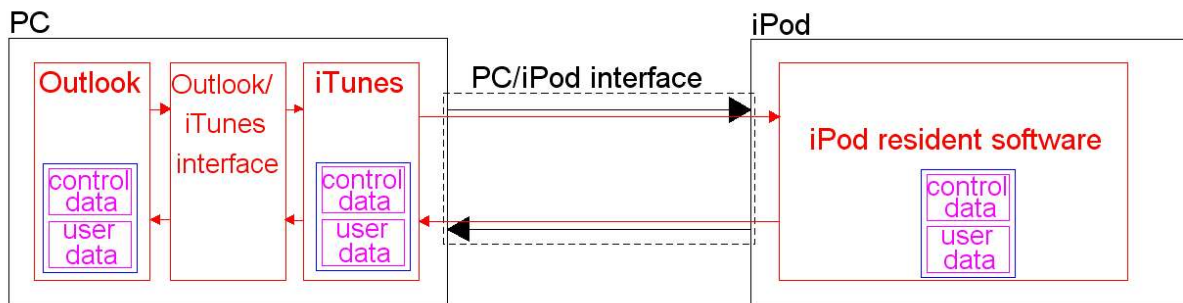


The PC/iPod touch® System View with Some Tips on Troubleshooting, version 1

By R. G. Sparber

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First, a disclaimer. I am self taught in this area so the following probably does have some errors. I welcome comments and questions that can improve this article.

I was in the midst of trying to figure out why changes to my calendar on Outlook® no longer appear on my iPod touch® 4th Generation, my wife's iPod touch 2nd Generation, or my iPad® 2. I had found a few potentially helpful articles on the support.apple.com site but ultimately, they did not help. More on this later.

Apple® supplied article HT1692² gives a series of procedures for troubleshooting contact and calendar syncing problems via USB. HT1925³ explains how to remove and reinstall iTunes and related software components. The problem I started to have was in seeing "the forest" with all of these "trees" lying around. So here is my attempt at the forest.

¹ You are free to copy and distribute this document but not change it.

² <http://support.apple.com/kb/ht1692>

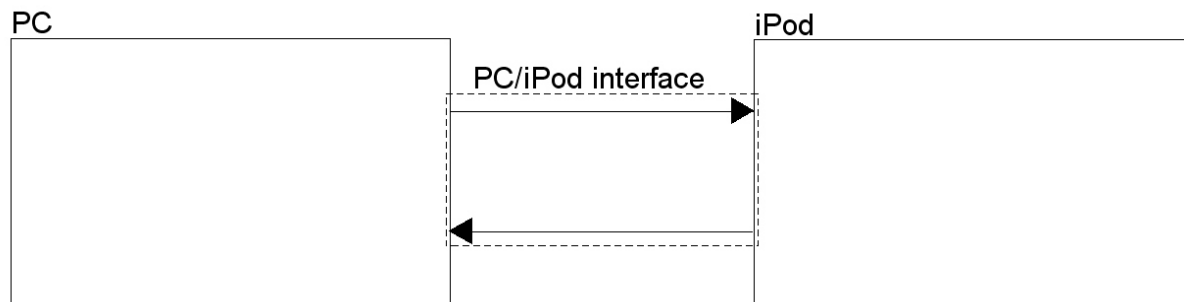
³ <http://support.apple.com/kb/ht1925>

The Bits

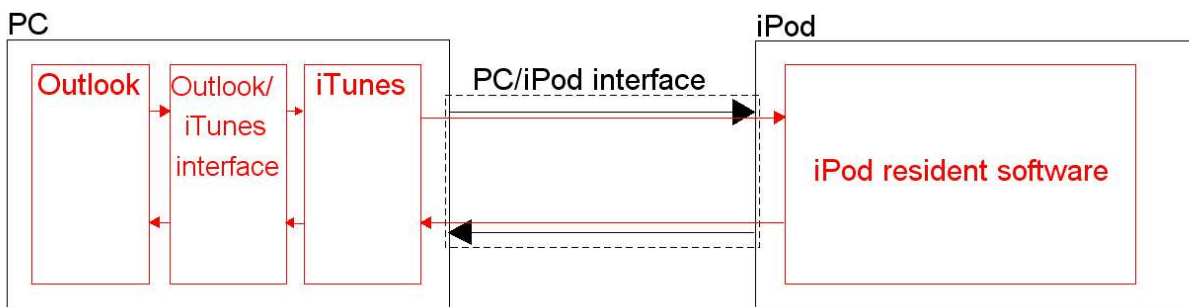
In order for me to visualize what could be wrong with the system, I must first understand the bits and how they fit together. This also helps me to see what is not likely to be the problem. Note that a failure to sync can be related to any of the following parts or to a combination of them.

