IMPORTANT NOTICE: Robert Bosch LLC and the manufacturers whose vehicles are accessible using the CDR System urge end users to use the latest production release of the Crash Data Retrieval system software when viewing, printing or exporting any retrieved data from within the CDR program. Using the latest version of the CDR software is the best way to ensure that retrieved data has been translated using the most current information provided by the manufacturers of the vehicles supported by this product.

CDR File Information

User Entered VIN	2T1BU4EE0[redacted]
User	Fran Cavanaugh
Case Number	AC346128
EDR Data Imaging Date	06/24/2014
Crash Date	06/08/2014
Filename	2T1BU4EE0[redacted]_06242014_EDR_ACM.CDRX
Saved on	Tuesday, June 24 2014 at 09:15:53
Collected with CDR version	Crash Data Retrieval Tool 12.3
Reported with CDR version	Crash Data Retrieval Tool 12.3
EDR Device Type	Airbag Control Module
Event(s) recovered	Front/Rear (1), Side (1)

Comments

No comments entered.

Data Limitations

CDR Record Information:

- Due to limitations of the data recorded by the airbag ECU, such as the resolution, data range, sampling interval, time period of the recording, and the items recorded, the information provided by this data may not be sufficient to capture the entire crash.
- Pre-Crash data is recorded in discrete intervals. Due to different refresh rates within the vehicle's electronics, the data recorded may not be synchronous to each other.
- Airbag ECU data should be used in conjunction with other physical evidence obtained from the vehicle and the surrounding circumstances.
- If the airbags did not deploy or the pretensioners did not operate during an event that meets a specified recording threshold, it is called a Non-Deployment Event. Data from a Non-Deployment Event can be overwritten by a succeeding event that meets the specified recording threshold. If the airbag(s) deploy or the pretensioners are operated, it is called a Deployment Event. Deployment Event data cannot be overwritten or deleted by the airbag ECU following that event.
- If power supply to the airbag ECU is lost during an event, all or part of the data may not be recorded.
- "Diagnostic Trouble Codes" are information about faults when a recording trigger is established. Various diagnostic trouble codes could be set and recorded due to component or system damage during an accident.
- The airbag ECU records only diagnostic information related to the airbag system. It does not record diagnostic information related to other vehicle systems.
- The TaSCAN, Global TechStream, or Intelligent Tester II devices (or any other Toyota genuine diagnostic tool) can be used to obtain detailed information on the diagnostic trouble codes from the airbag system, as well as diagnostic information from other systems. However, in some cases, the diagnostic trouble codes of the airbag system recorded by the airbag ECU when the event occurred may not match the diagnostic trouble codes read out when the diagnostic tool is used.

General Information:

- The data recording specifications of Toyota's airbag ECUs are divided into the following seven categories. The specifications for 12EDR or later are designed to be compatible with NHTSA's 49CFR Part 563 rule.
  - 00EDR / 02EDR / 04EDR / 06EDR / 10EDR / 12EDR / 13EDR
- The airbag ECU records data for all or some of the following accident types: frontal crash, rear crash , side crash, and rollover events. Depending on the installed airbag ECU, data for side crash and/or rollover events may not be recorded.
- The airbag ECU records post-crash data and may record pre-crash data in the event of a frontal/rear crash. In addition, it may record post-crash data in the event of a side crash or rollover.
- The airbag ECU has the following recording pages (memory maps) for each accident type to store event data: three pages for frontal or rear crash, one page for a side crash (if airbag ECU is applicable) , and one page for rollover events. (if airbag ECU is applicable)
- The data recorded by the airbag ECU in the event of a frontal/rear crash includes information that indicates the sequence and interval of each previously-occurring frontal/rear crash event.
  - Time from Previous TRG
  - TRG Count
- The point in time at which the recording trigger is established is regarded as time zero for the recorded data. For the time indicated in "Lateral Delta-V", "Roll Angle" or "Lateral Acceleration", the first sampling point after the recording trigger establishment is regarded as time zero. The time zero of the data and the recording trigger establishment do not always occur simultaneously.

