Apex Promotes Solutions for Coping with OEM Firmware Updates

Firmware

If you are in the aftermarket supplies business, Apex Microelectronics wants you to know that the company has the expertise necessary to cope with OEM firmware updates. Moreover, the Zhuhai, China-based chipmaker has developed three different solutions to solve the problems posed by firmware upgrades.

It's All about the Chips

The firmware updates that printer OEMs periodically roll out for printers and MFPs might seem innocuous, but some can prevent the use of third-party supplies. This was brought to the forefront of the public's attention recently when an HP firmware update on certain OfficeJet, OfficeJet Pro, and OfficeJet Pro X from earlier in the year included a "time bomb" that suddenly caused certain aftermarket inkjet cartridges to stop working in mid-September (see "HP Inkjet Printer Firmware Update Disables Some Third-Party Inkjet Cartridges" and "HP Apologizes over Aftermarket-Cartridge-Killing Firmware Update, Will Offer Fix for Affected Customers").

When firmware updates do disable third-party cartridges, what they are actually disabling is the aftermarket chip used on these cartridges. This puts the onus for solving the challenges posed by firmware updates directly on chipmakers like Apex. However, firms that manufacture or sell third-party cartridges are also impacted by such updates. When a firmware upgrade locks out aftermarket cartridges, companies up and down the supply chain must scramble to replace inventories and deal with angry customers. The process of issuing product recalls and customer refunds, scrapping old inventory, and sending new product to customers can be enormously disruptive and expensive. According to Apex, firmware updates are a big enough threat that they can even put a company out of business.

With so much of OEM intellectual property centered on the chips used in cartridges and a third-party supplies industry dependent on fully functional and firmware-resistant chips to make their cartridges function, aftermarket chips are perhaps the most essential component of aftermarket cartridges today. As Apex told us in a recent interview, "The replacement chip is mostly the basis of the aftermarket."

Because firmware issues can cause problems with customers of aftermarket products, the ability for a chip manufacturer to quickly and effectively deal with a firmware issue is critical.

For manufacturers, this means chips are one of the few components that provide hefty margins. Demand for chips has helped Apex to flourish, and now the company is growing rapidly through acquisition. Apex, which is publicly listed on China's Shenzhen stock exchange, acquired rival U.S. aftermarket chip and component maker Static Control Components in 2015 (see "Apex Weds Static Control and the Reman Chip Industry Gets a Lot Smaller") and, with the help of other investment partners, is expected to acquire printer OEM Lexmark by the end of the year (see "It's Official: Apex to Acquire Lexmark").

But, as firmware updates demonstrate, being in the aftermarket chip business isn't all upside. In addition to having to cope with the effects of firmware updates in their chips, chipmakers are impacted when firmware updates cause customers

to lose confidence in—and even stop purchasing—aftermarket cartridges.

Firmware Woes

Apex explains that firmware updates are a huge problem for the aftermarket supplies industry today. The company states, "In recent years, we have seen printer manufacturers fix bugs through firmware upgrades, while some manufacturers are taking advantage of consumers by using firmware to limit the use of aftermarket consumables by 'locking out' the replacement chip. This tactic causes strain on the aftermarket. Because firmware issues can cause problems with customers of aftermarket products, the ability for a chip manufacturer to quickly and effectively deal with a firmware issue is critical."

