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Class B Data Communication Network Messages— Message Definitions for Three Byte Headers

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1. ***Scope***—This SAE Recommended Practice defines the information contained in the header and data fields of non-diagnostic messages for automotive serial communications based on SAE J1850 Class B networks. This document describes and specifies the header fields, data fields, field sizes, scaling, representations, and data positions used within messages.

The general structure of a SAE J1850 message frame without in-frame response is shown in Figure 1. The structure of a SAE J1850 message with in-frame response is shown in Figure 2. Figures 1 and 2 also show the scope of frame fields defined by this document for non-diagnostic messages. Refer to SAE J1979 for specifications of emissions related diagnostic message header and data fields. Refer to SAE J2190 for the definition of other diagnostic data fields. The description of the network interface hardware, basic protocol definition, the electrical specifications, and the CRC byte are given in SAE J1850.

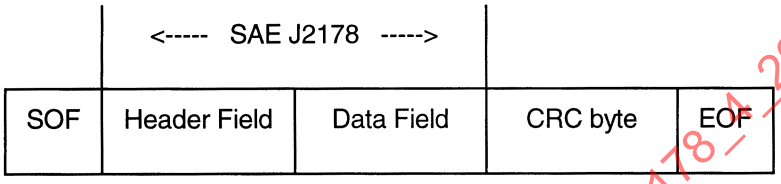

FIGURE 1—SCOPE OF SAE J2178 FOR A SAE J1850 FRAME WITHOUT IN-FRAME RESPONSE (IFR)

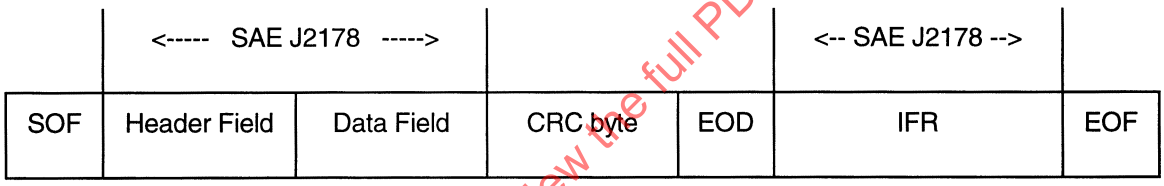

FIGURE 2—SCOPE OF SAE J2178 FOR A SAE J1850 FRAME WITH IN-FRAME RESPONSE (IFR)

SAE J1850 defines two and only two formats of message headers. They are the Single Byte header format and the Consolidated header format. The Consolidated header format has two forms, a Single Byte form and a three byte form. This document covers all of these formats and forms to identify the contents of messages which could be sent on a SAE J1850 network.

This document consists of four parts, each published separately.

SAE J2178-1 (Titled: Detailed Header Formats and Physical Address Assignments) describes the two allowed forms of message header formats, single byte and consolidated. It also contains the physical node address range assignments for the typical sub-systems of an automobile.

SAE J2178-2 (Titled: Data Parameter Definitions) defines the standard parametric data which may be exchanged on SAE J1850 (Class B) networks. The parameter scaling, ranges, and transfer functions are specified. Messages that refer to these parametric definitions shall always adhere to these parametric definitions. It is intended that at least one of the definitions for each parameter in this part match the SAE J1979 definition.

SAE J2178-3 (Titled: Frame IDs for Single Byte Forms of Headers) defines the message assignments for the single byte header format and the one byte form of the consolidated header format.

SAE J2178-4 (this part, Titled: Message Definition for Three Byte Headers) defines the message assignments for the three byte form of the consolidated header format.

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2. References

2.1 Related Publications—The following publications are provided for information purposes only and are not a required part of this document.

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

SAE J1213/1—Glossary of Vehicle Networks for Multiplex and Data Communication
SAE J1850—Class B Data Communication Network Interface
SAE J1930—Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms
SAE J1979—E/E Diagnostic Test Modes
SAE J2190—Enhanced E/E Diagnostic Test Modes

2.1.2 ANSI PUBLICATION—Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002.

ANSI/IEEE Std 754-1985, August 12, 1985—IEEE Standard for Binary Floating-Point Arithmetic

3. Terms and Definitions

3.1 Data [Data Field]—Data and data field are used interchangeably in this document and they both refer to a field within a frame that may include bytes with parameters pertaining to the message and/or secondary ID and/or extended addresses and/or test modes which further defines a particular message content being exchanged over the network.

3.2 Extended Address—The extended address is a means to allow a message to be addressed to a specific geographical location or zone of the vehicle, independent of any node's physical address.

3.3 Frame—A frame is one complete transmission of information which may or may not include an In-Frame Response. The frame is enclosed by the start of frame and end of frame symbols. For Class B networks, each frame contains one and only one message (see "message" definition below).

3.4 Frame ID—The Frame ID is the header byte for the Single Byte Header format and the one byte form of the Consolidated header format. The definition of the frame ID is found in SAE J2178/3. This header byte defines the target and source and content of the frame.

3.5 Functional Addressing—Functional addressing allows a message to be addressed or sent to one or more nodes on the network interested in that function. Functional addressing is intended for messages that may be of interest to more than a single node. For example, an exterior lamp "off" message could be sent to all nodes controlling the vehicle exterior lamps by using a functional address. The functional address consists of a primary ID and may include a secondary ID and may also include an extended address.

3.6 Header [Header Field]—The header (or header field, used interchangeably) is a one or three byte field within a frame that contains information about the message priority, message source and target addressing, message type, and in-frame response type.

3.7 In-Frame Response (IFR) Type—The IFR type identifies the form of the in-frame response which is expected within that message.

3.8 Load—The load command indicates the operation of directly replacing the current/existing value of a parameter with the parameter value(s) contained in the message.

3.9 Message—A message consists of all of the bytes of a frame excluding the delimiter symbols (SOF, EOD, EOF, NB).

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3.10 Modify—The modify command indicates the operation of using the message data parameter value to change (e.g., increment, decrement, or toggle) the current/existing value.

3.11 Parameter—A parameter is the variable quantity included in some messages. The parameter value, scaling, offset, units, transfer function, etc., are unique to each particular message. (The assigned parameters are contained herein.)

3.12 Physical Addressing—Physical addressing allows a message to be addressed to a specific node or to all nodes or to a non-existent, null node. The information in this message is of relevance only to a particular node, so the other nodes on the bus should ignore the message, except for the case of the "all nodes" address.

3.13 Primary ID—The primary ID identifies the target for this functional message. This is the primary discriminator used to group functions into main categories.

3.14 Priority—The priority describes the rank order and precedence of a message. Based upon the SAE J1850, Class B arbitration process, the message with the highest priority will win arbitration.

3.15 Report—A report indicates the transmission of parametric data values, based on: a change of state; a change of value; on a periodic rate basis; or as a response to a specific request.

