Daimler AG
MAN Nutzfahrzeuge AG

Scania AB
Volvo Truck Corporation
Renault Trucks

Iveco SpA
DAF Trucks N.V.

FMS-Standard
Interface description

Vers. 02.00

11.11.2010

General annotations

- Data might be not available during ignition off
- Physical Layer according to ISO 11898 (250kb/s)
- Application Layer according SAE J1939/ 71
- Data Link Layer according SAE J1939/ 21
- If there is a discrepancy between definitions in this document and the SAE, the SAE documents are valid only.
- Mentioned reference no. in this document is referring to SAE document
- The priority/source address of each partner is different and has to be masked by connected FMS-ECU.
- In the FMS-ECU a switchable terminating resistor is recommended.
- If the information is delivered the function/data has to be delivered according FMS-standard definition.
- If the information is not available the function/data has to be sent as not available according to SAE
- “not used for FMS-standard” means that there might be data sent according SAE but are not used in FMS-standard interface. If no information is sent, then it has to be sent as “not available”.
- “reserved for FMS-standard” means that as long as there is no definition it is sent “FF (not available)”

History

Version 01.00 Oct. 2009

- added history
- change of DaimlerChrysler to Daimler
- added Renault Trucks
- update General Annotation
- added description acc. SAE (based on Jan 2008 version)
- deleted SAE ref as no longer valid
- added additional comments
- correction of PGNs (dez) in Example for BAM
- added Priority to Example for BAM
- added 2.2 Example SW Identification for buses and/or trucks
- added Overview Messages

Version 02.00 Sept. 2010

- update History
- added 1.14 Ambient Conditions: AMB
- added 1.15 Driver’s Identification: DI
- added 1.16 Fuel Economy: LFE
- added 1.2 EEC2: Engine Percent Load At Current Speed
- added 1.17 PTO Drive Engagement: PTODE
- added 1.18 High Resolution Fuel Consumption (Liquid): HRLFC
- update 3. Overview Messages

Version 02.00 Nov. 2010

- some editorial corrections

1 Parameters for FMS gateway (according SAE J1939)

always MSB (Most Significant BIT) First

1.1 Cruise Control/Vehicle Speed: CCVS

00FEF1								PGN Hex
65,265								PGN
100 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1			8 7 6 5 4 3 2 1		Bit No
Not used for FMS-Standard	Wheel based speed 1/256 km/h Bit gain 0 km/h offset SPN 84	Wheel based speed 1/256 km/h Bit gain 0 km/h offset SPN 84	Clutch switch 00 = pedal released 01 = pedal depressed SPN 598	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Name values values values SPN
			Brake switch 00 = pedal released 01 = pedal depressed SPN 597			PTO state 00000 = off/disabled 00101 = Set 11111 = not available SPN 976		Name values values values SPN
			Not used					
			Cruise control active 00 = switched off 01 = switched on SPN 595					Name values values values SPN

Description acc. SAE J 1939:

Wheel Based Speed: Speed of the vehicle as calculated from wheel or tailshaft speed.
Clutch Switch: Switch signal which indicates that the clutch pedal is being pressed. It is necessary for a safe drivetrain behaviour that the clutch switch is set before the clutch is opened (cruise control function).
Brake Switch: Switch signal which indicates that the driver operated brake foot pedal is being pressed. This brake foot pedal is controlling the vehicles' service brake (total vehicle braking application, not park brakes). It is necessary for safe drivetrain behaviour that the switch activates before the physical braking components are activated (i.e. Disengage the cruise control function prior to the activation of friction brakes).
Cruise Control Active: Cruise control is switched on. It is not ensured that the engine is controlled by cruise control, as in the case of a large driver's demand the engine is controlled by the driver while cruise control is active (maximum selection of cruise control and driver's demand). The cruise control is set to 0 if a switch off condition occurs.
PTO state: This parameter is used to indicate the current state or mode of operation by the power takeoff (PTO) device. It needs to be ensured that each achieved state information be set up to be conveyed in at least one datalink message before a transition to another state is allowed.
Off/Disabled 00000b — Used to indicate that the PTO enable switch is in the off position.
Set 00101b — Used to indicate that the PTO device is establishing current speed as the operating speed (captured value).

