

## Marlin Keypad Module CAN Protocol

Marlin Keypad modules are designed to operate in slave fashion and communicate status over a Controller Area Network (CAN) using the industry standard J1939 messaging protocol. LED Indicators are controlled via CAN messages from the master control unit (MCU). Key status is reported at user selected interval, on change of state and upon request. Module status is reported at user selected interval or upon request.

### Key Orientation

KEYs are numbered consecutively from 1 to 8, beginning with the upper left key.

LEDs are numbered consecutively from 1 to 24, beginning with the left most LED of KEY 1.

See diagram below:

|    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|
| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 |
| 1  |    |    | 2  |    |    | 3  |    |    | 4  |    |    |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 5  |    |    | 6  |    |    | 7  |    |    | 8  |    |    |

INDICATOR NUMBERING

BUTTON KEY NUMBERING

## Key Status

The Keypad module uses the J1939 AUXIO1 message to broadcast key status information. The message Data Field contains the current state of each key.

| Auxiliary Input/Output Status #1 |                                                                                                             |               |      |                                                                                                                                        | PGN: 65241 |
|----------------------------------|-------------------------------------------------------------------------------------------------------------|---------------|------|----------------------------------------------------------------------------------------------------------------------------------------|------------|
|                                  |                                                                                                             |               |      |                                                                                                                                        | hex: 0FED9 |
| Description                      | This message is broadcast periodically or on change of state to indicate the status of the keypad switches. |               |      |                                                                                                                                        |            |
| PGN                              | 65241                                                                                                       |               |      |                                                                                                                                        |            |
| Priority                         | 6                                                                                                           |               |      |                                                                                                                                        |            |
| Destination                      | Global                                                                                                      |               |      |                                                                                                                                        |            |
| DLC                              | 8                                                                                                           |               |      |                                                                                                                                        |            |
| Direction                        | Transmit                                                                                                    |               |      |                                                                                                                                        |            |
| Update Rate                      | 250 mS periodic and upon change of state (configurable, no faster than 20 mS)                               |               |      |                                                                                                                                        |            |
| Start                            | Bits                                                                                                        | Name          | SPN  | Notes                                                                                                                                  |            |
| 1.7                              | 2                                                                                                           | Key Switch #1 | 701  | 00 <sub>2</sub> - Key is Not Pressed<br>01 <sub>2</sub> - Key is Pressed<br>10 <sub>2</sub> - Error<br>11 <sub>2</sub> - Not Available |            |
| 1.5                              | 2                                                                                                           | Key Switch #2 | 702  |                                                                                                                                        |            |
| 1.3                              | 2                                                                                                           | Key Switch #3 | 703  |                                                                                                                                        |            |
| 1.1                              | 2                                                                                                           | Key Switch #4 | 704  |                                                                                                                                        |            |
| 2.7                              | 2                                                                                                           | Key Switch #5 | 705  |                                                                                                                                        |            |
| 2.5                              | 2                                                                                                           | Key Switch #6 | 706  |                                                                                                                                        |            |
| 2.3                              | 2                                                                                                           | Key Switch #7 | 707  |                                                                                                                                        |            |
| 2.1                              | 2                                                                                                           | Key Switch #8 | 708  |                                                                                                                                        |            |
| 3.7                              | 2                                                                                                           | Not Used      | 709  | All bits set to 1                                                                                                                      |            |
| 3.5                              | 2                                                                                                           | Not Used      | 710  |                                                                                                                                        |            |
| 3.3                              | 2                                                                                                           | Not Used      | 711  |                                                                                                                                        |            |
| 3.1                              | 2                                                                                                           | Not Used      | 712  |                                                                                                                                        |            |
| 4.7                              | 2                                                                                                           | Not Used      | 713  |                                                                                                                                        |            |
| 4.5                              | 2                                                                                                           | Not Used      | 714  |                                                                                                                                        |            |
| 4.3                              | 2                                                                                                           | Not Used      | 715  |                                                                                                                                        |            |
| 4.1                              | 2                                                                                                           | Not Used      | 716  |                                                                                                                                        |            |
| 5.1                              | 16                                                                                                          | Not Used      | 1083 |                                                                                                                                        |            |
| 7.1                              | 16                                                                                                          | Not Used      | 1084 |                                                                                                                                        |            |

