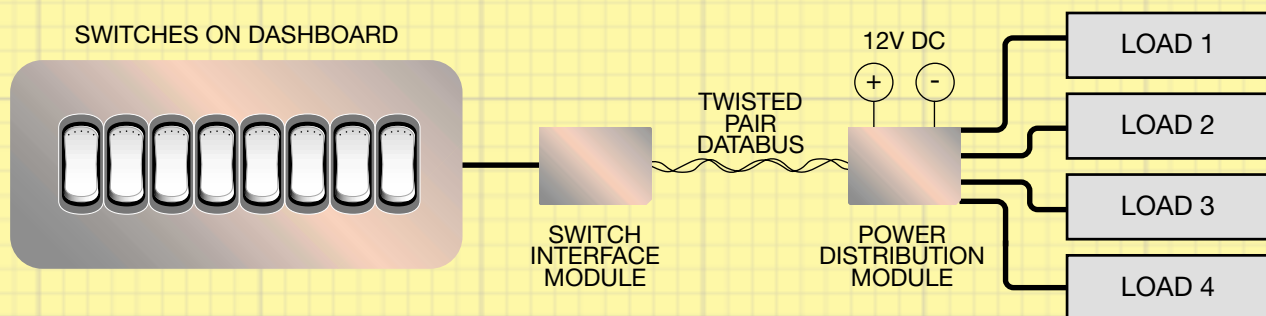


# MiniBus™ Digital Databus System

*Linking electronic switches to electrical motors and lighting circuits.*

- Cost-effective solution to digital switching
- Provides low current electronic switching of high current motors
- Can be bridged to a SAE1939 digital databus



## THE MINIBUS™ SYSTEM CONSISTS OF:

1. A Switch Interface Module (SIM) connecting 8 dual-function panel switches to the digital databus.
2. An 8-channel Power Distribution Module (PDM) containing electronic relays to operate motors or lighting circuits, and feed status information back to the SIM.
3. A dual twisted pair shielded cable.
4. Programming software.
5. (Optional) DS Rocker™ Switches, and switch-to-SIM jumper cables.

### 1. MINIMIZES BEHIND-PANEL WIRING

Traditional electromechanical switches require up to 8 wires, so an array of eight switches can mean as many as 64 wires in the harness. With MiniBus, there is one connection from each switch to the SIM behind the panel.

### 2. SIMPLIFIES THRU-FIREWALL WIRING

Conventional harness wires pass from the panel and radiate to locations all over the vehicle. MiniBus™ has a single 2X twisted pair passing from the SIM (behind the panel) to the PDM.

### 3. CUSTOMIZABLE SOFTWARE

Proprietary programming software is available on a CD. It is easy to run on a PC or laptop, and provides a broad array of switching options. A RS-232 to RS-485 converter cable assembly is required.

### 4. FACILITATES EASY DIAGNOSTICS

Independent wiring systems in electromechanical switching necessitate laborious testing of each of the circuits one by one. MiniBus™ is a single, unified self-diagnostic system that provides the driver with continuous feedback about the electrical loads that it controls.