Additional comment:

The cruise control conditions might vary on different brands.

Wheel based speed might vary from tacho speed.

The PTO state might be different over the brands (not comparable) due to different internal topology

Either SPN 3948 (PTO DE) or SPN 976 (CCVS) is sent. PTO DE message is preferred

1.2 Electronic Engine Controller #2: EEC2

00F003								PGN Hex
61,443								PGN
50 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1						Bit No
Not used for FMS-Standard	Accelerator pedal position 1 0,4 % / Bit gain 0 % offset SPN 91	Engine Percent Load At Current Speed 1 % / bit, 0 offset 0 to 125 % op. range SPN 92	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Name values values values SPN

Description acc. SAE J 1939:

Accelerator Pedal Position: The ratio of actual position of the analogue engine speed/torque request input device (such as an accelerator pedal or throttle lever) to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. If an application has only one accelerator control, use SPN 91. For on-highway vehicles, this will typically be the operator's accelerator pedal. Although it is used as an input to determine powertrain demand, it also provides anticipatory information to transmission and ASR algorithms about driver actions.

Engine Percent Load At Current Speed
At Current Speed
The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.

Additional comment:

Mandatory in all factory fitted FMS gateways

1.3 Fuel Consumption: LFC

00FEE9								PGN Hex
65,257								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
				8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	Bit No
Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Engine total fuel used 0,5 L / Bit gain 0 L offset SPN 250	Engine total fuel used 0,5 L / Bit gain 0 L offset SPN 250	Engine total fuel used 0,5 L / Bit gain 0 L offset SPN 250	Engine total fuel used 0,5 L / Bit gain 0 L offset SPN 250	Name values values values SPN

Description acc. SAE J 1939:

Total Fuel Used: Accumulated amount of fuel used during vehicle operation.

Additional comment:

Calculated values given as indications, not as contractual values.

1.4 Dash Display: DD

00FEFC								PGN Hex
65,276								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
	8 7 6 5 4 3 2 1							Bit No
Not used for FMS-Standard	Fuel Level 1 0,4 % / Bit gain 0 % offset SPN 96	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Name values values values SPN

Description acc. SAE J 1939:

Fuel Level: Ratio of volume of fuel to the total volume of fuel storage container.
When Fuel Level 2 (SPN 38) is not used, Fuel Level 1 represents the total fuel in all fuel storage containers.
When Fuel Level 2 is used, Fuel Level 1 represents the fuel level in the primary or left-side fuel storage container.

Additional comment:

Mandatory from 01.10.2009 in all factory fitted FMS gateways

1.5 Electronic Engine Controller #1: EEC1

00F004								PGN Hex
61,444								PGN
20 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
			8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1				Bit No
Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Engine speed 0.125 rpm / Bit gain 0 rpm offset SPN 190	Engine speed 0.125 rpm / Bit gain 0 rpm offset SPN 190	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Name values values values SPN

Description acc. SAE J 1939:

Engine Speed: Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.

Additional comment:

Mandatory from 01.10.2009 in all factory fitted FMS gateways

1.6 Vehicle Weight: VW

00FEEA								PGN Hex
65,258								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1						Bit No
Axle location Bit-mapped position number counting front to back facing forward F = not available SPN 928	Axle weight 0.5 kg / Bit gain 0 kg offset SPN 582	Axle weight 0.5 kg / Bit gain 0 kg offset SPN 582	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Name values values values values values values values SPN
Tire location Bit-mapped counting left to right facing forward F = not available SPN 928								Name values values values values values values values SPN

Description acc. SAE J 1939:

Axle / Tire Location: To identify to which of several similar devices (such as tires or fuel tanks) the information applies.
The low order 4 bits represent a position number, counting left to right when facing in the direction of normal vehicle travel (forward).
The high order 4 bits represent a position number, counting front to back on the vehicle.
The value 0xFF indicates not available.
It is recommended that output devices add 1 to the position number (range 1 to 15, not 0 to 14) for use by drivers and service technicians.
Examples: Tire pressure for location 0x00 would be left front tire.
Tire pressure for location 0x23 would be right outside rear rear on a 3-axle tractor with dual axle per side (3rd axle, 4th tire)
Axel weight: Total mass imposed by the tires on the road surface at the specified axle.

