

 DOT Auto Safety Hotline Vehicle Owner's Questionnaire To Report Vehicle Safety Defects 1-888-DASH-2-DOT (1-888-327-4236) INTERNET: www.nhtsa.dot.gov/hotline				FOR AGENCY USE ONLY 100148	
				Date Received 14-AUG-2017 OCT 16 2017	Repository ☐ Reference No. 11015191
OWNER INFORMATION (Type or Print)					
Name		Address		Daytime Telephone Number	E-mail Address
City		State	Zip Code	Evening Telephone Number	
HOLLISTON		MA			
The information you provide will be used to identify potential safety-related defects. We may share your information with the applicable vehicle manufacturer during an investigation or recall in accordance with the routine uses described in the agency's Privacy Act notice. See 49 FR 53971 (Sep. 3, 2004).					
VEHICLE INFORMATION					
17 digit Vehicle Identification Number Located at bottom of windshield on driver's side 2T3DK4DV5BW		Make TOYOTA	Model RAV4	Model Year 2011	
Date Purchased 12/2/2010	Dealer's Name and Telephone Number BENARDI TOYOTA - 508-879-1520		Engine: No. Cylinders 6	Fuel Type: GAS	
Original Owner ☒	Dealer's City FRAMINGHAM	State MA	Zip Code 01702		
Transmission Type	☐ Antilock Brakes ☐ Cruise Control	Powertrain	Multiple Failure:	Incident Date(s) 08-AUG-2017	
FAILED COMPONENT(S)/PART(S) INFORMATION					
Vehicle Component Code: 180000 VEHICLE SPEED CONTROL				Failure Mileage 83000	Failure Speed
ADDITIONAL ITEMS TO BE COMPLETED WHEN REPORTING A TIRE FAILURE					
Tire Make	Tire Model (Name or Number)		Tire Size (Example P215/65R15)		
DOT No. (Example: DOTM19ABC036)	☐ Original Equipment ☐ Prior Repair		Failure Location:		
Tire Component Code			Tire Failure Type:		
ADDITIONAL ITEMS TO BE COMPLETED WHEN REPORTING A CHILD SEAT FAILURE					
Make:	Date Manufactured:		Model No./Name:		
Seat Type:	Installation System:				
Child Seat Component Code:		Failed Part:			
APPLICABLE INCIDENT INFORMATION (Please describe in detail the incident(s), failure(s), crash(es), and injury(ies).)					
Crash ☒ Yes ☐ No	Fire ☐ Yes ☒ No	Number of Persons Injured	Number of Deaths	Reported to Police N	
Narrative Description of Incident(s), Crash(es), and Injury(ies). Please describe (1) events leading up to the failure, (2) failure and its consequences, and (3) what was done to correct the failure; i.e., parts repaired or replaced (and if old part is available).					
TL* THE CONTACT OWNS A 2011 TOYOTA RAV4. WHILE PARKING THE VEHICLE AND DEPRESSING THE BRAKE PEDAL, THE VEHICLE SURGED FORWARD INDEPENDENTLY. THE VEHICLE CRASHED INTO THE FRONT OF ANOTHER VEHICLE. THE FAILURE WAS PERSISTENT. A POLICE REPORT WAS NOT FILED AND NO INJURIES WERE SUSTAINED. THE LOCAL DEALER (BENARDI TOYOTA 1626 WORCESTER ROAD, FRAMINGHAM, MA, 01702) WAS CONTACTED AND A DIAGNOSTIC APPOINTMENT WAS SCHEDULED. THE MANUFACTURER WAS NOT NOTIFIED OF THE FAILURE. THE FAILURE MILEAGE WAS APPROXIMATELY 83,000.					
SEE ATTACHED					
Include, if available: Police/Fire Department Report, Photos, and Repair Invoice. ATTACH ADDITIONAL SHEETS IF NECESSARY					
The Privacy Act of 1974-Public Law 93-579 This information is requested pursuant to authority vested in the National Highway Traffic Safety Act and subsequent amendments. You are under no obligation to respond to this questionnaire. Your response may be used to assist the NHTSA in determining whether a Manufacturer should take appropriate action to correct a safety defect. If the NHTSA proceeds with administrative enforcement or litigation against a manufacturer, your response, or a statistical summary thereof, may be used in support of the agency's action.					

