

# WIRED TO WIN

## The Latest in Race-Car Switch Panels

by Evan J. Smith

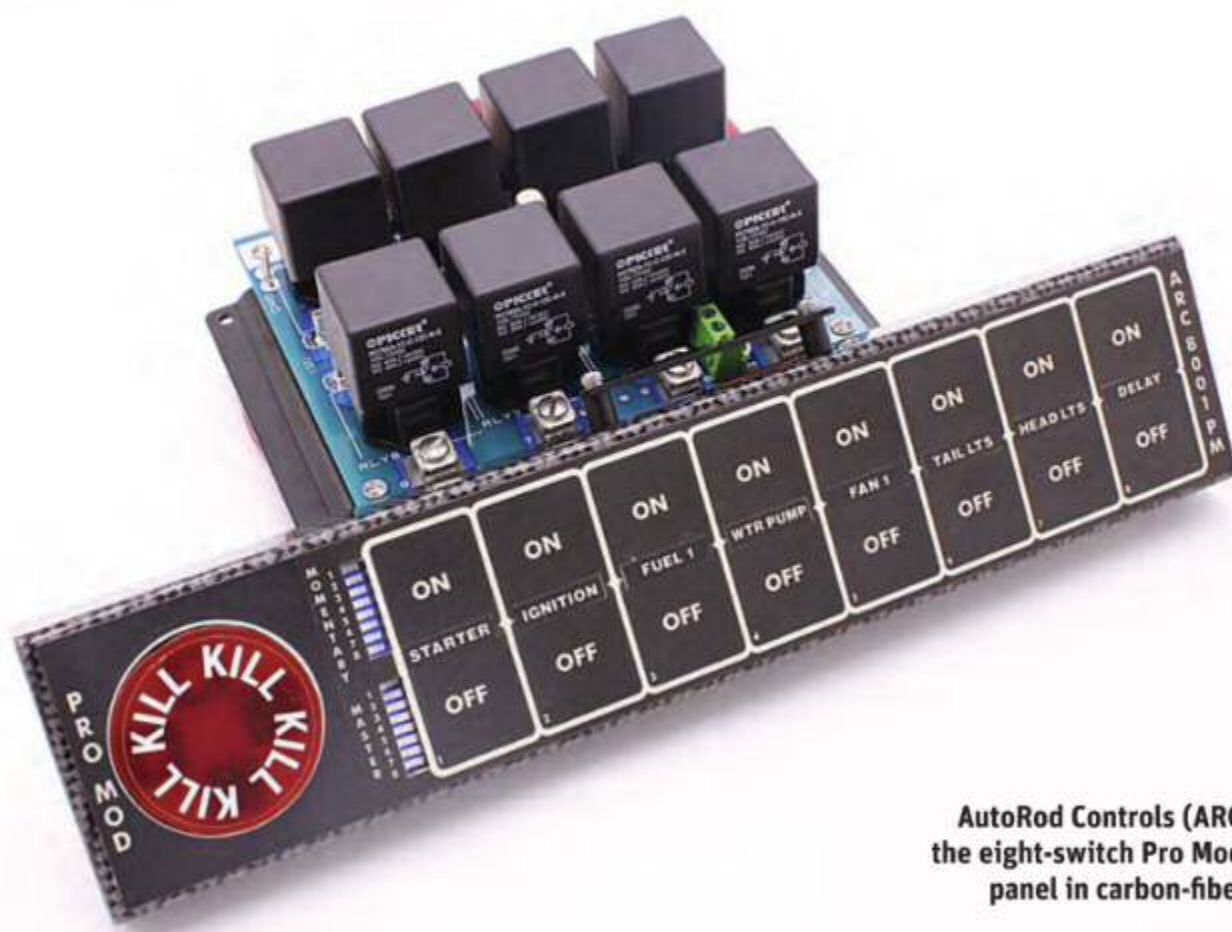
