SAE International™

SURFACE VEHICLE RECOMMENDED PRACTICE

SAE J1698

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Vehicle Event Data Interface—Vehicular Output Data Definition

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1.1 Scope

This Recommended Practice aims to establish a common format for displaying and presenting crash-related data recorded and stored within certain electronic components currently installed in many light-duty vehicles. This Recommended Practice pertains only to the post-download format of such data and is not intended to standardize the format of the data stored within any on-board storage unit, or to standardize the method of data recording, storing, or extraction.

Historically, crash data recording technology in light-duty vehicles has developed and evolved based on differing technical needs of manufacturers and their customers without industry standards or government regulation. As a result, wide variations currently exist among vehicle manufacturers regarding the scope and extent of recorded data. For this reason, this Recommended Practice is not intended to standardize or mandate the recording of any specific data element or to specify a minimum data set. Rather, it is intended to be a compilation of data elements and parameters that various manufacturers are currently recording, as well as those elements reasonably predicted to be recorded in the foreseeable future, and to establish a common format for display and presentation of that data so recorded.

This version of the Recommended Practice is limited in application to vehicular data recorded in single frontal impact events. Provisions for multiple-impact events may be included in the next version. Side-impact and rollover events may be addressed at a later time.

1.1.1 Limitation and Justification of Scope

1.1.1.1 Post-Download versus Pre-Download Formatting

The scope of this version of Recommended Practice is deliberately restricted to providing post-download formatting guidelines, only. This restriction is to avoid imposing constrains on the type of data recorded, the method of gathering and storing data, and the pre- and/or post-processing of data that may be used by various vehicle/device manufacturers as a matter of proprietary design. This Recommended Practice suggests, in essence, if a manufacturer implements event data recording as defined by the scope of this document, then it ought to make a copy of the recorded data available in a generic format that enables comparative use of the data by any interested entity that has permission to access it. As noted above, vehicle event recording is a fairly new automotive feature for which there is a variety of applicable uses and implementation strategies in existence, therefore, it is reasonable to assume that the current nascent state of the technology precludes competent assessment of available options necessary to identify an optimal solution.

The Committee further recognized that, given the still-questionable social acceptability of on-board data recording devices, it also lacks the appropriate authority to effectively set a policy on such devices, and has, therefore, avoided specific recommendations concerning whether event data recorders should be equipped on motor vehicles, and whether, when implemented, a particular type, quantity, and manner of data collection should be used.

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1.1.1.2 Single Frontal Impact Events versus Multiple Frontal Impact and Non-Frontal Impact Events

The current version of the subject Recommended Practice specifies that an "event" for the purposes of this document is defined as a single frontal impact resulting in a change in velocity of more than one half mile per hour in a 20 ms time period. This threshold approximately correlates with the threshold used by most airbag firing algorithms for "wake-up" purposes (i.e., for the purposes of beginning the sequence of acceleration-based calculations that may lead to the firing of one or more pyrotechnical restraint device). It was chosen because light-duty manufacturers already equip motor vehicles with deployable restraints triggered by frontal impacts, and the technology used to do so is mature, and therefore fairly similar among manufacturers. Due to a variety of recording strategies, some events may not result in recorded data. The threshold for recording event data is left to the discretion of manufacturers. In the next version of this document, provisions for multiple frontal events may be included. During subsequent reviews, provisions for non-frontal impact events may be added if the state of technological maturity supports a common definition for such events.

1.2 Purpose

Vehicular event data recording and extraction has several potential uses. These include diagnostic and operational information of the on-board occupant protection system, crash reconstruction, and improved highway safety. Collection of various types of data for a variety of commercial and non-commercial uses is of significant interest of many entities, most of which are not mentioned in the statement of the Purpose. A standard format for vehicle event data output will help facilitate these uses, and possibly more, by improving the availability and efficient use of the extracted data. The judgment on the appropriateness of any particular use of recorded data is beyond the scope and purpose of this Recommended Practice therefore the Committee passes no judgment on that issue

2. References

2.1 Applicable Publications

2.1.1 SAE PUBLICATIONS

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J1979- (R) E/E Diagnostic Test Methods – Equivalent to ISO/DOS 15031-5
SAE J211 Part 1, Instrumentation for Impact Test-Part 1-Electronic Instrumentation

2.1.2 OTHER PUBLICATIONS

Electronic 2002 FARS Coding and Validation Manual, U.S. Department of Transportation, National Highway Traffic Safety Administration, ftp://ftp.nhtsa.dot.gov/fars/FARS-DOC/, "2002 FARS C&V Manual.zip"

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3. Terms and Definitions

3.1 Frontal Impact Event

A frontal impact event is an occasion where either the frontal occupant restraint control algorithm is activated or, for continuously running algorithms, where a longitudinal, cumulative Delta-V of over 0.8 km/h (0.5 mph) is reached within a 20 ms time period.

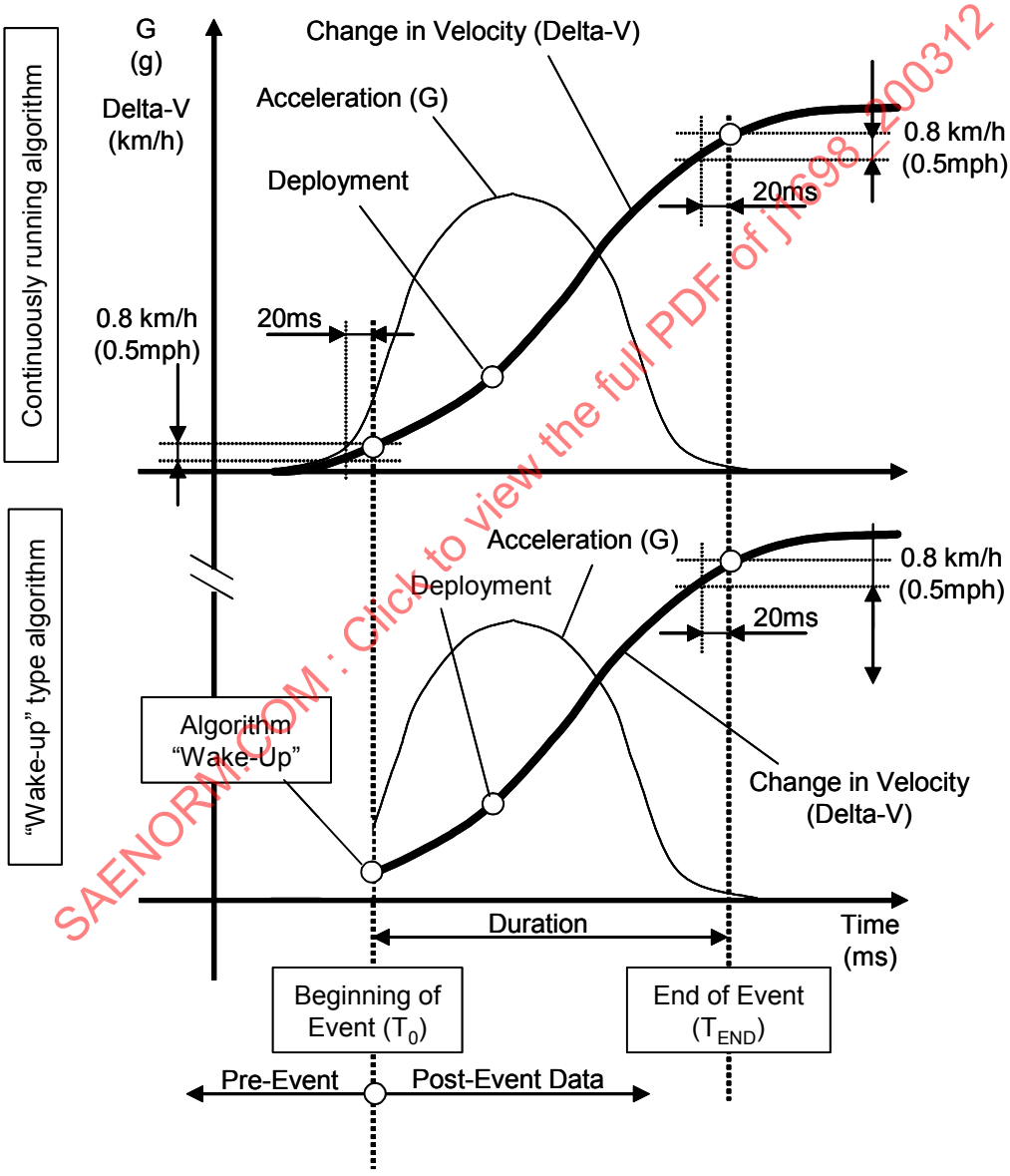

FIGURE 1—COMMON REFERENCING DATA POINTS OF A FRONTAL IMPACT EVENT[1]

1 This figure is a very simplified image of event data to illustrate those common referencing data points and it is not drawn to scale.

