

New Technical Notes

Macintosh



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Developer Support

Serial I/O Port Q&As

Hardware

M.HW.Serial.Q&As

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This Technical Note contains a collection of Q&As relating to a specific topic—questions you've sent the Developer Support Center (DSC) along with answers from the DSC engineers. While DSC engineers have checked the Q&A content for accuracy, the Q&A Technical Notes don't have the editing and organization of other Technical Notes. The Q&A function is to get new technical information and updates to you quickly, saving the polish for when the information migrates into reference manuals.

Q&As are now included with Technical Notes to make access to technical updates easier for you. If you have comments or suggestions about Q&A content or distribution, please let us know by sending an AppleLink to DEVFEEDBACK. Apple Partners may send technical questions about Q&A content to DEVSUPPORT for resolution.

|New Q&As and Q&As revised this month are marked with a bar in the side margin.

Where to get detailed Zilog Z8530 SCC documentation

Written: 3/9/90

Last reviewed: 12/17/90

I need to find documentation for the Zilog Z8530 SCC beyond Inside Macintosh. Do you how I can contact Zilog or another vendor for this documentation?

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You can get documentation on the SCC from the following source:

Advanced Micro Devices (AMD Z8530)
901 Thompson Place
P.O. Box 3453
Sunnyvale, CA 94088

Macintosh maximum sustainable serial baud rate

Written: 8/28/91

Last reviewed: 10/8/91

When my hardware device sends data to a Macintosh at 57.6 kilobaud, characters can get lost if LocalTalk is on and a file server is mounted. Does Apple know about the problem? Is there a solution?

—

The specification for the top speed of the serial port on a Macintosh is an absolute maximum given that no other processing or use of the SCC are present. Although the speed of the Macintosh IIfx has now allowed this ceiling to be reached in the presence of other processing, it is just not attainable on other models of the Macintosh except when the machine is dedicated to this purpose. While AppleTalk remains active there is no guarantee on serial port data transmissions over 2400 baud. The same processor must handle the OS, the Serial driver and the AppleTalk driver (with no advantage of DMA), so the overhead is considerable. Because of the AppleTalk driver's considerations for incoming serial data, users can usually work at up to 9600 bps without any problems. All models in the current product line, except the Macintosh IIfx, are unable to sustain throughput with baud rates beyond 19.2 kbaud except when exclusively dedicated to that task.

There is essentially no way to guarantee 100% serial data acquisition when using AppleTalk. This is due to the fact that while the Macintosh is receiving an AppleTalk packet, interrupts are disabled for the duration of packet transmission. What this means in a "worst case" situation is that a 603-byte packet (the largest possible AppleTalk packet) sent to the serial port would take approximately 26 milliseconds to receive. Compare this with asynchronous serial data transmitted at 9600 bps which would only take 1 millisecond to receive. A very realistic situation arises in which 26 bits could be lost during a concurrent AppleTalk/Serial Device transmission. The possibility is further strengthened when there are routers on the network, which send out large RTMPs (Routing Table Maintenance Packets).

To alleviate possible data loss, the AppleTalk driver interrogates the serial port at key times that won't interfere with packet reception. However, the checks are not at regular intervals; they are encoded in the driver as stated above. This means that these random checks may not coincide with the demands of the serial driver, and an occasional character is lost.

This same loss of characters may also occur in conjunction with the Sony driver. If a disk is inserted and it requires special attention (like formatting) then the odds of losing characters is increased. The Sony driver has built-in considerations like the AppleTalk driver (although not as frequent). So you can still lose data at high transfer rates if a disk is inserted during the transfer.

The character dropout also occurs on systems which are not currently running AppleTalk but are receiving serial transmissions from high-speed devices (57.6 k baud) and are performing CPU tasks which require a high amount of memory access (such as a CPU like the Macintosh IIsi or IICI running on-board video in 8-bit mode, or a CPU using VM).

There is, however, a way to ensure reception of high-speed serial data without character loss—through the use of a Serial NuBus card or other third-party NuBus cards with a dedicated processor necessary to provide higher speeds. The cards in essence operate as dedicated port-handling circuitry. They are able to perform necessary buffering while the processor is servicing other interrupts. This is the reason that network cards such as EtherTalk and

TokenTalk can accomplish lossless transactions; they do at least some of their own buffering until being serviced to avoid interference with other operations like receiving serial data.

Alternatively, you may want to develop a custom card yourself that exactly fits the needs of your product. In this case you should look into the Macintosh Coprocessing Platform (MCP) and Apple / Real-time Operating System Environment (A/ROSE) as a basis of this line of development. Development packages for both these products are available from APDA.