### 5. IMPROVES RELIABILITY

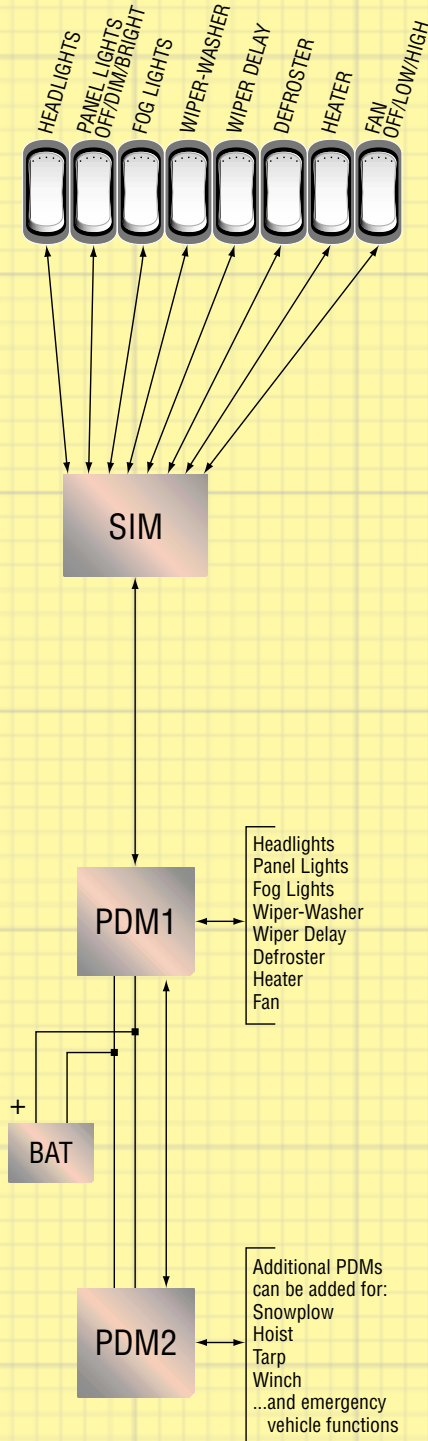
The entire system is solid-state, with no mechanical parts, and fully sealed modules. High current (20A each) electronic relays are built in to the PDMs. The system is impervious to vibration and highly resistant to moisture and contamination. The components are rated to millions of On-Off cycles.

### 6. EXPANDABLE SYSTEM

The system is modular and expandable. It can command additional loads by adding switches, SIMs and PDMs up to a total of 128 channels. Modules can be daisy-chained to utilize the same central twisted pair.

# The MiniBus Digital Databus System

A bi-directional, multi-transmitter digital data network, linking switches to motors, lighting systems and other loads. It allows components to 'talk' to each other, exchanging a continuous stream of information. It's a systems solution to the ever-increasing complexities of wiring throughout the vehicle.



## THIS NEW SYSTEM:

- Connects as many as 128 switch functions to high-current devices or lighting systems.
- Has integral circuit protection, providing an electronic, remote, manually-resettable circuit breaker for each branch circuit.
- Has built-in fault mode detection.
- Reduces voltage drop by minimizing the total length of high-amp wires. (A voltage reduction of 10% can decrease motor efficiency by up to 50%.) In a conventional system, high-amp cables are routed to the dashboard, then back to the load. In the MiniBus system, the high-amp cables are routed only to the local PDM.

## OPERATION OF THE MINIBUS:

- A bank of digital switches feeds "control commands" to the SIM.
- The SIM communicates these control commands to the PDM.
- The PDM receives this information and directs it to the appropriate output load. The MiniBus continually monitors the system to verify that the equipment is operating correctly.
- This data is fed back to the switches that indicate the system status via LEDs in the DS Rocker switches. Typically a continuous light = system operating, flashing light = fault mode.

## FAULT MODES

### Short circuit or overcurrent

Each output functions as a manually resettable electronic circuit breaker with a delayed shutdown of approximately .05 seconds (to avoid false tripping due to a surge current.) Programmable trip currents: 2.0, 3.0, 4.0, 5.0, 7.5, 10, 15 or 20 amps.

### No Load Alarm

The PDM senses the output current when the output is turned On. If there is no current, or very low current, the No Load signal is transmitted to the SIM. The programming software allows this function to be selectable. For some applications there may be a no load condition when the output is turned On.

### Thermal shutdown

The temperature of the PDM heatsink is monitored. If the temperature exceeds the design limit, the outputs will be shut down. Outputs can be programmed to shut down simultaneously or in a priority sequence.

### Communications failure

If the PDM senses a communications failure, it goes into a 'default output status' mode. Outputs can be programmed 'Default On' or 'Default Off'.

## PROGRAMMABLE OUTPUT CONTROLS

Outputs can be programmed:

- One switch controls one output.
- One switch controls multiple outputs.
- Multiple switches control the same output.