

VSCADA/CAN Bus ICD

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This document describes how the CAN Bus worked in the LFEV car.

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Overview

The CAN Bus network is used to talk between all sensors and VSCADA. Devices jabber on the network with each sensor having a unique ID. VSCADA accepts sensor packets and decodes the raw bytes into useful values. The largest ID can be 0x7FF.

Hardware interface

There are 2 hardware connection options; a 6-pin and a 9-pin connector. These are documented in the appendix. Any traces on a PCB should be 120 ohms and differentially routed. The cable should be twisted pair.

ID allocation and respective sensor, byte length, unit and subsystem

Description	Address	Offset	ByteLength	System	Units
Pack 1 state	0x100	0	1	TSV	
Pack 1 voltage	0x100	1	2	TSV	V
Pack 1 current	0x100	3	4	TSV	A
Pack 1 SOC	0x100	7	1	TSV	%
Pack 1 Coulombs	0x101	0	4	TSV	
Pack 1 cell status 1	0x101	4	1	TSV	
Pack 1 cell status 2	0x101	5	1	TSV	
Pack 1 cell status 3	0x101	6	1	TSV	
Pack 1 cell status 4	0x101	7	1	TSV	
Pack 1 cell status 5	0x102	0	1	TSV	
Pack 1 cell status 6	0x102	1	1	TSV	
Pack 1 cell status 7	0x102	2	1	TSV	
Pack 1 cell voltage 1	0x102	3	2	TSV	V
Pack 1 cell voltage 2	0x102	5	2	TSV	V
Pack 1 cell voltage 3	0x103	0	2	TSV	V
Pack 1 cell voltage 4	0x103	2	2	TSV	V
Pack 1 cell voltage 5	0x103	4	2	TSV	V
Pack 1 cell voltage 6	0x103	6	2	TSV	V
Pack 1 cell voltage 7	0x104	0	2	TSV	V
Pack 1 cell temp 1	0x104	2	2	TSV	C
Pack 1 cell temp 2	0x104	4	2	TSV	C
Pack 1 cell temp 3	0x104	6	2	TSV	C
Pack 1 cell temp 4	0x105	0	2	TSV	C
Pack 1 cell temp 5	0x105	2	2	TSV	C

Pack 1 cell temp 6	0x105	4	2	TSV	C
Pack 1 cell temp 7	0x105	6	2	TSV	C
Pack 2 state	0x200	0	1	TSV	
Pack 2 voltage	0x200	1	2	TSV	V
Pack 2 current	0x200	3	4	TSV	A
Pack 2 SOC	0x200	7	1	TSV	%
Pack 2 Coulombs	0x201	0	4	TSV	
Pack 2 cell status 1	0x201	4	1	TSV	
Pack 2 cell status 2	0x201	5	1	TSV	
Pack 2 cell status 3	0x201	6	1	TSV	
Pack 2 cell status 4	0x201	7	1	TSV	
Pack 2 cell status 5	0x202	0	1	TSV	
Pack 2 cell status 6	0x202	1	1	TSV	
Pack 2 cell status 7	0x202	2	1	TSV	
Pack 2 cell voltage 1	0x202	3	2	TSV	V
Pack 2 cell voltage 2	0x202	5	2	TSV	V
Pack 2 cell voltage 3	0x203	0	2	TSV	V
Pack 2 cell voltage 4	0x203	2	2	TSV	V
Pack 2 cell voltage 5	0x203	4	2	TSV	V
Pack 2 cell voltage 6	0x203	6	2	TSV	V
Pack 2 cell voltage 7	0x204	0	2	TSV	V
Pack 2 cell temp 1	0x204	2	2	TSV	C
Pack 2 cell temp 2	0x204	4	2	TSV	C
Pack 2 cell temp 3	0x204	6	2	TSV	C
Pack 2 cell temp 4	0x205	0	2	TSV	C
Pack 2 cell temp 5	0x205	2	2	TSV	C
Pack 2 cell temp 6	0x205	4	2	TSV	C
Pack 2 cell temp 7	0x205	6	2	TSV	C
Pack 3 state	0x300	0	1	TSV	
Pack 3 voltage	0x300	1	2	TSV	V
Pack 3 current	0x300	3	4	TSV	A
Pack 3 SOC	0x300	7	1	TSV	%
Pack 3 Coulombs	0x301	0	4	TSV	
Pack 3 cell status 1	0x301	4	1	TSV	
Pack 3 cell status 2	0x301	5	1	TSV	
Pack 3 cell status 3	0x301	6	1	TSV	
Pack 3 cell status 4	0x301	7	1	TSV	
Pack 3 cell status 5	0x302	0	1	TSV	
Pack 3 cell status 6	0x302	1	1	TSV	