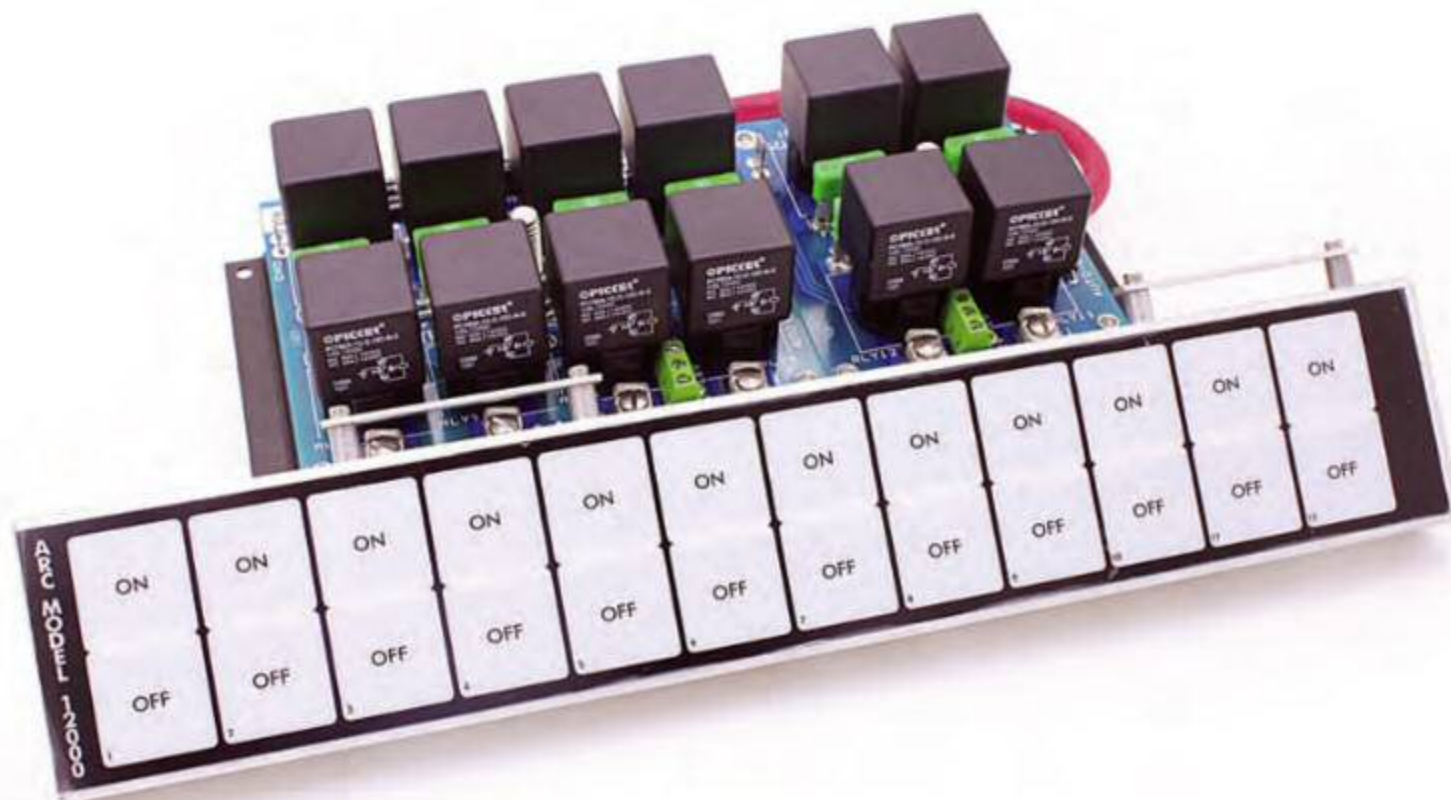
photos by the author and courtesy of the manufacturers