3.16 Request—A request is a command to, or a query for data, or action from another node on the network.

3.17 Response Data—The response data is the information from a node on the network in response to a request from another node on the network. This may be an in-frame response or a report type of message.

3.18 Secondary ID—The secondary ID (along with the primary ID or Frame ID) identifies the functional target node for a message. The purpose of the secondary ID field within the frame is to further define the function or action being identified by the primary ID.

4. Abbreviations and Acronyms

A/C - Air Conditioning
ASC - ASCII Encoded SLOT
BCD - Binary Coded Decimal (BCD) SLOT
BMM - Bit Mapped with Mask SLOT
BMP - Bit Mapped without Mask SLOT
CRC - Cyclic Redundancy Check
CS - Checksum
DTC - Diagnostic Trouble Code
EOD - End of Data
EOF - End of Frame
ERR - Error Detection
EV-ETS - Electric Vehicle Energy Transfer System
EVSE - Electric Vehicle Supply Equipment
HVAC - Heating, Ventilation, Air Conditioning
ID - Identifier
IFR - In-Frame Response
LSB - Least Significant Bit/Byte
MSB - Most Significant Bit/Byte
NB - Normalization Bit
PID - Parameter IDentification (number, NOT the primary ID, (see Section 7)
PKT - Multiple Parameter Packet SLOT
PRN - Parameter Reference Number
SED - State Encoded SLOT

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SFP - Signed Floating Point (Scientific Notation) SLOT
SLOT - Scaling, Limit, Offset, and Transfer Function (see Section 8)
SNM - 2's Complement Signed Numeric SLOT
SOF - Start of Frame
UNM - Unsigned Numeric SLOT
VIN - Vehicle Identification Number

5. General Information—The messages defined by this four part document are specified for networks using one byte headers or consolidated one and three byte headers as specified in SAE J1850. This part focuses on the message definition for the three byte form of the consolidated header format. Section 5 consists of the list of functional target addresses for all of the functionally addressed SAE J1850 messages except Type #3, Function Read. The SAE J1850 Type #3 messages have a separate address assignment because this message type does not support any secondary addressing. Functional target addresses (Primary IDs) are shown in Section 5 and secondary message definitions are shown in Section 7. Section 6 shows the valid extended address assignments which are referenced in the message definition tables.

The information in the header field contains target, source, priority and message type information, while the data field contains additional addressing and parametric information. This information is explicitly defined in some headers and implicitly defined in others. Messages can be classified generally into two types:

a. Requests, that is, commands (load or modify) or queries for data, and
b. Responses, that is, reports or acknowledgments.

When a node generates a request, the target node(s) which is/are responsible for the requested data or function must respond by sending the requested information or by performing the requested function. For responses (that is, reports or acknowledgments), data information that a node responds with may be requested by another node, or reported by the node when the desired information has changed, or reported by the node on a periodic basis.

This document defines a great number of specific messages which are expected to have wide application. Designers are required to use the defined messages on SAE J1850 networks in the exact way that they are defined here. There are a large number of message codes which are reserved for each manufacturer to define. If the user cannot find a needed message, he or she is expected to define a manufacturer specific message in these reserved codes. Therefore, messages on different manufacturer's products using these "Manufacturer Reserved" codes will have meaning only for that manufacturer or specific vehicle. These will most likely be different between manufacturers. The codes that are defined here, however, shall always carry the same meaning from one manufacturer to another and from one model and year to the next.

6. Functional Target Address Assignments (Primary ID)—Primary IDs are used to address a generic function. The second byte of the three byte header contains this primary ID. Each target function has a separate ID for command and status messages. The command ID is used to control a function while the status ID is used to report a condition or report that a command has been executed. Each primary ID pair then contains a secondary address, optional geographical extended address, and optional parametric data. Table 1 below lists the primary ID assignments, command and status, and a description. Those IDs labeled as "Reserved - SAE" are reserved for the SAE to define at a later time while those labeled "Reserved - MFG" are left for the individual manufacturers to use.

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TABLE 1—PRIMARY ID ASSIGNMENTS BYTE 2 OF MESSAGE TYPES 0, 1, 2, 8, 9, 10, 11

Command	Status	Function
00	01	Reserved - SAE
02	03	Reserved - MFG
04	05	Reserved - MFG
06	07	Reserved - MFG
08	09	Engine Torque
0A	0B	Engine Air Intake
0C	0D	Reserved - MFG
0E	0F	Reserved - MFG
10	11	Reserved - SAE
12	13	Throttle
14	15	A/C Clutch
16	17	Reserved - MFG
18	19	Reserved - MFG
1A	1B	Engine RPM
1C	1D	Reserved - MFG
1E	1F	Reserved - MFG
20	21	Reserved - SAE
22	23	Reserved - MFG
24	25	Wheels
26	27	Reserved - MFG
28	29	Vehicle Speed
2A	2B	Traction Control
2C	2D	Reserved - MFG
2E	2F	Reserved - MFG
30	31	Reserved - SAE
32	33	Brakes
34	35	Steering/Steering Wheel
36	37	Reserved - SAE
38	39	Reserved - MFG
3A	3B	Transmission / Transaxle / PRNDL
3C	3D	Reserved - MFG
3E	3F	Reserved - MFG
40	41	Reserved - SAE
42	43	Reserved - MFG
44	45	Reserved - MFG
46	47	Engine Sensors
48	49	Engine Coolant
4A	4B	Engine Oil
4C	4D	Reserved - MFG
4E	4F	Reserved - MFG
50	51	Reserved - SAE
52	53	Engine Systems Other
54	55	Reserved - MFG
56	57	Reserved - SAE
58	59	Suspension
5A	5B	Non-Legislated Diagnostics
5C	5D	Reserved - MFG
5E	5F	Reserved - MFG

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TABLE 1—PRIMARY ID ASSIGNMENTS BYTE 2 OF MESSAGE TYPES 0, 1, 2, 8, 9, 10, 11 (CONTINUED)

Command	Status	Function
60	61	Reserved - SAE
62	63	Vehicle Speed Control
64	65	Reserved - MFG
66	67	Reserved - SAE
68	69	Reserved - MFG
6A	6B	Legislated Diagnostics
6C	6D	Reserved - MFG
6E	6F	Reserved - MFG
70	71	Electric Vehicle Energy Transfer System
72	73	Charging System
74	75	Electrical Energy Management
76	77	Reserved - SAE
78	79	Reserved - MFG
7A	7B	Odometer
7C	7D	Reserved - MFG
7E	7F	Reserved - MFG
80	81	Reserved - SAE
82	83	Fuel System
84	85	Vehicle Motion
86	87	Ignition Switch / Starter
88	89	Tell Tales
8A	8B	Reserved - MFG
8C	8D	Reserved - MFG
8E	8F	Reserved - MFG
90	91	Reserved - SAE
92	93	Vehicle Security
94	95	Audio Control
96	97	Audible Warnings
98	99	Reserved - MFG
9A	9B	Compact Disc
9C	9D	Reserved - MFG
9E	9F	Reserved - MFG
A0	A1	Reserved - SAE
A2	A3	Digital Audio Tape
A4	A5	Audio Tuner / Receiver
A6	A7	Cassette Tape
A8	A9	Reserved - MFG
AA	AB	Cellular Phone
AC	AD	Reserved - MFG
AE	AF	Reserved - MFG
B0	B1	Reserved - SAE
B2	B3	Climate Control (HVAC)
B4	B5	Reserved - MFG
B6	B7	Reserved - SAE
B8	B9	Window Wiper/Washer
BA	BB	Reserved - MFG
BC	BD	Reserved - MFG
BE	BF	Reserved - MFG
C0	C1	Reserved - SAE
C2	C3	Mirrors

