HP LaserJet Firmware Upgrades

Most people think of computers and printers as two completely different things. The computer manipulates and processes data; all the printer has to do is print the data. But most printers are not quite that simple. A typical printer actually contains a computer. It's not as versatile as the computer on your desk – it only does a few things – but those things are essential to the operation of the printer.

By itself, the "print engine" can only move paper and put toner (or ink) on the paper. The intelligence that interprets commands from the external computer (the one on your desk) and decides when to move the paper, where to put the toner, etc. (and also monitors the printer's general well-being and generates an error message when something is wrong) comes from the printer's internal computer, which resides on the two main boards – the Formatter and the DC Controller.

Like any computer, this one needs instructions – i.e., firmware – to tell it what to do and how to do it. As with any computer, this firmware is complex enough that it will occasionally malfunction, or run into a condition that was not foreseen by its authors. Then it needs to be replaced or revised or upgraded. How is this done (and where is the firmware in the first place?)?

Firmware is like software – it's basically a computer program – except that it's permanently stored on an integrated circuit chip called a ROM. In the early days, these ROMs were soldered directly into the Formatter board. Since they were proprietary (you couldn't buy just the ROMs), the only way to replace the firmware was to replace the entire Formatter board. And the only way to revise or upgrade the firmware was again to replace the Formatter – with an updated version. The ridiculous extreme of this was the HP LaserJet 5Si, which had 6 different firmware revisions, and hence 6 different versions of the Formatter board!

Somewhere along the line (perhaps after the 5Si), HP decided to put the firmware on a separate SIMM or DIMM (a small circuit board that plugs into the Formatter – the same kind that is used to add memory), which could be removed and replaced without replacing the entire Formatter board. Now firmware revisions involved only a new SIMM or DIMM rather than a whole new board. Most of HP's newer laser printers (the ones with 4-digit model numbers) have this type of firmware.

The next innovation was flashable, downloadable firmware. This firmware still resides on a chip that is soldered into either the Formatter or a DIMM, but it's a re-writeable chip. So no hardware at all need be replaced (unless the hardware itself has failed). You simply download a file from HP's website (at no charge) and then flash it to your printer through the parallel or USB port or the network. This overwrites the old firmware with the new version.

The details of this last step (flashing the new firmware to the printer) vary depending on the printer model, the operating system (on your computer), and the type of connection. These details can be found in a "read me" file that is downloaded together with the new firmware. Finding these files on HP's website can be a challenge, so we will guide you through the process, using the HP LaserJet 9000 as an example.

Suppose you want to download the latest version of the firmware for the HP LaserJet 9000. You would first go to HP's main website (www.hp.com) and click on "Software & Driver Downloads" in the lower right corner of the home page. On the page that this takes you to, select "Download drivers and software (and firmware)" as your task, then either type "LaserJet 9000" into the search window and click on the arrow to the right of the window, or use the categories listed at the bottom of the page to find the 9000. Either way, you'll get to a page that lists all versions of the 9000. Select the appropriate one by clicking on it, which takes you to the next page – operating system selection.

Here's where it gets tricky if you don't know the secret. Common sense would tell you to just select the appropriate operating system ("Windows XP" or whatever) for your computer -- and this works if you want to download a driver or other software. It also gets you to the firmware for a few printer models. But for most printers (including the 9000), you won't find any firmware downloads by doing this. The reason is that firmware downloads are, for the most part, independent of the operating system. So instead of being listed under any specific operating system, they're in another category: "Cross operating system", which is on the bottom under all the other listings. Select this one and you'll find your firmware (if you don't find it in either place, then there is no downloadable firmware for your printer – but in the case of the 9000, there is)!

Note that it's not completely independent of the operating system. For the 9000, there are three choices of firmware: one for Macintosh, one for UNIX, and one for all versions of Windows. At this point, just click "Download" next to the appropriate choice and you're on your way. For more details about what to do from here, refer to the "read me" file that accompanies the download, and to the following webpage:

http://h20000.www2.hp.com/bizsupport/TechSupport/Document.jsp?lang=en&cc=us&taskId=130&prodSeriesId=28650&prodTypeId=18972&objectID=bpl12018

Note that not all printers have flashable firmware. The following webpage lists which ones do, and what the most recent revision is:

http://h20000.www2.hp.com/bizsupport/TechSupport/Document.jsp?lang=en&cc=us&taskId=130&prodSeriesId=28650&prodTypeId=18972&objectID=c00096410

Note that there are two tables on this page. The first one lists "Software". This is not firmware – it's a list of printer drivers and other software for your computer. Printer firmware upgrades are in the second table. Also note that in this second table, the rightmost column says either "RFU" or "DIMM". "RFU" means that you can upgrade the firmware by downloading and flashing, as we have just described. "DIMM" means that you would have to replace the actual DIMM.

We have to take this table with a small grain of salt. It apparently hasn't been updated since May of 2004, so some of the newer printers aren't listed, and "current firmware version" may not be up to date (if in doubt, check the actual download page for the printer in question, as described above for the 9000 – the firmware version listed there will be the most recent revision). Also, it lists "DIMM" for two printers that don't normally have firmware DIMMs: the 4000 and the 4050. Both of these had the firmware ROMs soldered directly into the Formatter board. In the case of the 4050, there actually is a firmware upgrade DIMM (part number C4251-67905) that replaces and overrides the onboard firmware (there was also such a DIMM for the 3300 series), but we were unable to find one for the 4000, so that may be an error in the table. Nevertheless, it gives a good overview of which printers have upgrades available. Note that none of the older printers (model numbers with a single digit followed by letters or symbols, such as the 4+, 5Si, or 6P) are on the list – for all of those, you had to replace the Formatter if there was any problem with firmware.

Which leads us to the final question: under what circumstances would you want or need to replace or upgrade your firmware? One reason would be simply to upgrade to the newest revision (you can find your existing revision level by printing a Configuration Page and looking under "Firmware Date Code" or "Firmware Version"; the download page on the website will tell you what the most recent version is). Another reason would be chronic "49" or "79" errors (both of these are defined as firmware errors). Firmware problems can also cause a blank display, or a display that gets hung with just asterisks or blocks. These are all traditional Formatter-type errors, and one simple rule of thumb would be this: on any error or condition that would have induced you to replace a Formatter in the old days, try a firmware upgrade first (if one is available for the printer in question).

But since firmware can also cause all kinds of other weird symptoms (fax problems in the 3200, colored background on the page in the 4600, etc.), we would go further: unless the error is a paper jam or something that you can definitely associate with a specific part (for example, "50" errors are always fuser-related; "51" errors are always laser/scanner-related; etc.), it can't hurt to try a firmware upgrade, at least on printers that have free downloads. Kudos to HP for making these free upgrades available online.

To reiterate, the most common scenarios requiring or suggesting a firmware upgrade are:

· Chronic "49" or "79" errors;

· Blank display, or display that gets hung with blocks or asterisks;

· Any error or condition that would have induced you to replace the Formatter board in the old days;

· Any error or condition that cannot be definitely associated with some other part of the printer;

∗ Or, you just want to upgrade your firmware to the latest revision.

—Dennis Kosterman

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