



## **HIGHWAY ACCIDENT BRIEF**

### **Attachment 3 – Crash Data Retrieval Report**

**Capitol Heights, Maryland**

**HWY16SH021**

(10 pages)

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	3VWD17AJ7 [REDACTED]
User	Cpl Carson
Case Number	PP16072000001626
EDR Data Imaging Date	08/23/2016
Crash Date	07/20/2016
Filename	3VWD17AJ7 [REDACTED].ACM.CDRX
Saved on	Tuesday, August 23 2016 at 15:50:13
Collected with CDR version	Crash Data Retrieval Tool 16.6
Reported with CDR version	Crash Data Retrieval Tool 16.6
EDR Device Type	Airbag Control Module
Event(s) recovered	Record 1

### Comments

Cpl Moyer Crash Central Avenue at Metro Station

### Data Limitations

#### General Information:

These limitations are intended to assist you in reading the event data that has been imaged from the vehicle's Airbag Control Module (ACM). They are not intended to provide specific information regarding the interpretation of this data. Event data should be examined in conjunction with other available physical evidence from the vehicle and scene.

**Note:** The ACM's current DTC status will be altered if the ACM is powered-up without the vehicle periphery connected. This situation might occur when the CDR tool is connected directly to the ACM (e.g. for bench top imaging). It will not affect the stored EDR data, but may result in additional DTCs within the ACM.

**Note:** During bench top imaging, make sure the ACM is not moved, tilted or turned over while connected to and powered by the CDR Interface Module. Also, after a CDR imaging process, wait one minute after power is removed from the ACM before attempting to move the module. Not following these general ACM guidelines for bench top imaging could cause new events to be recorded in the ACM.

#### Recorded Crash Events:

This ACM is capable of recording up to 6 events of front, side, rear, or rollover events within its memory. Each record contains 5 seconds of pre-crash data and at least 300ms of post-crash data. Deployment events are locked into memory and cannot be over-written. Non-deployment events can be over-written by subsequent deployment or non-deployment events. The oldest non-deployment event will be over-written first. Some ACMs stop over-writing of non-deployment events after a certain number of events (more than 1000). The event counter is incremented for each event and stored within the data record.

Deployment events are recorded, when a non-reversible restraint system was commanded to deploy. Non-deployment events require a minimum delta-V of 8km/h within a 150ms period in either longitudinal or lateral direction. Reversible restraint systems (e.g. active head-rests) that have been commanded to deploy also trigger recording of a non-deployment event. Time zero of an event is determined by the ACMs algorithms based on acceleration and/or pressure sensors or a deployment command. Post-crash data is reported relative to time zero (e.g. deployment time of restraint systems).

The ACM supports recording of multiple events. In case of a rapid sequence of events (e.g. a combined front-side event), the ACM will record the data within a common EDR entry (a so-called parallel event). In this case, the post-crash data is reported relative to time zero of the initial event. If the initial event did already end and another event happens within a time period of 5s, the ACM will record a multi event consisting of 2 or more separate EDR entries.

If power to the ACM was lost during an event, all or part of the event data record may not have been recorded.

#### Data:

The reported data elements may vary by vehicle model, model year or vehicle configuration. Part of the pre-crash data has been transmitted to the ACM by various vehicle control modules via the vehicle's communication network.

Pre-crash data is recorded at two samples per second for 5 seconds before time zero. Main data elements are:

- "Speed, Vehicle Indicated" is reported as displayed by the vehicle's instrument cluster. The vehicle speed is evaluated as an average of wheel speeds and transmitted via the vehicle communication network to the ACM. Its data accuracy might be affected by various factors, such as significant changes in tire size from the factory settings, wheel lock-up or slip.
- "Accelerator Pedal" is the ratio of the accelerator pedal's position compared to the fully depressed position (in percent). The pedal position sensor is wired to the Engine Control Module.
- "Service Brake Activation" is the status of the brake pedal switch. The switch is wired to the Engine Control Module.
- "Safety Belt Status" is evaluated by the belt-switches that are wired to the ACM.
- "Seat Track Position Switch" as evaluated by the seat track position sensors that are wired to the ACM.
- "Airbag Warning Lamp, Status" as commanded by the ACM.
- "Occupant Size Classification, Front Passenger" as reported by the classification system.