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TABLE 1—PRIMARY ID ASSIGNMENTS BYTE 2 OF MESSAGE TYPES 0, 1, 2, 8, 9, 10, 11 (CONTINUED)

Command	Status	Function
C4	C5	Door Locks
C6	C7	External Access
C8	C9	Seat Motion/Control
CA	CB	Windows
CC	CD	Steering Column
CE	CF	Reserved - MFG
D0	D1	Seat Switches
D2	D3	Restraints
D4	D5	Reserved - MFG
D6	D7	Reserved - MFG
D8	D9	External Lamp Outage
DA	DB	External Lamps
DC	DD	Interior Lamp Outage
DE	DF	Interior Lamps
E0	E1	Reserved - SAE
E2	E3	Reserved - MFG
E4	E5	Tires
E6	E7	Electric Defrost
E8	E9	Navigation
EA	EB	Displays
EC	ED	Reserved - MFG
EE	EF	Reserved - MFG
F0	F1	Reserved - SAE
F2	F3	Exterior Environment
F4	F5	Interior Environment
F6	F7	Reserved - SAE
F8	F9	Time
FA	FB	Vehicle ID (VIN)
FC	FD	Reserved - MFG
FE	FF	Network Control

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7. ***Function Read Target Address Assignments***—Function Read IDs are used to address a specific function in a type 3 message. The second byte of the three byte header contains this function read ID. In a type 3 message (Function Read) the data is returned to the transmitting node in the In-Frame Response (IFR) portion of the message. The data returned is identified by a Parameter Reference Number (PRN). Table 2 lists the function read ID assignments, description, and PRN. Those IDs labeled as "Reserved - SAE" are reserved for the SAE to define at a later time while those labeled "Reserved - MFG" are left for the individual manufacturers to use.

TABLE 2—FUNCTION READ ID ASSIGNMENTS BYTE 2 OF MESSAGE TYPE 3

ID	Function
00 - 0F	Reserved - MFG
10 - 1F	Reserved - SAE
20 - 4F	Reserved - MFG
50 - 5F	Reserved - SAE
60 - 8F	Reserved - MFG
90 - 9F	Reserved - SAE
A0 - CF	Reserved - MFG
D0 - DF	Reserved - SAE
E0 - FF	Reserved - MFG

8. ***Message Assignments***—The following tables contain the message assignments associated with the primary IDs for message types 0, 1, 2, 8, 9, 10, and 11. A separate table is included for each primary ID pair that has at least one secondary ID currently defined. Table 3 is an example of how to interpret the tables to follow.

TABLE 3—EXAMPLE OF MESSAGE TABLES TO FOLLOW

Secondary ID Name	Sec ID	Msg Op	Q	C	Ext Addr	PRN
Secondary ID Name #1	xx	?	?	?	?	?
Secondary ID Name #2	xx	?	?	?	?	?
...	...	...	...	...	...	...
Secondary ID Name #n	xx	?	?	?	?	?

Each primary ID pair can have up to 64 secondary IDs. If a secondary ID is not defined here, it is assumed to be manufacturer specific. Future definitions of secondary IDs can be brought to the attention of the SAE J2178 task force and if all manufacturers agree, a new secondary ID can be defined. Following each secondary ID name is the 6-bit hexadecimal secondary ID. The secondary ID byte is made up of the Q bit (bit 7), C bit (bit 6), and 6-bit ID as listed in the table. Following the secondary ID is the message operation column. Up to three operations can be defined for any secondary ID. Table 4 lists the valid message operations and the appropriate primary ID (i.e., command or status) and C bit definitions for the operation.

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TABLE 4—MESSAGE OPERATIONS

Operation	Msg Op	Primary ID	C-bit (bit 6)
Report Data	R	Status	0
Load Data	L	Command	0
Modify State	M	Command	1

Each secondary ID can support one or more of the operations listed above. Typically, a secondary ID will support report data only (R), report and load data (L/R), or report data, load data, and modify state (L/R/M). The other combinations are very unlikely.

Following the operation column is Q bit usage. Each secondary ID will have an entry under Q bit = "1" and Q bit = "0" indicating how the Q bit (bit 7) is used in the message. Table 5 lists the valid options.

TABLE 5—Q BIT DEFINITIONS

Q bit = "1"	Q bit = "0"	Meaning
--	x	Q bit not used, Defaults to logic "0"
x	--	Q bit not used, Defaults to logic "1"
Set	--	Q bit must be logic "1" and means Set
E	D	Enable(d) / Disable(d)
Inc	Dec	Increment / Decrement
O	C	Open(ed) / Close(d)
L	U	Lock(ed) / Unlock(ed)
On	Off	On / Off
R	-R	Reset / Not Reset
Y	N	Yes / No

The next column after the Q bit definitions is the Extended Address column. If extended addressing is used for a particular secondary ID, the paragraph number (in Section 9) which defines the valid extended addresses is listed. Otherwise, "--" is found.

The final column is used for those secondary IDs which contain data (e.g., coolant temperature, vehicle speed, etc.) that cannot be encoded in the Q bit field (i.e., non-boolean). The PRN number is essentially a lookup into SAE J2178-2 where the complete data encoding, size, resolution, etc., can be found.

The specific message tables can be found as follows:

Table 6 - Engine Torque
Table 7 - Engine Air Intake
Table 8 - Throttle
Table 9 - Air Conditioning Clutch
Table 10 - Engine RPM
Table 11 - Wheels
Table 12 - Vehicle Speed
Table 13 - Traction Control
Table 14 - Brakes
Table 15 - Steering/Steering Wheel
Table 16 - Transmission/Transaxle/PRNDL
Table 17 - Engine Sensors - Other
Table 18 - Engine Coolant
Table 19 - Engine Oil
Table 20 - Engine Systems - Other
Table 21 - Suspension
Table 22 - Vehicle Speed Control
Table 23 - Electric Vehicle Energy Transfer System
Table 24 - Charging System
Table 25 - Electrical Energy Management
Table 26 - Odometer
Table 27 - Fuel System
Table 28 - Ignition Switch/Starter
Table 29 - Tell Tales
Table 30 - Climate Control (HVAC)
Table 31 - Window Wiper/Washer
Table 32 - Mirrors
Table 33 - Door Locks

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8.1 Engine Torque—(See Table 6.)