Additional Comment:

The repetition rate for this PGN is 1000ms and contains information about one axle.

If there are more axles available the information will be updated with each repetition (e.g. information about 3 axles will have a repetition of 3000 ms for each axle).

Please refer to the OEM documentation for more detailed information.

1.7 Engine Hours, Revolutions: HOURS

00FEE5								PGN Hex
65,253								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1					Bit No
Engine total hours of Operation 0.05 h / Bit gain 0 h offset SPN 247	Engine total hours of Operation 0.05 h / Bit gain 0 h offset SPN 247	Engine total hours of Operation 0.05 h / Bit gain 0 h offset SPN 247	Engine total hours of Operation 0.05 h / Bit gain 0 h offset SPN 247	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Name values values values SPN

Description acc. SAE J 1939:

Engine total hours of Operation: Accumulated time of operation of engine.

Additional comment:

Mandatory from 01.10.2009 in all factory fitted FMS gateways

1.8 Vehicle Identification: VI

00FEEC								PGN Hex
65,260								PGN
10.000 ms								Rep. Rate
Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Byte No
								Bit No
Vehicle identification number ASCII up to 200 characters * = Delimiter SPN 237	Vehicle identification number ASCII up to 200 characters * = Delimiter SPN 237	Vehicle identification number ASCII up to 200 characters * = Delimiter SPN 237	Vehicle identification number ASCII up to 200 characters * = Delimiter SPN 237	Vehicle identification number ASCII up to 200 characters * = Delimiter SPN 237	Vehicle identification number ASCII up to 200 characters * = Delimiter SPN 237	Vehicle identification number ASCII up to 200 characters * = Delimiter SPN 237	Vehicle identification number ASCII up to 200 characters * = Delimiter SPN 237	Name values values values SPN

Description acc. SAE J 1939:
Vehicle identification number: Vehicle Identification Number (VIN) as assigned by the vehicle manufacturer. NOTE The ASCII character "*" is reserved as a delimiter.

Annotations:

1) If the Vehicle ID is up to 8 Bytes (including) then it is broadcasted with PGN 00FEEC containing the vehicle ID and filled with “FF” at the unused bytes.
2) If the Vehicle ID contains more than 8 Bytes then a TP.CM (PGN 00EC00) with a minimum of two TP.DT (PGN 00EB00) will be used.

see example 2.1

Additional comment:

Mandatory from 01.10.2009 in all factory fitted FMS gateways

1.9 FMS-standard Interface: FMS

FDD1								PGN Hex
64,977								PGN
10.000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1				Bit No
Reserved for FMS-Standard	SW-version supported Version number in the format ab.cd where this byte represents “a” ASCII SPN 2806	SW-version supported Version number in the format ab.cd where this byte represents “b” ASCII SPN 2806	SW-version supported Version number in the format ab.cd where this byte represents “c” ASCII SPN 2806	SW-version supported Version number in the format ab.cd where this byte represents “d” ASCII SPN 2806	Reserved for FMS-Standard	Reserved for FMS-Standard	Reserved for FMS-Standard	Name values values values values values SPN
Requests supported 00 = request is not supported 01= request is supported 10 = reserved 11 = don´t care SPN 2805								Name values values values values values values SPN
Diagnostics supported 00 = diagnostics is not supported 01 = diagnostics is supported 10 = reserved 11 = don´t care SPN 2804								Name values values values values values values SPN

Subject

FMS-Standard interface description according SAE J1939

Description acc. SAE J 1939:

