

Marlin Classic Keypad Module Slave Protocol

Marlin Classic 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 and Module status are reported via "Proprietary A" PGN's at user selected intervals or upon request.

Key Orientation

KEYs are numbered consecutively from 1 to 6, beginning with the upper left key.
LEDs are numbered consecutively from 1 to 18 beginning with the left most LED of KEY 1.
See diagram below:

1	2	3	4	5	6	7	8	9
1			2			3		
10	11	12	13	14	15	16	17	18
4			5			6		

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: FED9
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			
Data Length	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 ₂ - Key is Not Pressed 01 ₂ - Key is Pressed 10 ₂ - Error 11 ₂ - 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	All bits set to 1
2.5	2	Key Switch #6	706	
2.3	2	Not Used	707	
2.1	2	Not Used	708	
3.7	2	Not Used	709	
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: A7xx
Description	This message will set the state of the LED Indicators.				
PGN	42752				
Priority	6				
Destination	Keypad (xx = Keypad Source Address)				
Data Length	8				
Direction	Receive				
Update Rate	N/A				
Start	Bits	Name		SPN	Notes
1.7	2	LED #1	(Key 1 - Left)	3840	00 ₂ - Indicator OFF 01 ₂ - Indicator ON 10 ₂ - Indicator Blink - 2 Hz 11 ₂ - 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	All bits set to 1
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	Not Used		3858	
5.1	2	Not Used		3859	
6.7	2	Not Used		3860	
6.5	2	Not Used		3861	
6.3	2	Not Used		3862	
6.1	2	Not Used		3863	
7.7	2	Not Used		3864	
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 intensity of keypad icon backlight intensity and keypad indicator intensity. The message Data Field contains the desired intensity of each type of LEDs. Values between 1(0x01) and 250(0xFA) are valid with values above and below are constrained to this range with the exception the value 0(0x00). A value of 0(0x00) in the Indicator LED data field will result in full intensity 250(0xFA).

Cab Illumination				PGN: 53248
				hex: D0xx
Description	This message will set the state of the LED Indicators.			
PGN	53248			
Priority	6			
Destination	Keypad (xx = Keypad Source Address)			
Data Length	8			
Direction	Receive			
Update Rate	N/A			
Start	Bits	Name	SPN	Notes
1.1	8	Backlight Illumination %		0-100 Percent (0.4% per bit) (MIN Value: 0, 0x00)(MAX Value: 250, 0xFA)
2.1	8	Indicator Illumination %		0.4-100 Percent (0.4% per bit) (MIN Value: 1, 0x01)(MAX Value: 250, 0xFA)
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:	FF60
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	5000ms (Configurable) periodic and upon request				
Start	Bits	Name		Notes	
1.1	16	Supply Voltage		Resolution 1mV/bit	
3.1	16	Core Junction Temperature		Resolution 1°C/bit	
5.1	32	Reserved			

Low Power Mode

The keypad module can be put into a low power state via CAN message as defined below.

Low Power Mode					PGN: 65282
					hex: FF28
Description	This message controls the low power state of the keypad module.				
PGN	65282				
Priority	6				
Destination	Keypad				
Data Length	8				
Direction	Receive				
Update Rate	N/A				
Start	Bits	Name	SPN	Notes	
1.1	8	Keypad Source Address		J1939 source address of the keypad being commanded.	
2.1	8	Low Power State Command		0 = Exit Low Power Mode, 1 = Enter Low Power Mode, Others = Ignored	
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			

By default, low power mode is disabled and cannot be entered. Low power mode must be configured to be used. Refer to the Module Configuration section for information on configuration options and how to configure the module.

While in low power mode, the module will draw ~2mA.

Note: If the module is not in low power mode, sending a '0' in byte 2 of the above message will result in no change. Likewise, if sending a '1' while the module is in low power mode.

Low Power Mode added in software rev. \$E
This command and associated configuration will not work in earlier software revisions.