- "Frontal Airbag Disable Indicator Status"

Pre-crash and post-crash data are recorded asynchronously. The data element "Time from Last Speed Data Sample (Pre-crash) to Time Zero" indicates the time delay between the most recent pre-crash data sample and time zero (0 to 500ms).

Post-crash data is recorded after time zero up to 300ms. Main data elements are:

- "Event Type" indicates the initial event type depending on the algorithm that was activated first (e.g. front, side, rollover, rear).
- "Multi-Event, Number of Events" determines the chronological order of records being part of a multi-event.
- "Time from Previous / Initial Event to Current Event" indicates the time difference between records of multi-events.
- "Delta-V Longitudinal / Lateral" are recorded from time zero to 250ms every 10ms. Delta-V reflects the change in velocity that the ACM experienced during the recorded time period. It does not necessarily correlate with vehicle traveling speed.
- Depending on the severity of the event, the measuring range of the accelerometers might be exceeded. The data elements "Clipping Time, Longitudinal / Lateral Acceleration Sensor" indicate the time of the first occurrence of exceeded accelerometer range within an event. Subsequent Delta-V data might be underestimated.
- "Time to Deployment" indicates the time a restraint system was commanded to deploy.
- "Disposal" indicates whether a restraint system was commanded to deploy for restraint or disposal purposes.
- "Accident Date" is reported as date and time of the vehicle's clock at an event. Since the vehicle clock can be adjusted manually, this data element does not necessarily indicate the actual time of an event.
- "Complete File Recorded" indicates, if the event data has been completely recorded to the ACM's memory or if the process has been interrupted before completing the record.

The status "Data not Available" is reported for data elements, if the ACM was not able to store the data element (e.g. due to missing communication). "Invalid Data" will be reported, if the ACM was unable to store valid data for the data element (e.g. range exceeded, communication failure, sensor failure).

**Note:** the element Accident date shown in this report might not reflect the real value of the date on the instrument cluster.

**Data Sign Convention:**

Data Element Name	Positive Sign Notation Indicates
Delta-V, Longitudinal	Forward
Maximum Delta-V, Longitudinal	Forward
Delta-V, Lateral	Left to Right
Maximum Delta-V, Lateral	Left to Right

**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.

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**System Status at Event (Record 1, Most Recent)**

Event Counter at Event (Counts)	1
Event Type	Frontal
Multi-Event, Number of Events	1. Event
Time from Initial Event to Current Event (msec)	0.0
Time from Previous Event to Current Event (msec)	0.0
Vehicle Mileage (km)	62,970
Operating Time (min)	89,348
Ignition Cycle at Event (Cycles)	4,246
Ignition Cycle at Download (Cycles)	4,247
Maximum Delta-V, Longitudinal (MPH [km/h])	-6.8 [-11]
Time, Maximum Delta-V, Longitudinal (msec)	185.0
Clipping Time, Longitudinal Acceleration Sensor (msec)	Clipping Not Reached
Maximum Delta-V, Lateral (MPH [km/h])	1.2 [2]
Time, Maximum Delta-V, Lateral (msec)	300.0
Clipping Time, Lateral Acceleration Sensor (msec)	20
Time from Last Speed Data Sample (Pre-crash) to Time Zero (msec)	287
Vehicle Identification Number (VIN)	Data Not Available
Complete File Recorded	Completed Successfully

**Deployment Command Data (Record 1, Most Recent)**

Pretensioner, Time to 1st Stage Deployment, Driver (msec)	32
Belt-Load Limiter, Time to Deployment, Driver (msec)	232
Frontal Airbag, Time to 1st Stage Deployment, Driver (msec)	32
Side Airbag, Time to Deployment 1st Stage, Driver (msec)	Not Deployed
Side Curtain/Tube Airbag, Time to Deployment, Driver Side (msec)	Not Deployed
Pretensioner, Time to 1st Stage Deployment, Front Passenger (msec)	32
Belt-Load Limiter, Time to Deployment, Front Passenger (msec)	232
Frontal Airbag, Time to 1st Stage Deployment, Front Passenger (msec)	32
Frontal Airbag, Time to 2nd Stage Deployment, Front Passenger (msec)	232
Frontal Airbag, 2nd Stage Disposal, Front Passenger	Disposal
Side Airbag, Time to Deployment 1st Stage, Front Passenger (msec)	Not Deployed
Side Curtain/Tube Airbag, Time to Deployment, Passenger Side (msec)	Not Deployed