Information which specifies the capabilities of the Fleet Management System (FMS) - standard interface device.
This PGN typically is sourced from the network interconnect FMS - standard interface device.
Requests supported: Status signal which indicates if the FMS Vehicle Interface (FMS Gateway) will respond to requests from the FMS device for the PGNs listed in the FMS Interface Specification.
This mode is to support FMS gateway devices that only operate in a 'Request' mode.
The FMS PGNs may also be broadcast periodically in this mode.
The FMS Gateway will NOT support the requests for information not included in the FMS Interface Specification onto the vehicle network..
Diagnostics supported: Status signal which indicates if the FMS Vehicle Interface (FMS Gateway) supports the handling of diagnostic messages from the vehicle network onto the FMS network.
The FMS gateway does NOT support the re-broadcast of diagnostics messages present on the vehicle network.
If this 'FMS-standard Diagnostics Supported' feature is supported by the FMS Gateway, the FMS Gateway will support the requests for diagnostics information (from the FMS device) onto the vehicle network and pass the responses onto the FMS network.
Note: This feature of the FMS Gateway is independent of the 'FMS-standard Requests Supported'. The FMS Gateway may support diagnostics without supporting the 'FMS-standard Requests Supported' function, or visa-versa..
FMS-standard SW-version supported: Information that identifies which issue level of the FMS-standard document the software included in the FMS gateway supports. Four bytes, representing ab.cd type revision level identification.
Version number in the format ab.cd where byte2 and 3 represent the version number for trucks “ab” (ASCII)
Byte 3 and 4 represent the version for buses and coaches “cd”(ASCII)
“00” represents “not supported”
For example, FMS-standard version 02.06 means the fms gateway supports version 02 of truck fms-standard and version 06 of bus fms-standard.

Additional comment:

See example 2.2

Mandatory from 01.10.2009 in all factory fitted FMS gateways

1.10 High Resolution Vehicle Distance: VDHR

00FEC1								PGN Hex
65,217								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1					Bit No
High resolution total vehicle distance 5 m / Bit gain 0 m offset SPN 917	High resolution total vehicle distance 5 m / Bit gain 0 m offset SPN 917	High resolution total vehicle distance 5 m / Bit gain 0 m offset SPN 917	High resolution total vehicle distance 5 m / Bit gain 0 m offset SPN 917	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Name values values values values SPN

Description acc. SAE J 1939:

High resolution total vehicle distance: Accumulated distance travelled by the vehicle during its operation.

Additional comment:

Mandatory from 01.10.2009 in all factory fitted FMS gateways

1.11 Service Information: SERV

00FEC0								PGN Hex
65,216								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1						Bit No
Not used for FMS-Standard	Service distance 5 km / Bit gain -160 635 km offset SPN 914	Service distance 5 km / Bit gain -160 635 km offset SPN 914	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Name values values values SPN

Description acc. SAE J 1939:

Service distance: The distance which can be traveled by the vehicle before the next service inspection is required. A negative distance is transmitted if the service inspection has been passed. The component that requires service is identified by the service component identification (see SPN 911-913, 1379, and 1584)

Additional comment:

1.12 Tachograph : TCO1

00FE6C								PGN Hex
65,132								PGN
20 ms/ 50 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1			8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	Bit No.
Vehicle motion 00 = Vehicle motion not detected 01 = vehicle motion detected SPN 1611	Vehicle Overspeed 00 = No overspeed 01 = Overspeed SPN 1614	Not used for FMS-Standard could be sent as “not available” or “don´t care”	Direction indicator 00 = Forward 01 = Reverse SPN 1619	Not used for FMS-Standard	Not used for FMS-Standard	Tachogr. vehicle speed 1/256 km/h Bit gain 0 km/h offset SPN 1624	Tachogr. Vehicle speed 1/256 km/h Bit gain 0 km/h offset SPN 1624	Name values values values values SPN
Driv. 2 working state 000 = Rest 001 = Driver available 010 = Work 011 = Drive 110 = Error 111 = not available SPN 1613	Driver 1 card 00 = Card not present 01= Card present SPN 1615	Driver 2 card 00 = Card not present 01= Card present SPN 1616	Tachgraph performance 00 = Normal performance 01 = Performance analysis SPN 1620					Name values values values values values values values values SPN
Driv. 1 working state 000 = Rest 001 = Driver available 010 = Work 011 = Drive 110 = Error 111 = not available SPN 1612	Driv. 1 time rel states 0000 = normal 0001 = 15 min bef. 4 ½ h 0010 = 4 ½ h reached 0011 = 15 min bef. 9 h 0100 = 9 h reached 0101 = 15 min bef. 16 h 0110 = 16h reached 1110 = Error 1111 = not available SPN 1617	Driv 2 time rel. states 0000 = normal 0001 = 15 min bef. 4 ½ h 0010 = 4 ½ h reached 0011 = 15 min before 9 h 0100 = 9 h reached 0101 = 15 min bef. 16 h 0110 = 16h reached 1110 = Error 1111 = not available SPN 1618	Handling information 00 = no handling information 01 = handling information SPN 1621					Name values values values values values values values values values SPN
			System event 00 = no tachogr. Event 01 = tachogr. Event SPN 1622					Name values values SPN