We typically don't see electricity, and many racers have difficulty understanding the best practices for wiring and power flow in race applications. Wiring problems can be the root of any malfunction, from an engine misfire to a light failing to illuminate to a pair of runs not being consistent — so, it's important for racers to have a working knowledge of the basic systems at a minimum.

For this edition of Racing Technology, we've reached out to the experts to examine what's new in switch panels and wiring and uncover common problems facing racers. Of course, this is a tricky subject because, for the most part, no two race cars are alike in terms of wiring. Nevertheless, we hope you can apply the information to your machine.

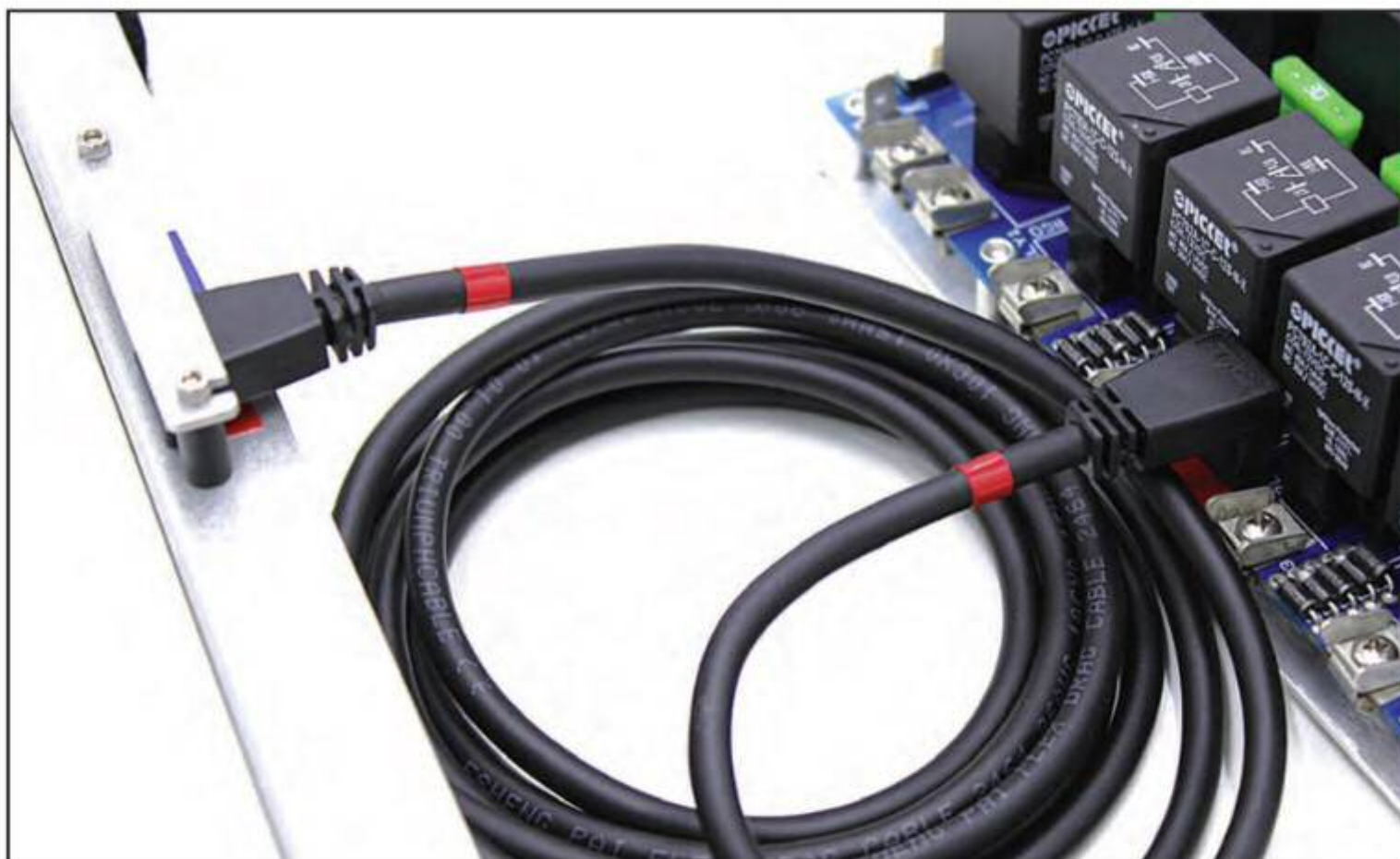
As you're likely aware, wiring in a race car can come in many forms. At any track, you'll see everything from 1950s or '60s cars with factory wiring that's 70 years old to new vehicles with the most modern systems. There are differences in the age of the wiring and the electrically powered components, too. You'll see cars with only a starter motor and ignition system and electronically controlled, high-voltage, direct-injected engines with dozens of sensors, electric fuel pumps, and external controllers.

Regardless of make, model, or year, racers want a nicely routed system that's easy to work on. Weight is also an area of concern, as many race cars have a harness stripped of anything unnecessary and a switch panel that offers quick and easy operation of the various systems.