## Indicator LED Command Messages

The Keypad module uses the J1939 AUXIO2 message to control the Indicator LEDs. The message Data Field contains the desired state for each indicator.

| Auxiliary Input/Output Status #2 |                                                        |                          |      |                                                                                                                                              | PGN: 42752 |
|----------------------------------|--------------------------------------------------------|--------------------------|------|----------------------------------------------------------------------------------------------------------------------------------------------|------------|
|                                  |                                                        |                          |      |                                                                                                                                              | hex: 0A700 |
| Description                      | This message will set the state of the LED Indicators. |                          |      |                                                                                                                                              |            |
| PGN                              | 42752                                                  |                          |      |                                                                                                                                              |            |
| Priority                         | 6                                                      |                          |      |                                                                                                                                              |            |
| Destination                      | Keypad                                                 |                          |      |                                                                                                                                              |            |
| Data Length                      | 8                                                      |                          |      |                                                                                                                                              |            |
| Direction                        | Receive                                                |                          |      |                                                                                                                                              |            |
| Update Rate                      | N/A                                                    |                          |      |                                                                                                                                              |            |
| Start                            | Bits                                                   | Name                     | SPN  | Notes                                                                                                                                        |            |
| 1.7                              | 2                                                      | LED #1 (Key 1 - Left)    | 3840 | 00 <sub>2</sub> - Indicator OFF<br>01 <sub>2</sub> - Indicator ON<br>10 <sub>2</sub> - Indicator Blink - 2 Hz<br>11 <sub>2</sub> - No Change |            |
| 1.5                              | 2                                                      | LED #2 (Key 1 - Center)  | 3841 |                                                                                                                                              |            |
| 1.3                              | 2                                                      | LED #3 (Key 1 - Right)   | 3842 |                                                                                                                                              |            |
| 1.1                              | 2                                                      | LED #4 (Key 2 - Left)    | 3843 |                                                                                                                                              |            |
| 2.7                              | 2                                                      | LED #5 (Key 2 - Center)  | 3844 |                                                                                                                                              |            |
| 2.5                              | 2                                                      | LED #6 (Key 2 - Right)   | 3845 |                                                                                                                                              |            |
| 2.3                              | 2                                                      | LED #7 (Key 3 - Left)    | 3846 |                                                                                                                                              |            |
| 2.1                              | 2                                                      | LED #8 (Key 3 - Center)  | 3847 |                                                                                                                                              |            |
| 3.7                              | 2                                                      | LED #9 (Key 3 - Right)   | 3848 |                                                                                                                                              |            |
| 3.5                              | 2                                                      | LED #10 (Key 4 - Left)   | 3849 |                                                                                                                                              |            |
| 3.3                              | 2                                                      | LED #11 (Key 4 - Center) | 3850 |                                                                                                                                              |            |
| 3.1                              | 2                                                      | LED #12 (Key 4 - Right)  | 3851 |                                                                                                                                              |            |
| 4.7                              | 2                                                      | LED #13 (Key 5 - Left)   | 3852 |                                                                                                                                              |            |
| 4.5                              | 2                                                      | LED #14 (Key 5 - Center) | 3853 |                                                                                                                                              |            |
| 4.3                              | 2                                                      | LED #15 (Key 5 - Right)  | 3854 |                                                                                                                                              |            |
| 4.1                              | 2                                                      | LED #16 (Key 6 - Left)   | 3855 |                                                                                                                                              |            |
| 5.7                              | 2                                                      | LED #17 (Key 6 - Center) | 3856 |                                                                                                                                              |            |
| 5.5                              | 2                                                      | LED #18 (Key 6 - Right)  | 3857 |                                                                                                                                              |            |
| 5.3                              | 2                                                      | LED #19 (Key 7 - Left)   | 3858 |                                                                                                                                              |            |
| 5.1                              | 2                                                      | LED #20 (Key 7 - Center) | 3859 |                                                                                                                                              |            |
| 6.7                              | 2                                                      | LED #21 (Key 7 - Right)  | 3860 |                                                                                                                                              |            |
| 6.5                              | 2                                                      | LED #22 (Key 8 - Left)   | 3861 |                                                                                                                                              |            |
| 6.3                              | 2                                                      | LED #23 (Key 8 - Center) | 3862 |                                                                                                                                              |            |
| 6.1                              | 2                                                      | LED #24 (Key 8 - Right)  | 3863 |                                                                                                                                              |            |
| 7.7                              | 2                                                      | Not Used                 | 3864 | All bits set to 1                                                                                                                            |            |
| 7.5                              | 2                                                      | Not Used                 | 3865 |                                                                                                                                              |            |
| 7.3                              | 2                                                      | Not Used                 | 3866 |                                                                                                                                              |            |
| 7.1                              | 2                                                      | Not Used                 | 3867 |                                                                                                                                              |            |
| 8.7                              | 2                                                      | Not Used                 | 3868 |                                                                                                                                              |            |
| 8.5                              | 2                                                      | Not Used                 | 3869 |                                                                                                                                              |            |
| 8.3                              | 2                                                      | Not Used                 | 3870 |                                                                                                                                              |            |
| 8.1                              | 2                                                      | Not Used                 | 3871 |                                                                                                                                              |            |

