



# CLTM12-S-Series

## Interface Specification

# Revision History

Revision	Description
1.0	Initial Release

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# 1 Overview

This document contains the J1939 interface for the CLTM12-S, including all transmitted messages and which messages it must receive to operate properly.

1.1 CLTM12-S Command Message (received)			
Description	This message shall be broadcast periodically to control the output states and operating mode of the CLTM12-S.		
PGN	65374 (0X00FF5E)		
Default Priority	6		
Source Address	Variable		
DLC	8		
Update Rate	100 mS (variable), or on change		
Direction	CAN Network -> CLTM12-S		
Start	Bits	Description	Notes
1.1	2	Output #01 Command	0 (00b) = Output commanded OFF 1 (01b) = Output commanded ON 2 (10b) = Unused (see note below) 3 (11b) = Not Available (see note below)
1.3		Output #02 Command	
1.5		Output #03 Command	
1.7		Output #04 Command	
2.1		Output #05 Command	
2.3		Output #06 Command	
2.5		Output #07 Command	
2.7		Output #08 Command	
3.1		Output #09 Command	
3.3		Output #10 Command	
3.5		Output #11 Command	
3.7		Output #12 Command	
4.1		Operating Mode	0 (00b) = Sleep 1 (01b) = Run
4.3	6	Reserved	63 (111111B)
5.1	8	Slave Source Address	49 (0X31) 50 (0X32) 51 (0X33) 52 (0X34)
6.1	8	Reserved	255 (0XFF)
7.1	8	Reserved	255 (0xFF)

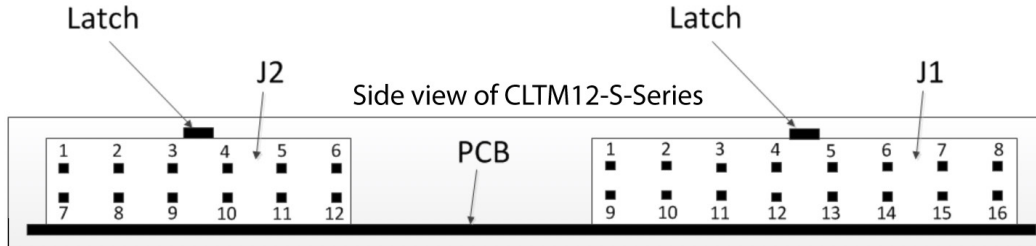
NOTE: If an output has previously been commanded ON, only a "commanded OFF" will turn that output OFF. Sending either "Unused" or "N/A" will maintain the ON state. This allows the commanding ECU to control individual channels using masking without requiring knowledge of the current ON/OFF states for all (12) outputs channels.

1.2 CLTM12-S Output State Message (transmitted)			
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 (12) CLTM12-S outputs.		
PGN	65375 (0X00FF5F)		
Default Priority	6		
Source Address	CLTM12-S Source Address		
DLC	8		
Update Rate	100 mS (variable), or on change		
Direction	CLTM12-S -> CAN Network		
Start	Bits	Description	Notes
1.1	4	Output #01 State	0 (0000b) = Output OFF 1 (0001b) = Output ON 2 (0010b) = ON when commanded OFF fault 3 (0011b) = OFF when commanded ON fault 4 (0100b) = Short circuit fault 5 (0101b) = Open circuit fault
1.5		Output #02 State	
2.1		Output #03 State	
2.5		Output #04 State	
3.1		Output #05 State	
3.5		Output #06 State	
4.1		Output #07 State	
4.5		Output #08 State	
5.1		Output #09 State	
5.5		Output #10 State	
6.1		Output #11 State	
6.5	Output #12 State		
7.1	8	Reserved	255 (0xFF)

1.3 CLTM12-S Input State Message (transmitted)			
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 (7) CLTM12-S inputs.		
PGN	65422 (0X00FF8E)		
Default Priority	6		
Source Address	CLTM12-S Source Address		
DLC	2		
Update Rate	100 mS, or on change		
Direction	CLTM12-S -> CAN Network		
Start	Bits	Description	Notes
1.1	2	Input #01 State	0 (0000b) = Input OFF 1 (0001b) = Input ON 2 (0010b) = Input OPEN 3 (0011b) = Input OUT OF RANGE (>32V)
1.3		Input #02 State	
1.5		Input #03 State	
1.7		Input #04 State	
2.1		Input #05 State	
2.3		Input #06 State	
2.5		Input #07 State	
2.7	8	Reserved	3 (11b)

Addr-1	Addr-2	J1939 Source Address
Open	Input 01 State	00b = Input OFF
Gnd	Input 02 State	01b = Input ON
Open	Reserved	11b

## Connector interface



J2 Connector Pin No.	Description	Output Rating in AMPS
1	Output 5	10
2	Output 4	10
3	Output 8	10
4	Output 2	10
5	Output 10	10
6	Output 1	10
7	Output 7	10
8	Output 9	5
9	Output 6	5
10	Output 12	5
11	Output 3	5
12	Output 11	10

J1 Connector Pin No.	Description
1	CAN High
2	System Ground
3	Baud Rate Select
4	Address #1 (active low)
5	Digital Input #3 (active high / open)
6	Digital Input #1 (active high / open)
7	Discrete Input #3 (active high / open)
8	Discrete Input #1 (active high / open)
9	CAN Low
10	CAN Shield
11	No connect
12	Address #2 (active low)
13	Digital Input #4 (active high) / Ignition Wake (active high)
14	Digital Input #2 (active high / open)
15	Pull-Down to Ground (for configuration address daisy-chain)
16	Discrete Input #2 (active high / open)