Primary ID: Engine Torque
Command ID: $08
Status ID: $09

TABLE 6—ENGINE TORQUE MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Crankshaft Torque - Percent	01	L / R	--	x	--	1020
Crankshaft Torque - Absolute	02	L / R	--	x	--	1019
Maximum Crankshaft Torque	10	R	--	x	--	1033

8.2 Engine Air Intake—(See Table 7.)

Primary ID: Engine Air Intake
Command ID: $0A
Status ID: $0B

TABLE 7—ENGINE AIR INTAKE MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Boost On/Off	01	L / R	On	Off	--	--
Boost Value	02	R	--	x	--	1021
Mass Air Flow Rate	08	R	--	x	--	0010
Manifold Absolute Pressure	11	R	--	x	--	000B
Intake Air Temperature	20	R	--	x	--	000F

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8.3 Throttle—(See Table 8.)

Primary ID: Throttle
Command ID: $12
Status ID: $13

TABLE 8—THROTTLE MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Sensor 1 Position	01	R	--	x	--	0011
Sensor 2 Position	02	R	--	x	--	1035
Sensor 3 Position	03	R	--	x	--	1036
Throttle Kicker	10	L / R	E	D	--	--
Pedal Position	11	R	--	x	--	1034

8.4 Air Conditioning Clutch—(See Table 9.)

Primary ID: Air Conditioning Clutch
Command ID: $14
Status ID: $15

TABLE 9—AIR CONDITIONING CLUTCH MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Enable	01	L / R	E	D	--	--
Enable Pending	02	L / R	Y	N	--	--
Load	03	R	--	x	--	100E
Required	04	L / R	Y	N	--	--

8.5 Engine RPM—(See Table 10.)

Primary ID: Engine RPM
Command ID: $1A
Status ID: $1B

TABLE 10—ENGINE RPM MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Low Resolution	01	R	--	x	--	1022
High Resolution	02	R	--	x	--	000C
Idle Speed	20	L / R	E	D	--	1023

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8.6 Wheels—(See Table 11.)

Primary ID: Wheels
Command ID: $24
Status ID: $25

TABLE 11—WHEELS MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Wheel Speed - Low Resolution	01	R	--	x	8.1	2801
Wheel Slip	02	R	--	x	8.1	2809
Wheel Load	04	R	--	x	8.1	2839
Wheel Speed - High Resolution	11	R	--	x	8.1	2802

8.7 Vehicle Speed—(See Table 12.)

Primary ID: Vehicle Speed
Command ID: $28
Status ID: $29

TABLE 12—VEHICLE SPEED MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Low Resolution	01	R	--	x	--	000D
High Resolution	02	R	--	x	--	6001

8.8 Traction Control—(See Table 13.)

Primary ID: Traction Control
Command ID: $2A
Status ID: $2B

TABLE 13—TRACTION CONTROL MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Engine Traction Active	01	R	Y	N	--	--
Brake Traction Active	02	R	Y	N	--	--
System On/Off	04	L / R	On	Off	--	--
System Active	05	R	Y	N	--	--
System Faulted	0A	R	Y	N	--	--
System Enable Sw. Active	20	R	Y	N	--	--

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8.9 Brakes—(See Table 14.)

Primary ID: Brakes
Command ID: $32
Status ID: $33

TABLE 14—BRAKES MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
ABS Active	03	R	Y	N	--	--
ABS System On / Off	04	L / R	On	Off	--	--
Fluid Life Reset	09	L / R	R	-R	--	--
System Faulted	0A	R	Y	N	--	--
Fluid Temperature	10	R	--	x	--	281A
Supply Pump Fluid Pressure	11	R	--	x	--	2819
Fluid Level - Percent	12	R	--	x	--	2841
Fluid Level - Volume	13	R	--	x	--	2842
Fluid Remaining Life	14	R	--	x	--	2843
Fluid Capacity	16	R	--	x	--	2844
Parking Brake Sw. Active	20	R	Y	N	--	--
Torque Convertor Clutch - Brake Sw. Active	21	R	Y	N	--	--
Brake Lamp - Brake Sw. Active	22	R	Y	N	--	--
Fluid Life Reset Sw. Active	29	R	Y	N	--	--

8.10 Steering/Steering Wheel—(See Table 15.)

Primary ID: Steering/Steering Wheel
Command ID: $34
Status ID: $35

TABLE 15—STEERING/STEERING WHEEL MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Fluid Life Reset	09	L / R	R	-R	--	--
Fluid Temperature	10	R	--	x	--	3005
Fluid Pressure	11	R	--	x	--	3006
Fluid Level - Percent	12	R	--	x	--	3007
Fluid Level - Volume	13	R	--	x	--	3008
Fluid Remaining Life	14	R	--	x	--	3009
Fluid Capacity	16	R	--	x	--	300B
Steering Wheel Angle	18	R	--	x	--	3001
Steering Wheel Rate	19	R	--	x	--	300C
Steering Wheel Torque	1A	R	--	x	--	300D
Wheel Steer Angle	20	R	--	x	8.1	300E
Fluid Life Reset Sw. Active	29	R	Y	N	--	--

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8.11 Transmission/Transaxle/PRNDL—(See Table 16.)

Primary ID: Transmission/Transaxle/PRNDL
Command ID: $3A
Status ID: $3B

TABLE 16—TRANSMISSION/PRNDL MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Torque Convertor Lock(ed)	01	L/R	Y	N	--	--
Clutch Enable	02	L/R	E	D	--	--
Actual Gear Position w/ Shift in Progress	03	R	Y	N	--	180E
Range Selected (PRNDL position)	04	R	--	x	--	1809
Transfer Case (4WD)	05	R	--	x	--	180A
Commanded Gear	06	L/R	--	x	--	180D
Range Actual (PRNDL sense at transmission)	07	R	--	x	--	1806
Transmission Kickdown	08	L/R	Y	N	--	--
Fluid Life Reset	09	L/R	R	R	--	--
Fluid Temperature	10	R	--	x	--	180B
Fluid Pressure	11	R	--	x	--	180C
Fluid Level - Percent	12	R	--	x	--	1801
Fluid Level - Volume	13	R	--	x	--	1802
Fluid Remaining Life	14	R	--	x	--	1804
Fluid Capacity	16	R	--	x	--	1803
Park/Neutral Sw. Active	20	R	Y	N	--	--
Fluid Life Reset Sw. Active	29	R	Y	N	--	--

8.12 Engine Sensors - Other—(See Table 17.)

Primary ID: Engine Sensors - Other
Command ID: $46
Status ID: $47

TABLE 17—ENGINE SENSORS—OTHER MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Convertor Bank 1, Sensor 1 Heater	01	L/R	On	Off	--	--
Convertor Bank 1, Sensor 2 Heater	02	L/R	On	Off	--	--
Convertor Bank 2, Sensor 1 Heater	03	L/R	On	Off	--	--
Convertor Bank 2, Sensor 2 Heater	04	L/R	On	Off	--	--
Convertor Bank 1, Sensor 1 Temperature	11	R	--	x	--	1037
Convertor Bank 1, Sensor 2 Temperature	12	R	--	x	--	1038
Convertor Bank 2, Sensor 1 Temperature	13	R	--	x	--	1039
Convertor Bank 2, Sensor 2 Temperature	14	R	--	x	--	103A

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8.13 Engine Coolant—(See Table 18.)