## Backlight Intensity

The Keypad module uses the J1939 Cab Illumination message to control the keypad icon backlighting. The message Data Field contains the desired intensity.

| Cab Illumination |                                                                          |                                 |      |                   | PGN: 53248   |
|------------------|--------------------------------------------------------------------------|---------------------------------|------|-------------------|--------------|
|                  |                                                                          |                                 |      |                   | hex: 0D000   |
| Description      | This message sets the brightness of the keypad backlight and indicators. |                                 |      |                   |              |
| PGN              | 53248                                                                    |                                 |      |                   |              |
| Priority         | 6                                                                        |                                 |      |                   |              |
| Destination      | Keypad                                                                   |                                 |      |                   |              |
| Data Length      | 8                                                                        |                                 |      |                   |              |
| Direction        | Receive                                                                  |                                 |      |                   |              |
| Update Rate      | N/A                                                                      |                                 |      |                   |              |
| Start            | Bits                                                                     | Name                            | SPN  | Notes             |              |
| 1.1              | 8                                                                        | Illumination Brightness Percent | 1487 | 0 - 100 Percent   | 0.4% per bit |
| 2.1              | 8                                                                        | Not Used                        |      | Set all bits to 1 |              |
| 3.1              | 8                                                                        | Not Used                        |      |                   |              |
| 4.1              | 8                                                                        | Not Used                        |      |                   |              |
| 5.1              | 8                                                                        | Not Used                        |      |                   |              |
| 6.1              | 8                                                                        | Not Used                        |      |                   |              |
| 7.1              | 8                                                                        | Not Used                        |      |                   |              |
| 8.1              | 8                                                                        | Not Used                        |      |                   |              |

## Module Status

The Keypad module uses a Proprietary J1939 message to broadcast system health.