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Therefore, depending on the circumstances, a frontal impact event can result in either a deployment or non-deployment of an occupant restraint system. In addition, the occurrence of a frontal impact event shall not be interpreted as the physical impact of the subject vehicle with another object.

3.2 Beginning of Frontal Impact Event (T_0)

The beginning of a frontal impact event (T_0) is a moment when either the frontal occupant restraint control algorithm is activated or, for continuously running algorithms, a longitudinal, cumulative Delta-V of over 0.8 km/h (0.5 mph) is reached within a 20 ms time period.

The Beginning of Frontal Impact Event shall not be interpreted as the moment when the subject vehicle made a first physical contact with another object.

3.3 End of Frontal Impact Event (T_{END})

The end of a frontal impact event (T_{END}) is at the moment when the longitudinal, cumulative Delta-V within a 20 ms time period becomes 0.8 km/h (0.5 mph) or less. If T_{END} was not captured, the Time to Maximum Delta-V, if available, may be substituted for T_{END} when (a) the recorded crash-pulse time-history is truncated (cut short) before meeting the 0.8 km/h change in velocity within 20 ms criterion, and (b) the Time to Maximum Delta-V is longer than the truncated crash pulse recording time period.

The End of Frontal Impact Event shall not be interpreted as the moment when the subject vehicle comes to a complete stop. It should be also noted that the vehicle could have a higher velocity at the End of Frontal Impact Event than at the Beginning of Frontal Impact Event

3.4 Duration of Frontal Impact Event

Duration of event is defined by the time between the Beginning of Frontal Impact Event (T_0) and End of Frontal Impact Event (T_{END}). Duration of a Frontal Impact Event is not a fixed time and will vary for each event.

This definition of the Duration of Frontal Impact Event shall not be interpreted as a mandatory data recording period of vehicular event data.

3.5 G

The upper case “G” is the data element name for the acceleration of a vehicle. The lower case “g” is the unit of acceleration (1 g = 9.80665 m/s^2). The Crash Pulse is the acceleration-time history of the event.

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3.6 High-Frequency Data

High-frequency data have 100 Hz sampling rate (10 ms intervals) or higher.

3.7 Low-Frequency Data

Low-frequency data have 1 Hz sampling rate (1 s intervals) or higher.

3.8 Static Data

Static data are recorded only once per event and are, therefore, not associated with temporal resolution.

3.9 Vehicle Coordinate System

The same coordinate system (axis and direction) that is defined in SAE J211-1 should be used in this Recommended Practice.

3.10 Data Not Available

Data Not Available indicates the condition when a particular data does not exist in the output data therefore, it is not available. Unless otherwise specified, the maximum possible hexadecimal value of $F, $FF, $FFFF or $FFFFFF is used as a common value to describe this condition in the output data.

3.11 Invalid Data

Invalid Data indicates the condition when a particular data exists in the output data however it is not readable or corrupted, therefore, is not usable as a valid data. When the value of a particular output data exceeds the specified data range in this document, the data is also treated as an Invalid Data. Unless otherwise specified, the hexadecimal value that is one count smaller then the maximum possible hexadecimal value of $E, $FE, $FFFE or $FFFFFE is used as a common value to describe this condition in the output data.

4. Available Time Period for Event Data Output

This section is intended to encompass the maximum duration that any manufacturer is considering recording, realizing that many manufacturers will record substantially less than this data.

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4.1 High-Frequency Data

While this Recommended Practice does not intend to dictate the amount of time that data shall be recorded, the common data output format shall provide for the capability of reporting high-frequency data surrounding a frontal impact event for up to 100 s of pre-event and 300 s of post-event data.

4.2 Low-Frequency Data

While this Recommended Practice does not intend to dictate the amount of time that data shall be recorded, the common data format shall provide for the capability of reporting low-frequency data surrounding a crash for up to 8 s of pre-event and 5 s of post event data.

4.3 Temporal Relationship between Low- and High-Frequency Data

Low-frequency data and high-frequency data may not be synchronized within the same time scale. Beginning of Frontal Impact Event (T_0 of the high-frequency data series) is the first post-event data point of the high-frequency data. T=0, the first data point in the low-frequency data, is defined as the next data point after the T_0 of the high-frequency data is recorded, therefore, there is no low-frequency pre-event data after the Beginning of Frontal Impact Eve

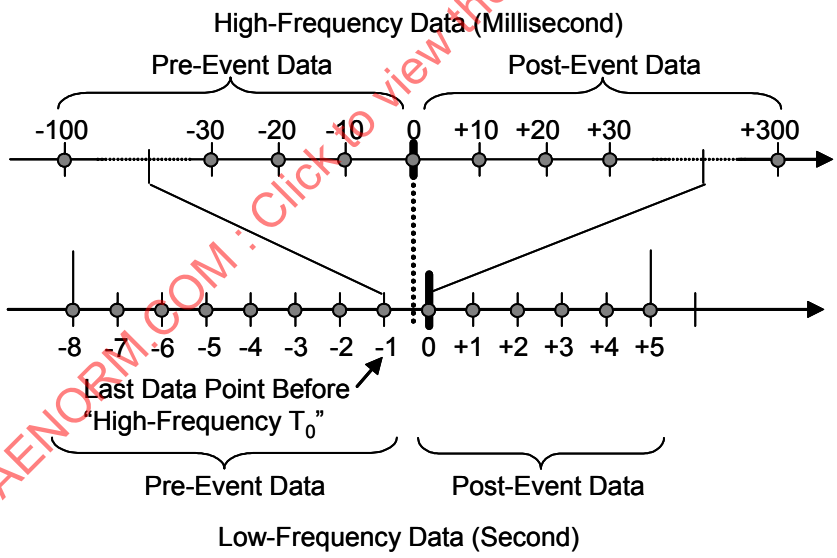

FIGURE 2—TEMPORAL RELATIONSHIPS BETWEEN LOW- AND HIGH-FREQUENCY DATA

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5. Data Elements

5.1 Data Element Format Definition

5.1.1 BYTE POSITION CONVENTION

Some data values include descriptions that are based on byte positions within the message. The convention used is that the first byte is referred to as “byte #1,” and the last byte is referred to as “byte #8,” as shown in the Table 1.

TABLE 1—BYTE POSITION CONVENTION

Byte #1	Byte #2	Byte #3	Byte #4	Byte #5	Byte #6	Byte #7	Byte #8

This Recommended Practice does not refer to or require the use of any particular data transmission protocols to send a message. The length of messages in this Recommended Practice varies from 1 to 17 bytes.