Narrative Description of Incident Addition

The following is an addition to the initial report that I delivered to the NHTSA. I reported to the dealership where the vehicle was purchased for the diagnostic appointment and requested to speak to the service manager. After explaining the circumstances of the accident, the Bernardi, Framingham service manager stated that I would have to have an inspection performed by Toyota USA which would involve an analysis of the event data recorder and a test drive by an inspector. That inspection was accomplished and I was promised a report of the findings with a follow-up from Toyota to explain its contents. I did receive a technical report of the EDR evaluation but no follow-up communication to explain its contents in understandable terms. I asked a good qualified mechanic to review the report and we all agreed that while the report addressed how the evaluation was accomplished, it did not address the specific events of the accident. I still feel that I am driving a vehicle that is prone to occasional malfunction and feel that I may be driving a time bomb. I have been to a body shop and the damage to my car is approximately \$1500.00. I am attaching a copy of the Toyota USA report.

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/Frame Number	2T3DK4DV5BW [REDACTED]
User	Fran Cavanaugh
Case Number	[REDACTED]
EDR Data Imaging Date	08/29/2017
Crash Date	08/14/2017
Filename	2T3DK4DV5BW [REDACTED] 08292017_EDR_ACM.CDRX
Saved on	Tuesday, August 29 2017 at 09:17:18
Imaged with CDR version	Crash Data Retrieval Tool 17.4.2
Imaged with Software Licensed to (Company Name)	Engineering Analysis Associates
Reported with CDR version	Crash Data Retrieval Tool 17.4.2
Reported with Software Licensed to (Company Name)	Engineering Analysis Associates
EDR Device Type	Airbag Control Module
Event(s) recovered	Front/Rear (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 Tech Stream, 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 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 / 15EDR / 17EDR
- 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.
- This airbag ECU records post-crash data, and depending on the airbag ECU, may record pre-crash data.
 - If a single event occurs independently, the data for that event is recorded on a one-to-one basis.
 - If multiple events occur successively (within a period of approximately 500ms), the establishment of the recording trigger for the first event is defined as the "pre-crash recording trigger". Pre-crash data for the first event and post-crash data for each successive event is then recorded.
- The airbag ECU has two recording pages (memory maps) to store pre-crash data. Additionally, to store post-crash data, the airbag ECU has two recording pages for each accident type: two pages for frontal and rear crash, two pages for a side crash, and two pages for rollover event.
- The data recorded by the airbag ECU includes correlating information between each previously occurring event (i.e., information that clarifies the collision event sequence. This correlation information consists of the following items.
 - Time from Previous Pre-Crash TRG
 - Linked Pre-Crash Page
 - Time from Pre-Crash TRG
 - TRG Count

- Previous Crash Type
- The point in time at which the recording trigger is established is regarded as time zero for the recorded data.
- The recording trigger judgment threshold value differs depending on the collision type (i.e., frontal crash, rear crash, side crash, or rollover event).
- Time series data for side crash may have 24 or 25 sampling points.
- 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.

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
Max. Lateral Delta-V, Slide Door 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, Slide Door 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.
 - "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.
 - 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 5,200 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 122 km/h (75.8mph). 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
 - "Accelerator Rate" value is recorded as a voltage. The voltage increases as the driver depresses the accelerator.
 - The "Drive" setting for the "Shift Position" value indicates the shift position state is other than "R,"(Reverse), "N" (Neutral), or "P" (Park). If sequential shift had been used, "Invalid" may be displayed.
 - 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 minutes, 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.
 - Depending on the specifications, "Roll Angle peak" can be recorded as absolute value.
 - "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.
 - "Time from Previous Pre-Crash TRG" indicates the time between the establishment of an event's pre-crash recording trigger to the establishment of a more recent event's pre-crash recording trigger. The upper limit for the recorded value is 16,381 milliseconds. In the event of establishment of the first pre-crash recording trigger after the ignition is switched ON, the upper limit value(max value) is recorded.
 - "TRG Count" indicates a calculated value of the number of times recording triggers have been established for all crash types. The sequence in which each event occurred can be verified from the "TRG Count". The smaller the "TRG Count" value, the older the data. The upper limit for the recorded value is 65,533 times. When more than one event reaches the upper limit, the actual "TRG Count" may be greater than what is displayed for that event.
 - "Linked Pre-Crash Page" is used to link "paged" pre-crash data with "paged" post-crash data. When old pre-crash data is overwritten by new pre-crash data, the "Linked Pre-Crash Page" value may record a page number that is not actually linked.
 - Resolution of the "Time from Pre-Crash to TRG" is 100 [ms], and the value is rounded down and recorded.