| Module Status |                                                                                              |                  |     | PGN: 65376              |
|---------------|----------------------------------------------------------------------------------------------|------------------|-----|-------------------------|
|               |                                                                                              |                  |     | hex: 0FF60              |
| Description   | This message is broadcast periodically or upon request to indicate the module system status. |                  |     |                         |
| PGN           | 65376                                                                                        |                  |     |                         |
| Priority      | 6                                                                                            |                  |     |                         |
| Destination   | Global                                                                                       |                  |     |                         |
| Data Length   | 8                                                                                            |                  |     |                         |
| Direction     | Transmit                                                                                     |                  |     |                         |
| Update Rate   | 5000 mS (configurable) periodic and upon request                                             |                  |     |                         |
| Start         | Bits                                                                                         | Name             | SPN | Notes                   |
| 1.1           | 16                                                                                           | Supply Voltage   | N/A | Resolution 1 mV / bit   |
| 3.1           | 16                                                                                           | Core Temperature | N/A | Resolution 0.1 °C / bit |
| 5.1           | 16                                                                                           | Reserved         |     |                         |
| 7.1           | 16                                                                                           | Reserved         |     |                         |

## Module Configuration

All module configuration is performed using the Proprietary-A CAN message, PGN 61184 (0xFE00) . The message Data Field will contain the configuration command function, action to be taken and any parameter data. All configuration commands must be sent from Service Tool Source Address 249 (0xF9).

Upon receiving a Configuration Message, the module will attempt to execute the operation and then will return the Configuration Message with the Function Extension configured to convey the status of the operation. The service tool must wait for this message to be returned before the module will be ready to accept another Configuration Message.

| Proprietary-A |                                                |                      |       | PGN: 61184                         |
|---------------|------------------------------------------------|----------------------|-------|------------------------------------|
|               |                                                |                      |       | hex: 0EF00                         |
| Description   | This message is used for module configuration. |                      |       |                                    |
| PGN           | 61184                                          |                      |       |                                    |
| Priority      | 5                                              |                      |       |                                    |
| Destination   | Keypad                                         |                      |       |                                    |
| Data Length   | 8                                              |                      |       |                                    |
| Direction     | Receive                                        |                      |       |                                    |
| Update Rate   | N/A                                            |                      |       |                                    |
| Start         | Bits                                           | Name                 | Value | Notes                              |
| 1.1           | 8                                              | Function Code        | 0x10  | Enter Configuration Mode           |
| 2.1           | 8                                              | Action Code          | 0xFF  |                                    |
| 3.1           | 8                                              | Service Tool Address | 0xF9  |                                    |
| 4.1           | 8                                              | Module Address       | DA    |                                    |
| 5.1           | 8                                              | Security Key0        | 0x44  |                                    |
| 6.1           | 8                                              | Security Key1        | 0x55  |                                    |
| 7.1           | 8                                              | Security Key2        | 0x66  |                                    |
| 8.1           | 8                                              | Security Key3        | 0x77  |                                    |
| 1.1           | 8                                              | Function Code        | 0x11  | Save and Exit Configuration Mode   |
| 2.1           | 8                                              | Action Code          | 0xFF  |                                    |
| 3.1           | 8                                              | Service Tool Address | 0xF9  |                                    |
| 4.1           | 8                                              | Module Address       | DA    |                                    |
| 5.1           | 8                                              | Security Key0        | 0x44  |                                    |
| 6.1           | 8                                              | Security Key1        | 0x55  |                                    |
| 7.1           | 8                                              | Security Key2        | 0x66  |                                    |
| 8.1           | 8                                              | Security Key3        | 0x77  |                                    |
| 1.1           | 8                                              | Function Code        | 0x12  | Reset to Factory Defaults          |
| 2.1           | 8                                              | Action Code          | 0xFF  |                                    |
| 3.1           | 8                                              | Service Tool Address | 0xF9  |                                    |
| 4.1           | 8                                              | Module Address       | DA    |                                    |
| 5.1           | 8                                              | Security Key0        | 0x44  |                                    |
| 6.1           | 8                                              | Security Key1        | 0x55  |                                    |
| 7.1           | 8                                              | Security Key2        | 0x66  |                                    |
| 8.1           | 8                                              | Security Key3        | 0x77  |                                    |
| 1.1           | 8                                              | Function Code        | 0x13  | Cancel and Exit Configuration Mode |
| 2.1           | 8                                              | Action Code          | 0xFF  |                                    |
| 3.1           | 8                                              | Service Tool Address | 0xF9  |                                    |
| 4.1           | 8                                              | Module Address       | DA    |                                    |
| 5.1           | 8                                              | Security Key0        | 0x44  |                                    |
| 6.1           | 8                                              | Security Key1        | 0x55  |                                    |
| 7.1           | 8                                              | Security Key2        | 0x66  |                                    |
| 8.1           | 8                                              | Security Key3        | 0x77  |                                    |