Apex provided us with a table exploring some recent OEM firmware updates from

Recent Printer Firmware Upgrades

Printer Model	Cartridge Model	Region	Date	Affect Aftermarket or Not?
Brother MFC-J4625DW	LC223/LC225/LC227	EUR	July 2016	no
Epson WF-2760DWF	T1621-1624/ T1631-T1634	EUR	July 2016	yes
Epson Expression Home XP-235 Epson Expression Premium XP-530 Epson EP-10VA Epson PX-048A Epson Expression Home XP-235	T29/T29XL/T33/T33XL /YTH/RDH	EUR/JPN/AUS	August 2016	no
HP Officejet Pro 6830 HP Officejet 6812	934/935		September 2016	yes
HP Officejet Pro 8100 ePrinter HP Officejet 6100 ePrinter (H611a) HP Officejet Pro X451dn HP Officejet Pro 3610 HP Officejet Enterprise X555xh/dn HP Designjet T120 HP Officejet Pro 6230 ePrinter	950/932/970/960/980/711/934	WW	September 2016	yes
HP Officejet Pro X576dw	970/971		July 2016	yes
Samsung Proxpress M4070FR	MLT-D203	EXP/EUR DOM/MEA/ CHN	July 2016	no
Samsung SL-C430W/C430/C432W	CLT-404	DOM/EUR/EXP CHN/MEA/AME/CIS	July 2016	yes
Samsung SL-M2023/M2029	MLT-D112S	EXP/EUR DOM/MEA /CHN	June 2016	yes

Source: Apex Microelectronics

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Brother, Epson, HP, and Samsung. Of the nine updates that Apex highlighted, six impacted aftermarket cartridges.

While by no means do all firmware updates lock out aftermarket cartridges, firmware updates are numerous, and analyzing whether these firmware updates will have any effect on third-party supplies takes resources. For example, Apex tells us that from July 2015 and the October 2016, Brother, Canon, Epson, HP, and Samsung rolled out 871 updates (see chart below). Again, only a small percentage of these impacted aftermarket supplies, but that is It seems that there is a "rule of three" operating when it comes to firmware updates. Apex explains that there are both three major types of firmware updates employed by OEMs and three common ways to deliver the firmware upgrade.

The three major types of firmware updates are:

1. those aimed at command algorithms;
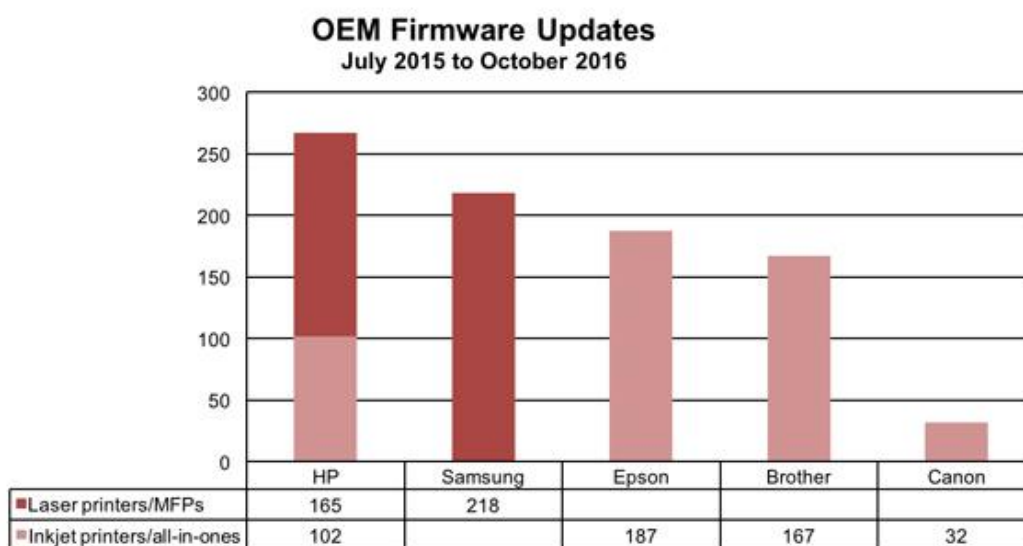
2. those focused on chip data; and

3. those centered on the chip's parameter and performance.

According to Apex, although the first type of upgrade—a command algorithm upgrade—is the least common, only accounting got about 20 percent of all updates, these tend to be the most severe. This type of update requires a complete redesign of the replacement chips. Apex states, "For chip manufacturers, that means a new development project with all the costs associated with it."