05004_ToyotaDENSO_r026

System Status at Time of Retrieval

ECU Part Number	89170-0R020
ECU Generation	04EDR
Recording Status, All Pages	Complete
Freeze Signal	OFF
Freeze Signal Factor	None
Diagnostic Trouble Codes Exist	No
Time from Previous Pre Crash TRG (msec)	16381 or greater
Latest Pre-Crash Page	0
Contains Unlinked Pre-Crash Data	No

Event Record Summary at Retrieval

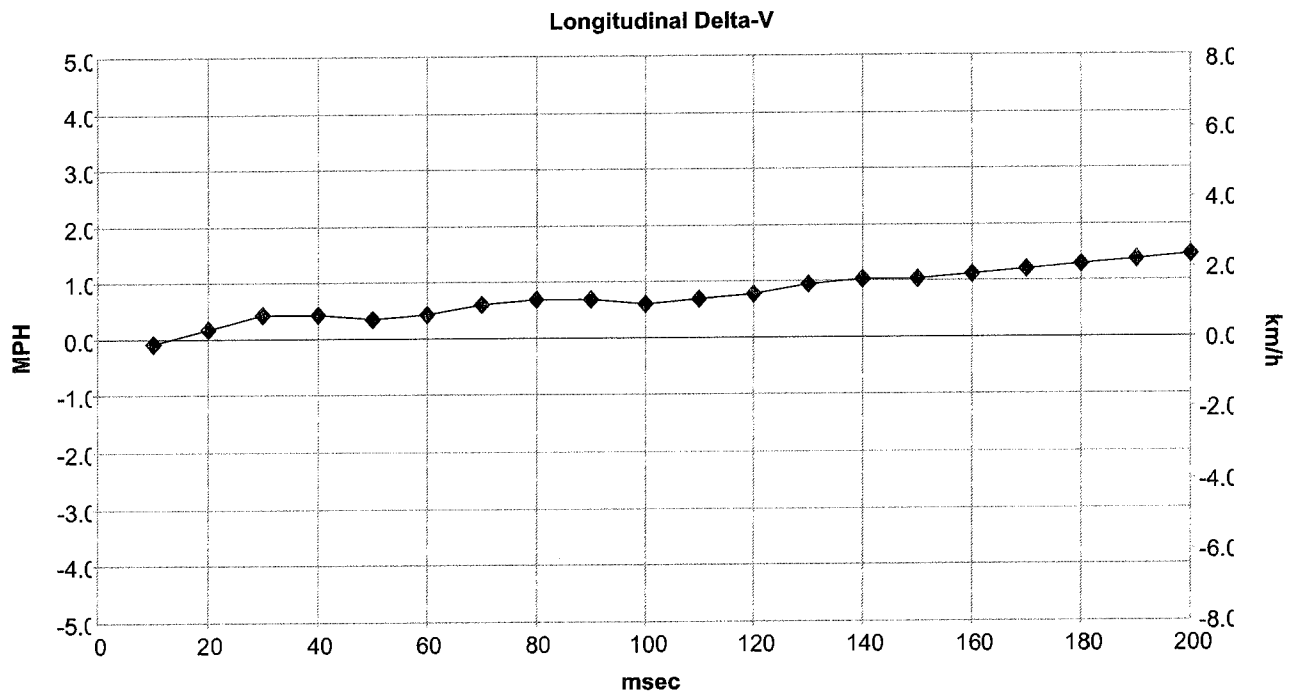
Events Recorded	TRG Count	Crash Type	Time (msec)	Pre-Crash & DTC Data Recording Status	Event & Crash Pulse Data Recording Status
Most Recent Event	1	Front/Rear Crash	0	Complete (Page 0)	Complete (Front/Rear Page 0)

System Status at Event (Most Recent Event, TRG 1)

Recording Status, Front/Rear Crash Info.	Complete
Crash Type	Front/Rear Crash
TRG Count (times)	1
Previous Crash Type	No Event
Time from Pre-Crash TRG (msec)	0
Linked Pre-Crash Page	0
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
Time to Deployment Command, Pretensioner (msec)	Not Commanded

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

Recording Status, Time Series Data	Complete
Max Longitudinal Delta-V (MPH [km/h])	1.5 [2.3]