| Proprietary-A<br>(continued) |                                                |                    |         |                                | PGN: 61184<br>hex: 0EF00 |
|------------------------------|------------------------------------------------|--------------------|---------|--------------------------------|--------------------------|
| Description                  | This message is used for module configuration. |                    |         |                                |                          |
| PGN                          | 61184                                          |                    |         |                                |                          |
| Priority                     | 5                                              |                    |         |                                |                          |
| Destination                  | Keypad                                         |                    |         |                                |                          |
| Data Length                  | 8                                              |                    |         |                                |                          |
| Direction                    | Receive                                        |                    |         |                                |                          |
| Update Rate                  | N/A                                            |                    |         |                                |                          |
| Start                        | Bits                                           | Name               | Value   | Notes                          |                          |
| 1.1                          | 8                                              | Function Code      | 0x20    | J1939 Source Address           |                          |
| 2.1                          | 8                                              | Action Code        | R/W     | <-- 0x10 Read; 0x11 Write      |                          |
| 3.1                          | 8                                              | Reserved           | 0xFF    |                                |                          |
| 4.1                          | 8                                              | New Source Address | ##      | valid J1939 address            |                          |
| 5.1                          | 32                                             | Reserved           | 0xFF... |                                |                          |
| 1.1                          | 8                                              | Function Code      | 0x23    | J1939 NAME (ECU Instance)      |                          |
| 2.1                          | 8                                              | Action Code        | R/W     | <-- 0x10 Read; 0x11 Write      |                          |
| 3.1                          | 8                                              | Reserved           | 0xFF    |                                |                          |
| 4.1                          | 8                                              | ECU Instance       | ##      | valid range 0-7                |                          |
| 5.1                          | 32                                             | Reserved           | 0xFF... |                                |                          |
| 1.1                          | 8                                              | Function Code      | 0x24    | J1939 NAME (Function Instance) |                          |
| 2.1                          | 8                                              | Action Code        | R/W     | <-- 0x10 Read; 0x11 Write      |                          |
| 3.1                          | 8                                              | Reserved           | 0xFF    |                                |                          |
| 4.1                          | 6                                              | Function Instance  | ##      | valid range 0-31               |                          |
| 5.1                          | 32                                             | Reserved           | 0xFF... |                                |                          |
| 1.1                          | 8                                              | Function Code      | 0x25    | J1939 NAME (Function)          |                          |
| 2.1                          | 8                                              | Action Code        | R/W     | <-- 0x10 Read; 0x11 Write      |                          |
| 3.1                          | 8                                              | Reserved           | 0xFF    |                                |                          |
| 4.1                          | 8                                              | Function           | ##      | valid range 0-255              |                          |
| 5.1                          | 32                                             | Reserved           | 0xFF... |                                |                          |
| 1.1                          | 8                                              | Function Code      | 0x26    | Transmission Priority          |                          |
| 2.1                          | 8                                              | Action Code        | R/W     | <-- 0x10 Read; 0x11 Write      |                          |
| 3.1                          | 8                                              | Reserved           | 0xFF    |                                |                          |
| 4.1                          | 8                                              | Priority           | ##      | valid range 0-7                |                          |
| 8.1                          | 32                                             | Reserved           | 0xFF... |                                |                          |