- The recording trigger judgment threshold value differs depending on the collision type (i.e., frontal crash, rear crash, side crash, or rollover event).
- Some of the data recorded by the airbag ECU is transmitted to the airbag ECU from various vehicle control modules by the vehicle's Controller Area Network (CAN).
- In some cases, the airbag ECU part number printed on the ECU label may not match the airbag ECU part number that the CDR tool reports. The part number retrieved by the CDR tool should be considered as the official ECU part number.
- The sampling interval of "Roll Angle" and "Lateral Acceleration" is 8 [ms] or 128 [ms]. A field indicating the sampling interval is not provided. The graph scaling can assist with derterming the sample rate. The time zero is indicated by count (0).
- The data sampling interval and data recording period may be 1.024 times depending on the ECU specifications.
- "Prior Event" is the event that occurred before the "1st Prior Event" that reached the greatest MAX Delta-V. Therefore, "Prior Event" is not always the prior event of "1st Prior Event".

Data Element Sign Convention:
The following table provides an explanation of the sign notation for data elements that may be included in this CDR report.

Data Element Name	Positive Sign Notation Indicates
Max. Longitudinal Delta-V	Forward
Longitudinal Delta-V	Forward
Max. Lateral Delta-V , B-Pillar Sensor	Outside to Inside
Max. Lateral Delta-V , C-Pillar Sensor	Outside to Inside
Lateral Delta-V , B-Pillar Sensor	Outside to Inside
Lateral Delta-V , C-Pillar Sensor	Outside to Inside
Lateral Delta-V , Airbag ECU Sensor	Left to Right
Roll Angle Peak	Clockwise Rotation
Roll Angle	Clockwise Rotation
Lateral Acceleration , Airbag ECU Sensor *	Right to Left

* For sensing a rollover

Data Definitions:
1)

- The "ON" setting for the "Freeze Signal" indicates a state in which the non-volatile memory can not be overwritten or deleted by the airbag ECU. After "Freeze Signal" has been turned ON, subsequent events will not be recorded.
- "Recording Status" indicates a state in which all recorded event data has been written into the non-volatile memory, or a state in which this process was interrupted and not fully written into the non-volatile memory. If "Recording Status" is "Incomplete", recorded event data may not be valid.
- "Recording Status, All Pages" does not consider the recording state of the side crash. Even if the side crash page writing process is interrupted, "Recording Status, All Pages" may display "Complete". If the writing of the frontal/rear crash page or rollover page is interrupted, "Recording Status, All Pages" may be displayed as "Incomplete".
- "Time to Deployment Command" indicates the time between recording trigger establishment and the determination of airbag deployment. This value may differ from the actual time it takes for the airbag to fully deploy. In the case of multiple crash, this item records the information of the first airbag which had been determined to deploy from Frontal/Rear impact TRG. It is necessary to confirm this record with an actual vehicle state.
- Even if an airbag/pretensioner did not deploy due to the "front passenger airbag disable switch and/or "RSCA Disable Switch" in the ON position or other disabling criteria are met, the "Time to deployment command" data element for that airbag/pretensioner may still be recorded.
- "Engine RPM" indicates the number of engine revolutions, not the number of motor revolutions. The recorded value has an upper limit of 6,000 rpm. Resolution is 400 rpm and the value is rounded down and recorded. For example, if the actual engine speed is 799 rpm, the recorded value will be 400 rpm.
- The upper limit for the recorded "Vehicle Speed" value is 126 km/h (78.3mph). Resolution is 2km/h (1.2mph) and the value is rounded down and recorded. The accuracy of the "Vehicle Speed" value can be affected by various factors. These include, but not limited, to the following.
  - Significant changes in the tire's rolling radius
  - Wheel lock and wheel slip
- The "Accelerator Rate" value is recorded as a voltage or level. In the case of voltage, the voltage increases as the driver depresses the accelerator. In case of the level, the following three levels are recorded.
  - FULL / MIDDLE / OFF
- "Accelerator Rate" may be recorded as "OFF" even if the accelerator pedal is depressed lightly. In addition, "FULL" may be recorded when the accelerator pedal is depressed strongly but not fully.
- The "Drive" setting for the "Shift Position" value indicates the shift position state is other than "R,"(Reverse), "N" (Neutral), or "P" (Park). It also includes communication disruption. Regardless of an actual shift position, "Drive" is always set for M/T vehicles because the shift position signal is not available.
- Depending on the type of occupant sensor installed in the vehicle, one of the following three recording formats for "Occupancy Status, Passenger" will be utilized.
  - Occupied / Not Occupied
  - Adult / Child / Not Occupied
  - AM50 / AF05 / Child / Not Occupied
- Resolution of the "Air Bag Warning Lamp ON Time Since DTC was Set" is 15 [min] or 15.36[min] for ECUs with 1.024 data sampling