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

Time (msec)	Longitudinal Delta-V (MPH [km/h])
10	-0.1 [-0.1]
20	0.2 [0.3]
30	0.4 [0.7]
40	0.4 [0.7]
50	0.3 [0.6]
60	0.4 [0.7]
70	0.6 [1.0]
80	0.7 [1.1]
90	0.7 [1.1]
100	0.6 [1.0]
110	0.7 [1.1]
120	0.8 [1.2]
130	0.9 [1.5]
140	1.0 [1.7]
150	1.0 [1.7]
160	1.1 [1.8]
170	1.2 [1.9]
180	1.3 [2.1]
190	1.4 [2.2]
200	1.5 [2.3]

DTCs Present at Time of Event (Most Recent Event, TRG 1)

Recording Status, Diagnostic	Complete
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, 1 Sample (Most Recent Event, TRG 1)

Recording Status, Pre-Crash/Occupant	Complete
Time from Pre-Crash to TRG (msec)	300
Buckle Switch, Driver	Buckled
Buckle Switch, Passenger	Unbuckled
Occupancy Status, Passenger	Not Occupied
Seat Position, Driver	Rearward
Shift Position	Drive

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

Time (sec)	-4.3	-3.3	-2.3	-1.3	-0.3	0 (TRG)
Vehicle Speed (MPH [km/h])	38.5 [62]	38.5 [62]	38.5 [62]	38.5 [62]	38.5 [62]	38.5 [62]
Brake Switch	OFF	OFF	OFF	OFF	OFF	OFF
Accelerator Rate (V)	1.21	1.21	1.17	1.17	1.13	1.05
Engine RPM (RPM)	1,600	1,600	1,600	1,600	1,200	1,600

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	BE E0 00 01
	01	00
	03	30 52 30 32 30 30 30 30 43 43 30 30 30 43 43 30 30 30 43 42 30 30
		30 43 42 30 30 30 44 30 30 30 30 44 30
	04	02 02 01 01
	05	02
	06	00
	07	30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30
	09	
	0A	01
	0B	00
	20	80 00 00 01
	21	00 51
	40	00 00 00 01
	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	-- -- -- -- -- -- -- -- -- -- -- -- -- -- 00 00
	30	00 00 4F 01 3F FD 00 00 00 00 00 00 FF FF FF FF
	40	FF FF FF FF FF FF FF FF FF FF FF FF FF FF -- --
	50	-- -- 10 01 01 7C 1B 43 7C 1D 44 7C 1E 44 7C 1E
	60	7C 1F 7C 1F 03 00 00 00 00 00 00 00 00 00 00 00
	70	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	80	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	90	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	A0	00 00 -- -- 01 FD FD 00 01 FF FE FF 00 01 FF FF
	B0	FE FF 00 FF FF FF FF FF 00 06 00 00 00 01 E0 00
	C0	FE FE 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	D0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	E0	00 00 00 00 -- -- 00 00 00 00 00 00 00 00 00 00
	F0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	100	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	110	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	120	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	130	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	140	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	150	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	160	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	170	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	180	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	190	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	1A0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	1B0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	1C0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	1D0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	1E0	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	1F0	00 00 00 00 00 00 00 00 00 00 00 00

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.

Event Data Recorder - Reference Document

An Event Data Recorder (EDR) is a part of the Supplemental Restraint System (SRS) ECU that records data for some types of collision events for future safety research or analysis. The EDR will record data when the vehicle experiences a rapid change in speed that exceeds a specified threshold. The threshold to start recording is above changes in speeds that are considered normal driving use. For example, stopping hard with the brakes would not cause a recording, but hitting a curb may. EDRs were installed on Toyota/Lexus/Scion vehicles because they have the capability to serve several purposes, such as assisting in vehicle development, quality control and/or safety research. An EDR is also helpful in determining the circumstances that caused an airbag to be deployed or not deployed.

EDR Generations

Starting with the 2001 Lexus LS400, EDRs were incorporated into to all Toyota, Lexus and Scion vehicles by 2007. SRS ECUs with EDRs were typically installed at full model change years, which generally occur every 4 to 6 years, depending on the model. The chart below outlines the three generations of EDRs installed on Toyota, Lexus, and Scion vehicles and what each EDR generation is capable of recording.

