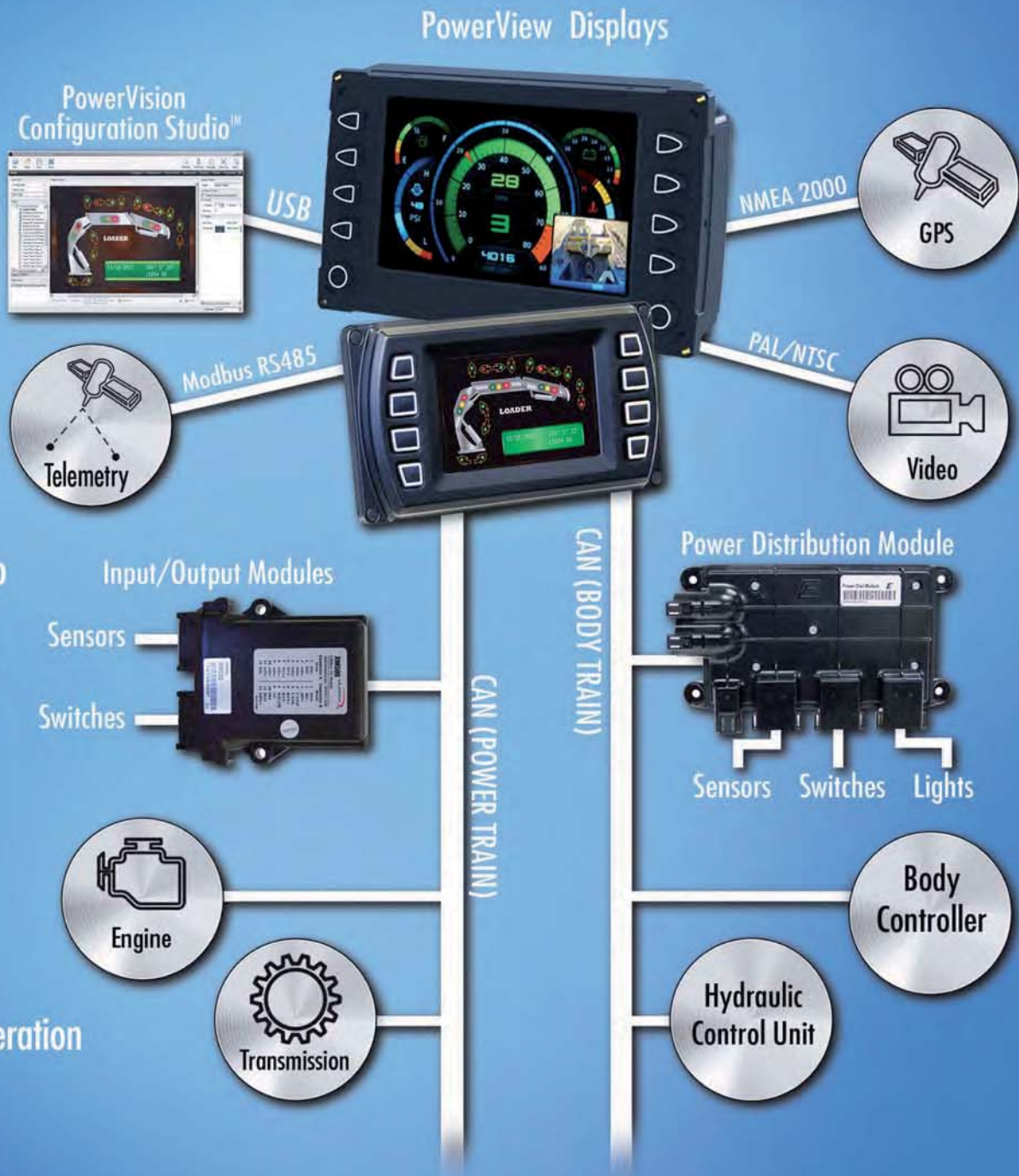


# Total System Integration

PowerView™ Displays 7 and 4.3 inches Freely-configurable

- ✓ CAN 2.0B
- ✓ SAE J1939
- ✓ CANopen
- ✓ NMEA 2000
- ✓ PAL/NTSC video
- ✓ RS485 modbus
- ✓ USB 2.0
- ✓ Data logging
- ✓ IP67
- ✓ -40 to +85°C operation



**MURPHY**®

Frank W. Murphy, Ltd.  
Swichage House, Church Rd., Laverstock  
Salisbury SP1 1QZ, U.K.  
tel. +44 1722 410055 fax +44 1722 410088  
email: sales@fwmurphy.co.uk  
<http://www.fwmurphy.co.uk/powerview>

# Power trip

**A PRODUCT DESIGNED TO IMPROVE THE DISTRIBUTION OF POWER AROUND A VEHICLE ENHANCES CONNECTIVITY, CAN IMPROVE RELIABILITY AND ELIMINATE ELECTROMECHANICAL COMPONENTS – AS WELL AS WIRING**

▶ To remain competitive, mobile equipment manufacturers are continually on the lookout for innovative solutions that reduce cost and improve performance. Perhaps one of the most challenging areas currently facing OEMs is power distribution around the vehicle. In the past, solutions to this have comprised parallel wired systems using fuses and relays. Standard wired systems can have numerous components that require extensive assembly time, and because they are electromechanical in nature, it is far more difficult to effectively seal them against environmental ingress – and physical wear over time can cause premature failure.