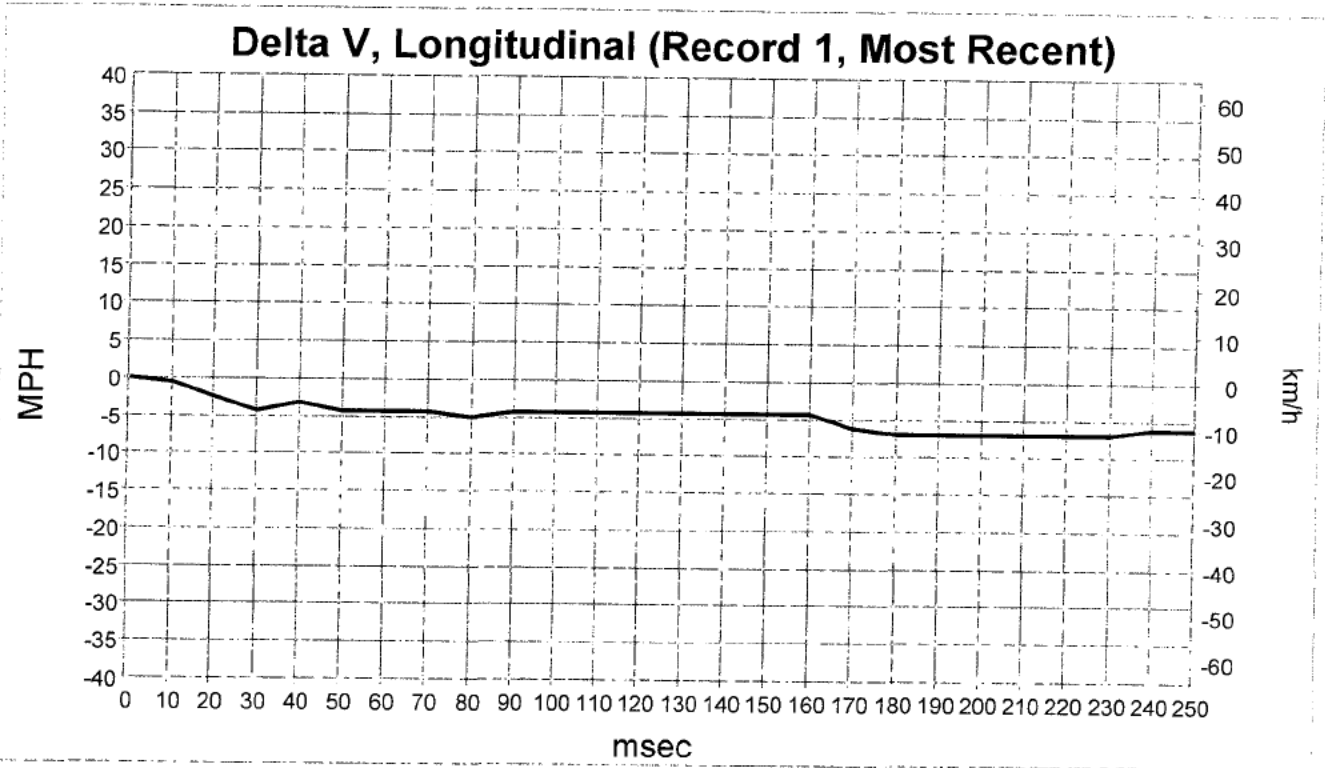
**Pre-Crash Data -1 Sec (Record 1, Most Recent)**

Safety Belt Status, Driver	Belted
Seat Track Position Switch Status, Driver	Not Foremost
Safety Belt Status, Front Passenger	Not Belted
Seat Track Position Switch Status, Front Passenger	Foremost
Occupant Size Classification, Front Passenger	Not Empty
Frontal Airbag Disable Indicator Status, Passenger	Off
Airbag Warning Lamp, Status	Off