Conditions degrading 57.6 Kbaud transmission

Written: 8/8/91

Last reviewed:

We are experiencing intermittent character dropout at 57.6 Kbaud on a Macintosh IIsi in 256-color mode, but if we drop down to 16-color mode, everything works hunky dory. MultiFinder on or off makes no difference. What's the connection between the number of colors and the serial port?

—

It turns out that various additions to the system cause performance to degrade, such that serial operation at 57.6 Kbaud cannot reliably be maintained.

There are various factors here, including the video mode (which requires more memory accesses and wait states to produce the same video rate, thus incurring a higher processor overhead). VM, if turned on, exacts an additional performance penalty. These problems are not limited to the Macintosh IIsi; we've had reports that they can also occur on the Macintosh IIci when running the on-board video in 256-color mode without a cache card.

How to keep power on the Macintosh Portable SCC

Written: 8/8/91

Last reviewed: 8/13/91

How do I tell the SCC on the Macintosh Portable to stay on (powered)?

—

The Macintosh Portable has a second CPU known as the Power Manager. The Power Manager controls power to each subsystem of the Portable in order to best conserve power on those parts that are not currently in use. The Power Manager is documented in Inside Macintosh Volume VI as is a trap (`_SerialPower`) that can be used by a driver to turn on (and off when done) the SCC.

Which Macintosh models support serial port GPi line

Written: 1/16/92

Last reviewed: 2/6/92

I need an updated list indicating which Macintosh models have a functional serial port GPi line.

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Here is a Macintosh product line GPi support summary:

Macintosh Plus	no
Macintosh Classic	no

Macintosh LC	no
Macintosh IIsi	yes
Macintosh Classic II	yes
Macintosh IIfx	yes
Macintosh IIfx	yes
Macintosh Quadra	yes

PowerBook 100	yes
PowerBook 140	yes
PowerBook 170	yes

We recommend use of the Gestalt call with the gestaltSerialAttr environment selector in order to locate machines implemented with the GPi line.

Macintosh IIfx Serial Switch 'cdev' for SCC direct access

Written: 6/29/90

Last reviewed: 12/17/90

My application requires direct access to the SCC and I do not find the Macintosh IIfx Serial Switch 'cdev' to be good solution. Is there a way for me to get the support I need from the Serial Driver, or do I need to continue breaking the rules?

—

The Serial Switch 'cdev' is a compromise between not allowing developers any solution or Apple redesigning the serial driver and waiting for developers to implement it. For the moment, this Serial Switch 'cdev' is the best solution available; however, Apple is working on improving the Serial Driver to solve this problem. Unfortunately, it was not possible to produce this improved Serial Driver in time for the Macintosh IIfx introduction.

SCC and AppleTalk timing

Written: 11/21/89

Last reviewed: 12/17/90

Written: 5/7/91

Last reviewed: 7/25/91

The AppleTalk spec claims a data rate of 230.4 kbaud, which should require a 3.6864 MHz input to the SCC, but RTxCB on the Macintosh carries a 3.672 MHz clock. How does the AppleTalk driver reconcile this and what frequency should I use?

—

The SCC contains a phase-locked loop which is able to lock on and synchronize with AppleTalk transmissions whose clock rates are not exactly to specifications, so everything is fine as long as both ends of the communication are using approximately the same clock frequency. If you are designing your own AppleTalk hardware from scratch, it is easiest to use a 3.6864 MHz oscillator and a Z8530. This has been tested and works just fine.

Where to find information on Coaxial card Twinax connector

Is there any documentation on how to gain access to the Twinax connector on the Macintosh Coaxial card?

Andrew/KMW Systems has developed a device interface for the Twinax connector on the Macintosh Coaxial card for their product. For more information, you can contact them at the following address:

Andrew/KWM Systems
6034 West Courtyard Drive
Suite 100
Austin, TX

78730-5014

AppleLink: D0500

For additional documentation, you might want to contact National Semiconductor for a copy of their technical documentation on the Biphase Communications Processor - DP8344A. Also, some Twinax technical documentation might be available from IBM.

Where to get connectors for making Apple-compatible cables

Written: 5/3/89

Last reviewed: 12/17/90

Where can I get connectors for making Apple-compatible cables?

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Here are some suppliers of the mini-DIN connectors. This list is provided for information only—Apple does not endorse any of the vendors.

Hosiden America/Harmonix Sales

Mike Ferrera

10090 Pasadena Avenue, Suite A-2

Cupertino, CA 95014

408-725-2424

CompuCable

Bob Mickey

180 Vallecitos De Oro

San Marcos, CA 92069

619-744-2789

800-222-2332 (outside CA)

TRW

Illinois

Gene Kazmarek aka Kaz

408-720-8727

HB Associates

Hank Lorta

415-487-3933

Union City, CA

Harbor Electronics
Ron Marsilio
650 Danbury Road
Ridgefield, CT 06877
203-438-9625

Also try AMP; they may supply the 8-pin variety.