Since my problem exists with both the iPod and iPad, I will limit the following discussion to just iPod. My guess was that when I fixed it for one, the other would work. That turned out to be true.

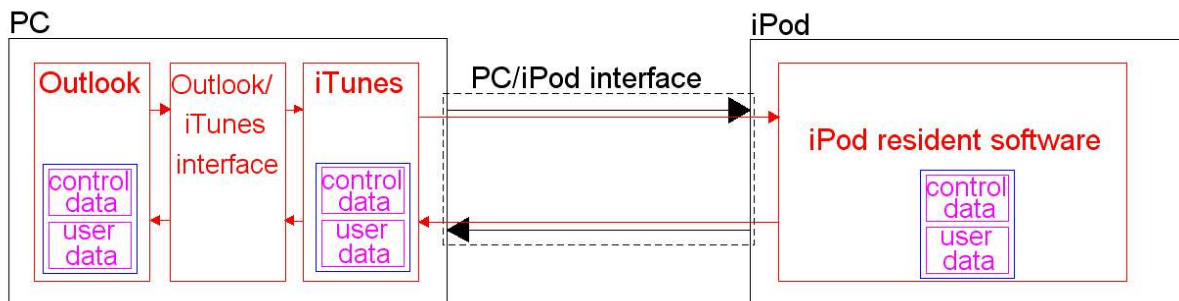
- The PC/iPod System consists of three parts:
 - Hardware
 - Software
 - data
- The hardware has three parts:
 - PC
 - PC/iPod interface (the USB to iPod cable)
 - iPod



- The software runs in two places:
 - on the PC
 - on the iPod
- PC resident software has three parts:
 - Outlook[®]
 - Outlook/iTunes interface
 - iTunes[®]
- The iPod resident software can be considered a single part.



- The data is a bit more involved. At the highest level we have:
 - Outlook data
 - iTunes data
 - iPod resident data
- But each of these can be further subdivided:
 - control data
 - user data



An example of iTunes control data is the sync history file, Conflicts.syncconflict⁴. It holds the identification of user data entries that differ between the iPod and the PC. The user will be prompted to identify which version of this data is to be kept. Part of the HT1692 procedure is to clear this file.

Debugging Techniques

As I tried to figure out a debugging strategy, I periodically reviewed the the block diagram I drew of the system. They help me define tests that will clarify possible sources of the failure.

The overall approach is to find a change that causes the problem to *reliably* come and go. Sometimes this is easy but most of the time it is not. But without recognizing all of the possible parts that can cause problems, troubleshooting can be near impossible.

Some problems come and go as a function of a set of conditions. You might see the problem only once a week or only when you wear a certain colored shirt. Be wary of jumping to conclusions.

Say you do suspect that your favorite green shirt causes sync to fail. Then you should be able to put that shirt on and get a sync failure, change into that blue shirt, see no sync failure, and then change back to your green shirt and get the failure *every time*. If you can demonstrate this correlation, say 10 times in a row, then I will believe that that green shirt is somehow related to the problem. But if the problem only shows when you wear your green shirt and a certain USB cable, focus on that cable. With so many potential variables, it helps to remind yourself that the simplest explanation is often the right one.

The toughest problems are the ones that occur on rare occasions. If you see the problem once a month, it could easily take a year before a pattern emerges. In these cases, finding a way to get the problem to occur on command is more valuable than fixing the problem and not realizing it.

⁴ On my PC, I went to C:\Documents and Settings\Rick\Application Data\Apple Computer\Sync Services\Local\Conflicts. You should see the file Conflicts.syncconflict. Be sure you make visible all hidden files.

Debugging Hardware Problems

There are two kinds of hardware problems:

- hard failures
- soft failures

A hard failure is one that does not change over time. For example, if the USB cable is broken, then it will not work every time you try to use it. This class of problem can be challenging to solve but it will not usually send you to the loony bin.

A soft failure is one that comes and goes. It might be a function of temperature such that the problem only occurs when the PC has been powered up for a long time. It might be a function of which software is using it or just be a random failure. This class of problem can drive you nuts and some people replace large chunks of the hardware just to isolate the problem. The frustration is if the problem is random and infrequent. You end up spending a lot of time and money trying to prove that the problem went away when it is just not revealing itself at the moment. In these cases I focus on finding ways to make the problem worse just so I can see it.

An essential starting point is to learn if the hardware configuration ever worked. If it never worked, then start with the really basic questions like hardware/software compatibility. The hardware may not be properly equipped or configured. It might even be too old for the needed software. If the system used to work but suddenly broke without any changes being introduced, then it is likely either the hardware failed or it is a software problem.

Swapping out hardware can be an effective approach but be careful you are not also swapping out software or data. If you can get the problem to come and go 10 times by swapping in and out just a piece of hardware, then you most likely do have it isolated.