**Pre-Crash Data -5 to 0 sec (Record 1, Most Recent)**

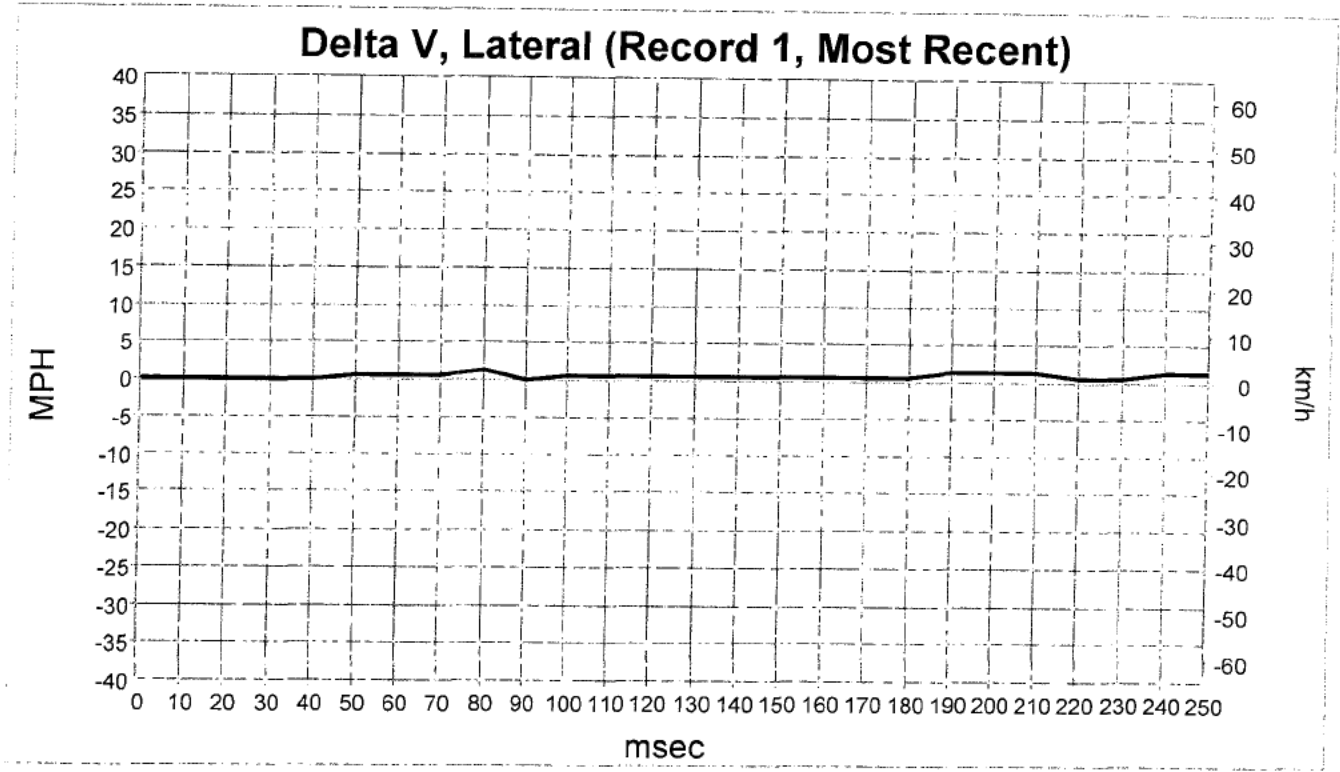
Time (sec)	Speed, Vehicle Indicated (MPH [km/h])	Accelerator Pedal (%)	Service Brake Activation
-5.0	58 [93]	43	Off
-4.5	58 [94]	39	Off
-4.0	60 [96]	40	Off
-3.5	60 [97]	36	Off
-3.0	61 [98]	34	Off
-2.5	62 [99]	20	Off
-2.0	62 [100]	0	Off
-1.5	60 [97]	51	Off
-1.0	60 [96]	7	Off
-0.5	60 [97]	26	Off
0.0	56 [90]	0	On