Description acc. SAE J 1939:

Vehicle motion: Indicates whether motion of the vehicle is detected or not.
Driver 2 Working State: State of work of the driver.
Driver 1 Working State: State of work of the driver.
Vehicle Overspeed: Indicates whether the vehicle is exceeding the legal speed limit set in the tachograph.
Driver 1 Card: Indicates the presence of a driver card.
Driver 1 Time Related Status: Indicates if the driver approaches or exceeds working time limits (or other limits).
Driver 2 Card: Indicates the presence of a driver card.
Driver 2 Time Related Status: Indicates if the driver approaches or exceeds working time limits (or other limits).
Direction Indicator: Indicates the direction of the vehicle.
Tachograph Performance: Indicates the tachograph performance; including electronic or mechanical analysis, instrument analysis, speed sensor analysis, mass storage analysis, and printer analysis.
Handling Information: Indicates that handling information is present. Information could include 'no printer paper', 'no driver card', etc.
System Event: Indicates that a tachograph event has occurred. This may include power supply interruption, interruption of the speed sensor, incorrect data on the driver card, driving without a driver card, illegal removal of a driver card, insertion of a driver card during driving, and time adjustment.
Tachograph Vehicle Speed: Speed of the vehicle registered by the tachograph.

Additional comment:

Tachograph vehicle speed might differ from the wheel based speed

The availability of the value direction indicator (SPN 1619) is tachograph dependant.
At the issuing date of this document the tachographs are not supporting this value.

1.13 Engine Temperature 1: ET1

00FEEE								PGN Hex
65,262								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1								Bit No
Engine coolant temperature 1 °C / Bit gain - 40 °C offset SPN 110	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Name values values values SPN

Description acc. SAE J 1939:

Engine Coolant Temperature: Temperature of liquid found in engine cooling system.

Additional comment:

Mandatory from 01.10.2009 in all factory fitted FMS gateways

1.14 Ambient Conditions: AMB

00FEF5								PGN Hex
65,269								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
			8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1				Bit No
Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Ambient Air Temperature 0.03125 °C / Bit gain - 273 °C offset SPN 171	Ambient Air Temperature 0.03125 °C / Bit gain - 273 °C offset SPN 171	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Name Name values values values values SPN

Description acc. SAE J 1939:

Ambient Air Temperature: Temperature of air surrounding vehicle.

Additional comment:

Mandatory in all factory fitted FMS gateways

1.15 Driver's Identification: DI

00FE6B								PGN Hex
65,131								PGN
10000 ms								Rep. Rate
Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Byte No
8-1	8 - 1	8 – 1	8-1	8 - 1	8 - 1	8 - 1	8 - 1	Bit No.
Driver 1 identification Driver 2 identification SPN 1625/1626	Driver 1 identification Driver 2 identification SPN 1625/1626	Driver 1 identification Driver 2 identification SPN 1625/1626	Driver 1 identification Driver 2 identification SPN 1625/1626	Driver 1 identification Driver 2 identification SPN 1625/1626	Driver 1 identification Driver 2 identification SPN 1625/1626	Driver 1 identification Driver 2 identification SPN 1625/1626	Driver 1 identification Driver 2 identification SPN 1625/1626	Name Name values values values values SPN

Description acc. SAE J 1939:

Field: a Driver 1 Identification Delimiter (ASCII '*') b Driver 2 Identification Delimiter (ASCII '*')
NOTE - If only driver card 1 is present, only the parameter driver 1 identification and two delimiters shall be transmitted.
If only driver card 2 is present, a delimiter followed by parameter driver 2 identification and the second delimiter shall be transmitted.
If no driver cards are present, only the two delimiters shall be sent."

