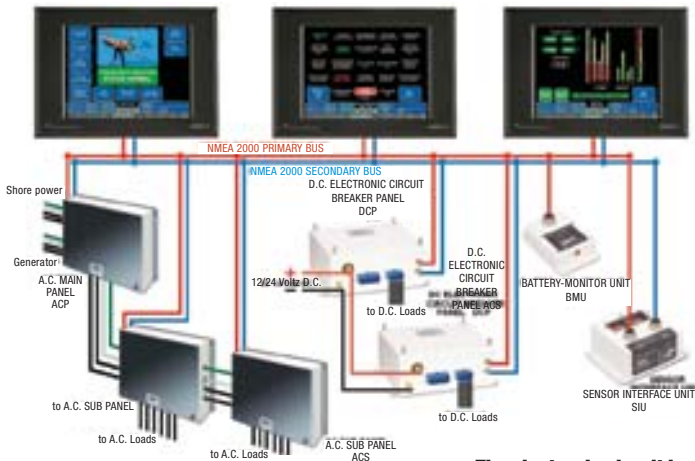


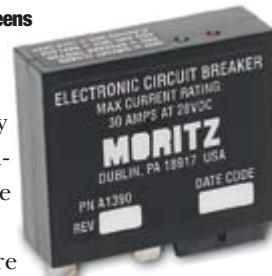


# Electronic Electricity



## INSIDE OCTOPLEX, AND WHY YOU NEED TO KNOW WHAT A MOSFET DOES.

The electronic circuit breaker at right means a boater can manage power with the touch screens above instead of a traditional breaker panel.



You know the look and feel of a standard marine circuit breaker because you probably manhandle racks of them every time you go boating. Now, notice how the new-fangled electronic version above just has LEDs where the manual handle should be. Well, that little difference, and the many subtleties rippling around it, is key to what looks like a coming revolution in yacht electrical systems. It's a revolution that's going to take us from the breaker panels we're all familiar with to something like the intriguing OctoPlex touchscreen pictured below. The general concept goes by many names—distributed power, multiplexed power, and the three-cable boat, to name a few—and it's loaded with attractive features like radically reduced wiring, advanced monitoring, automated load management, and snazzy light dimming. Heck, it could eventually even make boats less expensive to buy and maintain! But, head's up—controlling electricity electronically also means that

an essentially simple technology is about to get a lot more complicated, and hence potentially more unreliable.

While all sorts of companies are developing digital switching and distribution products for boats, OctoPlex will serve well to illustrate an overview. For one thing, its ambitious developer, Moritz Aerospace, has seemingly included all possibilities, as hinted at by the system diagram above. The 6.5-inch screen can potentially do more system

protection and management than a whole bulkhead of traditional A.C. and D.C. breaker panels, and you can have control heads wherever you want. But Moritz is also pleasingly paranoid about how this could all go wrong and has built in fail-safe redundancy that was impressively explained to me by OctoPlex's head cheerleader, Richard Sorenson, a gentleman about as deep into boat electricity as a guy can be.

Sorenson is the CEO of Carling Technologies, which was founded by his grandfather, and which quite possibly manufactured the conventional switches and circuit breakers that are in your boat right now. Sorenson himself has some 45 patents in the field, and is also a darn serious boater, currently owner of an 82-foot Hatteras with a 117-foot Hargrave in production. As he realized the inevitability of multiplexed electrical systems, he had Carling acquire Moritz, already experienced at modernizing critical electrical systems. Now he's OctoPlexing the



Advanced electronic power control : Octoplex (above) can even manage load shedding on a yacht with two shore power cables.

# Electronics

Hargrave from stem to stern and has developed an infectious enthusiasm for the technology.

To best explain distributed power, Sorenson starts with that familiar manual circuit breaker. It's actually a very competent device, able to steadily feed a certain amount of electricity out to whatever's on its circuit, but it's also able to instantly stop that flow—literally put an air gap in it—if the amperage used

## Q

**Is it true that you can ruin some electronics screens with regular cleaning products like Windex and paper towels? T.S., via e-mail**

It sure is, as PMY painfully learned last summer when a zealous but naïve boat cleaner left permanent swipe marks on a Raymarine C120 installed aboard our Luhrs 41 convertible. We don't know what exact cleaning product was used, but the results didn't wipe off and were nearly impossible to see through. It was a vivid lesson about how much more delicate coated-glass screens are than their plain-glass predecessors. The coatings, which are common these days, reduce glare and increase contrast, but only if they are treated with great care. In fact, if you check your manual, it likely advises you to clean your screen only with a damp cloth using mild soap and water. Raymarine product manager Louis Chemi adds that in his personal experience, a key concern is the danger of wiping abrasive salt crystals across a display. His tools of choice are a spray bottle of fresh water for flushing away the salt and a camera-lens cloth for gentle wiping.