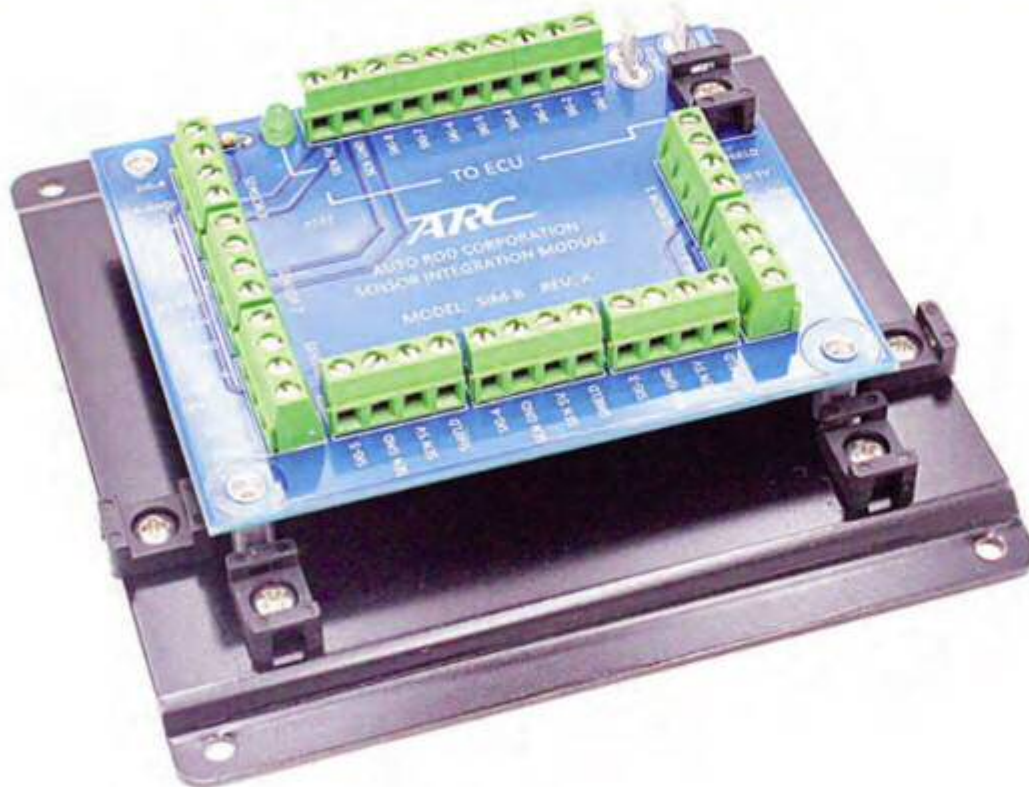


AutoRod Controls (ARC) offers the eight-switch Pro Mod switch panel in carbon-fiber finish.





(Above) Pictured is the new third-generation ARC connector cable for all Flat Touch units. (Right) Here is the ARC electronic fuel injection (EFI) sensor integration module for up to eight sensors.



With that, we reached out to the experts from Altronics, AutoRod Controls (ARC), and Philadelphia Racing Products with a series of questions designed to help you maximize wiring performance. The very first thing we asked was: What advancements have been made in switch panels in the last few years?

"There have been many advancements in recent years," said Rich Concato, president of AutoRod Controls. "Years ago, relays were not integrated into switch panels; today, it is common, and for good reason. Ensuring that the components in

the race car have adequate power feeding them is important. Many racers think that switches can handle large amounts of current; this is not the case, so relays are a reliable way to minimize the current through the switch itself. We now offer the 6001Z series that includes low-oil pressure shutdown, a dedicated data-logger circuit, and an integrated 'kill' button. This system will monitor oil pressure through a pressure switch. If the oil pressure falls below the switch value, it will shut the ignition off automatically," he added.

Fred Bartoli, president of Altronics, added, "Switch panels with integrated solid-state power distribution module [PDM] capabilities are new. These advancements eliminate physical rocker switches, mechanical relays, and blowable fuses. Altronics PowerQuest system features an integrated PDM controlled by a programmable touch screen."

"Switch panels in the last five years have come a long way," said Richard Schonberger, president and co-owner of Philadelphia Racing Products. "Some have fallen into the

digital age, and some have stayed to their roots with toggle switches. Most panels include LED-lighted switches rather than bulbs. The newer panels have up-to-date fuses and some come pre-wired."

"ARC offers a full line of control modules," Concato said. "We offer the Flat Touch Series, with four, eight, or 12 switches. These units are our most popular control modules. The switches can be labeled with the included label so the racer can decide which switches do what. All switches can be momentary or on/off. The ignition switch can be set to turn off some or all switches if the racer chooses."

"These systems offer a lifetime transferable warranty. The Pro Mod Series Flat Touch model includes a 1-5/8-inch backlit kill switch. We also offer the previously mentioned 6001Z Series with dual-function switches, which control two individual relays on the relay board. This system includes our exclusive low-oil pressure engine shutdown, a dedicated data-logger circuit, ground-triggered relays for things like auto shift, and built-in interior lights. And we still offer the rocker switch panels we started with in the '70s with various enhancements over the years."

"We here at PRP offer two types of switch panels," said Schonberger. "A four-toggle switch panel and a five-toggle switch panel with a starter button. Both panels come fully pre-wired for easy installation. These panels also offer fused circuits on each toggle switch for the protection of your harness and/or the product wired to the panel. Each switch panel has a mounting frame and an insert with quick-release buttons. This allows you to change fuses easily while having a seamless look since they are hidden behind the face."

"For the longest time, racers did not use relays. When they did, it was usually an individual relay at each accessory. ARC was one of the first companies to offer a system with switch panel and a separate relay board," said Concato.