Primary ID: Engine Coolant
Command ID: $48
Status ID: $49

TABLE 18—ENGINE COOLANT MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Fan 1 Speed	01	L/R	On	Off	--	102A
Fan 2 Speed	02	L/R	On	Off	--	103B
Fan 1 Clutch	06	L/R	E	D	--	--
Fan 2 Clutch	07	L/R	E	D	--	--
Fluid Life Reset	09	L/R	R	R	--	--
Fluid Temperature	10	R	--	x	--	0005
Fluid Pressure	11	R	--	x	--	1029
Fluid Level - Percent	12	R	--	x	--	1026
Fluid Level - Volume	13	R	--	x	--	1027
Fluid Remaining Life	14	R	--	x	--	103D
Fluid Capacity	16	R	--	x	--	1028
Fluid Life Reset Sw. Active	29	R	Y	N	--	--
Fluid Temperature High	30	R	Y	N	--	--
Low Coolant Level	32	R	Y	N	--	--

8.14 Engine Oil—(See Table 19.)

Primary ID: Engine Oil
Command ID: $4A
Status ID: $4B

TABLE 19—ENGINE OIL MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Fluid Life Reset	09	L/R	R	R	--	--
Fluid Temperature	10	R	--	x	--	102B
Fluid Pressure	11	R	--	x	--	102F
Fluid Level - Percent	12	R	--	x	--	102C
Fluid Level - Volume	13	R	--	x	--	102D
Fluid Remaining Life	14	R	--	x	--	1030
Oil Viscosity	15	R		x	--	103F
Fluid Capacity	16	R	--	x	--	102E
Fluid Life Reset Sw. Active	29	R	Y	N	--	--
Fluid Temperature High	30	R	Y	N	--	--
Low Oil Level	32	R	Y	N	--	--

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8.15 Engine Systems - Other—(See Table 20.)

Primary ID: Engine Systems - Other
Command ID: $52
Status ID: $53

TABLE 20—ENGINE SYSTEMS—OTHER MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Engine Redline - Low Resolution	01	R	--	x	--	1048
Number Engine Cylinders	02	R	--	x	--	1040
Number Valves/Cylinder	03	R	--	x	--	1041
Engine Running	04	R	Y	N	--	--
Engine Displacement	05	R	--	x	--	1043
Engine Redline - High Resolution	10	R	--	x	--	1049
Engine Accelerating	20	R	Y	N	--	--

8.16 Suspension—(See Table 21.)

Primary ID: Suspension
Command ID: $58
Status ID: $59

TABLE 21—SUSPENSION MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Ride Setting	01	L/R	--	x	--	3804
Fluid Life Reset	09	L/R	R	R	--	--
System Faulted	0A	R	Y	N	--	--
Fluid Temperature	10	R	--	x	--	3805
Fluid Pressure	11	R	--	x	--	3806
Fluid Level - Percent	12	R	--	x	--	3807
Fluid Level - Volume	13	R	--	x	--	3808
Fluid Remaining Life	14	R	--	x	--	3809
Fluid Capacity	16	R	--	x	--	380A
Fluid Life Reset Sw. Active	29	R	Y	N	--	--

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8.17 Vehicle Speed Control—(See Table 22.)

Primary ID: Vehicle Speed Control
Command ID: $62
Status ID: $63

TABLE 22—VEHICLE SPEED CONTROL MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
System On/Off	01	L/R	On	Off	--	--
Set Speed	02	L/R	E	D	--	A015
Coast Mode	03	L/R	E	D	--	--
Resume Mode	04	L/R	E	D	--	--
Accelerate Mode	05	L/R	E	D	--	--
Speed Control Active	06	R	Y	N	--	--
On/Off Sw. Active	21	R	Y	N	--	--
Set Speed Sw. Active	22	R	Y	N	--	--
Coast Sw. Active	23	R	Y	N	--	--
Resume Sw. Active	24	R	Y	N	--	--
Accelerate Sw. Active	25	R	Y	N	--	--

8.18 Electric Vehicle Energy Transfer System

Primary ID: Electric Vehicle Energy Transfer System
Command ID: $70
Status ID: $71

TABLE 23—ELECTRIC VEHICLE ENERGY TRANSFER SYSTEM

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
ETS Sleep	01	L/R/M	Y	N	—	—
Delay Timer Expired	02	L/R/M	Y	N	—	—
App Comm State	03	L/R/M	—	x	—	C825
EVSE Configuration	04	L/R/M	—	—	—	C808
Transfer Type	05	L/R/M	—	—	—	C81E
Voltage Mode Control	06	L/R/M	—	—	—	C823
Pulse Mode Enabled	07	L/R/M	Y	N	—	—
Vehicle Ready	08	L/R/M	—	—	—	C821
EVSE Ready	09	L/R/M	—	—	—	C809
Coupling Proximity Detected	0A	L/R/M	Y	N	—	—
Power Out of Range	0B	L/R/M	—	—	—	C817
Sw DC Present	0C	L/R/M	Y	N	—	—
Sw AC Present	0D	L/R/M	Y	N	—	—
Transfer Ready	0E	L/R/M	Y	N	—	—
Pulse Period	0F	L/R/M	—	—	—	C81A
Power Level	10	L/R/M	—	—	—	C816
Max Transfer Power	16	L/R/M	—	—	—	C813
Covnersion Power Range	17	L/R/M	—	—	—	C803
Requested Stage Index	18	L/R/M	—	—	—	C81B
Stage Power Range	19	L/R/M	—	—	—	C81D
LMS Preference Toggle	1A	L/R/M	Y	N	—	—
LMS Preference Override	1B	L/R/M	Y	N	—	—
Base Charging Complete	1C	L/R/M	Y	N	—	—

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TABLE 23—ELECTRIC VEHICLE ENERGY TRANSFER SYSTEM (CONTINUED)