intervals, and the value is rounded down and recorded.

- "Longitudinal Delta-V" indicates the change in forward speed after establishment of the recording trigger. This does not refer to vehicle speed, and it does not include the change in speed during the period from the start of the actual collision to establishment of the recording trigger.
- "Roll Angle peak" may not always match the peak value within the "Roll Angle" sampling points due to differences in data calculation method.
- For "Lateral Delta-V", the sensor location (B-pillar, front door, C-pillar, and slide door) shows the outline of a typical sensor position. Sensory location can be confirmed using the repair manual.
- "TRG Count" indicates the number of frontal/rear recording triggers that have been established. The calculated value does not include the number of times side or rollover recording triggers have been established. The sequence in which each frontal/rear event occurred can be verified from the "TRG Count". The lesser the "TRG Count" value, the older the data. The upper limit for the recorded value is 254 times. When more than one event reaches the upper limit, the actual "TRG Count" may be greater than what is displayed for that event.
- Resolution of the "Time from Pre-Crash to TRG" is 100[ms] or 102.4[ms] for ECUs with 1.024 data sampling intervals, and the value is rounded down and recorded.
- For "Time from Previous TRG", the recording trigger of side crash and rollover is not considered. The upper limit for the recorded value is 5000 [ms] or 5120 [ms] for ECUs with 1.024 data sampling intervals. Resolution is 20 [ms] or 20.48 [ms] and the value is rounded down and recorded.
- If 2 or more frontal/rear events occur successively within a period of 5000ms (or 5120ms for ECUs with 1.024 data sampling intervals), the actual sample time before the trigger is not displayed for subsequent events. The sample time before trigger will only be displayed for the first event of the successive events. For subsequent events (i.e second event or later events), the pre-crash "Time (sec)" data is replaced by integers -5 through -1 and the heading "Time (sec)" is replaced with "Sample Count". The time between "Sample Count" integers (-5 through -1) cannot be determined. The time between the last integer and TRG cannot be determined.
- "Pre-Crash Data Status" indicates data communication status of the vehicle. If communication disruption or other failure is occur, "Invalid" is set. Moreover, "Invalid" is set for some M/T vehicles because the shift position signal is not transmitted for them even if the other data is valid.

System Status at Time of Retrieval

ECU Part Number	89170-02760
ECU Generation	02EDR
Recording Status, All Pages	Complete
Diagnostic Trouble Codes Exist	No
Total Number of Front/Rear Crash Events	1
Freeze Signal	OFF

Front/Rear Event Record Summary at Retrieval

Events Recorded	TRG Count	Crash Type	Time (msec)	Event & Crash Pulse Data Recording Status
Most Recent Frontal/Rear Event	1	Front/Rear Crash	0	Complete (Front/Rear Page 0)