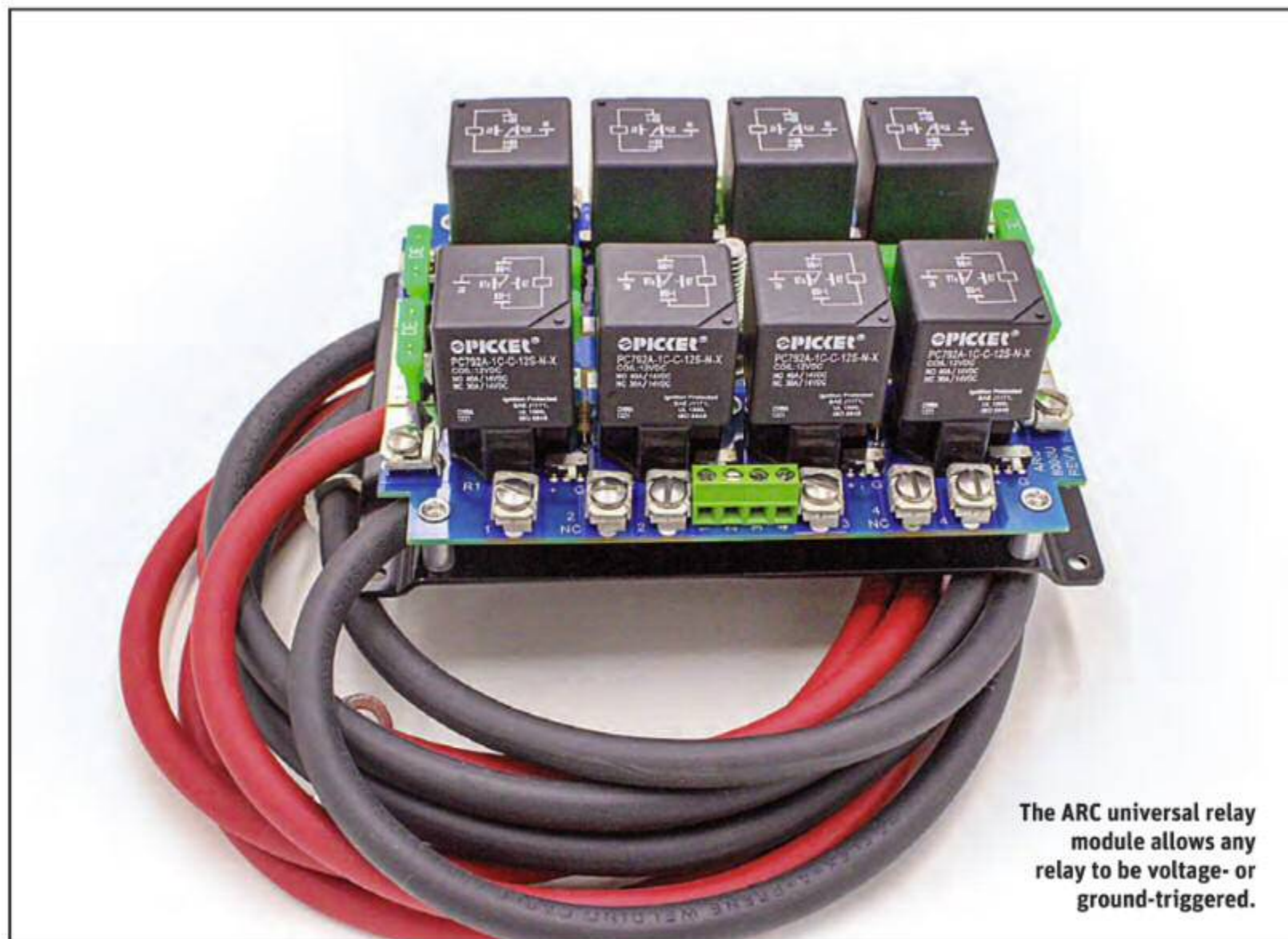
"This design makes wiring easier and less complicated. We have one control wire between the switch panel and the relay board, thus eliminating 10-15 wires exiting the switch panel itself; this is all done at the relay board. We also offer a



system with ground or voltage-triggered relays on the board for engine control unit [ECU] control purposes. Today, many racers have made the switch to EFI with ECUs capable of controlling many things, but this will always require a relay to be triggered by the ECU. Any of our ECU systems will have additional relays on the relay board for ECU power."