Pack 3 cell status 7	0x302	2	1	TSV	
Pack 3 cell voltage 1	0x302	3	2	TSV	V
Pack 3 cell voltage 2	0x302	5	2	TSV	V
Pack 3 cell voltage 3	0x303	0	2	TSV	V
Pack 3 cell voltage 4	0x303	2	2	TSV	V
Pack 3 cell voltage 5	0x303	4	2	TSV	V
Pack 3 cell voltage 6	0x303	6	2	TSV	V
Pack 3 cell voltage 7	0x304	0	2	TSV	V
Pack 3 cell temp 1	0x304	2	2	TSV	C
Pack 3 cell temp 2	0x304	4	2	TSV	C
Pack 3 cell temp 3	0x304	6	2	TSV	C
Pack 3 cell temp 4	0x305	0	2	TSV	C
Pack 3 cell temp 5	0x305	2	2	TSV	C
Pack 3 cell temp 6	0x305	4	2	TSV	C
Pack 3 cell temp 7	0x305	6	2	TSV	C
Pack 4 state	0x400	0	1	TSV	
Pack 4 voltage	0x400	1	2	TSV	V
Pack 4 current	0x400	3	4	TSV	A
Pack 4 SOC	0x400	7	1	TSV	%
Pack 4 Coulombs	0x401	0	4	TSV	
Pack 4 cell status 1	0x401	4	1	TSV	
Pack 4 cell status 2	0x401	5	1	TSV	
Pack 4 cell status 3	0x401	6	1	TSV	
Pack 4 cell status 4	0x401	7	1	TSV	
Pack 4 cell status 5	0x402	0	1	TSV	
Pack 4 cell status 6	0x402	1	1	TSV	
Pack 4 cell status 7	0x402	2	1	TSV	
Pack 4 cell voltage 1	0x402	3	2	TSV	V
Pack 4 cell voltage 2	0x402	5	2	TSV	V
Pack 4 cell voltage 3	0x403	0	2	TSV	V
Pack 4 cell voltage 4	0x403	2	2	TSV	V
Pack 4 cell voltage 5	0x403	4	2	TSV	V
Pack 4 cell voltage 6	0x403	6	2	TSV	V
Pack 4 cell voltage 7	0x404	0	2	TSV	V
Pack 4 cell temp 1	0x404	2	2	TSV	C
Pack 4 cell temp 2	0x404	4	2	TSV	C
Pack 4 cell temp 3	0x404	6	2	TSV	C
Pack 4 cell temp 4	0x405	0	2	TSV	C
Pack 4 cell temp 5	0x405	2	2	TSV	C

Pack 4 cell temp 6	0x405	4	2	TSV	C
Pack 4 cell temp 7	0x405	6	2	TSV	C
Motor RPM	0x601	0	2	DYNO	RPM
Motor Temp	0x601	2	1	DYNO	C
Controller Temp	0x601	3	1	DYNO	C
RMS Current	0x601	4	2	DYNO	A
Capacitor Voltage	0x601	6	2	DYNO	V
Stator Frequency	0x602	0	2	DYNO	HZ
Controller Fault Primary	0x602	2	1	DYNO	
Controller Fault Secondary	0x602	3	1	DYNO	
Throttle Input	0x602	4	1	DYNO	%
Brake Input	0x602	5	1	DYNO	%
Cooling state	0xF0	0	2	COOLING	
Outlet Fluid Temp	0xF0	2	4	COOLING	C
Fluid Flow Rate	0xF1	0	4	COOLING	
Inlet Fluid Temp	0xF1	4	4	COOLING	C
TSI state	0xF2	0	3	TSI	
IMD	0xF2	3	4	TSI	
Brake	0xF3	0	5	TSI	
Throttle position	0xF4	0	6	TSI	
TSV Voltage	0xF5	0	7	TSI	
TSV Current	0xF6	0	8	TSI	

Data packet formats

Each CAN packet contains data from multiple sensors. The first buffer has offset zero. Sensor values that span multiple bytes transmit the most significant bytes first. Subsequent sensor values follow, with an offset as noted in the table above. An example packet is shown in the table below:

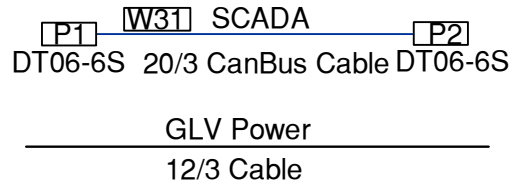
ID	Buffer(7)	6	5	4	3	2	1	Buffer(0)
0x100	Pack 1 State	Pack 1 voltage MSB	Pack 1 Voltage LSB	Pack 1 Current [31:34]	Pack 1 Current [23:16]	Pack 1 Current [15:8]	Pack 1 Current [7:0]	Pack SOC

Appendix A - Hardware Interfaces

6 pin connector

Pin Color Signal

1 YEL CAN H
 2 GRN CAN L
 3 BARE SHIELD
 4 GRN CHGND
 5 WHT 24VDC
 6 BLK 24V RTN



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