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Battery Design Capacity	1D	L/R/M	—	—	—	C800
Battery SOC	1E	L/R/M	—	—	—	C801
Conversion Load	1F	L/R/M	—	—	—	C802
Current Limit	20	L/R/M	—	—	—	C804
Current Limit Mandate	21	L/R/M	—	—	—	C805
Delay Timer Count	22	L/R/M	—	—	—	C806
Delay Timer Enable	23	L/R/M	Y	N	—	—
Delay Timer Period	24	L/R/M	—	—	—	C807
EVSE Location	25	L/R/M	INDOOR	OUTDOOR	—	—
LMS Current Limit Mandate	26	L/R/M	—	—	—	C80A
LMS Current Limit Preference	27	L/R/M	—	—	—	C80B
LMS Power Limit Mandate	28	L/R/M	—	—	—	C80C
LMS Power Limit Preference	29	L/R/M	—	—	—	C80D
Max Power Level	2A	L/R/M	—	—	—	C80F
Max Power Level Mandate	2B	L/R/M	—	—	—	C810
Recovery Timeout	2C	L/R/M	Y	N	—	—
Stage Power LImited	2D	L/R/M	Y	N	—	—
Transfer Type Valid	2E	L/R/M	Y	N	—	—
Usage Mode	2F	L/R/M	—	—	—	C81F
Usage Mode Time	30	L/R/M	—	—	—	C820
Vent Fault	31	L/R/M	Y	N	—	—
Vent Required	32	L/R/M	Y	N	—	—
App Service Request Enabled	33	L/R/M	—	—	—	C827
App Service Request	34	L/R/M	—	—	—	C826
Transfer Type Preference	35	L/R/M	—	—	—	C82C
Vent Confirmed	36	L/R/M	Y	N	—	—
Vent Request	37	L/R/M	Y	N	—	—

8.19 Charging System—(See Table 24.)

Primary ID: Charging System
Command ID: $72
Status ID: $73

TABLE 24—CHARGING SYSTEM MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Charging Voltage	01	R	--	x	--	6035
Charging Current	03	R	--	x	--	6037
Battery Voltage	09	R	--	x	--	600A
Battery Current	0A	R	--	x	--	6038
Battery Temperature	10	R	--	x	--	600B
Charging System Faulted	21	R	Y	N	--	--

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8.20 Electrical Energy Management—(See Table 25.)

Primary ID: Electrical Energy Management
Command ID: $74
Status ID: $75

TABLE 25—ELECTRICAL ENERGY MANAGEMENT MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Delayed Accessory	01	L/R	E	D	--	--
Short Term Storage	02	L/R	E	D	--	--
Long Term Storage	03	L/R	E	D	--	--

8.21 Odometer—(See Table 26.)

Primary ID: Odometer
Command ID: $7A
Status ID: $7B

TABLE 26—ODOMETER MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Vehicle Odometer	01	R	--	x	--	6004
Trip Reset	03	L/R	R	R	--	--
Trip Odometer	04	R	--	x	--	6039
Trip Reset Sw. Active	20	R	Y	N	--	--

8.22 Fuel System—(See Table 27.)

Primary ID: Fuel System
Command ID: $82
Status ID: $83

TABLE 27—FUEL SYSTEM MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Average Fuel Economy	01	R	--	x	--	6020
Instant. Fuel Economy	05	R	--	x	--	603A
Average Fuel Economy Reset	09	L/R	R	R	--	--
Fuel Used - Percent	0B	R	--	x	--	603B
Fuel Used - Volume	0C	R	--	x	--	603C
Fuel Used Reset	0F	L/R	R	R	--	--
Fuel Temperature	10	R	--	x	--	1044
Fuel Pressure	11	R	--	x	--	000A
Fuel Level - Percent	12	R	--	x	--	6005
Fuel Level - Volume	13	R	--	x	--	6006
Fuel Capacity	16	R	--	x	--	6007
Fuel Pump Low Speed	18	L/R	E	D	--	--
Fuel Pump High Speed	19	L/R	E	D	--	--
Fuel Eonomy Reset Sw. Active	29	R	Y	N	--	--
Fuel Used Reset Sw. Active	2F	R	Y	N	--	--
Low Fuel Level	32	R	Y	N	--	--

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8.23 Ignition Switch/Starter—(See Table 28.)

Primary ID: Ignition Switch / Starter
Command ID: $86
Status ID: $87

TABLE 28—IGNITION SWITCH/STARTER MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Ignition Switch Position	04	R	--	x	--	1047
Key-In-Ignition	05	R	Y	N	--	--

8.24 Tell Tales—(See Table 29.)

Primary ID: Tell Tales
Command ID: $88
Status ID: $89

TABLE 29—TELL TALES MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Seatbelt	01	L/R	On	Off	--	--
Service Engine Soon	02	L/R	On	Off	--	--
Check Engine (MIL)	03	L/R	On	Off	--	--
High Beam Indicator	04	L/R	On	Off	--	--
Left Turn Indicator	05	L/R	On	Off	--	--
Right Turn Indicator	06	L/R	On	Off	--	--
Airbag	07	L/R	On	Off	--	--
Anti-Lock Brake System Failed	08	L/R	On	Off	--	--
Traction Control System Failed	09	L/R	On	Off	--	--
Security	0A	L/R	On	Off	--	--
Low Fuel	0B	L/R	On	Off	--	--
Low Coolant	0C	L/R	On	Off	--	--
Low Oil	0D	L/R	On	Off	--	--
Low Voltage	0E	L/R	On	Off	--	--
Upshift	0F	L/R	On	Off	--	--
Low Washer Fluid	10	L/R	On	Off	--	--
Traction Control Active	11	L/R	On	Off	--	--
Alternator Failure	12	L/R	On	Off	--	--
Low Brake Fluid	13	L/R	On	Off	--	--
Overdrive	14	L/R	On	Off	--	--
Traction Control Disabled	15	L/R	On	Off	--	--
Convertible Latch Warning	21	L/R	On	Off	--	--
Super Lock System Warning	22	L/R	On	Off	--	--
Catalyst Overtemperature	23	L/R	On	Off	--	--
Vehicle Speed Control	24	L/R	On	Off	--	--

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8.25 Climate Control (HVAC)—(See Table 30.)