George Kioutas of Argonaut Computer says he "could write a book on cleaning and maintaining coated glass!" He warns against harsh cleaners like Windex and also against reusing cleaning rags, especially if there are even traces of oil, grease, or silicone on them. He says rubbing alcohol is safe on most antireflective screen coatings, and paper towels are okay if new and pressed lightly, but what Argonaut uses during manufacturing are screen cleansers and wipes from Kensington Technology ([www.kensington.com](http://www.kensington.com)). Kioutas also notes that most manufacturers apply a hydrophobic top coat to their screen glass, which resists water stains, grease, and finger smudges. But the coating can wear off over time and make the screen harder to clean and more susceptible to damage. The good news is that commercially available Rain-X ([www.rainx.com](http://www.rainx.com)) is essentially the same thing. Kioutas recommends applying this treatment to a thoroughly clean screen every six to 12 months. Thanks, Kioutas and Chemi, and let's all remember to treat our nice screens nicely.

Got a marine electronics question? Write to Electronics Q&A, Power & Motoryacht, 260 Madison Ave., 8th Fl., New York, NY 10016. Fax: (917) 256-2282. e-mail: [PMYElectronics@primedia.com](mailto:PMYElectronics@primedia.com). For fastest response, visit the Electronics forum at [www.powerandmotoryacht.com](http://www.powerandmotoryacht.com). No phone calls,

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# Electronics


**NEW**

## MAGELLAN WIRELESS SECURITY SYSTEM

A new Florida company, Edgewater Technologies, has cleverly modified a wireless home security system for yachts. Paradox's Magellan line already included easy-to-install wireless door sensors, smoke alarms, and pet-immune motion detectors; Edgewater added wireless high-water detection and voltage monitoring, as well as enabled the control head (left) to communicate via a specialized, fixed GSM cellular phone or via your vessel's satellite phone, in addition to or instead of a marina's

landline. The verbal reports can go directly to phones you specify or to Edgewater's worldwide call center. Magellan can also control lights, air conditioning, or whatever when you send commands either with a short-range wireless remote or over the phone, guided by voice prompts. The control head can even be used as a regular speakerphone.

A typical Magellan system starts at around \$2,000, and the wireless sensors will greatly reduce installation costs. Eventually networked systems like the one described in the column will make off-boat monitoring and control even easier and more powerful.

**Edgewater Technologies** ☎ (866) 929-4441. [www.edgewatertechnolo-](http://www.edgewatertechnolo-)

ers find circuit breakers so useful that we often mount the panels right in our saloons—quite unlike the panels in our basements, which are generally ignored—and use them to monitor and manage our complicated system of A.C./D.C. power sources and uses.

So we like our panels, but aren't things getting a bit bizarre? I've been in otherwise-elegant saloons where the main panel is the largest (and oddest) piece of wall art. And the amount of wiring running behind one has gotten ridiculously bulky and inefficient. Routing, say, the juice for some engine-room fans all the way from the batteries to the panel and back below doesn't really make sense. Especially if you can now put an electronic circuit breaker (ECB) efficiently close to batteries and fans and then run it via a data cable that can also link other ECBs with multiple control panels. In

exceeds a certain threshold, a threshold threatening heat, fire, and worse down the line. A breaker also makes an excel-

lent off switch, protecting the boat and batteries from leakage or a troubleshootinger from shock. In fact, we boat-

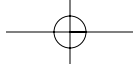
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# Electronics



**NEW**

## MASTERVOLT MASS GI ISOLATION TRANSFORMER

An isolation transformer is a valuable tool for protecting a boat against galvanic action, dangerous shorts, and other electricity problems when plugged into shore power. But up until now, such transformers have been bulky and noisy. Mastervolt's new Mass GI is an amazing 75 percent lighter and 60 percent smaller than its predecessor and is reportedly so vibration-free that it doesn't even require rubber mountings. The trick—which has already quietly revolutionized other power boxes like battery chargers and inverters—is the use of high-frequency electronics switch technology in lieu of massive linear transformers. A single 13-pound Mass GI can handle 16 amps of shore power (anything from 90 to 255 volts), and multiple \$885 units can be paralleled to get the total capacity desired. The device supports remote monitoring and even automatic genset starts; in fact, Mastervolt is about to unveil an entire power communications system it says is easily connected to NMEA 2000 called MasterBus.