Side/Rollover Event Record Summary at Retrieval

Events Recorded	Recording Status
Side Crash	Not Supported

System Status at Front Airbag Deployment

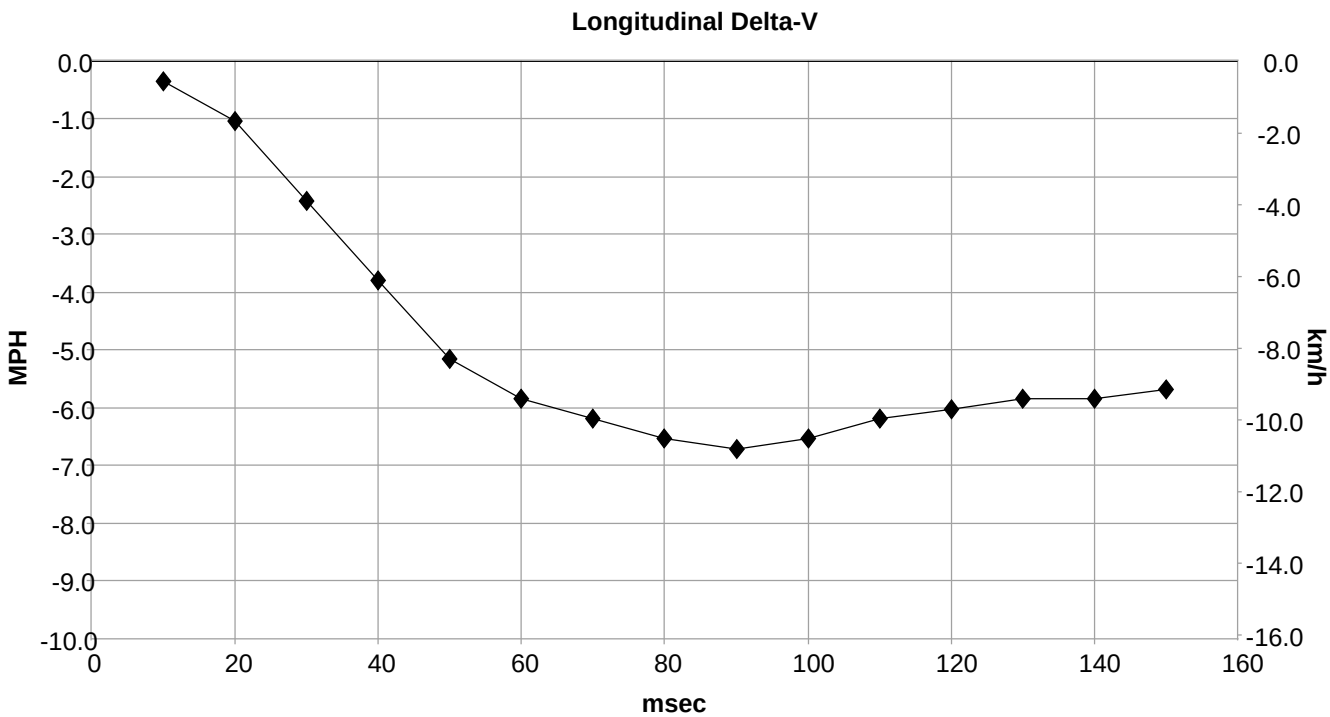
Time to Deployment Command, Front Airbag, Driver (msec)	Not Commanded
Time to Deployment Command, Front Airbag, Passenger (msec)	Not Commanded
Event Severity Status, Driver	N/A
Event Severity Status, Passenger	N/A

System Status at Event (Most Recent Frontal/Rear Event, TRG 1)

Recording Status, Front/Rear Crash Info.	Complete
TRG Count	1
Time From Previous TRG (msec)	5000 or greater
Time from Pre-Crash to TRG (msec)	800
Buckle Switch, Driver	Buckled
Buckle Switch, Passenger	Unbuckled
Occupancy Status, Passenger	AM50
Seat Position, Driver	Rearward
Shift Position	Drive

Longitudinal Crash Pulse (Most Recent Frontal/Rear Event, TRG 1 - table 1 of 2)

Max Longitudinal Delta-V (MPH [km/h])	-6.7 [-10.8]



Longitudinal Crash Pulse (Most Recent Frontal/Rear Event, TRG 1 - table 2 of 2)