| Proprietary-A<br>(continued) |                                                |                            |         |                                        | PGN: 61184<br>hex: 0EF00 |
|------------------------------|------------------------------------------------|----------------------------|---------|----------------------------------------|--------------------------|
| Description                  | This message is used for module configuration. |                            |         |                                        |                          |
| PGN                          | 61184                                          |                            |         |                                        |                          |
| Priority                     | 5                                              |                            |         |                                        |                          |
| Destination                  | Keypad                                         |                            |         |                                        |                          |
| Data Length                  | 8                                              |                            |         |                                        |                          |
| Direction                    | Receive                                        |                            |         |                                        |                          |
| Update Rate                  | N/A                                            |                            |         |                                        |                          |
| Start                        | Bits                                           | Name                       | Value   | Notes                                  |                          |
| 1.1                          | 8                                              | Function Code              | 0x27    | J1939 NAME (Vehicle System)            |                          |
| 2.1                          | 8                                              | Action Code                | R/W     | <-- 0x10 Read; 0x11 Write              |                          |
| 3.1                          | 8                                              | Reserved                   | 0xFF    |                                        |                          |
| 4.1                          | 8                                              | Vehicle System             | ##      | valid range 0-127                      |                          |
| 5.1                          | 32                                             | Reserved                   | 0xFF... |                                        |                          |
| 1.1                          | 8                                              | Function Code              | 0x28    | J1939 NAME (Vehicle System Instance)   |                          |
| 2.1                          | 8                                              | Action Code                | R/W     | <-- 0x10 Read; 0x11 Write              |                          |
| 3.1                          | 8                                              | Reserved                   | 0xFF    |                                        |                          |
| 4.1                          | 8                                              | Vehicle System Instance    | ##      | valid range 0-15                       |                          |
| 5.1                          | 32                                             | Reserved                   | 0xFF... |                                        |                          |
| 1.1                          | 8                                              | Function Code              | 0x29    | J1939 NAME (Industry Group)            |                          |
| 2.1                          | 8                                              | Action Code                | R/W     | <-- 0x10 Read; 0x11 Write              |                          |
| 3.1                          | 8                                              | Reserved                   | 0xFF    |                                        |                          |
| 4.1                          | 8                                              | Industry Group             | ##      | valid range 0-7                        |                          |
| 5.1                          | 32                                             | Reserved                   | 0xFF... |                                        |                          |
| 1.1                          | 8                                              | Function Code              | 0x2A    | J1939 NAME (Arbitrary Address Capable) |                          |
| 2.1                          | 8                                              | Action Code                | R/W     | <-- 0x10 Read; 0x11 Write              |                          |
| 3.1                          | 8                                              | Reserved                   | 0xFF    |                                        |                          |
| 4.1                          | 8                                              | Arbitrary Address Capable  | ##      | valid range 0-1                        |                          |
| 5.1                          | 32                                             | Reserved                   | 0xFF... |                                        |                          |
| 1.1                          | 8                                              | Function Code              | 0x2B    | Alternate Address Count                |                          |
| 2.1                          | 8                                              | Action Code                | R/W     | <-- 0x10 Read; 0x11 Write              |                          |
| 3.1                          | 8                                              | Reserved                   | 0xFF    |                                        |                          |
| 4.1                          | 6                                              | Alternate Address Count    | ##      | valid range 0-15                       |                          |
| 5.1                          | 32                                             | Reserved                   | 0xFF... |                                        |                          |
| 1.1                          | 8                                              | Function Code              | 0x2C    | Alternate Address List                 |                          |
| 2.1                          | 8                                              | Action Code                | R/W     | <-- 0x10 Read; 0x11 Write              |                          |
| 3.1                          | 8                                              | Reserved                   | 0xFF    |                                        |                          |
| 4.1                          | 8                                              | Index into list            | ##      | valid range 1-15                       |                          |
| 5.1                          | 8                                              | Alternate Address Count    | ##      | valid J1939 address                    |                          |
| 6.1                          | 24                                             | Reserved                   | 0xFF... |                                        |                          |
| 1.1                          | 8                                              | Function Code              | 0x34    | CAN Transmission Rates                 |                          |
| 2.1                          | 8                                              | Action Code                | R/W     | <-- 0x10 Read; 0x11 Write              |                          |
| 3.1                          | 16                                             | PGN number                 | ##      | Note 1                                 |                          |
| 5.1                          | 16                                             | Transmit Rate (1 mS/bit)   | ##      | Note 2                                 |                          |
| 7.1                          | 16                                             | Transmit Offset (1 mS/bit) | ##      | Note 3                                 |                          |