Recent advances in high-current semiconductor technology, however, provide opportunities to address weaknesses inherent in standard power distribution systems. Not only can solid-state solutions be easily adapted to an existing CAN system, but they can also offer other benefits such as diagnostic feedback on outputs, additional connections for inputs and the possibility to drive loads at variable levels.

As these new systems can be housed in more compact enclosures using field-proven connection technology, it is much easier to position them where needed on the vehicle. This mounting flexibility enables the system designer to further reduce wiring harness size by locating the unit closer to the controlled I/O. Because of the small, solid-state design, and sealed construction, highly improved performance in the worst environments is assured.

## Rewrite the rules

For the more technology-savvy OEMs focused on incorporating advanced features that solve real-world problems, FW Murphy recently introduced a product that has the potential to drastically change how a considerable portion of power can be managed on a vehicle. Murphy's Power Distribution Module (PDM) can be used directly in a CAN-based control system to effectively replace most conventional relay/fuse-based electromechanical devices. The PDM is a rugged completely solid-state, compact, sealed product that integrates CAN communication using the SAE J1939 protocol. It features integrated circuit protection and diagnostics, and is designed for use in conjunction with a controller, display, or other device capable of performing logic and sending/receiving CAN messages.



**ABOVE: The Power Distribution Module is an advanced CAN-based I/O Module that allows the integration of high-current I/O on both 12V and 24V systems**

For use in mobile-control applications, the high-current PDM I/O module is robust enough to handle the challenges of severe-duty environments. The PDM uses popular, field-proven Deutsch connectors for the utmost reliability in even the most adverse conditions. It can be easily configured via standard SAE J1939 messages using either a configuration tool available from Murphy, or through an existing control system.

The revolutionary PDM device is far superior to conventional hard-wired control systems for several reasons: it is completely sealed against moisture, humidity, dust or other contaminants; it has no wear items or components that require servicing or replacement; and it is impervious to vibrations, temperature swings or rough environments. The module is not affected by normal levels of electromagnetic interference or RF signals. In addition, it can be located virtually anywhere on a piece of equipment, either under the hood or close to the device it is controlling.

The PDM's design and creation was originally driven by demands from OEMs seeking a better

solution to existing control methods that could accommodate a higher degree of automation. However, the PDM soon proved itself practical for use in a variety of on- and off-highway, commercial and industrial vehicle applications, where greater reliability and more flexible load control was sought. The PDM offers all the advantages of a CAN-based system, including reduced wiring, reduced assembly labour time, increased integration with other advanced electronic devices and higher power density.

## CAN-capable

Since they were introduced in the mid-1980s, CAN control systems, which enable devices to easily communicate with each other, have become accepted as an industry standard in the mobile equipment design and manufacture marketplace. The PDM J1939-based I/O module uses a 10-24V power supply and is well-suited for CAN applications in that it can assist in collecting data from input devices such as those used for pressure, flow, temperature, position, inclination angle and more. The module can also collect data from the operator controls, such as rockers or toggle switches, keypads, joysticks or potentiometers. In addition, the PDM can handle high-current loads, including valves, motors and

**INTERMATT**  
 16 - 21 April 2012  
 Paris-Nord Villepinte - France  
 Hall 5A Stand H027

lighting. A configuration tool available from Murphy allows OEMs to change parameters on the PDM, or it can be configured and commanded using J1939 Protocol CAN messaging.

The PDM comes as standard with 12 digital inputs (high-side or low-side for up to 24 in total), eight analogue inputs (offering 10-bit resolution with 0-5V capability) and 12 high-current outputs each capable of handling 15A for a maximum of 70A simultaneous output. Additionally, outputs can be set up with individual overcurrent set points and used to enable an automatic shutdown of the respective output. When controlling motors, the outputs can be configured as H-Bridge pairs. Up to four PDMs can be used on a network and unused I/O can be easily sealed in the connector.

Although there are many devices that currently switch outputs – most often through relays and fusing – they do not offer the capability to proportionally drive the individual outputs using PWM, or they lack additional available inputs. Additional available inputs offer the user more options and therefore greater application scope. For instance, the inputs can be used for additional control, or to accept signals from a variety of sensors or switches.