Time (msec)	Longitudinal Delta-V (MPH [km/h])
10	-0.3 [-0.6]
20	-1.0 [-1.7]
30	-2.4 [-3.9]
40	-3.8 [-6.1]
50	-5.2 [-8.3]
60	-5.8 [-9.4]
70	-6.2 [-10.0]
80	-6.5 [-10.5]
90	-6.7 [-10.8]
100	-6.5 [-10.5]
110	-6.2 [-10.0]
120	-6.0 [-9.7]
130	-5.8 [-9.4]
140	-5.8 [-9.4]
150	-5.7 [-9.1]

DTCs Present at Start of Event (Most Recent Frontal/Rear Event, TRG 1)

Ignition Cycle Since DTC was Set (times)	0
Airbag Warning Lamp ON Time Since DTC was Set (min)	0
Diagnostic Trouble Codes	None

Pre-Crash Data, -5 to 0 seconds (Most Recent Frontal/Rear Event, TRG 1)

Time (sec)	-4.8	-3.8	-2.8	-1.8	-0.8	0 (TRG)
Vehicle Speed (MPH [km/h])	3.7 [6]	3.7 [6]	3.7 [6]	3.7 [6]	5 [8]	7.5 [12]
Brake Switch	OFF	OFF	OFF	OFF	OFF	ON
Accelerator Rate (V)	0.78	0.78	0.86	0.78	0.78	0.78
Engine RPM (RPM)	800	800	800	800	800	1,600
Pre-Crash Data Status *	Valid	Valid	Valid	Valid	Valid	Valid