Additional comment:

The driver ID is only available if a digital tachograph is present.
Driver ID = CardNumber = 16 Byte
If a driver ID is available the message is sent with a Broadcast Announce Message (BAM)
If no driver cards are present then it is broadcasted with PGN 00FE6B (8Byte) containing two delimters and filled with “FF” at the unused bytes.

Difference to SAE: broadcast instead of on request

Mandatory (EU) in all factory fitted FMS gateways

1.16 Fuel Economy: LFE

00FEF2								PGN Hex
65,266								PGN
100 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1					Bit No.
Fuel Rate 0.05 L/h per bit 0 offset 0 to 3,212.75 L/h SPN 183	Fuel Rate 0.05 L/h per bit 0 offset 0 to 3,212.75 L/h SPN 183	Instantaneous Fuel Economy 1/512 km/L per bit 0 offset 0 to 125,5 km/L SPN 184	Instantaneous Fuel Economy 1/512 km/L per bit 0 offset 0 to 125,5 km/L SPN 184	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Name Name values values values values values SPN

Description acc. SAE J 1939:

Fuel rate: Amount of fuel consumed by engine per unit of time

Instantaneous Fuel Economy: Current fuel economy at current vehicle velocity

Additional comment:

Calculated values given as indications, not as contractual values.

Mandatory in all factory fitted FMS gateways

1.17 PTO Drive Engagement: PTODE

00FDA4								PGN Hex
64,932								PGN
100 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
						8 7 6 5 4 3 2 1		Bit No.
Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	At least one PTO engaged 00 No PTO drive is engaged 01 At least one PTO drive is engaged 10 Error 11 Not available SPN 3948	Not used for FMS-Standard	Name Name values values values values values values values values SPN
						Not used for FMS-Standard		

Description acc. SAE J 1939:

Information relating to the request for engagement, consent for engagement, and status of engagement of various specific physical PTO drives.

This message may be broadcast by one or all controllers involved in the enabling of a given PTO drive

At least one PTO engaged: Indicates that at least one PTO is engaged

Note: This parameter should only be sent by the controller that has knowledge of all PTO drives on the vehicle (e.g, the FMS gateway).

Individual PTO drive controllers should broadcast this parameter as "not available".

Additional comment:

Either SPN 3948 (PTO DE) or SPN 976 (CCVS) is sent. PTO DE message is preferred

1.18 High Resolution Fuel Consumption (Liquid): HRLFC

00FD09								PGN Hex
64,777								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
				Bit 8 - 1	Bit 8 - 1	Bit 8 - 1	Bit 8 - 1	Bit No.
Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	High resolution engine total fuel used 0.001 L/bit 0 offset 0 to 4,211,081.215 L SPN 5054	High resolution engine total fuel used 0.001 L/bit 0 offset 0 to 4,211,081.215 L SPN 5054	High resolution engine total fuel used 0.001 L/bit 0 offset 0 to 4,211,081.215 L SPN 5054	High resolution engine total fuel used 0.001 L/bit 0 offset 0 to 4,211,081.215 L SPN 5054	Name Name values values values values values SPN

Description acc. SAE J 1939:

Engine fuel consumption accumulators

High resolution engine total fuel used: Accumulated amount of fuel used during vehicle operation. High resolution used for calculations and fleet management systems.

Additional comment:

Is implemented if technical possible

2 Examples

2.1 Broadcast Announce Message (BAM) for Vehicle ID longer than 8 Byte

Transport Protocol – Connection Management (TP.CM)

00ECFF								PGN Hex
60,671								PGN
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte No
								Bit No
Control byte should be filled with (20_{16})	Total message size, number of bytes	Total message size, number of bytes	Total number of packets	Reserved should be filled with FF_{16}	Parameter Group Number of packeted message	Parameter Group Number of packeted message	Parameter Group Number of packeted message	Name values values values SPN

Transport Protocol – Data Transfer (TP.DT)

00EBFF								PGN Hex
60,415								PGN
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte No
								Bit No
Sequence Number	Packetized Data	Packetized Data	Packetized Data	Packetized Data	Packetized Data	Packetized Data	Packetized Data	Name values values values SPN

In the situation shown in Figure 1, a node indicates to the network that it is about to transfer a multipacket message utilizing the service of the transport protocol.
In this example, the PGN $00FEEC_{16}$ (Vehicle Identification) is being broadcasted to the network.
The length of the Vehicle ID in this example is 17.
The unused bytes in the last TP.DT are filled with FF_{16}.
The originating node first transmits a TP.CM Broadcast Announce Message (BAM) followed by the data packets.
No acknowledgment is performed by any of the responders.