**Longitudinal Crash Pulse (Record 1, Most Recent)**



Time (msec)	Delta-V, Longitudinal (MPH [km/h])
0	0.0 [0]
10	-0.6 [-1]
20	-2.5 [-4]
30	-4.3 [-7]
40	-3.1 [-5]
50	-4.3 [-7]
60	-4.3 [-7]
70	-4.3 [-7]
80	-5.0 [-8]
90	-4.3 [-7]
100	-4.3 [-7]
110	-4.3 [-7]
120	-4.3 [-7]
130	-4.3 [-7]
140	-4.3 [-7]
150	-4.3 [-7]
160	-4.3 [-7]
170	-6.2 [-10]
180	-6.8 [-11]
190	-6.8 [-11]
200	-6.8 [-11]
210	-6.8 [-11]
220	-6.8 [-11]
230	-6.8 [-11]
240	-6.2 [-10]
250	-6.2 [-10]

**Lateral Crash Pulse (Record 1, Most Recent)**



Time (msec)	Delta-V, Lateral (MPH [km/h])
0	0.0 [0]
10	0.0 [0]
20	0.0 [0]
30	0.0 [0]
40	0.0 [0]
50	0.6 [1]
60	0.6 [1]
70	0.6 [1]
80	1.2 [2]
90	0.0 [0]
100	0.6 [1]
110	0.6 [1]
120	0.6 [1]
130	0.6 [1]
140	0.6 [1]
150	0.6 [1]
160	0.6 [1]
170	0.6 [1]
180	0.6 [1]
190	1.2 [2]
200	1.2 [2]
210	1.2 [2]
220	0.6 [1]
230	0.6 [1]
240	1.2 [2]
250	1.2 [2]



## Hexadecimal Data

```
FA10 01
FA12 01 00 00 07 F1 00 00 07 F9
FA11 02 00 04
FA13 00 01 00 01 00 00 04 00 00 00 05 00 39 00 06 00
    1F 00 07 FF FF 00 0C 00 6C 00 0D 01 36 00 0E 00
    6D 00 0F FF FF 00 1F 64 1B 02 17 7F 7E 7B 78 7A
    78 78 78 77 78 78 78 78 78 78 78 75 74 74 74
    74 74 74 75 75 00 20 64 1B 02 17 7F 7F 7F 7F 7F
    80 80 80 81 7F 80 80 80 80 80 80 80 80 81 81
    81 80 80 81 81 00 21 74 00 22 81 00 23 4A 00 24
    78 00 28 FF 00 29 14 00 2D 01 00 2E 00 00 00 2F
    01 1F 00 30 00 00 00 33 00 20 00 38 00 20 00 39
    00 E8 00 3B 01 00 3D FF FF 00 3E FF FF 00 3F 00
    20 00 41 FF FF 00 42 FF FF 00 43 00 20 00 47 01
    00 48 03 00 4B 00 00 4D 00 00 4E 00 00 4F 08 00
    51 00 00 5B 5D 5E 60 61 62 63 64 61 60 61 5A 00
    5C 2B 27 28 24 22 14 00 33 07 1A 00 00 5F 00 00
    00 00 00 00 00 00 00 00 01 00 73 00 E8 00 74 00
    E8 03 DA 00 00 03 DC 00 00 4B 32 FF FF FF FF FF
    FF FF FF FF FF FF FF FF FF 03 DF 30 30 33 4C 5A
    44 30 33 46 53 57 4C 20 20 00 00 00 00 00 00 00
    00 03 E1 30 38 30 33 30 33 03 E2 30 39 37 35 03
    E3 35 30 30 03 E4 31 36 30 30 30 33 56 5F 5F 5F
    5F 03 E5 35 43 30 39 35 39 36 35 35 41 42 03 E8
    A5 03 E9 10 96 03 EA 10 97 03 EB 76 03 EC 0E 03
    ED 1B 03 EE 04 03 EF 0E 03 F0 10 03 F1 18 99 03
    F2 01 5D 04 03 F3 FF FF FF FF FF FF FF FF FF
    FF FF FF FF FF FF FF 03 FB 04 03 FD 00 01 03 FE
    60 8E D3 41
FA14 00 00
FA15 00 00
FA16 00 00
FA17 00 00
FA18 00 00
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### **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.