5.1.2 BIT POSITION CONVENTION

Some data byte values include descriptions that are based on bit positions within the byte. The convention used is that the most significant bit (MSB) is referred to as “bit 7,” and the least significant bit (LSB) is referred to as “bit 0,” as shown in the Table 2.

TABLE 2—BIT POSITION CONVENTION

MSB							LSB
Bit #7	Bit #6	Bit #5	Bit #4	Bit #3	Bit #2	Bit #1	Bit #0

5.2 Vehicular Output Data Elements

This Recommended Practice does not refer to or require the use of any particular data transmission protocols to send a message. Table 3 lists the data elements that are specified in this document. The length of messages in this Recommended Practice varies from 1 to 17 bytes.

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TABLE 3—LIST OF DATA ELEMENTS

Type	Section	Data Element	Data Length	Ref.
High Frequency Data	6.1.1	Change in Velocity (Frontal Delta-V)		
	6.1.1.1	Longitudinal Frontal Delta-V	1 byte	
	6.1.1.2	Lateral Frontal Delta-V	1 byte	
	6.1.2	Vehicle Acceleration (G)		
	6.1.2.1	Longitudinal G	2 bytes	J211
	6.1.2.2	Lateral G	2 bytes	J211
	6.1.2.3	Vehicle Acceleration Timestamp	2 bytes	
Low Frequency Data	6.2.1	Vehicle Traveling Speed	1 byte	
	6.2.2	Engine Revolution	1 byte	
	6.2.3	Throttle Position		
	6.2.3.1	Engine Throttle Position	1 byte	
	6.2.3.2	Throttle Pedal Position	1 byte	
	6.2.4	Steering Angle	1 byte	
	6.2.5	Driver Controls – Dynamic		
	6.2.5.1	Brake Pedal Switch Status	2 bits	
	6.2.5.2	Turn Signal Switch Status	3 bits	
	6.2.6	Engine Torque Ratio	1 byte	
	6.2.7	Yaw Rate	1 byte	
	6.2.8	Vehicle System Status		
	6.2.8.1	Gear Position	4 bits	
	6.2.8.2	Anti-Lock Brake System Status	2 bits	
	6.2.8.3	Traction Control System Status	2 bits	
	6.2.8.4	Stability Control System Status	2 bits	

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Static Data	6.3.1	Vehicle Identification Number	17 bytes	J1979
	6.3.2	Restraint System Use		
	6.3.2.1.	Seating Position	1 byte	FARS
	6.3.2.2	Seatbelt Buckle Switch Status	2 bits	
	6.3.2.3	Foremost Seat Track Position Switch Status	2 bits	
	6.3.3	SRS Deployment Information		
	6.3.3.1	SRS Deployment Status	1 byte	
	6.3.3.2	SRS Deployment Time	1 byte	
	6.3.4	Maximum Recorded Delta-V Information		
	6.3.4.1	Maximum Recorded Delta-V	1 byte	6.1.1
	6.3.4.2	Time to Maximum Recorded Delta-V	1 byte	
	6.3.5	Indicator Status		
	6.3.5.1	VEDI Warning Lamp Status	2 bits	
	6.3.5.2	SRS Warning Lamp Status	2 bits	
	6.5.3.3	Passenger Airbag Disable Indicator Status	2 bits	
	6.5.3.4	Low Tire Pressure Warning Lamp Status	2 bits	
	6.5.3.5	Service Engine Indicator Status	2 bits	
	6.5.3.6	Door Ajar Indicator Status	2 bits	
	6.5.3.7	Battery-Off Device Deployed	2 bits	
	6.3.6	Vehicle Mileage	2 bytes	
	6.3.7	Ignition Cycle		
	6.3.7.1	Ignition Cycle at Event	4 bytes	J1979
	6.3.7.2	Ignition Cycle at Download	4 bytes	J1979
	6.3.8	Hours in Operation	4 bytes	J1979
	6.3.9	Latitude		
	6.3.9.1	Latitude-Degree	1 byte	FARS
	6.3.9.2	Latitude-Minute	1 byte	FARS
	6.3.9.3	Latitude-Second	1 byte	FARS
	6.3.10	Longitude		
	6.3.10.1	Longitude-Degree	1 byte	FARS
	6.3.10.2	Longitude-Minute	1 byte	FARS
	6.3.10.3	Longitude-Second	1 byte	FARS
	6.3.11	Accident Date		
	6.3.11.1	Accident Date-Year	1 byte	FARS
	6.3.11.2	Accident Date-Month	1 byte	FARS
	6.3.11.3	Accident Date-Day	1 byte	FARS
	6.3.12	Accident Time		
	6.3.12.1	Accident Time-Hour	1 byte	FARS
	6.3.12.2	Accident Time-Minute	1 byte	FARS
	6.3.12.3	Accident Time-Second	1 byte	
	6.3.13	Temperature		
	6.3.13.1	Ambient Temperature	1 byte	
	6.3.13.2	Cabin Temperature	1 byte	

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	6.3.14	Cruise Control System Status	2 bits	
	6.3.15	Driver Controls-Static		
	6.5.15.1	Parking Brake Switch Status	2 bits	
	6.5.15.2	Headlight Switch Status	2 bits	
	6.5.15.3	Front Wiper Switch Status	2 bits	
	6.5.15.4	Gear Selection Status	2 bits	6.2.8.1
	6.5.15.5	Passenger Airbag Disabling Switch Status	2 bits	
	6.5.16	Event Data Recording Complete	1 byte	

6. Data Definition

6.1 High Frequency Data

6.1.1 FRONTAL DELTA-V

6.1.1.1 Longitudinal Frontal Delta-V

TABLE 4—DATA DEFINITION

Data Element			***Description***		
Longitudinal Frontal Delta-V			Change in longitudinal vehicle speed during a frontal impact event. A Longitudinal Frontal Delta-V is only the longitudinal component of the total Delta-V. Up to 41 data points from -100 to +300 ms relative to start of event, the time corresponding to the Longitudinal Frontal Delta-V stored is implied by the memory location it is stored in.		
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
1 byte	km/h	1 km/h	1 km/h per bit	-127 km/h	+126 km/h
Format				***Note***	
Signed Numeric (signed 2's complement)				Data collected at higher than 100 Hz should be averaged. Partial data should be stored in the next higher location (for example, data at 1 ms intervals 111 to 116 ms should be averaged and stored as 120 ms).	

TABLE 5—SIGNAL VALUE DESCRIPTION

Signal Value	***$00***	***$01***	***…***	***$FD***	***$FE***	***$FF***
Data Value	-127 km/h	-126 km/h	…	+126 km/h	Invalid Data	Data Not Available

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6.1.1.2 Lateral Frontal Delta-V

TABLE 6—DATA DEFINITION

Data Element			*Description*		
Lateral Frontal Delta-V			Change in lateral vehicle speed during a frontal impact event. A Lateral Frontal Delta-V is only the lateral component of the total Delta-V. Up to 41 data points from -100 to +300 ms relative to start of event, the time corresponding to the Lateral Frontal Delta-V stored is implied by the memory location it is stored in.		
Data Length	*Unit*	*Resolution*	*Scaling*	*Minimum Value*	*Maximum Value*
1 byte	km/h	1 km/h	1 km/h per bit	-127 km/h	+126 km/h
Format				*Note*	
Signed Numeric (signed 2's complement)				Data collected at higher than 100 Hz should be averaged. Partial data should be stored in the next higher location (for example, data at 1 ms intervals 111 to 116 ms should be averaged and stored as 120 ms).	