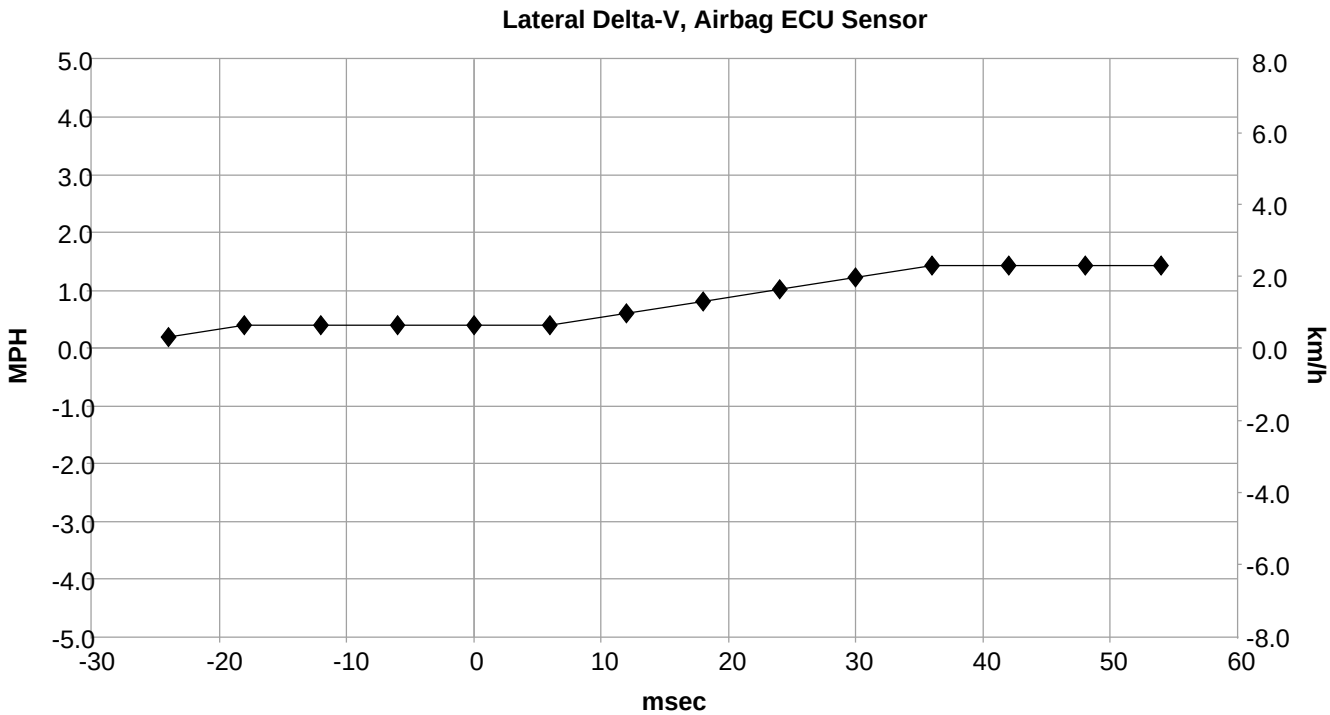
* "Invalid" may be set for M/T vehicle

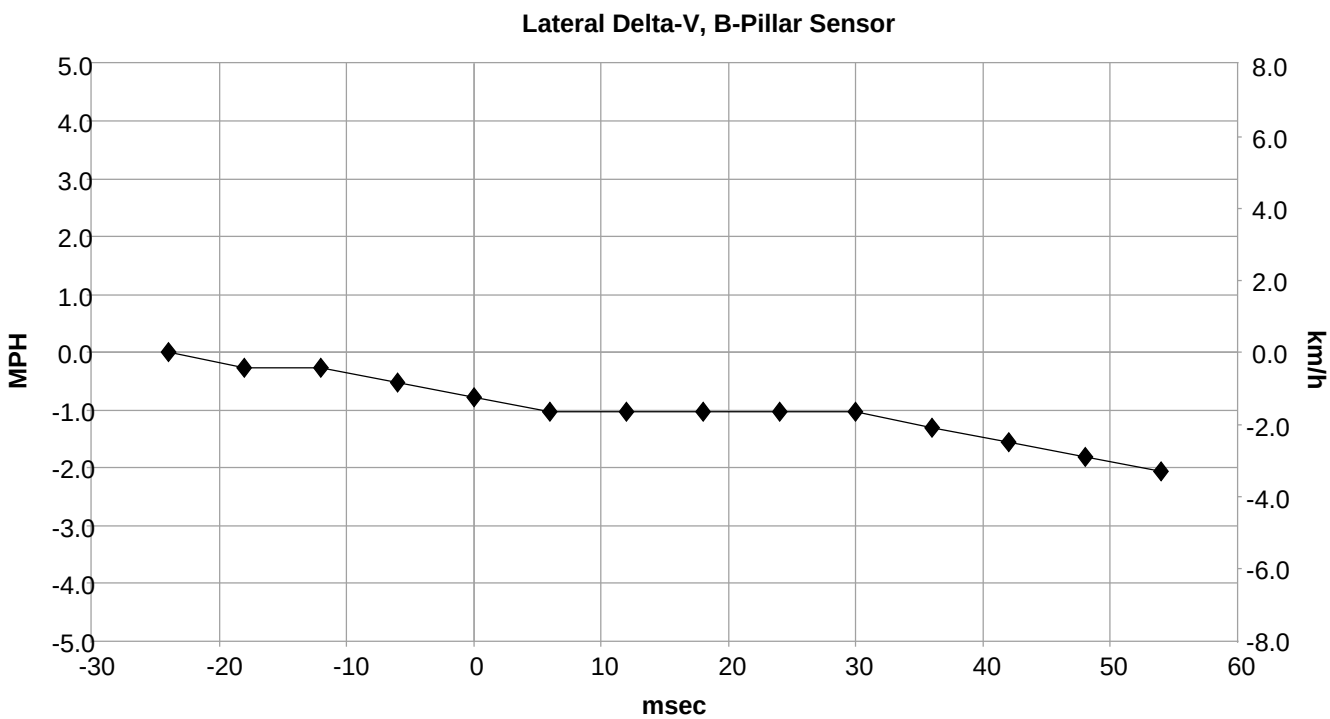
System Status at Side Event

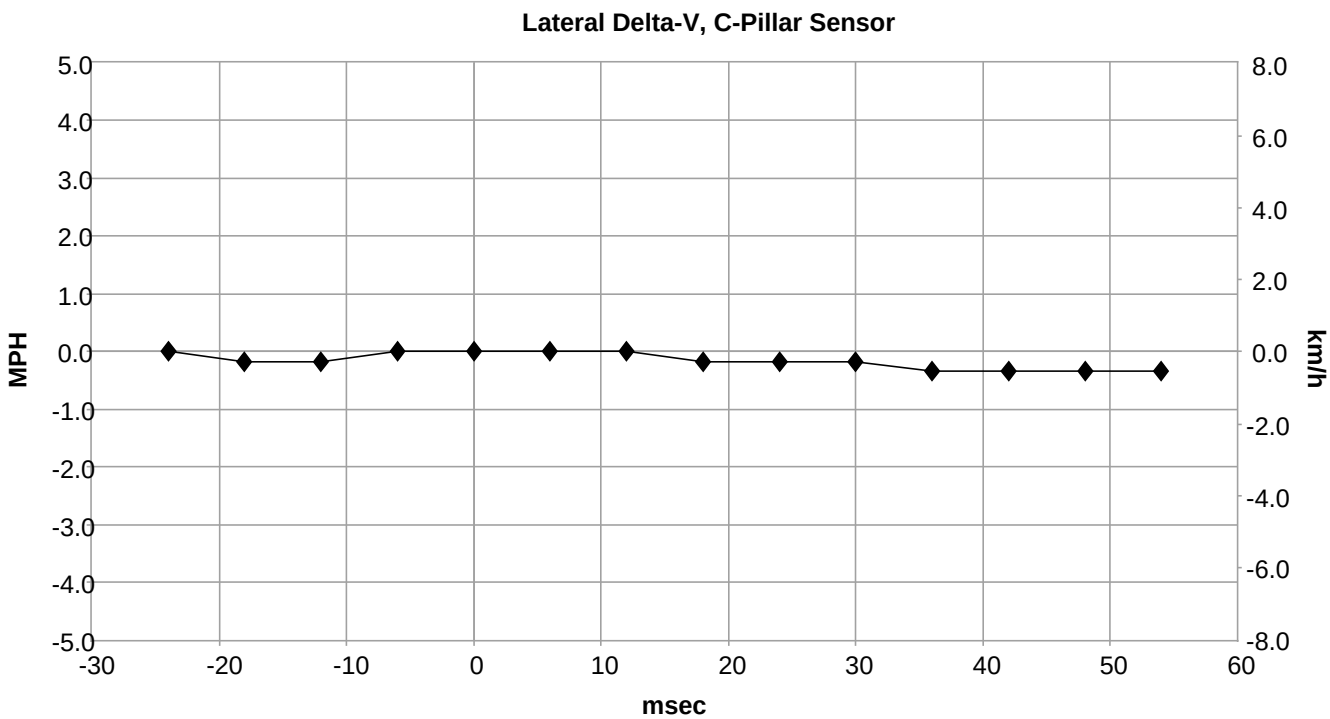
Recorded Side	Left Side
Side Airbag Disable Status	Enable
Deployed Side	Not Commanded

Lateral Crash Pulse for Side Event (table 1 of 2)

Max Lateral Delta-V, B-Pillar Sensor (MPH [km/h])	-2.1 [-3.3]
Max Lateral Delta-V, C-Pillar Sensor (MPH [km/h])	-0.3 [-0.6]






Lateral Delta-V, C-Pillar Sensor
MPH
km/h
msec
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
8.0
6.0
4.0
2.0
0.0
-2.0
-4.0
-6.0
-8.0
-30
-20
-10
0
10
20
30
40
50
60

Lateral Crash Pulse for Side Event (table 2 of 2)