Automatic Baudrate Detection

By default, the Marlin Classic keypads will perform an automatic baudrate detection on startup. Once a valid CAN frame is detected, the keypad will configure the CAN peripheral to operate at the detected baudrate. Starting in software rev. \$G, this behavior can be disabled and a default baudrate can be selected (see Module Configuration section for details)

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: EFxx
Description	This message is used for Module Configuration			
PGN	61184			
Priority	5			
Destination	Keypad (xx = Keypad Source Address)			
Data Length	8			
Direction	Receive			
Update Rate	N/A			
Start	Bits	Name	Value	Notes
1.1	8	Function Code	->	0x10 = Enter Configuration Mode 0x11 = Save and Exit Configuration Mode 0x12 = Reset toFactory Defaults 0x13 = Cancel and Exit Configuration Mode
2.1	8	Action Code	0xFF	
3.1	8	Reserved	0xF9	
4.1	8	Module Address	xx	
5.1	8	Security Key 0	0x44	
6.1	8	Security Key 1	0x55	
7.1	8	Security Key 2	0x66	
8.1	8	Security Key 3	0x77	

Proprietary-A (Cont.)					PGN: 61184
					hex: EFxx
Description	This message is used for Module Configuration				
PGN	61184				
Priority	5				
Destination	Keypad (xx = Keypad Source Address)				
Data Length	8				
Direction	Receive				
Update Rate	N/A				
Start	Bits	Name	Value	Notes	
1.1	8	Function Code	0x20	J1939 Source Address <-- 0x10 Read; 0x11 Write Valid J1939 Address	
2.1	8	Action Code	R/W		
3.1	8	Reserved	0xFF		
4.1	8	Source Address	##		
5.1	32	Reserved	0xFF...		
1.1	8	Function Code	0x21	J1939 Name (Module Number) <-- 0x10 Read; 0x11 Write <-- Module Num (Big Endian)	
2.1	8	Action Code	R/W		
3.1	8	Reserved	0xFF		
4.1	24	Module Num	##		
7.1	16	Reserved	0xFF...		
1.1	8	Function Code	0x22	J1939 Name (Manufacturer Code) <-- 0x10 Read; 0x11 Write	
2.1	8	Action Code	R/W		
3.1	8	Reserved	0xFF		
4.1	16	Manufacturer Code	##		
6.1	24	Reserved	0xFF...		
1.1	8	Function Code	0x26	Transmission Priority <-- 0x10 Read; 0x11 Write <-- Valid Range 0-7	
2.1	8	Action Code	R/W		
3.1	8	Reserved	0xFF		
4.1	8	Transmission Priority	##		
5.1	32	Reserved	0xFF...		
1.1	8	Function Code	0x27	J1939 Name (Vehicle System) <-- 0x10 Read; 0x11 Write <-- Valid range 0-127	
2.1	8	Action Code	R/W		
3.1	8	Reserved	0xFF		
4.1	8	Vehicle System	##		
5.1	32	Reserved	0xFF...		
1.1	8	Function Code	0x28	J1939 Name (Vehicle System Instance) <-- 0x10 Read; 0x11 Write	
2.1	8	Action Code	R/W		
3.1	8	Reserved	0xFF		
4.1	8	Vehicle System	##		
5.1	32	Reserved	0xFF...		