TABLE 7—SIGNAL VALUE DESCRIPTION

Signal Value	*$00*	*$01*	*...*	*$FD*	*$FE*	*$FF*
Data Value	-127 km/h	-126 km/h	…	+126 km/h	Invalid Data	Data Not Available

6.1.2 VEHICLE ACCELERATION DATA

6.1.2.1 Longitudinal G

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TABLE 8—DATA DEFINITION

Data Element		***Description***			
Longitudinal G		Longitudinal acceleration of the vehicle in g's during a frontal impact event. Up to 401 data points from -100 to +300 ms relative to start of event, the time corresponding to each Longitudinal G data should be paired with and indicated by the 6.1.2.2 Vehicle Acceleration Timestamp data.			
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
2 bytes	g	0.01 g	0.01 g per bit	-327.67 g	+327.66 g's
Format				***Note***	
Appropriate filtering methods in SAE J211 should be applied to raw acceleration data series before reporting and plotting. Apply CFC 60[2] for acceleration data collected at 1000 Hz sampling rate.				1 g = 9.80665 m/s^2 Each data in this series is always paired with a corresponding Vehicle Acceleration Timestamp data (6.1.2.3).	

TABLE 9—SIGNAL VALUE DESCRIPTION

Signal Value	***$0000***	***$0001***	***…***	***$FFFD***	***$FFFE***	***$FFFF***
Data Value	-327.67 g	-327.66 g	…	+327.66 g	Invalid Data	Data Not Available

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2 CFC 60 is a Butterworth, 4-pole phase-less digital filter for vehicle acceleration data recorded at 1000 Hz sampling rate (see SAE J211 Part 1, Appendix C, March 1995).

6.1.2.2 Lateral G

TABLE 10—DATA DEFINITION

Data Element			*Description*		
Lateral G			Lateral acceleration of the vehicle in g's during a frontal impact event. Up to 401 data points from -100 to +300 ms relative to start of event, the time corresponding to each Longitudinal G data should be paired with and indicated by the 6.1.2.2 Vehicle Acceleration Timestamp data.		
Data Length	*Unit*	*Resolution*	*Scaling*	*Minimum Value*	*Maximum Value*
2 bytes	g	0.01 g	0.01 g per bit	-327.67 g	+327.66 g
Format				*Note*	
Appropriate filtering methods in SAE J211 should be applied to raw acceleration data series before reporting and plotting. Apply CFC 60[3] for acceleration data collected at 1000 Hz sampling rate.				1 g = 9.80665 m/s^2 Each data in this series is always paired with a corresponding Vehicle Acceleration Timestamp data (6.1.2.3).	

TABLE 11—SIGNAL VALUE DESCRIPTION

Signal Value	*$0000*	*$0001*	*…*	*$FFFD*	*$FFFE*	*$FFFF*
Data Value	-327.67 g	-327.66 g	…	+327.66 g	Invalid Data	Data Not Available

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3 CFC 60 is a Butterworth, 4-pole phase-less digital filter for vehicle acceleration data recorded at 1000 Hz sampling rate (see SAE J211 Part 1, Appendix C, March 1995).

6.1.2.3 Vehicle Acceleration Timestamp

TABLE 12—DATA DEFINITION

Data Element			***Description***		
Vehicle Acceleration Timestamp			Time in s during a frontal impact event to indicate the temporal position of each Vehicle Acceleration (6.1.2.1) data relative to the Beginning of Event (T_0=0).		
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
2 bytes	ms	0.01 ms	0.01 ms per bit	-327.67 ms	+327.66 ms
Format				***Note***	
				Each data in this series is always paired with a corresponding Longitudinal and Lateral G data (6.1.2.1 and 6.1.2.2).	

TABLE 13—SIGNAL VALUE DESCRIPTION

Signal Value	***$0000***	***$0001***	***…***	***$FFFD***	***$FFFE***	***$FFFF***
Time Data Value	-327.67 ms	-327.66 ms	…	+327.66 ms	Invalid Data	Data Not Available

6.2 Low Frequency Data

6.2.1 VEHICLE TRAVELING SPEED

TABLE 14—DATA DEFINITION

Data Element			***Description***		
Vehicle Traveling Speed			Longitudinal velocity of the vehicle.		
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
1 byte	km/h	1 km/h	1 km/h per bit	0 km/h	+253 km/h
Format				***Note***	
				1 km/h = 0.62137 mph	

TABLE 15—SIGNAL VALUE DESCRIPTION

Signal Value	***$00***	***$01***	***$64***	***$E7***	***$FE***	***$FF***
Data Value	0 km/h	+1 km/h	+100 km/h	+231 km/h	Invalid Data	Data Not Available

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6.2.2 ENGINE REVOLUTION

TABLE 16—DATA DEFINITION

Data Element		***Description***			
Engine Revolution		Rotational frequency of the engine output shaft.			
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
1 byte	rpm	64 rpm	64 rpm per bit	0 rpm	+16192 rpm
Format				***Note***	

TABLE 17—SIGNAL VALUE DESCRIPTION

Signal Value	***$00***	***$04***	***…***	***$FD***	***$FE***	***$FF***
Data Value	0 rpm	+256 rpm	…	+16192 rpm	Invalid Data	Data Not Available

6.2.3 THROTTLE POSITION

6.2.3.1 Engine Throttle Position

TABLE 18—DATA DEFINITION

Data Element		***Description***			
Engine Throttle Position		Percentage ratio of the engine throttle opening.			
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
1 byte	%	1%	1% per bit	0%	+100%
Format				***Note***	

TABLE 19—SIGNAL VALUE DESCRIPTION

Signal Value	***$00***	***$01***	***…***	***$64***	***$FE***	***$FF***
Data Value	0%	+1%	…	+100%	Invalid Data	Data Not Available

6.2.3.2 Throttle Pedal Position

TABLE 20—DATA DEFINITION

Data Element		***Description***			
Throttle Pedal Position		Percentage ratio of the throttle pedal opening (driver's operation).			
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
1 byte	%	1%	1% per bit	0%	+100%
Format				***Note***	

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TABLE 21—SIGNAL VALUE DESCRIPTION

Signal Value	***$00***	***$01***	***…***	***$64***	***$FE***	***$FF***
Data Value	0 %	+1%	…	+100%	Invalid Data	Data Not Available

6.2.4 STEERING ANGLE

TABLE 22—DATA DEFINITION

Data Element		***Description***			
Steering Angle		Degree of the steering position where the value of zero (0 degree) is at its neutral position (i.e., straight). A positive value indicates the steering wheel is turned clockwise (i.e., right)			
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
1 byte	degree	2 degrees	2 degrees per bit	-254 degrees	+252 degrees
Format				***Note***	

TABLE 23—SIGNAL VALUE DESCRIPTION

Signal Value	***$00***	***$57***	***$7F***	***$A7***	***$FD***	***$FE***	***$FF***
Data Value	-254 degrees	-80 degrees	0 degree	+80 degrees	+252 degrees	Invalid Data	Data Not Available

6.2.5 DRIVER CONTROLS – DYNAMIC

6.2.5.1 Brake Pedal Switch Status

TABLE 24—DATA DEFINITION

Data Element		***Description***			
Brake Pedal Switch Status		Brake Pedal Switch Status indicates the status of the switch that is installed in or connected to the brake pedal system to detect whether or not the pedal was pressed. This switch is usually used to turn on the rear brake lamps.			
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
2 bits	n.a.	n.a.	n.a.	n.a.	n.a.
Format				***Note***	

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TABLE 25—SIGNAL VALUE DESCRIPTION

Signal Value	***$0***	***$1***	***$2***	***$3***
Switch Status	Off (not On)	On	Invalid Data	Data Not Available

6.2.5.2 Turn Signal Switch Status

TABLE 26—DATA DEFINITION

Data Element			***Description***		
Turn Signal Switch Status			Turn Signal Switch Status indicates the status of the switch that is usually installed in the steering column to detect whether or not the driver indicated his/her intention to make a turn. This switch is used to turn on the side turning lamps.		
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
3 bits	n.a.	n.a.	n.a.	n.a.	n.a.
Format				***Note***	