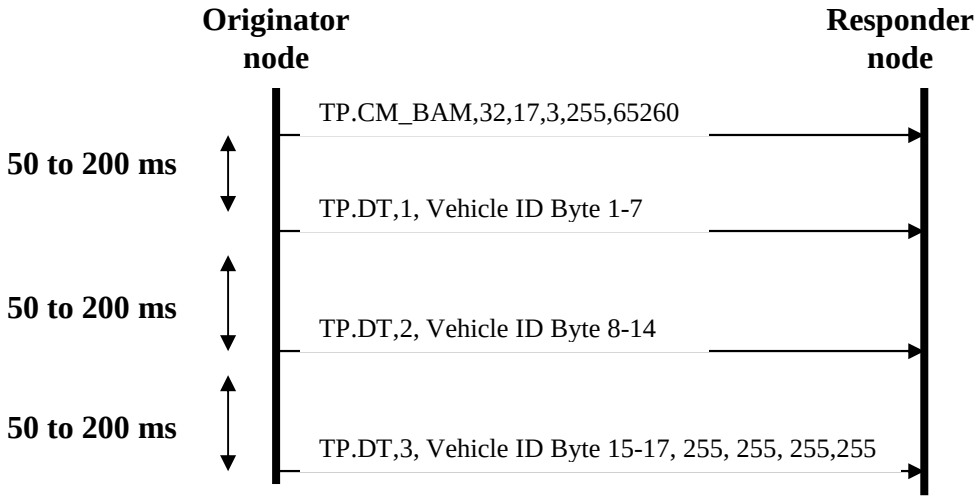

Figure 1

Time (ms)	ID	DLC	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0	PR EC FF SA $_{16}$	8	20 $_{16}$	11 $_{16}$	00 $_{16}$	03 $_{16}$	FF $_{16}$	EC $_{16}$	FE $_{16}$	00 $_{16}$
50	PR EB FF SA $_{16}$	8	01 $_{16}$	Vehicle ID byte 1 – 7						
100	PR EB FF SA $_{16}$	8	02 $_{16}$	Vehicle ID byte 8 – 14						
150	PR EB FF SA $_{16}$	8	03 $_{16}$	Vehicle ID byte 15	Vehicle ID byte 16	Vehicle ID byte 17	FF $_{16}$	FF $_{16}$	FF $_{16}$	FF $_{16}$

PR is Priority (to be masked)
SA is Source Address (to be masked)

2.2 Example SW Identification for buses and/or trucks

	ID	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Supporting Bus-FMS-Standard Version 01	00 FD D1 $_{16}$	X0 $_{16}$	30 $_{16}$	30 $_{16}$	30 $_{16}$	31 $_{16}$	FF $_{16}$	FF $_{16}$	FF $_{16}$
Supporting Truck-FMS-Standard Version 01	00 FD D1 $_{16}$	X0 $_{16}$	30 $_{16}$	31 $_{16}$	30 $_{16}$	30 $_{16}$	FF $_{16}$	FF $_{16}$	FF $_{16}$
Supporting Bus FMS-Standard Version 01 and Truck FMS-Standard Version 01	00 FD D1 $_{16}$	X0 $_{16}$	30 $_{16}$	31 $_{16}$	30 $_{16}$	31 $_{16}$	FF $_{16}$	FF $_{16}$	FF $_{16}$

Remark: **Byte 2 – Byte 5 are ASCII** **X=reserved and set to F_{16}**
30_{16} = “0” ASCII
31_{16} = “1” ASCII

