

# Manufacturing Innovation Insider Newsletter

## Eliminating the Phantom-Problem Service Call with Line Power Conditioning

Now that electronic power conditioners can provide "computer grade" power at the same price point as surge protection alone, copier dealers can cost-effectively reduce service visits by as much as 40%.

"Yes, there is a ghost in the machine!" As much as a copier dealer would like to blurt out this statement to a "problem" customer who keeps calling to complain that their copier isn't working, the vendor, instead, must bite his or her tongue and send a service tech out to the site, knowing full well that nothing will show up. Most office-systems integrators are equally aware of machines that inexplicably spew error codes, costing wasted time and money on service calls that come back as "no problem found."

Yet, with increasing frequency, dealers and integrators are exorcizing such demons through the use of power conditioning units that filter "dirty" line power into "computer grade" power that allows the machine to operate as designed without the temporal damage caused by frequent spikes or over-voltages. The fact that new innovations have now brought the price of full-featured power conditioning units down to that of simple surge protectors means that dealers and integrators can cost-effectively reduce unnecessary service calls while increasing customer satisfaction.

"The feedback from our dealers is that when they follow our recommendations of using a good quality line filter, they have experienced a decreased number of service calls; which has increased their bottom line and improved customer satisfaction," says Anthony Loguidice, Assistant VP of Service for Sharp Electronics of Canada Ltd.

### The high cost of "wild goose chase" service calls

Like taking an intermittent car problem to the mechanic, only to have it suddenly behave when he pops the hood, unnecessary service calls have long



*Electronic power conditioners, such as SmartPower's Copier Guardian (pictured), now provide "computer grade" power at the same price point as surge protection alone.*

been the frustrating bane of office-equipment dealers. By some accounts, as much as 60% of the profit margin for some dealers stems from selling service contracts, so the less calls the dealer has to go on, the more money he or she keeps.

"Since it is typical within the copier industry that when a customer signs a maintenance agreement, they pay for service based on how many copies they make — as opposed to how many trips the dealer makes — it is obviously in the best interest for the dealer to make sure the up-time of the machine stays as high as possible," notes Loguidice. "Otherwise, every time they have to go out and do a service call, it's an expense."

Since each call can cost a dealer as much as \$100 in labor and gas, the toll can quickly mount when machines throw errant codes for untraceable reasons.

"If you're using your good technicians for recur-

ring problems that are difficult to interpret or fix, then you can't handle more machines with 'real' problems that are fixable — this is a big issue for us," says Bob Schoon, President of Schoon Corporation of San Leandro, California; celebrating 30 continuous years in the copier-fax-printer business. "Besides, in the San Francisco area, you have to pay a lot of money to keep a good technician; if you can find one."

### Identifying the culprit: "dirty" power

While every tech can readily spot the damage caused by a large power spike, such as a lightning strike, the insidious effects of power surges (less than 200 volts) can prove more difficult to pinpoint. According to studies by well-know manufacturers and independent labs, 87% of power-related component failures result from a low-voltage spikes and surges that cause "logic confusion," which yields system errors and frozen screens.

"Everyone has had their computer lock up on them, and the same thing can happen with a copier," explains Sharp's Loguidice. "Most photocopiers today are MFPs, and since they have lots of digital circuitry the environment plays an important factor in the reliability of the machine; and one of those things in the environment is the electrical power. If there's spikes and surges on the line it can cause things like copy quality issues, paper jams and a lot of odd problems."

"We're not in a metropolitan area, so our customers are served by rural electric co-ops that are notorious for brownouts and power surges," says Shana Ward, President and CEO of Tri-Valley Digital Imaging, Inc. (a division of BMA Digital Ventures, Inc.), a document imaging expert in Brenham, Texas. "Our business is 90% copier, and a lot of times we would see machines act normal here in the shop, but then we would install them back in the field and not a day later they would be 'possessed' again. Different copies throw various error codes when we would have abnormal power cycles, and in some cases the machine just stops working."

Even copiers in big cities suffer from the immediate effects of power surges and lags from line-voltage

variations within the building, such as when an HVAC system cycles on and off or an elevator starts and stops.

"Surprisingly, San Francisco has some of the worst wiring; the neutral voltage is always all over the map," says Schoon. "We've had copier machines installed next to a laser printer, next to a fax, and near a whole bunch of stuff going on and off, and it would give us fits. The codes would say the copier would need toner when it didn't, or it was out of paper when it wasn't."

### Technology to the rescue

In the past, standard surge protectors have been used to protect against catastrophic high-voltage spikes. However, they are not "intelligent" enough to handle the relatively small over- and under-voltages that momentarily disrupt copiers and other office machines. At the other end of the spectrum, older-model "filters" have been available to help avoid some power surges; however, their poor performances couldn't help to solve most of power problems. Given these limited options, the inexpensive price of simple surge protectors had previously made them the usual option among some copier dealers. Until now.

Recent technological advancements in the field of power conditioning have now yielded devices that provide "computer grade" power — a clean, filtered power supply to the copier — at the same price as limited-function surge protectors; which is far below that of expensive "traditional" filters. Known as transformer based filtering (TBF) devices, their protective feature set is such that some copier OEMs have already recognized the benefits and started recommending TBF devices over old-fashioned filters or simple surge protectors.

"One of my main responsibilities is to support our dealer network to make sure we provide them with proper resources and information on how to better manage the service side of their business, including top line and bottom line growth," says Sharp's Loguidice. "So, for three years now, I've been highly recommending the use of power conditioners from SmartPower Systems to all our dealers. By putting

this product on the line you can actually eliminate many reliability problems.”

