectors are not connected.

There is no one correct way to institute a hardware handshaking protocol as it relies heavily on a combination of events: the software requiring serial communications, the cable used to connect the computer and the external serial communications device (typically a modem of sorts), and the communications device itself (again, typically a modem).

In Macintosh software, the choice of using GPi is up to the programmer of the software. The software producer should tell you in the documentation whether their software relies on GPi and other configuration information. In most Macintosh serial communications software, the use of GPi is minimal or non-existent.

A few Macintosh computers (such as the Macintosh IIfx and Macintosh Quadra 950) are exceptions to certain hardware trends and require the use of special compatibility software to allow the use of communications software that require GPi control.

GPi signal use can be instituted to allow for one form of Hardware handshaking control. However, the use of the GPi line is not required for the use of other hardware handshaking control schemes on the Macintosh. In fact, many "Super High Speed" modems do not use GPi to hardware handshake.

Can you use a "high Speed" modem with your Macintosh?

Yes, you can use a "Super High Speed" modem for your Macintosh. The general technical classification for these modems are:

- V.32 for 9600baud
- V.32bis for 14,400
- V.32ter for 19,200
- V.34 for 28,800

The data rate specified is typically the best data for that class of modem (for example, V.32 will never go faster than 9600, but it can communicate at 4800, 2400, and 1200 baud speeds) taking into account certain factors like quality of telecommunications line, how much "attention" your Macintosh can pay to the serial line, and other tasks that it needs to be doing at the same time.

In fact, for most Macintosh computers that are not equipped with the Geoport capability, the fastest ideal speed that you can expect the computer can speak at the serial connector is 57,600 bps. Geoport-equipped Macintosh computers can potentially go up to 230Kbps at the serial port.

Further Reference

For additional information about GPi technology, refer to the following publications:

- "Inside Macintosh, Volume III - The Macintosh Hardware"
- "Inside Macintosh, Volume VI - Compatibility Guidelines"
- "Guide to the Macintosh Family Hardware – Serial I/O Ports"
- "Technical Note M.OV. GestaltSysenvirons – Gestalt and Sysenvirons: A Never Ending Story"
- "Technical Note M.HW.MacIIfx – Macintosh IIfx: The Inside Story"
- "Technical Manual: Z8530 SCC Serial Communications Controller (contact Zilog or AMD)"

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