TABLE 27—SIGNAL VALUE DESCRIPTION

Signal Value	***$0***	***$1***	***$2***	***$7***	***$8***
Switch Status	Neutral	Left	Right	Invalid Data	Data Not Available

6.2.6 ENGINE TORQUE

TABLE 28—DATA DEFINITION

Data Element			***Description***		
Engine Torque			Torque value in percentage at the engine output shaft where 0% is no torque output (0 Nm) and 100% is the maximum torque output of the engine.		
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
1 byte	%	1%	1%	0%	100%
Format				***Note***	
				1 Nm = 0.101972 Kgf-m	

TABLE 29—SIGNAL VALUE DESCRIPTION

Signal Value	***$00***	***$01***	***…***	***$64***	***$FE***	***$FF***
Data Value	0%	1%	…	100%	Invalid Data	Data Not Available

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6.2.7 YAW RATE

TABLE 30—DATA DEFINITION

Data Element		***Description***			
Yaw Rate		Rate of horizontal rotational directional change around the Z axis.			
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
1 byte	degree per second	1 deg/s	1 deg/s per bit	-127 deg/s	+126 deg/s
Format				***Note***	

TABLE 31—SIGNAL VALUE DESCRIPTION

Signal Value	***$00***	***$2F***	***$7F***	***$CF***	***$FD***	***$FE***	***$FF***
Data Value	-127 deg/s	-80 deg/s	0 deg/s	+80 deg/s	+126 deg/s	Invalid Data	Data Not Available

6.2.8 VEHICLE SYSTEM STATUS

6.2.8.1 Gear Position

TABLE 32—DATA DEFINITION

Data Element		***Description***			
Gear Position		Gear Position indicates the gear of the transmission is in at the time of event.			
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
4 bits	n.a.	n.a.	n.a.	n.a.	n.a.
Format				***Note***	

TABLE 33—SIGNAL VALUE DESCRIPTION

Signal Value	***$0***	***$1***	***$2***	***$3***	***$4***	***$5***	***$6***
Gear Selection	Park	1st	2nd	3rd	4th	5th	6th
Signal Value	***$9***	***$A***	***$B***	***$C***	***$D***	***$E***	***$F***
Gear Selection	Reverse	Neutral	-	-	-		
Data Availability						Invalid Data	Data Not Available

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6.2.8.2 Anti-Lock Brake System Status

TABLE 34—DATA DEFINITION

Data Element			Description		
Anti-Lock Brake System Status			Status of anti-lock brake system whether activated or not.		
Data Length	**Unit**	**Resolution**	**Scaling**	**Minimum Value**	**Maximum Value**
2 bits	n.a.	n.a.	n.a.	n.a.	n.a.
Format				**Note**	

TABLE 35—SIGNAL VALUE DESCRIPTION

Signal Value	$0	$1	$2	$3
System Status	Not Activated	Activated	Invalid Data	Data Not Available

6.2.8.3 Traction Control System Status

TABLE 36—DATA DEFINITION

Data Element			Description		
Traction Control System Status			Status of traction control system whether activated or not.		
Data Length	**Unit**	**Resolution**	**Scaling**	**Minimum Value**	**Maximum Value**
2 bits	n.a.	n.a.	n.a.	n.a.	n.a.
Format				**Note**	

TABLE 37—SIGNAL VALUE DESCRIPTION

Signal Value	$0	$1	$2	$3
System Status	Not Activated	Activated	Invalid Data	Data Not Available

6.2.8.4 Stability Control System Status

TABLE 38—DATA DEFINITION

Data Element			Description		
Stability Control System Status			Status of stability control system whether activated or not.		
Data Length	**Unit**	**Resolution**	**Scaling**	**Minimum Value**	**Maximum Value**
2 bits	n.a.	n.a.	n.a.	n.a.	n.a.
Format				**Note**	

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TABLE 39—SIGNAL VALUE DESCRIPTION

Signal Value	***$0***	***$1***	***$2***	***$3***
System Status	Not Activated	Activated	Invalid Data	Data Not Available

6.3 Static Data

6.3.1 VEHICLE IDENTIFICATION NUMBER

TABLE 40—DATA DEFINITION: VEHICLE IDENTIFICATION NUMBER

Data Element		***Description***			
Vehicle Identification Number (VIN)		This element indicates the Vehicle Identification Number (VIN), assigned by the vehicle manufacturer.			
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
17 bytes	n.a.	n.a.	n.a.	n.a.	n.a.
Format				***Note***	
SAE J1979 Table G3 – Vehicle Identification number Data Bytes Description					

TABLE 41—SIGNAL VALUE DESCRIPTION

Signal Value	*$30*	*$31*	*$32*	*$33*	*$34*	*$35*	*$36*	*$37*	*$38*	*$39*
Data Value	0	1	2	3	4	5	6	7	8	9
Signal Value	*$41*	*$42*	*$43*	*$44*	*$45*	*$46*	*$47*	*$48*	*$49*	*$4A*
Data Value	A	B	C	D	E	F	G	H	I	J
Signal Value	*$4B*	*$4C*	*$4D*	*$4E*	*$4F*	*$50*	*$51*	*$52*	*$53*	*$54*
Data Value	K	L	M	N	O	P	Q	R	S	T

Signal Value	*$55*	*$56*	*$57*	*$58*	*$59*	*$5A*	*$FE*	*$FF*
Data Value	U	V	W	X	Y	Z	Invalid Data	Data Not Available

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6.3.2 RESTRAINT SYSTEM USE

6.3.2.1 Seating Position

TABLE 42—DATA DEFINITION

Data Element		***Description***			
Seating Position		Position of vehicle occupants.			
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
1 byte	n.a.	n.a.	n.a.	n.a.	n.a.
Format				***Note***	
FARS, Seating Position				This data is used in combination with 6.3.2.2 Seatbelt Buckle Switch Status, 6.3.2.3 Foremost Seat Track Position Switch Status, 6.3.3.1 SRS Deployment Status, and 6.3.3.2 SRS Deployment Time to connect those data to specific seating location. See Table A2 for an example.	

TABLE 43—SIGNAL VALUE DESCRIPTION

Signal Value	***$11***	***$12***	***$13***	***$FE***	***$FF***
Seating Position	Front Left (Driver)	Front Center	Front Right	Invalid Data	Data Not Available

Signal Value	***$21***	***$22***	***$23***
Seating Position	2nd Row Left	2nd Row Center	2nd Row Right
Signal Value	***$31***	***$32***	***$33***
Seating Position	3rd Row Left	3rd Row Center	3rd Row Right

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6.3.2.2 Seatbelt Buckle Switch Status

TABLE 44—DATA DEFINITION

Data Element	Description				
Seatbelt Buckle Switch Status	This signal reports whether a seatbelt buckle switch is at On or Off position. This data only indicates the status of the seatbelt buckle switch and does not indicate the existence of an occupant in the seat. In addition, when a child seat is installed properly, this switch should be at On position even though a child is not present.				
Data Length	**Unit**	**Resolution**	**Scaling**	**Minimum Value**	**Maximum Value**
2 bits	n.a.	n.a.	n.a.	n.a.	n.a.
Format				**Note**	
				6.3.2.1 Seating Position data should be used to specify the seating position where this data is subject of. See Table A2 for an example.	

TABLE 45—SIGNAL VALUE DESCRIPTION

Signal Value	$0	$1	$2	$3
Seatbelt Buckle Switch	Off (not On)	On	Invalid Data	Data Not Available

6.3.2.3 Foremost Seat Track Position Switch Status

TABLE 46—DATA DEFINITION

Data Element	Description				
Foremost Seat Track Position Switch Status	This signal reports the status of the switch that is installed into the seat system to detect whether the seat is moved to its foremost position.				
Data Length	**Unit**	**Resolution**	**Scaling**	**Minimum Value**	**Maximum Value**
2 bits	n.a.	n.a.	n.a.	n.a.	n.a.
Format				**Note**	
				6.3.2.1 Seating Position data should be used to specify the seating position where this data is subject of. See Table A2 for an example.	