Time (msec)	Lateral Delta-V, Airbag ECU Sensor (MPH [km/h])	Lateral Delta-V, B-Pillar Sensor (MPH [km/h])	Lateral Delta-V, C-Pillar Sensor (MPH [km/h])
-24	0.2 [0.3]	0.0 [0.0]	0.0 [0.0]
-18	0.4 [0.7]	-0.3 [-0.4]	-0.2 [-0.3]
-12	0.4 [0.7]	-0.3 [-0.4]	-0.2 [-0.3]
-6	0.4 [0.7]	-0.5 [-0.8]	0.0 [0.0]
0	0.4 [0.7]	-0.8 [-1.2]	0.0 [0.0]
6	0.4 [0.7]	-1.0 [-1.7]	0.0 [0.0]
12	0.6 [1.0]	-1.0 [-1.7]	0.0 [0.0]
18	0.8 [1.3]	-1.0 [-1.7]	-0.2 [-0.3]
24	1.0 [1.7]	-1.0 [-1.7]	-0.2 [-0.3]
30	1.2 [2.0]	-1.0 [-1.7]	-0.2 [-0.3]
36	1.4 [2.3]	-1.3 [-2.1]	-0.3 [-0.6]
42	1.4 [2.3]	-1.5 [-2.5]	-0.3 [-0.6]
48	1.4 [2.3]	-1.8 [-2.9]	-0.3 [-0.6]
54	1.4 [2.3]	-2.1 [-3.3]	-0.3 [-0.6]

Hexadecimal Data

Data that the vehicle manufacturer has specified for data retrieval is shown in the hexadecimal data section of the CDR report. The hexadecimal data section of the CDR report may contain data that is not translated by the CDR program. The control module contains additional data that is not retrievable by the CDR system.

PIDs

PID	Data
00	BC 40 00 01
01	00
03	30 32 37 36 30 30 30 30 30 32 30 30 30 30 32 30 30 30 30 35 30 30 30 30 35 30 30 30 30 31 30 30 30 30 31
04	02 02 01 01
05	01
06	00
0A	02
20	80 00 00 01
21	00 01
40	C0 00 E0 01
41	54 57
42	22
51	00
52	99 FF 00
53	FF
60	00 00 00 01
80	00 00 00 01
A0	00 00 00 01
C0	00 00 00 01
E0	C0 10 00 00
E1	00 00
E2	00 5B 1F 11 00
EC	00

EEPROM

Address	Data (-- = data not imaged from ECU) (** = no response from ECU)
0	-- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
10	-- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20	-- -- -- -- -- -- -- -- -- -- -- -- -- -- 80 00
30	00 00 FF FF FF FF 80 00 FF FF 00 00 FC 00 FF FF
40	A9 02 45 04 86 08 14 08 04 08 14 04 42 02 03 02
50	14 01 03 FF 16 FE 22 FF 03 FF 14 00 03 FF 14 02
60	22 FA 08 01 00 70 00 00 00 00 00 00 00 00 00 00
70	00 00 80 00 80 00 AA AA FF FF FF FF FF FF FF FF
80	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
90	FF FF FF FF FF FF FF FF FF FF FF FF 00 FF FF FF
A0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
B0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
C0	FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
D0	FF FF FF 00 FF FF FF FF FF FF FF FF FF FF FF FF
E0	FF FF FF FF FF FF FF FF -- -- -- -- -- -- -- --
F0	-- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
100	-- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
110	-- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
120	-- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
130	-- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
140	-- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
150	-- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
160	-- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
170	-- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
180	-- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
190	-- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
1A0	-- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
1B0	-- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
1C0	-- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --

```
1D0    00 FF 00 FF FF FF 00 00 00 00 FF FF FF FF 00 FF
1E0    00 01 00 00 00 FF 00 00 FF 00 00 00 FF FF 00 00
1F0    00 00 FF FF FF FF FF 00 00 00 00 03 00 02
```

Disclaimer of Liability

The users of the CDR product and reviewers of the CDR reports and exported data shall ensure that data and information supplied is applicable to the vehicle, vehicle's system(s) and the vehicle ECU. Robert Bosch LLC and all its directors, officers, employees and members shall not be liable for damages arising out of or related to incorrect, incomplete or misinterpreted software and/or data. Robert Bosch LLC expressly excludes all liability for incidental, consequential, special or punitive damages arising from or related to the CDR data, CDR software or use thereof.