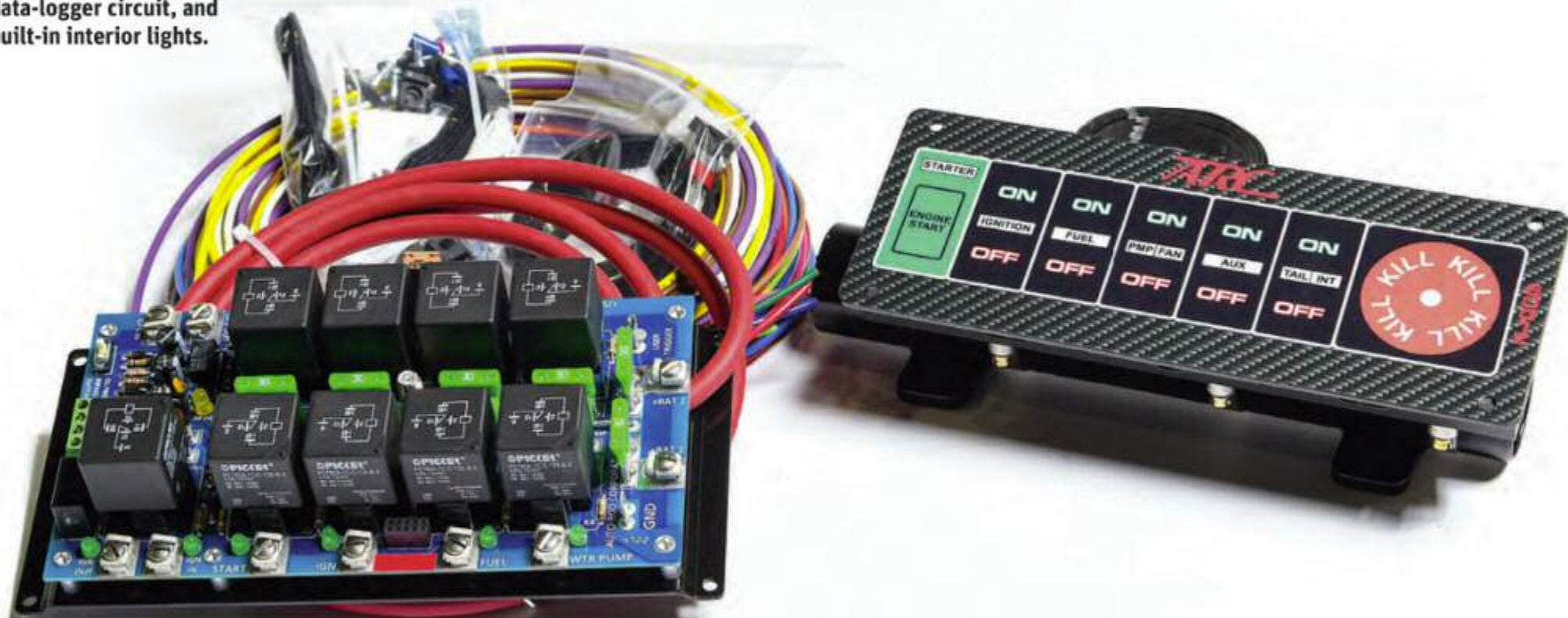
"Our Altronics PowerQuest system greatly simplifies wiring and installation by integrating the switching, fusing, and programming into one module. It is an innovative solution that replaces traditional mechanical rocker switches with a state-of-the-art touch screen and solid-state digital switching technology," said Bartoli.

to page 156



The ARC universal relay module allows any relay to be voltage- or ground-triggered.

**ARC's 6001Z control module features low-oil pressure shutdown, data-logger circuit, and built-in interior lights.**





from page 155



(Above, below) Here's a look at Altronics PowerQuest switch panel system that greatly simplifies wiring and installation by integrating the switching, fusing, and programming into one module. It is an innovative solution that replaces traditional mechanical rocker switches with a state-of-the-art touch screen and solid-state digital switching technology.



Altronics' key features include:

- **Touch screen control:** The system integrates a touch screen display that allows you to customize switch functions and icons. You can program each switch directly within the system.
- **Solid-state switching:** Instead of relying on mechanical switches, the PowerQuest uses solid-state digital switching. This technology offers improved reliability and eliminates the need for replacing blown fuses.
- **Customizable functions:** You can set up various functions for each switch, including circuit load levels (1-30 amps) for each channel, multi-switch control that combines multiple switches for coordinated actions, a soft start function that eliminates in-rush current when turning on loads, and a pulse-width modulation (PWM) function controls motor speed and lighting brightness.
- **Automatic switch delays:** The system allows time delays

for switches to activate after the start button is pressed. For example, the fuel pump and ignition can be delayed to prevent flooding during engine cranking.

- **Custom graphics and labels:** Choose from 50 different switch graphics or create custom labels for each switch.
- **Water temperature sensor:** Included in the system, measuring temperatures from 0 to 300 degrees Fahrenheit.
- **Expandable options:** The standard system offers eight channels, but an optional 16-channel version is available.
- **Easy setup:** PowerQuest is configured through the included touch screen display and does not require a PC.

"ARC released the first race-car electrical system back in the late '70s, winning a Best New Performance Product award in 1982," said Concato. "It was the first real race-car electrical control module. Since then, ARC has sold nearly 100,000 control modules of all different types. While we still offer and sell many of the rocker switch units each year, our best seller is our Flat Touch Series units now.

"In 2019, we started offering pre-wired electrical panels for race cars. These panels are designed and built to the customer's specs and wired here at our shop in New Jersey. Upon receiving the panel, the racers simply must make the connections at the accessories, and the job is done. We have a library of panels that fit the most popular body styles, and if we don't have a panel in our library, we will design it based on the racer's measurements, build it, wire it, and ship it."

Tennessee-based racer Gene Brown put one of these pre-wired panels in his Super Gas Nova right before the 2024 Super Grip NHRA Thunder Valley Nationals and won the event. Brown recently called to express how happy he was with the system, saying, "Wiring a car is a challenge, with an ARC pre-wired panel, anyone can do it! The customer service and the products are second to none."