Proprietary-A (Cont.)				PGN: 61184
				hex: EFxx
Description	This message is used for Module Configuration			
PGN	61184			
Priority	5			
Destination	Keypad (xx = Keypad Source Address)			
Data Length	8			
Direction	Receive			
Update Rate	N/A			
Start	Bits	Name	Value	Notes
1.1	8	Function Code	0x29	J1939 Name (Industry Group) <-- 0x10 Read; 0x11 Write Valid range: 0-15
2.1	8	Action Code	R/W	
3.1	8	Reserved	0xFF	
4.1	8	Vehicle System	##	
5.1	32	Reserved	0xFF...	
1.1	8	Function Code	0x2A	J1939 Name (Arbitrary Address Capable) <-- 0x10 Read; 0x11 Write <-- Valid Range 0-1 (1 = True, 0 = False)
2.1	8	Action Code	R/W	
3.1	8	Reserved	0xFF	
5.1	24	Arbitrary Address Capable	##	
8.1	8	Reserved	0xFF...	
1.1	8	Function Code	0x2B	Alternate Address Count <-- 0x10 Read; 0x11 Write
2.1	8	Action Code	R/W	
3.1	8	Reserved	0xFF	
4.1	16	Manufacturer Code	##	
6.1	24	Reserved	0xFF...	
1.1	8	Function Code	0x2C	Alternate Address List <-- 0x10 Read; 0x11 Write <-- Valid Range 1-15 <-- Valid J1939 Address
2.1	8	Action Code	R/W	
3.1	8	Reserved	0xFF	
4.1	8	Index Into List	##	
5.1	8	Alternate Address	##	
6.1	24	Reserved	0xFF...	
1.1	8	Function Code	0x34	CAN Transmission Rates <-- 0x10 Read; 0x11 Write <-- Valid PGN <-- Valid Range: 10-60000ms <-- Valid Range: 0-3000ms
2.1	8	Action Code	R/W	
3.1	16	PGN Number	##	
5.1	16	Transmission Rate (1ms/bit)	##	
7.1	16	Transmission Offset (1ms.bit)	##	

Proprietary-A (Cont.)					PGN: 61184
					hex: EFxx
Description	This message is used for Module Configuration				
PGN	61184				
Priority	5				
Destination	Keypad (xx = Keypad Source Address)				
Data Length	8				
Direction	Receive				
Update Rate	N/A				
Start	Bits	Name	Value	Notes	
1.1	8	Function Code	0x30	<u>Enable Low Power Mode</u>	
2.1	8	Action Code	R/W	0 = Low Power Mode Disabled,	
3.1	8	Reserved	0xFF	1 = Low Power Mode Enabled,	
4.1	8	<u>Enable Low Power Mode</u>	##	Others = Ignored	
5.1	32	Reserved	0xFF...		
1.1	8	Function Code	0x31	<u>Enable Low Power exit via CAN</u>	
2.1	8	Action Code	R/W	0 = Do not exit Low power via CAN	
3.1	8	Reserved	0xFF	1 = Can exit Low Power via CAN	
4.1	8	<u>Enable Exit Via CAN</u>	##	Others = ignored	
5.1	32	Reserved	0xFF...		
1.1	8	Function Code	0x32	<u>Enable Exit Low Power on Key Press</u>	
2.1	8	Action Code	R/W	0 = Do not exit Low Power on key press	
3.1	8	Reserved	0xFF	1 = Can exit Low Power on key press	
4.1	8	<u>Enable Exit Via Key Press</u>	##	Others = ignored	
5.1	32	Reserved	0xFF...		
1.1	8	Function Code	0x33	<u>Wake on Key Press Mask</u>	
2.1	8	Action Code	R/W	0 = Do not exit low power when specified key is pressed	
3.1	8	Reserved	0xFF	1 = Exit low power when specified button is pressed	
4.1	1	Reserved	N/A		
4.2	1	<u>Key 2</u>	##	*Note: Key 1 cannot be used to exit low power mode	
4.3	1	<u>Key 3</u>	##		
4.4	1	<u>Key 4</u>	##		
4.5	1	<u>Key 5</u>	##		
4.6	1	<u>Key 6</u>	##		
5.1	32	Reserved	0xFF...		