The three ways firmware updates reach printers are:

1. through the printer manufacturer's website;

2. downloaded via an Internet connection through the printer's interface; and

3. the upgrade is pre-installed on new printers.

Apex warns that firmware upgrades can also occur when service providers or after-sales outlets repair or fix a printer. The company emphasizes that while

OEM Firmware Updates
July 2015 to October 2016

	HP	Samsung	Epson	Brother	Canon
Laser printers/MFPs	165	218			
Inkjet printers/all-in-ones	102		187	167	32

Source: Apex Microelectronics

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Apex has developed some new solutions that enable customers to better cope with the near-endless stream of firmware updates for printers.

these are the ways it is seeing firmware updates delivered now, other ways may arise in the future.

Apex says that there are several types of firmware upgrades that block the use of replacement chips. Different OEMs use different types of updates and delivering them in different ways, even from region to region, and keeping track of all these details is challenging.

Apex's Strategy

Apex says that its strategy for coping with firmware updates is centered on prevention. That goal is reflected in its aim of designing firmware-resistant chip solutions. Another key part of the firm's prevention strategy is that Apex has established an internal group dedicated to "monitoring the movement of firmware upgrades." It is that group which collected the data for the table and charts shown above.

When this group detects that a firmware upgrade blocks the use of a replacement chip, Apex's engineers go to work to perform an analysis of "the crux of the upgrade." Typically, this involves classifying the firmware update to see if it is aimed at data, software, or hardware.

Apex explains, "After finding the crux, our project team will give the solution and keep finding the potential upgrade risks."

Three New Solutions

In addition to the work Apex does to design chip solutions and redesign those chips as necessary in the wake of problematic firmware updates, Apex has developed some new solutions that enable customers to better cope with the near-endless stream of firmware updates for printers. We found it fitting and in keeping with the firmware "rule of three" noted above that Apex is offering three such solutions.

The first is a free mobile app called Apex Support. It is available for Apple and Android devices. The app is offered in both English and Chinese. Apex explains that the app provides information on firmware versions and printer models (including regions and launch dates). After customers are notified about a firmware update that may impact their cartridges, they can then test their cartridges in stock to see if they work. If the firmware locks out aftermarket cartridges, they can take action and warn customers not to upgrade the firmware and stop selling the affected cartridges

A screenshot from Apex's website, where it is promoting the Apex Support app.

Apex hopes the aftermarket industry will realize the seriousness of the threat and take advantage of the tools it is offering, including the free new Apex Support app and the Unismart and ActivKit resetting solutions.

right away. Getting up-to-date information on firmware updates can help customers reduce the negative impact of these updates. Apex Support also include information on Apex news and new product development.

Apex also offers its patented Unismart chip-resetting tool. Apex says that when a firmware update blocks a replacement chip from working, the Unismart tool can reset the chips and solve problems that a firmware update may cause to a chip's data and command algorithms. The Unismart tool works on both OEM and Apex chips. Apex claims it can reset over 900 different OEM chips and 90 percent of all Apex's chips.

Another new solution from Apex is ActivKit, a compact chip-resetting tool that is specifically designed to solve chip data problems caused by firmware upgrades. ActivKit is equipped with an Apex-patented system on a chip (SoC). It works by changing serial numbers and reprogramming chip data.

Something to Watch

Firmware updates and their effect on the aftermarket supplies industry are something we will be watching closely moving forward. As Apex points out, firmware upgrades are one more tool in OEMs' arsenal to combat the aftermarket, and, when it comes to shutting down aftermarket competition, firmware updates can be less expensive than and just as effective as filing a series of lawsuits. For chipmakers like Apex, closely monitoring the latest firmware updates and devoting the R&D necessary to combat them has become an essential part of its business. The company hopes the aftermarket industry will realize the seriousness of the threat and take advantage of the tools it is offering, including the free new Apex Support app and the Unismart and ActivKit resetting solutions, to make sure they are ready to cope with the firmware updates sure to be headed the industry's way in the future.

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