"We ship each panel pre-wired with 6 feet of wire for easy installation," said Schonberger. "Each toggle is color-coded with an LED light. All circuits are fused connected and wired with top-grade wire.

Someone handy can take on the task of wiring their own race car. Most are not that hard other than being a bit tedious. Having the right tools will play a roll in making the job go smoothly."

## What level of expertise is required to tackle wiring a race car?

"PowerQuest's predefined switches for the typical components used in race cars [starter, ignition, fan, water pump, and lights] come with labeled terminal blocks, allowing the average racer to wire up their car," said Bartoli.

Concato added, "Our systems are among the easiest to install. We have taken many steps to ensure that racers can easily install our systems. On some occasions, racers have asked us to ship a system to the racetrack and then install it overnight. We also offer free tech support for our products and general help with the car wiring. As the owner of ARC, I have wired nearly 300 cars in the past 25 years, so I have dealt with almost any scenario. I personally enjoy helping racers with the wiring of their cars."

## What typical electrical problems are common in older race cars?

"Older race cars can have many different gremlins that need to be dealt with," Concato said. "The first one I would say is the quality of the wire and connections in the car. We do not recommend soldering connections as it makes the joint brittle, which can cause failure over time. When new components go in, wiring can get messy and confusing very fast."

Concato continued, "The wiring in a car, be it old or new, should be clean, neat, and easy to follow, so if a problem arises at the racetrack, it can be dealt with quickly and easily. This may also be important for class cars such as Competition eliminator cars. We recommend replacing the main disconnect every few years as they can become a problem. We also recommend using a 250- to 300-amp continuous-duty rated switch for the car, especially if you run an alternator or 16-volt electrical system. Each winter, it is a good idea to run through the car and check every screw terminal and connection in the car. This will save a potential headache down the road."





Philadelphia Racing Products (PRP) has designed a two-part dash-mount switch panel with a removable center. The frame stays permanently mounted while the inserted center can be removed. All fuses are conveniently mounted on the back side of the panel to keep a clean and uncluttered face. Each panel comes complete with LED-lighted switches, and all wired and ready to go. Fifteen feet of extra wire is included to help make your install as smooth as possible. Each panel is two-tone anodized and laser etched for easy identification.

The PRP billet switch panel is available as a five-switch version with a starter button or as a four-switch unit.

FOR OVER 5 DECADES,  
AUTO IMAGERY  
HAS BEEN CREATING A POSITIVE  
IMAGE FOR YOU!



CHECK THEM OUT:  
GREAT BACK THEN, EVEN BETTER NOW!



[www.AutoImagery.com](http://www.AutoImagery.com)  
[info@autoimagery.com](mailto:info@autoimagery.com)



ARC also offers traditional rocker switch panels for in-dash and roll-bar mounts.





Schoenberger added, "Old race cars can have lots of wiring issues: wire that is worn or dry rotted, bad ground connections, and not having good connections wire to wire. The car can have too small of a wire for the power needed today to run all accessories. Take extra care when working on an older car."

### What did our pros have to say is the preferred method of making wiring connections?

"We recommend an air-tight connection and heat-shrink tubing," said Concato. "This simply consists of a good, crimped connection with heat-shrink tubing for protection. The same applies to battery cables. We also recommend and sell uninsulated brazed-seam terminals. These are like normal terminals, but the seam is brazed, so it will not separate when crimping. We also offer a full line of Deutsch connectors for accessory connections. These are weatherproof connectors that are easy to make and connect and disconnect. We sell the tools necessary for these connectors as well."

"There are lots of products on the market for making wire connections, and most are very reliable. Everyone will tell you something different, but it's all a matter of preference," added Schoenberger. "Lastly, make sure to always have a good ground, make sure to use sufficient size wire for your project, make sure to read all instructions carefully on your electronics, and never overload a circuit and make sure to purchase good wire, make sure to fuse all connections, and/or include relays if necessary. Make sure to have sufficient voltage for your project."

### Can battery type or placement affect the electrical systems?

"Again, this is also a matter of preference, but I prefer to see a 16-volt battery in a race car," said Schoenberger. "With the amount of accessories today and the power that is needed for ignition boxes, I believe it is a must. Placement is not an issue, just make sure to use a sufficient size wire for the location."

Bartoli added, "A properly maintained lithium or absorbent glass mat [AGM] battery should work fine; 16-volt would be preferred over 12-volt to provide better cranking power and efficient pump and fan

control. Locating the battery to keep wire and cabling short is essential to minimize voltage drop, ensuring efficient power distribution."

