

## Overview

This document contains the message format details required for communication between the ECU and the VM-Series under the J1939 protocol.

## J1939 CAN Messages

### 1.1 Switch Status (transmitted)

The Switch Status message contains the current status of each logical channel on the VM-Series. This message is broadcast at a periodic rate of 500ms(default), as well as any time the VM-Series switch channels are pressed.

Auxiliary Input / Output Status 1				
Description	This message shall be broadcast periodically or upon change of state to the rest of the CAN network to indicate the state of the switches.			
PGN	64520 (0x00FC08)			
Default Priority	6			
Source Address	Source Address configurable (default = 0x81)			
DLC	8			
Update Rate	500 ms periodically and upon change of state (no faster than 20 ms)			
Direction	VM-Series -> CAN Network			
Start	Bits	Name	Notes	
1.1	2	Auxiliary I/O #01	00 <sub>2</sub>	Logical Channel OFF
1.3	2	Auxiliary I/O #02	01 <sub>2</sub>	Logical Channel ON
1.5	2	Auxiliary I/O #03	10 <sub>2</sub>	Logical Channel Error
1.7	2	Auxiliary I/O #04	11 <sub>2</sub>	Not Available
2.1	2	Auxiliary I/O #05		
2.3	2	Auxiliary I/O #06		
2.5	2	Auxiliary I/O #07		
2.7	2	Auxiliary I/O #08		
3.1	2	Auxiliary I/O #09		
3.3	2	Auxiliary I/O #10		
3.5	6	Auxiliary I/O #11		
3.7	2	Auxiliary I/O #12		
4.1	40	Not Used	All bits set to 1's	

Below shows how the above J1939 Auxiliary I/O 1 channels map to the physical 12-channels of VM-Series.

Note: The orientation of each unit may vary according to the product configuration - Set VM-Series reverse orientation option.



## 1.2 LED Function Indicators Status (received)

LED Function Lights are controlled independently from the switch status(es). The 12 function lights are controlled through the message as detailed in the below tables

Auxiliary Input / Output Status 2				
Description	Message will control all 12 indicators state.			
PGN	61184 (0x00EF00)			
Default Priority	6			
Source Address	Source Address of Master ECU			
DLC	8			
Update Rate	Upon command			
Direction	Master ECU -> VM-Series			
Start	Bits	Name	Notes	
1.1	8	Control byte	0x38	Switch logical channel function LED on/off control.
2.1	2	Logical Channel 1 function indicator on/off.	00 <sub>2</sub>	Function Indicator OFF
2.3	2	Logical Channel 2 function indicator on/off.	01 <sub>2</sub>	Function Indicator ON
2.5	2	Logical Channel 3 function indicator on/off.	10 <sub>2</sub>	Function Indicator Flash (Error)
2.7	2	Logical Channel 4 function indicator on/off.	11 <sub>2</sub>	Not Available
3.1	2	Logical Channel 5 function indicator on/off.		
3.3	2	Logical Channel 6 function indicator on/off.		
3.5	2	Logical Channel 7 function indicator on/off.		
3.7	2	Logical Channel 8 function indicator on/off.		
4.1	2	Logical Channel 9 function indicator on/off.		
4.3	2	Logical Channel 10 function indicator on/off.		
4.5	2	Logical Channel 11 function indicator on/off.		
4.7	2	Logical Channel 12 function indicator on/off.		
5.1	32	Not Used	All bits set to 1's	

Note: The order of indicator channels is the same as the switch channels.

## 1.3 Relay Controlled Command (received)

Relay Controlled Command				
Description	Message will control all 4 relays.			
PGN	61184 (0x00EF00)			
Default Priority	6			
Source Address	Source Address of Master ECU			
DLC	8			
Update Rate	Upon command			
Direction	Master ECU -> VM-Series			
Start	Bits	Name	Notes	
1.1	8	Control byte	0x39	Relays output control
2.1	2	Relay 1 output control	00	OFF
2.3	2	Relay 2 output control	01	ON
2.5	2	Relay 3 output control	10	Reserved
2.7	2	Relay 4 output control	11	Not Available

## 1.4 Common CAN Messages

This document contains the J1939 interface for the VM-Series, including all transmitted messages and which messages it must receive from a master ECU to operate properly.

Cab Illumination Message				
Description	The VM-Series unit will adjust the LED brightness of its own LEDs based on the standard J1939 Cab Illumination Message.			
PGN	53248 (0x00D000)			
Default Priority	6			
Source Address	Source Address of Master ECU			
DLC	8			
Update Rate	Upon change			
Direction	Master ECU -> VM-Series			
Start	Bits	Name	SPN	Notes
1.1	8	Switch Backlight Illumination Brightness Percent	1487	0-250, Percentage, 0.4%/bit, data range 0-100%. If this value is >250, it will be regarded as 250.

Address Claim				
Description	The VM-Series shall transmit an address claim at start-up.			
PGN	60928 (0x00EE00)			
Default Priority	6			
Source Address	Source Address of VM-Series			
DLC	8			
Direction	VM-Series -> Master ECU			
Start	Bits	Name	Notes	
1.1	21	Identity Number	Variable	
2.6	11	Manufacturers Code	J1939: 2005	
5.1	3	ECU Instance	0 (Default)	
5.4	5	Function Instance	0 (Default)	
6.1	8	Function	37	
7.1	1	Reserved	0 (Defined by SAE)	
7.2	7	Vehicle System	0 (Default)	
8.1	4	Vehicle System Instance	0 (Default)	
8.5	3	Industry Group	J1939: 3	
8.8	1	Arbitrary Address Capable	Always 1	

## 1.5 Low-Power Sleep Mode

Both of the following need to be in place for the VM-Series to sleep:

- No CAN communication on the vehicle
- No keys pressed

Any one of the above two conditions will wake the VM-Series.