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TABLE 47—SIGNAL VALUE DESCRIPTION

Signal Value	*$0*	*$1*	*$2*	*$3*
Foremost Seat Track Position Switch	Off (not On)	On	Invalid Data	Data Not Available

6.3.3 SRS DEPLOYMENT INFORMATION

6.3.3.1 SRS Deployment Status

TABLE 48—DATA DEFINITION

Data Element	*Description*				
SRS Deployment Status	Status of each SRS device for each seating position. A message should be reported for every existing vehicle occupant passive restraint system.				
Data Length	*Unit*	*Resolution*	*Scaling*	*Minimum Value*	*Maximum Value*
1 byte	n.a.	n.a.	n.a.	n.a.	n.a.
Format				*Note*	
				6.3.2.1 Seating Position data should be used to specify the seating position where this data is subject of. In addition, this data should be used in combination with 6.3.3.2 SRS Deployment Time to indicate the time of deployment of these SRS devices. See Table A2 for an example.	

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TABLE 49—SIGNAL VALUE DESCRIPTION: DEPLOYMENT STATUS

Signal Value	***$00***	***$01***	***$02***
Primary Stage Front Airbag Deployed	No	Yes	Other Deployment Status
Signal Value	***$10***	***$11***	***$13***
Secondary Stage Front Airbag Deployed	No	Yes	Other Deployment Status
Signal Value	***$20***	***$21***	***$22***
Seat-Mount Side Thorax Airbag Deployed	No	Yes	Other Deployment Status
Signal Value	***$30***	***$31***	***$32***
Seat-Mount Side Pelvis Airbag Deployed	No	Yes	Other Deployment Status
Signal Value	***$40***	***$41***	***$42***
Door-Mount Side Airbag Deployed	No	Yes	Other Deployment Status
Signal Value	***$50***	***$51***	***$52***
Knee Airbag Deployed	No	Yes	Other Deployment Status
Signal Value	***$60***	***$61***	***$62***
Side Curtain Airbag Deployed	No	Yes	Other Deployment Status
Signal Value	***$70***	***$71***	***$72***
Seatbelt Buckle Pre-Tensioner Deployed	No	Yes	Other Deployment Status
Signal Value	***$80***	***$81***	***$82***
Retractor Pre-Tensioner Deployed	No	Yes	Other Deployment Status
Signal Value	***$90***	***$91***	***$92***
Seatbelt Airbag Deployed	No	Yes	Other Deployment Status
Signal Value	***$A0***	***$A1***	***$A2***
Seat Cushion Airbag (Anti-Submarine Device)	No	Yes	Other Deployment Status
Signal Value	***$B0***	***$B1***	***$B2***
Hood Hinge	No	Yes	Other Deployment Status
Signal Value	***$C0***	***$C1***	***$C2***
Hood Airbag	No	Yes	Other Deployment Status
Signal Value	***$E0***	***$E1***	***$E2***
Other Supplemental Occupant Restraint System Deployed	No	Yes	Other Deployment Status
Signal Value		***$FE***	***$FF***
Data Availability		Invalid Data	Data Not Available

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6.3.3.2 SRS Deployment Time

TABLE 50—DATA DEFINITION

Data Element			Description		
SRS Deployment Time			The elapsed time since the beginning of frontal impact event (T_0) until the deployment decision was made.		
Data Length	**Unit**	**Resolution**	**Scaling**	**Minimum Value**	**Maximum Value**
1 byte	ms	1 ms	1 ms per bit	0 ms	+253 s
Format				**Note**	
				6.3.2.1 Seating Position data should be used to specify the seating position where this data is subject of. In addition, this data should be used in combination with 6.3.3.1 SRS Deployment Status. See Table A2 for an example.	

TABLE 51—SIGNAL VALUE DESCRIPTION

Signal Value	$00	$01	…	$FD	$FE	$FF
Data Value	0 ms	+1 ms	…	+253 ms	Invalid Data	Data Not Available

6.3.4 MAXIMUM RECORDED DELTA-V INFORMATION

6.3.4.1 Maximum Recorded Delta-V

TABLE 52—DATA DEFINITION

Data Element			Description		
Maximum Recorded Delta-V			The maximum value of the recorded Delta-V data in the event. It should be noted that the Maximum Recorded Delta-V may be recorded beyond the Duration of Frontal Impact Event (i.e., after the End of Frontal Impact Event).		
Data Length	**Unit**	**Resolution**	**Scaling**	**Minimum Value**	**Maximum Value**
1 byte	Km/h	1 km/h	1 km/h per bit	-127 km/h	+126 km/h
Format				**Note**	
Identical to 6.1.1 Change in Velocity				This data should be used in combination with 6.3.4.2 Time to Maximum recorded Delta-V.	

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0

TABLE 653—SIGNAL VALUE DESCRIPTION

Signal Value	*$00*	*$01*	*…*	*$FD*	*$FE*	*$FF*
Data Value	-127 km/h	-126 km/h	…	+126 km/h	Invalid Data	Data Not Available

6.3.4.2 Time to Maximum Recorded Delta-V

TABLE 54—DATA DEFINITION

Data Element			*Description*		
Time to Maximum Recorded Delta-V			The time from the Beginning of Event when the maximum value was recorded. It should be noted that the Maximum Recorded Delta-V may be recorded beyond the Duration of Frontal Impact Event (i.e., after the End of Frontal Impact Event).		
Data Length	*Unit*	*Resolution*	*Scaling*	*Minimum Value*	*Maximum Value*
1 byte	ms	2.5 ms	2.5 ms per bit	0 ms	+637.5 ms
Format				*Note*	
				This data should be used in combination with 6.3.4.1 Maximum recorded Delta-V.	

TABLE 55—SIGNAL VALUE DESCRIPTION

Signal Value	*$00*	*$01*	*…*	*$FD*	*$FE*	*$FF*
Data Value	0 ms	+2.5 ms	…	+637.5 ms	Invalid Data	Data Not Available

6.3.5 INDICATOR STATUS

The indicator status of “on” is the condition when a signal to turn on the indicator is transmitted from an on-board device to the indicator and does not mean whether the indicator is actually turned on. The indicator status of “off” is when the above “on” signal is not transmitted while the vehicle on-board electronics system is properly functioning.

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6.3.5.1 VEDI Warning Lamp Status

TABLE 56—DATA DEFINITION

Data Element	Description				
VEDI Warning Lamp Status	VEDI Warning Lamp Status indicates the status of an indicator in the instrument panel that provides the information to the driver of the data recorder failure or malfunction when lit.				
Data Length	**Unit**	**Resolution**	**Scaling**	**Minimum Value**	**Maximum Value**
2 bits	n.a.	n.a.	n.a.	n.a.	n.a.
Format				**Note**	

TABLE 57—SIGNAL VALUE DESCRIPTION

Signal Value	$0	$1	$2	$3
VEDI Warning Lamp	Off (not On)	On	Invalid Data	Data Not Available

6.3.5.2 Supplement Restraint System Warning Lamp Status

TABLE 58—DATA DEFINITION

Data Element	Description				
Supplement Restraint System Warning Lamp Status	Supplement Restraint System Warning Lamp Status indicates the status of an indicator in the instrument panel that provides the information to the driver of the SRS system malfunction when lit.				
Data Length	**Unit**	**Resolution**	**Scaling**	**Minimum Value**	**Maximum Value**
2 bits	n.a.	n.a.	n.a.	n.a.	n.a.
Format				**Note**	

TABLE 59—SIGNAL VALUE DESCRIPTION

Signal Value	$0	$1	$2	$3
Supplement Restraint System Warning Lamp	Off (not On)	On	Invalid Data	Data Not Available

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6.3.5.3 Passenger Airbag Disabled Indicator Status

TABLE 60—DATA DEFINITION

Data Element	Description
Passenger Airbag Disabled Indicator Status	Passenger Airbag Disabled Indicator Status indicates the status of an indicator in the instrument panel that provides information to the driver and passengers when the passenger-side airbag system was suppressed.