"Battery type or placement does not affect our systems, so long as you use the correct size cable from the battery to the main panel," said Concato. "With the rising popularity of lithium batteries, many racers will put them in the driver compartment to simplify wiring and use less cable. If you do this, make sure the battery is mounted securely. Also keep in mind that moving from a 12-volt to a 16-volt battery will increase the overall amperage draw of the car by roughly 30%. This is especially important for racers who have an alternator on the car. In some [a few] cases, the change to the 16-volt system may require a move to a more powerful alternator. And all of our units are fully 16-volt compatible."

Concato also added a few Do's:

- Get a quality control module for the car
- Use good, crimped connections
- Ensure everything is grounded to a good steel ground
- Keep everything clean and neat
- Check the rules for your class regarding electronics and wiring

And Don't's:

- Assume the car is a good ground
- Overload a particular circuit
- Let a small toggle switch carry a lot of current

"Lastly, when we wire cars here at ARC, every ground spot in the car gets a direct reference back to battery ground," said Concato. "This method helps keep radio frequency

to page 160

## SOURCES

### ALTRONICS INC.

847.923.0002  
AltronicsInc.com

### AUTOROD CONTROLS [ARC]

732.851.5095  
AutoRod.net

### PHILADELPHIA RACING PRODUCTS [PRP]

215.969.3550  
PRPRacingproducts.com



**Billet REAPER**  
E4340 Billet Steel Crankshafts

- Manufactured from E4340 Aircraft Quality Bar Stock Material
- CNC Machined to Exacting Tolerances
- Center Counterweights
- Stress Relieved & Shot Peened
- Nitride Hardened for Superior Wear
- Large Fillet Radii on All Bearing Journals
- Lightening Holes in All Rod Journals
- Double Keyways for Dampers
- Chevrolet SB - Available with Standard or Big Block Snout
- Chevrolet LS - Counterweights Fit OE & Aftermarket Blocks
- Chevrolet LS - Include Choice of 24 or 58 Tooth Reluctor
- Chevrolet SB 3.500", 3.750" 3.875" & 4.000" Strokes
- Chevrolet LS 3.500", 3.622" 4.000" & 4.125" Strokes
- Chevrolet BB 4.000", 4.250" 4.375", 4.500" & 4.750" Strokes

**HOWARDS** cams & RACING COMPONENTS  
**HOWARDS** RACING COMPONENTS



## Billet Reluctor Wheels One Piece Design for GM LS Engines

One piece billet steel design and are held to the highest tolerances. Designed to eliminate the failures due to re-luctor slipping on the crankshaft.

- Machined Out of a Solid Block of Steel Billet
- State of the Art CNC Machined
- One Piece Direct Replacement
- Designed to Eliminate Slipping
- Eliminates Runout Misfire
- Proven Reliability at 1500+ HP
- Accurate Consistent Ignition Timing
- Available for LS 24 or 58 Tooth Applications



920.233.5228 [www.HOWARDScams.com](http://www.HOWARDScams.com)



from page 159



FRANKHAWLEY.COM  
866.480.7223

**FRANK HAWLEY'S**  
DRAG RACING SCHOOL



**EARN YOUR COMPETITION LICENSE, IMPROVE YOUR SKILLS**  
A GREAT FOUNDATION FOR ALL TYPES OF RACING, AND LEARN MUCH MORE THAN HOW TO DRIVE A RACE CAR!

PHOTOS BY RICH SAMUELS





interference [RFI] and other noise out of the picture. ARC also offers a wide assortment of accessories for racers wiring their cars, including dedicated relay boards for ECU control, sensor integration modules to help neaten EFI sensor wiring, and voltage reducers from 16 to 12 for volts for sensitive accessories in the car, such as lights.

"We recently introduced a new connector wire from our relay board to the switch panel. Upon purchasing ARC in 2022, it was a priority to create a new cable that was better built and more durable than the original ribbon cable we used to offer. Since launching our new website last July, we have been constantly adding components that racers need for the wiring of any race car." 

■ *Evan J. Smith is the owner of REVan Media Inc., a contributor to Hot Rod and Muscle Mustangs & Fast Fords magazines, and regularly competes in Stock.*

# Cody Wins Again with T&D

Congratulations to Cody Lane for winning Comp at back-to-back LODRS events at Yellowstone Drag Strip in Montana. Cody's dad Jeff ensures reliable performance by always equipping Hancock & Lane engines with T&D shaft-mount rockers.

T&D Machine Products has long been known to manufacture the finest in shaft-mount rocker systems for virtually every OEM and aftermarket head available.

Your need for reliable longevity has become our demand.

**T&D is truly your only choice!**

**JOHNSON LIFTERS**  
now available direct  
or online from T&D!

 Manufactured proudly in the USA

Photo Courtesy NHRA



Send \$3 for the latest T&D catalog or check out website



**T&D MACHINE PRODUCTS**

**COMPETITION ROCKER ARMS**

4859 Convair Drive, Carson City, NV 89706

**(775) 884-2292 • [www.tdmach.com](http://www.tdmach.com)**