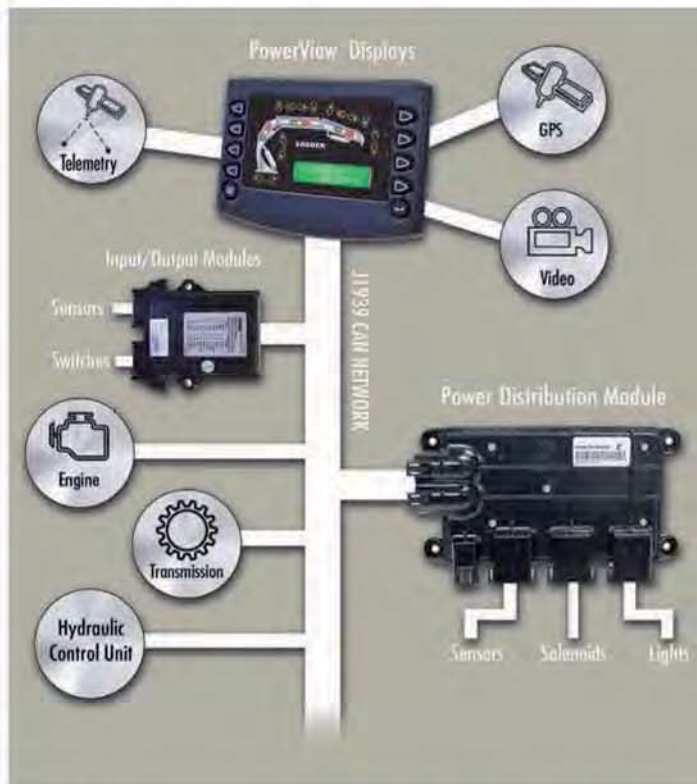
Typical control devices used today to facilitate automation on a piece of mobile equipment are capable of switching from 2.5 to 4A loads. The PDM can accommodate 15A, which gives the designer or user much more flexibility, whether for lighting, controlling a small motor and even doing directional control on a motor – a rare ability compared with many other control offerings available on the market.

Besides small motors, the PDM can accommodate high-current loads such as actuators, valve solenoids and lighting systems. Perhaps the largest benefit of the PDM is that it can eliminate the need for troublesome fuses and relays. When a fuse blows it must be located and replaced, and the cause of failure must be determined. With the PDM, diagnostics report open, short, overcurrent and overtemperature for each channel. When an output is close to an overload situation, the device can be programmed to shut down or not, and send an alert to a display along the CAN network to alert the user of the high-current situation. The PDM also offers current overload and short-circuit protection.

Today's electromechanical control systems are limited in what they handle and where they can be positioned on a vehicle. Wiring harnesses are not optimised for point-of-use due to the fact that the input/output device may be quite a distance from the location of the relay, fuse or controller. Yet the PDM can be located next to the device it is managing to reduce overall wiring. The PDM was designed to handle the demands of extreme environments (-40 to



LEFT: The PDM's robust design enables the unit to be located anywhere on the vehicle, including close to I/O devices to reduce wire harness requirements



BELOW: The PDM is an integral part of the entire CAN system, transferring diagnostic information to displays inside the vehicle

+85°C) often found under the hood or elsewhere on industrial vehicles.

Vehicle OEMs looking for a more reliable and capable solution to vehicle power distribution will find numerous benefits with the PDM. The PDM's solid-state technology provides manufacturers with the ability to handle high-current loads, collect data from inputs and receive diagnostic data all within one compact, simplified module. By switching from

traditional wired systems to the Power Distribution Module from Murphy, OEMs enjoy far greater integration and capability, with fewer wires and less to maintain. **IVT**

*Michael Sewick is FW Murphy's off-highway product manager. Dan Vnuck is a freelance journalist based in Milwaukee, Wisconsin, USA*



**CONTACT**  
[www.fwmurphy.co.uk/pdm](http://www.fwmurphy.co.uk/pdm)  
[sales@fwmurphy.co.uk](mailto:sales@fwmurphy.co.uk)

# Want More Performance?



## GET MORE INTEGRATION WITH I/O MODULES FROM MURPHY

**Don't be limited by your system's capabilities** — get the tightest, most complete engine integration available with FW Murphy's complete line of I/O modules. Our selection of high-current, expandable and configurable I/O modules allow you to integrate sensors on mechanical engines as well as machine control connected through the CANbus, including lights, hydraulics and more. Expand your integration even further by combining our configurable I/O modules with one of your controllers for enhanced diagnostics.



visit [www.fwmurphy.co.uk/io](http://www.fwmurphy.co.uk/io)  
call +44 (0)1722 410055

visit our booth: #5a H 027

**INTERMAT**  
April 16-19 2012 *Paris*

or scan this  
QR code  
for more  
information



**MURPHY**

FW Murphy, Church Road, Laverstock, Salisbury, SP1 1QZ, UK  
tel: +44 (0)1722 410055 sales@fwmurphy.co.uk

1210944-IO-EU