**Mastervolt USA** ☎ (207) 354-0618. [www.mastervoltusa.com](http://www.mastervoltusa.com).



fact, picture just three cables—plus, minus, and data—feeding a box of ECBs that control numerous nearby circuits. That's the essence of efficient distributed power but by no means its only attraction.

You see, the technology behind a true ECB, called MOSFET (for Metal Oxide Semiconductor Field-Effect Transistor), is much better at moni-

toring than a conventional mechanical breaker. A MOSFET can not only detect an overload and break the connection, but it can also precisely measure the voltage and amperage passing through it during normal operations. Therefore, a microprocessor talking to a MOSFET can know, for instance, if those fans actually run

when you turn them on, or even if a failing bearing is causing an abnormal load. MOSFETs can also control amperage, which means they can efficiently dim whole light circuits. As you understand these attributes, you *start* to comprehend what's possible with a system like OctoPlex.

Though even Sorenson says, "We're

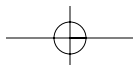
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# Electronics


**NEW**

## KVH TracVISION M3

Though its new 14.5-inch stabilized M3 antenna is the world's smallest—40 percent smaller than competing 18-inch antennas—KVH claims that the M3 can pull in crystal-clear DirecTV even on boats as small and “dynamic” (bouncy!) as 25 feet. The antenna installs with a single cable and is said to be quiet. The system comes with KVH's new 12-volt marine TV receiver, another first, and also includes a powerful RF (radio frequency) remote control. Once installed, the \$4,995 TracVISION M3 will automatically connect to DirecTV's 300 channels of programming, which these days include more than 50 channels of XM radio music, and it should stay locked on as far as 200 miles offshore.

**KVH** ☎ (888) 584-4163. [www.kvh.com](http://www.kvh.com).



still discovering things we can do with this!” Once you can control and monitor electric circuits with a data network and microprocessors, the sky's the limit. For instance, a wall switch on an OctoPlex boat doesn't just turn a fixed set of lights on or off; instead it goes back to the

control head, where it activates a customizable program of X many light circuits with individual dim settings. And whereas an ECB can tell from the increased current draw when there's water in the bilge, a smart system like OctoPlex can automatically manage the pumps

plus keep their history and set off ship-wide alarms if something is amiss.

OctoPlex is particularly interesting because so far it's the only distributed power system also handling A.C. circuits, though it's not yet practical to do this with MOSFET. Instead, OctoPlex uses remotely actuated breakers, i.e. solenoids pushing regular manual handles. That's a little crude, but OctoPlex can still monitor total vessel power use and shed specific A.C./D.C. loads if total amperage demands get too great or when low voltage threatens certain sensitive equipment. The screen on page xx shows how this sort of sophisticated and valuable power management is set up.

Once you have a system like OctoPlex strung around the boat, why not use the color screens and computer power—OctoPlex runs under Windows—to monitor tanks and other nonelectric

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# Electronics

systems? Moritz builds Sensor Interface Units for this purpose, plus OctoPlex uses industry-standard NMEA 2000 protocols for its data networking, which means easy interconnections with a growing list of engines, navigation gear, and—most interesting—power devices. Companies like Xantrex and Mastervolt are starting to make NMEA 2000-aware inverters, chargers, etc.

So the sky's the limit, but isn't it a little crazy to use a computer to turn on your navigation lights? How many ways can a



**Sandy and Rick Sorenson, who currently own this 82-foot Hatteras, are making their next yacht, a 117-foot Hargrave, fully OctoPlexed.**

system like OctoPlex fail? I liked it that when Sorenson painted a worst-case scenario, like losing all your systems at once while running an inlet at night, there was no doubt that he could really picture the desperate scene. Hence, OctoPlex is seriously failsafe. For instance, while NMEA 2000 cabling is already exceedingly rugged, OctoPlex nonetheless has a redundant secondary network. Both networks are constantly monitored and, even if you somehow axed both backbone cables, all active A.C./D.C. breakers stay on and continue to protect their circuits. In fact, the D.C. breaker boxes have redundant backup power supplies to keep the ECBs alive (the A.C. breakers are not, as noted, MOSFETs). Moreover, OctoPlex monitors each D.C. ECB to see that it doesn't fail in the on position. Supposedly a MOSFET rarely does that, but OctoPlex is ready to blow a secondary fuse to prevent any chance of fire or shock.

Those features and all that backup is why OctoPlex is an expensive system that you will first see on vessels from the likes of Viking and (surprise) Hargrave. But you will start seeing MOSFET-based power technology on many new boats, and hopefully you're now better prepared to understand what it can do for you and how it needs to be protected from itself.

**Moritz Aerospace** ☎ (860) 793-7786. [www.moritz.aero.com](http://www.moritz.aero.com).

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