Proprietary-A (Cont.)				PGN: 61184
				hex: 0xEF00
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	0x40	Disable Auto-baudrate Detection <-- 0x10 Read; 0x11 Write
2.1	8	Action Code	R/W	
3.1	8	Reserved	0xFF	
4.1	8	Function	##	
5.1	32	Reserved	0xFF...	0 = Auto-baud enabled, 1 = Auto-baud disabled
1.1	8	Function Code	0x41	Baudrate (if auto-baudrate detection disabled) <-- 0x10 Read; 0x11 Write
2.1	8	Action Code	R/W	
3.1	8	Reserved	0xFF	
4.1	8	Function	##	
5.1	32	Reserved	0xFF...	2 = 250kbaud, 5 = 500kbaud, 1 = 1Mbaud

NOTE: Autobaud configuration only available in software revisions \$G or later

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)

Low Power Mode configuration (Software rev. \$E or later)

0x30	Enable Low Power Mode
0x31	Enable Exit Low Power on CAN
0x32	Enable Exit Low Power on Keys
0x33	Exit Low Power Mode Key Mask
0x34	Status CAN Transmit Rates (PGN, Rate, Offset)

Autobaud configuration (Software rev. \$G or later)

0x40	Disable CAN Autobaud
0x41	Default Baudrate

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 as millivolts 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 = 0xC1. 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
0xEFC1F9	8	0x10	0xFF	0xF9	0xC1	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: 0xC1 = 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
0xEFF9C1	8	0x10	0x12	0xF9	0xC1	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
0xEFC1F9	8	0x20	0x11	0xFF	0xC2	0xFF	0xFF	0xFF	0xFF

Byte 1: 0x20 = Function (J1939 Source Address)

Byte 2: 0x11 = Sub-command (Write)

Byte 3: 0xFF

Byte 4: 0xC2 = 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
0xEFF9C1	8	0x20	0x12	0xFF	0xC2	0xFF	0xFF	0xFF	0xFF

Byte 1: Function

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

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Tx: Additional configuration commands

Rx: Reply

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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
0xEFC1F9	8	0x11	0xFF	0xF9	0xC1	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: 0xC1 = Current Module Address

Byte 5-8 0x77665544 = security key (low byte first)

Module will restart with all changes in effect.

APPENDIX 3: Low Power Mode Configuration Example

* EXTENDED CAN ID - Assumes message priority = 0, module address = 0xC1. 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
0xEFC1F9	8	0x10	0xFF	0xF9	0xC1	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: 0xC1 = 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
0xEFF9C1	8	0x10	0x12	0xF9	0xC1	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 Low Power Mode Enable

Ext ID *	DLC	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0xEFC1F9	8	0x30	0x11	0xFF	0x01	0xFF	0xFF	0xFF	0xFF

Byte 1: 0x30 = Function (Low Power Mode Enable)
 Byte 2: 0x11 = Sub-command (Write)
 Byte 4: 0x01 = Enable Low Power Mode

Rx: Reply

Ext ID *	DLC	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0xEFF9C1	8	0x30	0x12	0xFF	0x01	n/a	n/a	n/a	n/a

Byte 1: Function
 Byte 2: Success = 0x12
 Byte 4: State of Low Power Mode enable bit.

Tx: Command to Enable Low Power Mode Exit via CAN

Ext ID *	DLC	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0xEFC1F9	8	0x31	0x11	0xFF	0x01	0xFF	0xFF	0xFF	0xFF

Byte 1: 0x30 = Function (Enable Low Power Mode via CAN)
 Byte 2: 0x11 = Sub-command (Write)
 Byte 4: 0x01 = Enable wake on CAN

Rx: Reply

Ext ID *	DLC	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0xEFF9C1	8	0x31	0x12	0xFF	0x01	n/a	n/a	n/a	n/a

Byte 1: Function
 Byte 2: Success = 0x12
 Byte 4: State of Enable Low Power Mode via CAN bit.

Cont. on next page.

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
0xEFC1F9	8	0x11	0xFF	0xF9	0xC1	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: 0xC1 = Current Module Address

Byte 5-8 0x77665544 = security key (low byte first)

Module will restart with all changes in effect.