Data Length	Unit	Resolution	Scaling	Minimum Value	Maximum Value
2 bits	n.a.	n.a.	n.a.	n.a.	n.a.

Format	Note

TABLE 61—SIGNAL VALUE DESCRIPTION

Signal Value	$0	$1	$2	$3
Passenger Airbag Disabled Indicator	Off (not On)	On	Invalid Data	Data Not Available

6.3.5.4 Low Tire Pressure Warning Lamp Status

TABLE 62—DATA DEFINITION

Data Element	Description
Low Tire Pressure Warning Lamp Status	Low Tire Pressure Warning Lamp Status indicates the status of the indicator in the instrument panel that provides the information to the driver when the on-board tire pressure monitoring system detected the tire pressure in one or more tire(s) is low.

Data Length	Unit	Resolution	Scaling	Minimum Value	Maximum Value
2 bits	n.a.	n.a.	n.a.	n.a.	n.a.

Format	Note

TABLE 63—SIGNAL VALUE DESCRIPTION

Signal Value	$0	$1	$2	$3
Low Tire Pressure Warning Lamp	Off (not On)	On	Invalid Data	Data Not Available

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6.3.5.5 Service Engine Indicator Status

TABLE 64—DATA DEFINITION

Data Element	Description				
Service Engine Indicator Status	Service Engine Indicator Status indicates the status of the indicator in the instrument panel that provides information to the driver that the on-board diagnostic system has detected malfunction in the emission system.				
Data Length	**Unit**	**Resolution**	**Scaling**	**Minimum Value**	**Maximum Value**
2 bits	n.a.	n.a.	n.a.	n.a.	n.a.
Format				**Note**	

TABLE 65—SIGNAL VALUE DESCRIPTION

Signal Value	$0	$1	$2	$3
Service Engine Indicator	Off (not On)	On	Invalid Data	Data Not Available

6.3.5.6 Door Ajar Indicator Status

TABLE 66—DATA DEFINITION

Data Element	Description				
Door Ajar Indicator Status	Door Ajar Indicator Status indicates the status of the indicator in the instrument panel that provides the information to the driver when a door or gate is not completely closed.				
Data Length	**Unit**	**Resolution**	**Scaling**	**Minimum Value**	**Maximum Value**
2 bits	n.a.	n.a.	n.a.	n.a.	n.a.
Format				**Note**	

TABLE 67—SIGNAL VALUE DESCRIPTION

Signal Value	$0	$1	$2	$3
Door Ajar Indicator	Off (not On)	On	Invalid Data	Data Not Available

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6.3.5.7 Door Lock Status

TABLE 68—DATA DEFINITION

Data Element	Description				
Door Lock Status	Door Lock Status indicates the status of the door locks whether they are locked or not locked (i.e., unlocked).				
Data Length	**Unit**	**Resolution**	**Scaling**	**Minimum Value**	**Maximum Value**
2 bits	n.a.	n.a.	n.a.	n.a.	n.a.
Format				**Note**	

TABLE 69—SIGNAL VALUE DESCRIPTION

Signal Value	$0	$1	$2	$3
Door Lock	Unlocked (not Locked)	Locked	Invalid Data	Data Not Available

6.3.5.8 Battery-Off Device Deployed

TABLE 70—DATA DEFINITION

Data Element	Description				
Battery-Off Device Deployed	Battery-Off Device Deployed indicates the status of the system that disconnects the power supply from on-board battery during an event to prevent electric short circuit or possible vehicle fire.				
Data Length	**Unit**	**Resolution**	**Scaling**	**Minimum Value**	**Maximum Value**
2 bits	n.a.	n.a.	n.a.	n.a.	n.a.
Format				**Note**	

TABLE 71 SIGNAL VALUE DESCRIPTION

Signal Value	$0	$1	$2	$3
Battery-Off Device Deployed	Not Deployed	Deployed	Invalid Data	Data Not Available

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6.3.6 VEHICLE MILEAGE

TABLE 72—DATA DEFINITION: VEHICLE MILEAGE

Data Element		***Description***			
Vehicle Mileage		Odometer reading of the vehicle at the beginning of the event.			
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
2 byte	Km	10 km	10 km per bit	0 km	+655,320 km
Format				***Note***	
				1 km = 0.621371 mile	

TABLE 73—SIGNAL VALUE DESCRIPTION

Signal Value	***$0000***	***$0001***	***…***	***$FFFD***	***$FFFE***	***$FFFF***
Data Value	0 km	+10 km	…	+655,320 km	Invalid Data	Data Not Available

6.3.7 IGNITION CYCLE

6.3.7.1 Ignition Cycle at Event

TABLE 74—DATA DEFINITION: IGNITION CYCLE

Data Element		***Description***			
Ignition Cycle at Event		Numbers that the ignition switch was turned ON at the moment when the event occurred since the fist use of this control unit.			
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
4 bytes	count	1 count	1 count per bit	0 count	65,533 counts
Format				***Note***	
SAE J1979 Table E36 – Unit and Scaling ID $24 Definition					

TABLE 75—SIGNAL VALUE DESCRIPTION

Signal Value	***$0000***	***$0001***	***…***	***$FFFD***	***$FFFE***	***$FFFF***
Data Value	0 count	+1 count	…	+65,533 counts	Invalid Data	Data Not Available

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6.3.7.2 Ignition Cycle at Download

TABLE 76—DATA DEFINITION: IGNITION CYCLE

Data Element			***Description***		
Ignition Cycle at Download			Numbers that the ignition switch was turned ON at the moment when the data is downloaded from the vehicle since the fist use of this control unit.		
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
4 bytes	count	1 count	1 count per bit	0 count	+65,533 counts
Format				***Note***	
SAE J1979 Table E36 – Unit and Scaling ID $24 Definition					

TABLE 77—SIGNAL VALUE DESCRIPTION

Signal Value	***$0000***	***$0001***	***…***	***$FFFD***	***$FFFE***	***$FFFF***
Data Value	0 count	+1 count	…	+65,533 counts	Invalid Data	Data Not Available

6.3.8 HOURS IN OPERATION

TABLE 78—DATA DEFINITION: HOURS IN OPERATION

Data Element			***Description***		
Hours in Operation			Number of total hours when the ignition switch has been at the ON position since the control unit was in first use.		
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
4 bytes	hour	1 h	1 h per bit	0 h	+65,533 h
Format				***Note***	
SAE J1979 Table E36 – Unit and Scaling ID $24 Definition				65533 h = 7 years 175 days 13 h	

TABLE 79—SIGNAL VALUE DESCRIPTION

Signal Value	***$0000***	***$0001***	***…***	***$FFFD***	***$FFFE***	***$FFFF***
Data Value	0 h	+1 h	…	+65,533 h	Invalid Data	Data Not Available

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6.3.9 LATITUDE

6.3.9.1 Latitude-Degree

TABLE 80—DATA DEFINITION

Data Element		*Description*			
Latitude_Degree		Latitude of the vehicle at the beginning of an event.			
Data Length	*Unit*	*Resolution*	*Scaling*	*Minimum Value*	*Maximum Value*
1 byte	Degree	1 degree	1 degree per bit	+17 degrees	+71 degrees
Format				*Note*	
Electronic 2002 FARS Coding and Validation Manual Global Position: Latitude				This data should be used in combination with 6.3.9.2 Latitude-Minute and 6.3.9.3 Latitude-Second	