I have found that software failures are far more common than hardware failures. However, you can usually fix broken hardware by replacing it. You can't really fix defective software. You can only re-set the clock until the failure occurs again.

Debugging iPod Resident Software and Data Problems

I have put this topic before PC resident software and data because it is so easy to reset the iPod's software and data. But first, a major word of warning. If at all possible, do run a back up of the iPod resident data. Failure to do this will cause all iPod resident data to be lost.

Assuming you are running iOS 4, you have a choice of resets within the iPod. Tap the Settings icon, select General. Scroll to the bottom of the screen and touch Reset. The first entry is Reset All Settings. This restores all iPod resident control data to its original factory settings. It will not touch user data.

The second entry is Erase All Content and Settings. This will erase all control and user data.

Debugging PC Resident Software and Data Problems

Start with the really dumb things. Did the system ever work? If not, there may be a more fundamental problem. Is the needed software compatible with the hardware? Is the needed software even installed?

If it used to work and now doesn't, then proceed.

Be sure you have the most up to date version of the software. Check that the PC's Operating System is fully up to date.

There are many bits of software that make up the Outlook/iTunes interface. One easily checked set can be found by going to Outlook's top menu. Click on Tools and select Trust Center. Then click on Add-Ins. There are two Add-Ins supplied by Apple that are used for sync. The first is called iTunes Outlook Addin and the other is called Outlook change Notifier. They both must be in the Active Applications Add-ins list. If they are not, go to the bottom of the window where it says Manage: to the left of a drop down menu. If necessary, select COM Add-ins from this menu. Then click Go. You can then select the needed Apple supplied Add-Ins. It is prudent to close Outlook and restart it to be sure these Add-Ins become active.

Isolate the software from all other programs. At the very least, turn off all software except Outlook and iTunes. If that does not help, run in "Safe Mode" which turns off other software that automatically starts yet is hidden from the casual user.

Assuming that the software used to run, maybe it or the related data has been corrupted. Apple suggests you suspect the data first and only if that does not help, consider the software.

A simple way to swap out all control and user data is to create a new user login for your PC. This enables you to use the same software but new data. First do a back up of your iPod under your present user login. Then log off of your PC and log back on as this new user. Create a little new user data. Have one entry each in your calendar and contact list. The software will create new control data.

Do a sync.

If sync now works but did not under your old user name, then you likely have a PC resident data corruption problem. The software on the PC is most likely fine.

If the problem persists, you most likely have PC resident corrupted software. You can use Apple's article HT1925 to remove and replace the software. Note that deleting the software does not appear to disturb the user or control data associated with it.

Hopefully the problem is a "hard" failure. If the problem is a "soft failure" (i.e. comes and goes for yet to be determined reasons), you will have to switch back and forth between user identities enough times to convince yourself that the problem really does come and go. Failure to do this can cause you to chase phantom problems and waste a huge amount of effort.

Assuming you are confident that the problem is data related, move back to your original log in. We still don't know if it is control data or user data.

If it is user data, you should be able to isolate the problem to a specific kind of data. With luck, you will be able to isolate the problem to a single collection of data, like one calendar or one set of contacts. Sometimes an entry with a blank line at the top can cause problems. Other times a non-printing character causes fits. If you find no such problems, you can do what is called a binary search.

First, save a copy of the data for later use. Then delete the first half of your active test copy. If the problem persists, you know that the bad data might be in the first half. If the problem goes away, then you know the bad data is in the part of the file you just removed. Restore the file from your copy if your problem went away. Verify the problem has returned.

Delete the half that likely does not contain the bad data. Then divide the remaining data in half and again see if the problem stays or goes. Eventually you may be able to isolate the problem down to a single line of data. If so, go back to the full data set and remove this one line. If the problem goes away, then you might have found the root cause. Only time will tell for sure.

If the problem does not go away, then either you have a soft failure or more than one defect exists in the file. Leave the bad data out and start your binary search of the entire file again. No guarantee this will work but the odds are in your favor.

If you search the entire set of user data and the problem persists, then the root cause might be in control data. Apparently replacing the software does not replace the control data. However, if the software can't find the control data, it will generate a new set. A relatively safe way to hide control files from the software is to rename them. In this way you can put them back if there is a problem. Do not simply delete them until you are positive they are no longer needed.

My Particular Root Cause

For over a year, I have had my Outlook resident contacts and calendar files stored under Archive Folders rather than Personal Folders. I can't recall the logic of doing this but it worked. Suddenly, we discovered that our calendar entries were not being updated after a sync. After many hours of searching the web for answers plus thinking hard about the problem, I stumbled into this as being the root cause. I moved all of my contact and calendar files into Personal Folders and iTunes was once again able to find them.

I welcome your comments and questions. All of us are smarter than any one of us.

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