Primary ID: Climate Control (HVAC)
Command ID: $B2
Status ID: $B3

TABLE 30—CLIMATE CONTROL (HVAC) MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Blower Fan Speed	02	L/R	--	x	--	--
Multi-Zone Mode	06	L/R	E	D	--	--
Low Refrigerant	07	R	Y	N	--	--
Fluid Life Reset	09	L/R	R	R	--	--
HVAC Set Temperature	0A	L/R	--	x	8.2	9820
		M	Inc	Dec		--
High Side Fluid Temperature	10	R	--	x	--	9808
High Side Fluid Pressure	11	R	--	x	--	9813
Fluid Charge - Percent	12	R	--	x	--	980B
Fluid Charge - Weight	13	R	--	x	--	980C
Fluid Remaining Life	14	R	--	x	--	980D
Fluid Capacity - Weight	16	R	--	x	--	980E
Low Side Fluid Temperature	20	R	--	x	--	9809
Low Side Fluid Pressure	21	R	--	x	--	980A
Fan Increment Speed Sw. Active	22	R	Y	N	--	--
Fan Decrement Speed Sw. Active	23	R	Y	N	--	--
Multi-Zone Mode Sw. Active	26	R	Y	N	--	--
Fluid Life Reset Sw. Active	29	R	Y	N	--	--
Increment Temp Sw. Active	2A	R	Y	N	--	--
Decrement Temp Sw. Active	2B	R	Y	N	--	--

8.26 Window Wiper/Washer—(See Table 31.)

Primary ID: Window Wiper/Washer
Command ID: $B8
Status ID: $B9

TABLE 31—WINDOW WIPER/WASHER MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Wiper Mode	01	L/R	--	x	8.3	A003
Washer On/Off	02	L/R	On	Off	8.3	--
Wiper Delay	03	L/R	E	D	8.3	A004
Wiper Pulse	04	L/R	E	D	8.3	--
Fluid Temperature	10	R	--	x	8.3	A006
Fluid Pressure	11	R	--	x	8.3	A007
Fluid Level - Percent	12	R	--	x	8.3	A008
Fluid Level - Volume	13	R	--	x	8.3	A009
Fluid Capacity	16	R	--	x	8.3	A00A
Washer On/Off Sw. Active	22	R	Y	N	8.3	--
Wiper Pulse Sw. Active	24	R	Y	N	8.3	--

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8.27 Mirrors—(See Table 32.)

Primary ID: Mirrors
Command ID: $C2
Status ID: $C3

TABLE 32—MIRRORS MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Up Motion	01	L/R	E	D	8.4	--
Down Motion	02	L/R	E	D	8.4	--
Right Motion	03	L/R	E	D	8.4	--
Left Motion	04	L/R	E	D	8.4	--
Retract Motion	05	L/R	E	D	8.4	--
Extend Motion	06	L/R	E	D	8.4	--
Horizontal Position	10	L/R	--	x	8.4	A00D
Vertical Position	11	L/R	--	x	8.4	A00E
Heater On/Off	17	L/R	On	Off	8.4	--
Nighttime On/Off	18	R	On	Off	8.4	--
Dimming Level	19	L/R	--	x	8.4	A00C
Up Sw. Active	21	R	Y	N	8.4	--
Down Sw. Active	22	R	Y	N	8.4	--
Right Sw. Active	23	R	Y	N	8.4	--
Left Sw. Active	24	R	Y	N	8.4	--
Retract Sw. Active	25	R	Y	N	8.4	--
Extend Sw. Active	26	R	Y	N	8.4	--
Heater Sw. Active	27	R	Y	N	8.4	--

8.28 Door Locks—(See Table 33.)

Primary ID: Door Locks
Command ID: $C4
Status ID: $C5

TABLE 33—DOOR LOCKS MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Lock	01	L/R	L	U	8.5	--
Unlock Enable	02	L/R	E	D	8.5	--
Lock Cylinder Secure	03	R	Y	N	8.5	--
Key-in-Lock Cylinder	04	R	Y	N	8.5	--
Master Controller Lock	05	L/R	L	N	8.5	--
Lock Cylinder State	06	R	--	x	8.5	A010
Super/Double Lock	07	L/R	L	U	8.5	
Remote Lock w/ Transmitter ID	08	L/R	L	U	8.5	C001
Remote Lock	09	L/R	L	U	8.5	
Lock Sw. Active	20	R	Y	N	8.5	--
Unlock Sw. Active	21	R	Y	N	8.5	--
Unlock Enable Sw. Active	22	R	Y	N	8.5	--
Master Controller Lock Sw. Active	25	R	Y	N	8.5	--
Master Controller Unlock Sw. Active	26	R	Y	N	8.5	--

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8.29 External Access—(See Table 34.)

Primary ID: External Access
Command ID: $C6
Status ID: $C7

TABLE 34—EXTERNAL ACCESS MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Open	01	L/R	Y	N	8.5	--
Close	02	L/R	Y	N	8.5	--
Remote Open/Close w/ Transmitter ID	11	L/R	O	C	8.5	C001
Remote Open/Close	12	L/R	O	C	8.5	--
Ajar Sw. Active	21	R	Y	N	8.5	--
Door Handle Sw. Active	22	R	Y	N	8.5	--
Door Jamb Sw. Active	23	R	Y	N	8.5	--

8.30 Seat Motion/Control—(See Table 35.)

Primary ID: Seat Motion / Control
Command ID: $C8
Status ID: $C9

TABLE 35—SEAT MOTION/CONTROL MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Horiz. Forward Motion	01	L/R	E	D	8.6	--
Horiz. Rearward Motion	02	L/R	E	D	8.6	--
Vert. Up Motion	03	L/R	E	D	8.6	--
Vert. Down Motion	04	L/R	E	D	8.6	--
Front Vert. Up Motion	05	L/R	E	D	8.6	--
Front Vert. Down Motion	06	L/R	E	D	8.6	--
Rear Vert. Up Motion	07	L/R	E	D	8.6	--
Rear Vert. Down Motion	08	L/R	E	D	8.6	--
Recline Forward Motion	09	L/R	E	D	8.6	--
Recline Rearward Motion	0A	L/R	E	D	8.6	--
Lumbar Up Motion	0B	L/R	E	D	8.6	--
Lumbar Down Motion	0C	L/R	E	D	8.6	--
Lumbar In Motion	0D	L/R	E	D	8.6	--
Lumbar Out Motion	0E	L/R	E	D	8.6	--
Headrest Up Motion	0F	L/R	E	D	8.6	--
Headrest Down Motion	10	L/R	E	D	8.6	--
Heater On/Off	11	L/R	On	Off	8.6	--
Heater Temperature	12	L/R	--	x	8.6	A001
		M	Inc	Dec		
Occupied	13	R	Y	x	8.6	--
Upper Bolster In Motion	14	L/R	E	D	8.6	--
Upper Bolster Out Motion	15	L/R	E	D	8.6	--
Lower Bolster In Motion	16	L/R	E	D	8.6	--
Lower Bolster Out Motion	17	L/R	E	D	8.6	--

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8.31 Windows—(See Table 36.)

Primary ID: Windows
Command ID: $CA
Status ID: $CB

TABLE 36—WINDOWS MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Open	01	L/R	E	D	8.7	--
Close	02	L/R	E	D	8.7	--
Operation Enable	03	L/R	E	D	8.7	--
Master Controller Open	04	L/R	E	D	8.7	--
Master Controller Close	05	L/R	E	D	8.7	--
Position	1A	L/R	--	x	8.7	A00F
Open Sw. Active	21	R	Y	N	8.7	--
Close Sw. Active	22	R	Y	N	8.7	--
Lockout Sw. Active	23	R	Y	N	8.7	--
Master Controller Open Sw. Active	24	R	Y	N	8.7	--
Master Controller Close Sw. Active	25	R	Y	N	8.7	--

8.32 Steering Column—(See Table 37.)

Primary ID: Steering Column
Command ID: $CC
Status ID: $CD

TABLE 37—STEERING COLUMN MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Up Motion	01	L/R	E	D	--	--
Down Motion	02	L/R	E	D	--	--
In Motion	03	L/R	E	D	--	--
Out Motion	04	L/R	E	D	--	--
Vertical Position	1A	L/R	--	x	--	A012
Horizontal Position	1B	L/R	--	x	--	A011
Up Sw. Active	21	R	Y	N	--	--
Down Sw. Active	22	R	Y	N	--	--
In Sw. Active	23	R	Y	N	--	--
Out Sw. Active	24	R	Y	N	--	--

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8.33 Seat Switches—(See Table 38.)