## Notes:

1. Must be a valid PGN
2. Valid range is 10-60000 milliseconds. Use 0xFFFF for no change. Use 0 to disable periodic transmissions.
3. Valid range is 0-3000 milliseconds. This value will delay the initial transmission. Used to stagger messages having the same transmit rate.

## APPENDIX 1: Suspect Parameter Numbers (SPN)

### SPN 520192 – Function Byte

**Data Field position: Byte 1, 8 bits**

Used to define the configuration Function is to perform

#### Control Functions

|      |                                                                     |
|------|---------------------------------------------------------------------|
| 0x10 | Enter Configuration Mode – Run Mode Suspended, all outputs shut off |
| 0x11 | Save Changes and Exit Configuration Mode – Restart in Run Mode      |
| 0x12 | Reset to Factory Default Settings – Restart in Run Mode             |
| 0x13 | Cancel Changes and Exit Configuration – Restart in Run Mode         |
|      |                                                                     |

#### CAN J1939 Configuration

|      |                                            |
|------|--------------------------------------------|
| 0x20 | J1939 Source Address                       |
| 0x21 | reserved                                   |
| 0x22 | reserved                                   |
| 0x23 | J1939 NAME (ECU Instance)                  |
| 0x24 | J1939 NAME (Function Instance)             |
| 0x25 | J1939 NAME (Function)                      |
| 0x26 | J1939 NAME (Reserved)                      |
| 0x27 | J1939 NAME (Vehicle System)                |
| 0x28 | J1939 NAME (Vehicle System Instance)       |
| 0x29 | J1939 NAME (Industry Group)                |
| 0x2A | J1939 NAME (Arbitrary Address Capable Bit) |
| 0x2B | J1939 NAME (Alternate Address Count)       |
| 0x2C | J1939 NAME (Alternate Address List)        |

#### Module Configuration

|      |                                               |
|------|-----------------------------------------------|
| 0x34 | Status CAN Transmit Rates (PGN, Rate, Offset) |
|------|-----------------------------------------------|

### SPN 520193 Action Byte

**Data Field position: Byte 2, 8 bits**

Used to define the action the Function is to perform

#### Tx: As a Command

|      |                 |
|------|-----------------|
| 0x10 | Read Operation  |
| 0x11 | Write Operation |
| 0xFF | Not Applicable  |

#### Rx: As a Response

|      |                                                  |
|------|--------------------------------------------------|
| 0x12 | Operation completed successfully                 |
| 0x13 | Operation failed due to incorrect message format |

|      |                                              |
|------|----------------------------------------------|
| 0x14 | Operation failed due to unsupported hardware |
|------|----------------------------------------------|

### SPN 520202 Module Status

#### Data Field position: Byte 1, 16 bits

Used to report Module supply voltage

Range: 0x0000-0x8CA0 (0-36000) expressed as 0.0-36000 mV 1 mV / bit

#### Data Field position: Byte 3, 16 bits

Used to report Module core temperature

Range: 0x0000-0x03E8 (0-1000) expressed in degrees Celsius 0.1 °C / bit

### SPN 520207 16-bit Output CAN Timeout Parameters

#### Data Field position: Byte 5, 16 bits

Used to set the output timeout in the event of lost CAN command messages.