TABLE 81—SIGNAL VALUE DESCRIPTION

Signal Value	*$00*	*$01*	*$3C*	*$5A*	*$FE*	*$FF*
Data Value	0 degree	+1 degree	+60 degrees	+90 degrees	Invalid Data	Data Not Available

6.3.9.2 Latitude-Minute

TABLE 82—DATA DEFINITION

Data Element			*Description*		
Latitude_Minute			Latitude of the vehicle at the beginning of an event.		
Data Length	*Unit*	*Resolution*	*Scaling*	*Minimum Value*	*Maximum Value*
1 byte	min	1 min	1 min per bit	0 min	+59 min
Format				*Note*	
Electronic 2002 FARS Coding and Validation Manual Global Position: Latitude				This data should be used in combination with 6.3.9.1 Latitude-Degree and 6.3.9.3 Latitude-Second	

TABLE 83—SIGNAL VALUE DESCRIPTION

Signal Value	*$00*	*$01*	*$3B*	*$FE*	*$FF*
Data Value	0 min	+1 min	+59 min	Invalid Data	Data Not Available

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6.3.9.3 Latitude-Second

TABLE 84—DATA DEFINITION: LATITUDE

Data Element		*Description*			
Latitude_Second		Latitude of the vehicle at the beginning of an event.			
Data Length	*Unit*	*Resolution*	*Scaling*	*Minimum Value*	*Maximum Value*
1 byte	second	0.01 s	0.01 s per bit	00.00 s	+59.99 s
Format				*Note*	
Electronic 2002 FARS Coding and Validation Manual Global Position: Latitude				This data should be used in combination with 6.3.9.1 Latitude-Degree and 6.3.9.2 Latitude-Minute	

TABLE 85—SIGNAL VALUE DESCRIPTION: SECOND

Signal Value	*$00*	*$01*	*$176F*	*$FE*	*$FF*
Data Value	0.00 s	0.01 s	59.99 s	Invalid Data	Data Not Available

6.3.10 LONGITUDE

6.3.10.1 Longitude-Degree

TABLE 86—DATA DEFINITION

Data Element		*Description*			
Longitude_Degree		Longitude of the vehicle at the beginning of an event.			
Data Length	*Unit*	*Resolution*	*Scaling*	*Minimum Value*	*Maximum Value*
1 byte	degree	1 degree	1 degree per bit	+65 degrees	+178 degrees
Format				*Note*	
Electronic 2002 FARS Coding and Validation Manual Global Position: Longitude				This data should be used in combination with 6.3.10.2 Longitude-Minute and 6.3.10.3 Longitude-Second	

TABLE 87—SIGNAL VALUE DESCRIPTION

Signal Value	*$00*	*$01*	*$3C*	*$FD*	*$FE*	*$FF*
Data Value	0 degree	+1 degree	+60 degrees	+253 degrees	Invalid Data	Data Not Available

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6.3.10.2 Longitude-Minute

TABLE 88—DATA DEFINITION

Data Element		Description			
Longitude_Minute		Longitude of the vehicle at the beginning of an event.			
Data Length	**Unit**	**Resolution**	**Scaling**	**Minimum Value**	**Maximum Value**
1 byte	minute	1 min	1 min per bit	0 min	+59 min
Format				**Note**	
Electronic 2002 FARS Coding and Validation Manual Global Position: Longitude				This data should be used in combination with 6.3.10.1 Longitude-Degree and 6.3.10.3 Longitude-Second	

TABLE 89—SIGNAL VALUE DESCRIPTION

Signal Value	$00	$01	$3C	$FE	$FF
Data Value	0 min	+1 min	+60 min	Invalid Data	Data Not Available

6.3.10.3 Longitude-Second

TABLE 90—DATA DEFINITION

Data Element		Description			
Longitude_Second		Longitude of the vehicle at the beginning of an event.			
Data Length	**Unit**	**Resolution**	**Scaling**	**Minimum Value**	**Maximum Value**
1 byte	second	0.01 s	0.01 s per bit	00.00 s	+59.99 s
Format				**Note**	
Electronic 2002 FARS Coding and Validation Manual Global Position: Longitude				This data should be used in combination with 6.3.10.1 Longitude-Degree and 6.3.10.2 Longitude-Minute	

TABLE 91—SIGNAL VALUE DESCRIPTION: SECOND

Signal Value	*$00*	*$01*	*$176F*	*$FE*	*$FF*
Data Value	0.00 sec	0.01 sec	59.99 sec	Invalid Data	Data Not Available

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6.3.11 ACCIDENT DATE

6.3.11.1 Accident Date–Year

TABLE 92—DATA DEFINITION

Data Element		***Description***			
Accident_Year		Year when the event occurred.			
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
1 byte	year	1 year	1 year per bit	1900 A.D.	2153 A.D.
Format				***Note***	
Electronic 2002 FARS Coding and Validation Manual Month & Day: Accident Date				This data should be used in combination with 6.3.11.2 Accident Date-Month and 6.3.11.3 Accident Date-Day	

TABLE 93—SIGNAL VALUE DESCRIPTION

Signal Value	***$00***	***$01***	***$64***	***$FD***	***$FE***	***$FF***
Data Value	1900 A.D.	1901 A.D.	2000 A.D.	2153 A.D.	Invalid Data	Data Not Available

6.3.11.2 Accident Date–Month

TABLE 94—DATA DEFINITION

Data Element		***Description***			
Accident_Month		Month when the event occurred.			
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
1 byte	month	1 month	1 month per bit	January	December
Format				***Note***	
Electronic 2002 FARS Coding and Validation Manual Month & Day: Accident Date				This data should be used in combination with 6.3.11.1 Accident Date-Year and 6.3.11.3 Accident Date-Day	

TABLE 95 SIGNAL VALUE DESCRIPTION

Signal Value	***$00***	***$01***	***$02***	***$0C***	***$FE***	***$FF***
Data Value	-	January (1)	February (2)	December (12)	Invalid Data	Data Not Available

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6.3.11.3 Accident Date–Day

TABLE 96—DATA DEFINITION

Data Element		***Description***			
Accident_Day		Date when the event occurred.			
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
1 byte	day	1 day	1 day per bit	1st	31st
Format				***Note***	
Electronic 2002 FARS Coding and Validation Manual Month & Day: Accident Date				This data should be used in combination with 6.3.11.1 Accident Date-Year and 6.3.11.2 Accident Date-Month	

TABLE 97—SIGNAL VALUE DESCRIPTION

Signal Value	***$00***	***$01***	***$02***	***$1F***	***$FE***	***$FF***
Data Value	-	1st	2nd	31st	Invalid Data	Data Not Available

6.3.12 ACCIDENT TIME

6.3.12.1 Accident Time-Hour

TABLE 98—DATA DEFINITION

Data Element		***Description***			
Accident Time_Hour		Hours portion of the time of the day when the event occurred.			
Data Length	***Unit***	***Resolution***	***Scaling***	***Minimum Value***	***Maximum Value***
1 byte	o'clock	1 h	1 h per bit	0 o'clock	23 o'clock
Format				***Note***	
Electronic 2002 FARS Coding and Validation Manual Hour & Minute Accident Time				This data should be used in combination with 6.3.12.2 Accident Time-Minute and 6.3.12.3 Accident Time-Second.	

TABLE 99—SIGNAL VALUE DESCRIPTION

Signal Value	***$00***	***$01***	***$17***	***$FE***	***$FF***
Data Value	0 o'clock	1 o'clock	23 o'clock	Invalid Data	Data Not Available

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