Primary ID: Seat Switches
Command ID: $D0
Status ID: $D1

TABLE 38—SEAT SWITCHES MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Horz. Forward Sw. Active	01	R	Y	N	8.6	--
Horz. Rearward Sw. Active	02	R	Y	N	8.6	--
Vert. Up Sw. Active	03	R	Y	N	8.6	--
Vert. Down Sw. Active	04	R	Y	N	8.6	--
Front Vert. Up Sw. Active	05	R	Y	N	8.6	--
Front Vert. Down Sw. Active	06	R	Y	N	8.6	--
Rear Vert. Up Sw. Active	07	R	Y	N	8.6	--
Rear Vert. Down Sw. Active	08	R	Y	N	8.6	--
Recline Forward Sw. Active	09	R	Y	N	8.6	--
Recline Rearward Sw. Active	0A	R	Y	N	8.6	--
Lumbar Up Sw. Active	0B	R	Y	N	8.6	--
Lumbar Down Sw. Active	0C	R	Y	N	8.6	--
Lumbar In Sw. Active	0D	R	Y	N	8.6	--
Lumbar Out Sw. Active	0E	R	Y	N	8.6	--
Headrest Up Sw. Active	0F	R	Y	N	8.6	--
Headrest Down Sw. Active	10	R	Y	N	8.6	--
Heater On/Off Sw. Active	11	R	Y	N	8.6	--
Increment Temp. Sw. Active	12	R	Y	N	8.6	--
Decrement Temp. Sw. Active	13	R	Y	N	8.6	--
Upper Bolster In Sw. Active	14	R	Y	N	8.6	--
Upper Bolster Out Sw. Active	15	R	Y	N	8.6	--
Lower Bolster In Sw. Active	16	R	Y	N	8.6	--
Lower Bolster Out Sw. Active	17	R	Y	N	8.6	--

8.34 Restraints—(See Table 39.)

Primary ID: Restraints
Command ID: $D2
Status ID: $D3

TABLE 39—RESTRAINTS MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Passsive Restraint Engaged	01	L/R	Y	N	8.6	--
Passive Restraint Retracted	02	L/R	Y	N	8.6	--
Passive Restraint Attached	03	R	Y	N	8.6	--
Seatbelt Attached	04	R	Y	N	8.6	--
Shoulder Adjustment Up Motion	05	L/R	E	D	8.6	--
Shoulder Adjustment Down Motion	06	L/R	E	D	8.6	--
Air Bag Deployed	07	R	Y	N	8.6	--
Shoulder Position	1A	L/R	--	x	8.6	5801
Shoulder Adjustment Up Sw. Active	25	R	Y	N	8.6	--
Shoulder Adjustment Down Sw. Active	26	R	Y	N	8.6	--

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8.35 Exterior Lamps Outage—(See Table 40.)

Primary ID: Exterior Lamps Outage
Command ID: $D8
Status ID: $D9

TABLE 40—EXTERIOR LAMPS OUTAGE MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Headlamp OK	01	R	Y	N	8.8	--
Tail Lamp OK	02	R	Y	N	8.8	--
Brake Lamp OK	03	R	Y	N	8.8	--
Park Lamp OK	04	R	Y	N	8.8	--
Turn Lamp OK	05	R	Y	N	8.8	--
High Beam Lamp OK	06	R	Y	N	8.8	--
Hazard Lamp OK	07	R	Y	N	8.8	--
Reverse Lamp OK	08	R	Y	N	8.8	--
Fog Lamp OK	09	R	Y	N	8.8	--
Daytime Running Lamp OK	0A	R	Y	N	8.8	--
Spot Lamp OK	0B	R	Y	N	8.8	--
Cargo Lamp OK	0C	R	Y	N	8.8	--
Cornering Lamp OK	0D	R	Y	N	8.8	--
Driving Lamp OK	0E	R	Y	N	8.8	--
Coach Lamp OK	0F	R	Y	N	8.8	--

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8.36 Exterior Lamps—(See Table 41.)

Primary ID: Exterior Lamps
Command ID: $DA
Status ID: $DB

TABLE 41—EXTERIOR LAMPS MESSAGES

Secondary ID Name	Sec ID	Msg Op	Q1	Q0	Ext Addr	PRN
Headlamp On/Off	01	L/R	On	Off	8.8	--
Tail Lamp On/Off	02	L/R	On	Off	8.8	--
Brake Lamp On/Off	03	L/R	On	Off	8.8	--
Park Lamp On/Off	04	L/R	On	Off	8.8	--
Turn Lamp On/Off	05	L/R	On	Off	8.8	--
High Beam Lamp On/Off	06	L/R	On	Off	8.8	--
Hazard Lamp On/Off	07	L/R	On	Off	8.8	--
Reverse Lamp On/Off	08	L/R	On	Off	8.8	--
Fog Lamp On/Off	09	L/R	On	Off	8.8	--
Daytime Running Lamp On/Off	0A	L/R	On	Off	8.8	--
Spot Lamp On/Off	0B	L/R	On	Off	8.8	--
Cargo Lamp On/Off	0C	L/R	On	Off	8.8	--
Cornering Lamp On/Off	0D	L/R	On	Off	8.8	--
Driving Lamp On/Off	0E	L/R	On	Off	8.8	--
Coach Lamp On/Off	0F	L/R	On	Off	8.8	--
Autolamp Delay	10	L/R	E	D	8.8	A014
Flash-to-Pass	11	L/R	E	D	8.8	--
Remote Headlamp On/Off w/Transmitter ID	12	L/R	On	Off	8.8	C001
Remote Headlamp On/Off	13	L/R	On	Off	8.8	--
Headlamp Sw. Active	21	R	Y	N	8.8	--
Right Turn Sw. Active	22	R	Y	N	8.8	--
Park Lamp Sw. Active	24	R	Y	N	8.8	--
Left Turn Sw. Active	25	R	Y	N	8.8	--
High Beam Sw. Active	26	R	Y	N	8.8	--
Hazard Sw. Active	27	R	Y	N	8.8	--
Fog Lamp Sw. Active	28	R	Y	N	8.8	--
Driving Lamp Sw. Active	29	R	Y	N	8.8	--

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