1.4 J1939 Diagnostic Reporting – DMI (transmitted)					
Description	This message is broadcast from the CLTM12-S and contains details of any problems within the unit. If more than one problem exists it will be transmitted using the multi-packet protocol. SPN 1215, through 1706 are repeated for each problem.				
PGN	65226 (0X00FECA)				
Default Priority	7				
Source Address	CLTM12-S Source Address				
DLC	8				
Update Rate	100 mS				
Direction	CLTM12-S -> CAN Network				
Start	Bits	Description	SPN	Notes	
1.1	2	Protect Lamp	987	0 (00b) = Lamp off 1 (01b) = Lamp ON 2 (10b) = Reserved 3 (11b) = Not Available	
1.3		Amber Warning Lamp	624		
1.5		Red Stop Lamp	623		
1.7		Malfunction Indicator Lamp	1213		
2.1		Flash Protect Lamp	3041		
2.3		Flash Amber Warning Lamp	3040		
2.5		Flash Red Stop Lamp	3039		
2.7		Flash Malfunction Indicator Lamp	3038		
3-4, 5.6	19	Suspect Parameter Number (SPN)	1214		
5.1	5	Failure Mode Identifier (FMI)	3883		
6.1	7	Occurrence count	1216		
6.8	2	SPN Conversion Method	1706		
Start			SPN	FMI	Lamps
V <sub>supply</sub> Above Normal (>32 V)			3598	3 <sup>3</sup>	Red Stop
V <sub>supply</sub> Below Normal (>32 V)			3598	4 <sup>2</sup>	Red Stop
Overtemperature			517248	0	Red Stop
CLTM12-S Command Message Timeout			517249	31 <sup>1</sup>	Red Stop

NOTE:

1. FMI 31 = Condition Exists
2. FMI 4 = Voltage Below Normal or Shorted to Low Source
3. FMI 3 = Voltage Above Normal or Shorted to High Source

1.5 J1939 Address Claim Message (transmitted)				
Description	The CLTM12-S shall transmit an address claim at start-up or upon request.			
PGN	60928 (0X00EE00)			
Default Priority	6			
Source Address	CLTM12-S Source Address			
DLC	8			
Update Rate	On start-up or upon request			
Direction	CLTM12-S -> Network			
Start	Bits	Description	SPN	Notes
1.1	21	Identity Number	2837	
3.6	11	Manufacturer Code	2838	741 (Carling Tech assigned Manufacturer Code)
5.1	3	ECU Instance	2840	0
5.4	5	Function Instance	2839	1
6.1	8	Function	2841	55
7.1	1	Reserved	N/A	0
7.2	7	Vehicle System	2842	0
8.1	4	Vehicle System Instance	2843	0
8.5	3	Industry Group	2846	3 (Construction)
8.8	1	Arbitrary Address Capable	2844	0

1.6 Supervisory Current Enable/Disable				
Description	Enables/disables the supervisory current for open circuit detection.			
PGN	61184 (0X00EF00)			
Default Priority	6			
Source Address	CLTM12-S Source Address			
DLC	8			
Update Rate	Upon command			
Direction	CAN Network -> CLTM12-S			
Start	Bits	Description	SPN	Notes
1.1	2	Input #01 State		176 (0xB0)
2.1		Input #02 State		137 (0x89)
3.1		Input #03 State		10 (0X0A)
4.1		Input #04 State		0 = disable open ckt detect; 1 = enable open ckt detect
5.1		Reserved		255 (0XFF)
6.1		Reserved		255 (0XFF)
7.1		Reserved		255 (0XFF)
8.1		8	Reserved	

1.7 Commanded Address Message (received)				
Description	The CLTM12-S shall receive the J1939 Commanded Address message as a means to change the source address of the CLTM12-S.			
PGN	65240 (0X00FED8)			
Default Priority	6			
Source Address	Variable			
DLC	9			
Update Rate	Upon command			
Direction	Network -> CLTM12-S			
Start	Bits	Description	SPN	Notes
1.1	21	Identity Number	2837	
3.6	11	Manufacturer Code	2838	741 (Carling Tech assigned Manufacturer Code)
5.1	3	ECU Instance	2840	0
5.4	5	Function Instance	2839	1
6.1	8	Function	2841	55
7.1	1	Reserved	N/A	0
7.2	7	Vehicle System	2842	0
8.1	4	Vehicle System Instance	2843	0
8.5	3	Industry Group	2846	3 (Construction)
8.8	1	Arbitrary Address Capable	2844	0
9.1	8	New Source Address	2847	0-253

## 1.8 Low-Power Sleep Mode

The following conditions need to be in place for the CLTM12-S to enter low power sleep mode:

- All outputs must be OFF
- All inputs must be OFF
- The 'Operating Mode' field of the CLTM12-S command message must be set to 'Sleep' (0)
- No CAN communication on the vehicle

A change in any of the above conditions will awaken the CLTM12-S.

## 1.9 Power Up Issues

If the CLTM12-S is configured for 500k Baud operation, several CAN errors will be visible on the bus at power-up. This is because the bootloader software is hard-configured for 250k Baud operation, and will generate CAN errors as the software transitions from the bootloader to the application.