Located in Houston, Texas, SmartPower Systems has traditionally been an innovator of hi-performance power conditioning and UPS products for the mission critical market. But in 2002, Smart Power developed a new circuit and patented the third generation of its “TBF” for digital technology that creates “electronic power conditioners” with more features, such as prolonged over-voltage protection (POVP).

TBF technology uses a small transformer and a “smart” electronic circuit that includes transistors, thyristors, capacitors, and relays to handle power conditioning duties. This intelligent digital circuitry provides greater functionality as a traditional power conditioner costing as much as \$1,000.00.

While TBF units still provide basic protection against massive spikes up to 6000 volts (via a metal oxide varistor) as well as small spikes and surges, they provide three additional levels of protection. For instance, the circuitry constantly monitors the line power. If it goes too high (>160VAC) for more than 5 cycles (80 milliseconds) — which is powerful enough blow out the power supply and motherboard of most copiers and fax machines — then it cuts the power off to the protected device. In either case, it leaves the power off until the cause is isolated. This prevents any further damage to the machine.

With some copiers, once the power is cut off, the software may have to be reloaded by the dealer. Yet, this task exacts a far less onerous toll than having to replace a motherboard or another major component were the excessive power to stay on continuously. In the case of the later, over \$1,000-worth of damage to a machine can occur in a second, and the dealer still has to reload the software anyway.

Unlike regular filters and surge protectors, new TBF technology is also capable of identifying miswired outlets. If a ground wire is loose, or the polarity between neutral and hot is reversed, a red warning light goes on and the TBF device will not let the power reach the protected machine. By this means the machine is doubly protected, while reducing the very real



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risk of shock to office personnel.

The digital circuitry in TBF “electronic power conditioner” also filters out induced noise (EMI and RFI). This is particularly important since excessive noise decreases the speed of data transmission. For instance, TBF comes in a model specifically designed to help eliminate zero cross problems in copiers.

Since all of this functionality occurs without the need for heavy isolation transformers, units such as SmartPower Systems’ Copier Guardian TBF manage to compress all this functionality into a 17-ounce package the size of handheld cassette tape recorder. Built-in RJ11 and RJ45 connectors extend protection to telephone and network lines.

### **Demon be gone!**

The use of TBF power conditioners by some early-adopting dealers has already proven to reduce service calls.

“Of most value to use, the SmartPower TBF is especially important during initial set-up, where the device eliminates problems right off the bat,” says Bob Schoon. “If the outlet isn’t wired correctly, the TBF won’t let the power through until the wiring is fixed.”

“In the San Francisco Bay area, we observe that the wiring is incorrect in 15-20% of the cases,” continues Schoon. “For example, we had a machine in place at the local municipal utility district and it was giving us all kinds of fits. We couldn’t replicate the

problem during a service call. So we put in a TBF and it indicated that the wiring to the outlet was wrong. They had their electrician check it out and sure enough, the polarity was reversed. A basic surge protector would have powered up this machine anyway, but then that's how these other issues and problems crop up in copiers, especially as they get older."

"Copiers would make copies by themselves and cash registers would throw error codes; but it wasn't until we started using the SmartPower TBF units that these problems cleared up for us," says Ward of Tri-Valley Digital. "We have customers that are two-and-a-half hours from us. To risk having to drive that far to clear an error code caused by under- or over-voltage is absurd. I truly would not trust anything else. These units have literally worked miracles for us."

"If a copier dealer were in San Francisco, where we have lots of dirty power, they could reduce service calls by 50% using the SmartPower TBF," adds Schoon. "In some of the newer areas, where the power is more straightforward, it might depend upon what else is on the circuit. There a dealer might see a 10-15% reduction. With one fax machine, if it wasn't for the TBF, we would have had to make five calls within six weeks, and we would have lost money on that job. The lower price point makes it a no-brainer to make sure you have a power conditioner on the line."

### **A talisman for warding off "ghosts?"**

As TBF units prove their value in reducing service calls and increasing customer satisfaction, some dealers simply absorb the small cost of attaching one to every office machine as opposed to trying to explain intangible electronic theory to a customer.

"These little units have saved us so many times that we do not lease or sell a machine, copier or fax, without a SmartPowr TBF," continues Schoon. "Even if it is a contract machine, we send the TBF out on our dime and then retrieve it when the contract is up. This is a very small investment to retain customer confidence and reduce our repair calls."

"I am an independent Ricoh dealer for a 14 county area, and you'd better believe that not a single copier machine will leave this building without the appropriate TBF in place," says Ward. "The fact that we incorporate the cost of these filters into the job says a lot. We don't even mention it to the customer."

"What I tell our dealers that are skeptical, is to take their two least reliable machines they have out in the field, and put a SmartPower filter on them and see what happens. A lot of them have done it, and have noticed the improvement," says Sharp's Loguidice. "The price, the reliability, and the feature set of the product is very good. While promoting it to our dealers, we also practice what we preach. We have our own direct sales force and every machine that we install comes with a power conditioner. That is mandatory."

*Who you gonna' call? For more information on power conditioning, contact Smart Power Systems, Inc. at 1760 Stebbins Drive; Houston, TX 77043; (713) 464-8000, fax: (713) 984-0841; or [www.smartpowersystems.com](http://www.smartpowersystems.com).*