Range: 0x0001-0xFFDC (1-65500) expressed as 0.01-655 Sec 10 mS / bit

Range: 0x0000 Timeout Feature Disabled

Range: 0xFFFF Leaves value unchanged

#### Data Field position: Byte 7, 16 bits

Used to set the output state in the event of a timeout

0x00 = Turn OFF output, 0x01 = Turn ON output, 0xFF = Unchanged

### SPN 520208 16-bit CAN Transmission Parameters

#### Data Field position: Byte 3, 16 bits

Used to identify the PGN of the message

Range: 0xFF40-0xFF62 (PGN 65344-65378)

#### Data Field position: Byte 5, 16 bits

Used to set the transmission interval of the message

Range: 0x000A-0xEA60 (10-60000) 1 mS / bit

Range: 0x0000 Disables transmission

Range: 0xFFFF Leaves value unchanged

#### Data Field position: Byte 7, 16 bits

Used to set the offset or stagger for many messages with same interval.

Range: 0x0000-0x0BBF (0-3000) 1 mS / bit

Range: 0xFFFF Leaves value unchanged

## APPENDIX 2: Typical configuration Sequence

\* EXTENDED CAN ID - Assumes message priority = 0, module address = 0xC2. Command source address must be 0xF9.  
Tx = message sent from service tool to module, Rx = reply sent from module back to service tool.

### Tx: Command to Enter Configuration Mode

| Ext ID * | DLC | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 | Byte 8 |
|----------|-----|--------|--------|--------|--------|--------|--------|--------|--------|
| 0xEFC2F9 | 8   | 0x10   | 0xFF   | 0xF9   | 0xC2   | 0x44   | 0x55   | 0x66   | 0x77   |

Byte 1: 0x10 = Function (Enter Configuration Mode)  
 Byte 2: 0xFF = Sub-command (none)  
 Byte 3: 0xF9 = Service tool Address  
 Byte 4: 0xC2 = Module Address  
 Byte 5-8: 0x77665544 = security key (low byte first)

### Rx: Reply

| Ext ID * | DLC | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 | Byte 8 |
|----------|-----|--------|--------|--------|--------|--------|--------|--------|--------|
| 0xEFF9C2 | 8   | 0x10   | 0x12   | 0xF9   | 0xC2   | n/a    | n/a    | n/a    | n/a    |

Byte 1: Function  
 Byte 2: Success = 0x12 (Three LEDs above Key 1 will light, center LED flashing)

### Tx: Command to Change Module Source Address

| Ext ID * | DLC | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 | Byte 8 |
|----------|-----|--------|--------|--------|--------|--------|--------|--------|--------|
| 0xEFC2F9 | 8   | 0x20   | 0x11   | 0xFF   | 0xC3   | 0xFF   | 0xFF   | 0xFF   | 0xFF   |

Byte 1: 0x20 = Function (J1939 Source Address)  
 Byte 2: 0x11 = Sub-command (Write)  
 Byte 3: 0xFF  
 Byte 4: 0xC3 = New Address (Desired Address)

### Rx: Reply

| Ext ID * | DLC | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 | Byte 8 |
|----------|-----|--------|--------|--------|--------|--------|--------|--------|--------|
| 0xEFF9C2 | 8   | 0x20   | 0x12   | 0xFF   | 0xC3   | 0xFF   | 0xFF   | 0xFF   | 0xFF   |

Byte 1: Function  
 Byte 2: Success = 0x12 (NOTE: New Address will not take effect until you save and exit configuration)

• • •

### Tx: Additional configuration command(s)

#### Rx: Reply

• • •

### Tx: Command to Save Configuration and Exit to Run Mode

| Ext ID * | DLC | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 | Byte 8 |
|----------|-----|--------|--------|--------|--------|--------|--------|--------|--------|
| 0xEFC2F9 | 8   | 0x11   | 0xFF   | 0xF9   | 0xC2   | 0x44   | 0x55   | 0x66   | 0x77   |

Byte 1: 0x11 = Function (Exit Configuration Mode)  
 Byte 2: 0xFF = Sub-command (none)  
 Byte 3: 0xF9 = Service tool Address  
 Byte 4: 0xC2 = Current Module Address  
 Byte 5-8: 0x77665544 = security key (low byte first)

Module will restart with all changes in effect.