3 Overview Messages

			(signal) name	Mandatory	rep. rate	remarks / comments	
page no	PGN	SPN	e.g. milage, fuel consumption		in ms		
5	65265	597	Brake switch		100	two bit status	-
5	65265	84	wheel based speed		100	may differ from TCO1	-
5	65265	595	cruise control active		100	two bit status	in trucks with no cruise control => send as not available
5	65265	598	clutch switch		100	two bit status	in trucks with automatic gear => send as not available
5	65265	976	PTO state		100	Either SPN 3948 (PTODE) or SPN 976 is sent	SPN 3948 (PTO DE) message is preferred
7	61443	91	accelerator pedal position 1	X (worldwide)	50	1 Byte	-
7	61443	92	Engine Percent Load At Current Speed	X (worldwide)	50	1 % / bit, 0 to 125 % operational range	-
8	65257	250	Engine total fuel used		1000	4 bytes, 0 to +2 105 540 607,5 L	-
9	65276	96	fuel level 1	X (worldwide)	1000	1 Byte	-
10	61444	190	engine speed	X (worldwide)	20	2 Byte, 0-8031,875 rpm	-
11	65258	928	Axle location		1000	-	-
11	65258	928	Tire location		1000	-	-
11	65258	582	Axle weight		1000	-	-
13	65253	247	Engine total hours of Operation	X (worldwide)	1000	4 bytes, 0 to 210 554 060,75 h	-
14	65260	237	vehicle identification number	X (worldwide)	10000	variable, max 200 char.	Will be sent every 10 sec
15	64977	2806	SW-version supported	X (worldwide	10000	Indicator for SW version supported	-
15	64977	2804	Diagnostics supported	X (worldwide)	10000	indicator for diagnosis session support	
15	64977	2805	Requests supported	X (worldwide)	10000	indicator for request supported	-
17	65217	917	High resolution total vehicle distance	X (worldwide)	1000	4 bytes, 0 - 21 055 406 km; without TCO	Resolution may be not within the SAE values
18	65216	914	Service distance		1000	-	-
19	65132	1611	Vehicle motion	X (EU)	20/50	With digital tachograph	rep. rate tacho dependant
19	65132	1613	driver 2 working state	X (EU)	20/50	With digital tachograph	rep. rate tacho dependant
19	65132	1612	driver 1 working state	X (EU)	20/50	With digital tachograph	rep. rate tacho dependant
19	65132	1614	Vehicle overspeed		20/50	With digital tachograph	rep. rate tacho dependant
19	65132	1617	Driver 1 time rel. states		20/50	With digital tachograph	rep. rate tacho dependant
19	65132	1618	Driver 2 time rel. states		20/50	With digital tachograph	rep. rate tacho dependant
19	65132	1615	Driver 1 card	X (EU)	20/50	With digital tachograph	rep. rate tacho dependant
19	65132	1616	Driver 2 card	X (EU)	20/50	With digital tachograph	rep. rate tacho dependant
19	65132	1619	Direction indicator		20/50	With digital tachograph	rep. rate tacho dependant
19	65132	1620	Tachograph performance	X (EU)	20/50	With digital tachograph	rep. rate tacho dependant
19	65132	1621	Handling information	X (EU)	20/50	With digital tachograph	rep. rate tacho dependant
19	65132	1622	System event	X (EU)	20/50	With digital tachograph	rep. rate tacho dependant
19	65132	1624	Tachograph vehicle speed	X (EU)	20/50	With digital tachograph - 2 bytes	rep. rate tacho dependant
21	65262	110	engine coolant temperature	X (worldwide)	1000	-40°to 210°	-
22	65269	171	Ambient Air Temperature	X (worldwide)	1000	0.03125 °C / Bit gain	- 273 °C offset
23	65131	1625/1626	Driver 1 / Driver 2 Identification	X (EU)	10000	If a driver ID is available the message is sent with a Broadcast Announce Message (BAM)	Diff. to SAE: broadcast instead of on request
24	65266	183	Fuel rate	X (worldwide)	100	0.05 L/h per bit, 0 to 3,212.75 L/h	Calculated values given as indications, not as contractual
24	65266	184	Instantaneous Fuel Economy	X (worldwide)	100	1/512 km/L per bit, 0 to 125,5 km/L	Calculated values given as indications, not as contractual
25	64932	3948	At least one PTO engaged		100	Either SPN 3948 or SPN 976 (CCVS) is sent	SPN 3948 (PTO DE) message is preferred
26	64777	5054	High resolution engine total fuel used		1000	0.001 L/bit, 0 to 4,211,081.215 L	Is implemented if technical possible