01MY	02MY	03MY	04MY	05MY	06MY
Gen 1		Gen 2		Gen 3	
EDR		★		★	
Frontal		Frontal Roll Over		Current EDR	
				Frontal Rollover Side Impact Multiple Events	

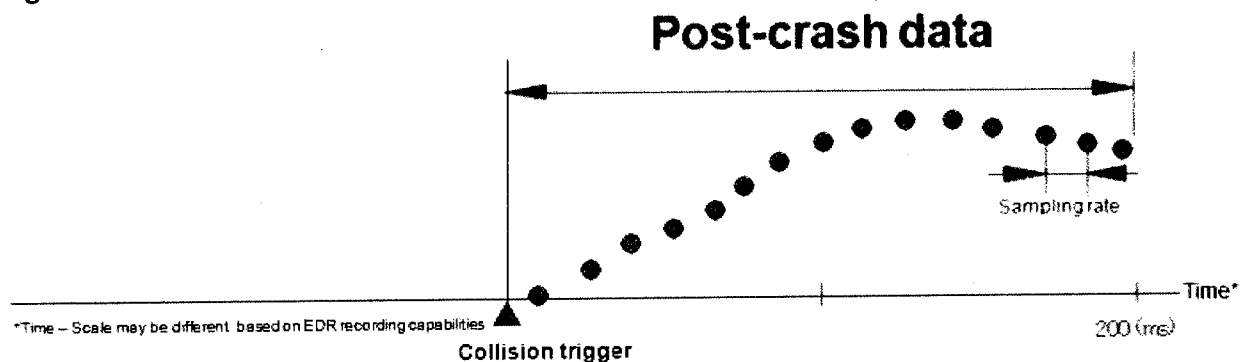
Note: MY stands for model year

Post-Crash & Pre-Crash data

Post-Crash Data - All vehicles equipped with an EDR will record post-crash data

If an impact occurs that has exceeded the rapid change in speed threshold, the EDR system will begin to record data for varying lengths of time depending on the parameters it is capable of recording. Figure 1 shows a collision 'trigger' and the data sampling rate recorded in the EDR.

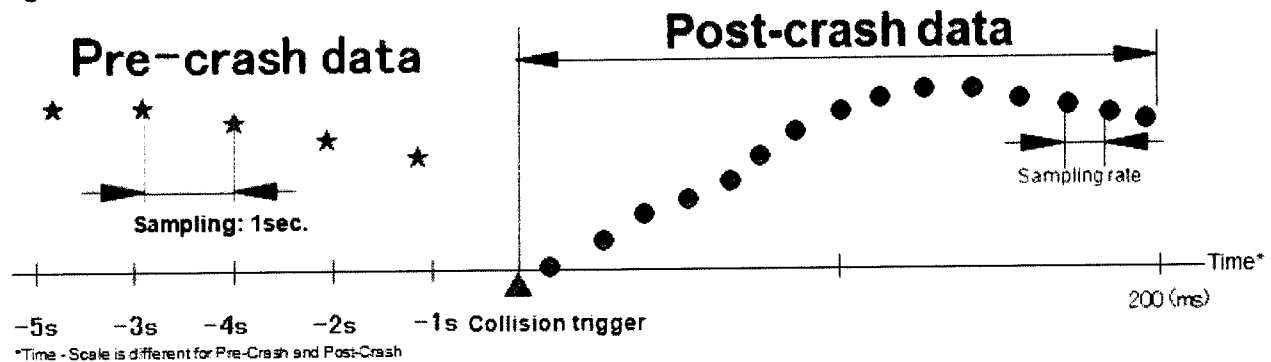
Figure 1



Pre-Crash Data - Not all models have an EDR capable of recording pre-crash data

As explained in the Post-crash section, the EDR System begins recording data when an impact exceeds the rapid change in speed threshold. On certain models, the EDR will also record about 5 seconds of data that took place before the impact. Figure 2 shows the sampling rate of Pre-Crash data is different than Post-Crash data.

Figure 2



Post Crash & Pre-Crash Applicability Chart

The chart below provides EDR capability of each model and the corresponding calendar year (CY) it was built. Vehicles and the corresponding year that have a yellow bar are equipped with EDR that have the ability to record post-crash data only. Vehicles and the corresponding year that have a red bar, are equipped with EDRs capable of pre & post-crash data recording.

		Post-crash data only Pre- & Post-crash data										
	Model Name	2000CY	2001CY	2002CY	2003CY	2004CY	2005CY	2006CY	2007CY	2008CY	2009CY	2010CY
Lexus	LS											
	LS HV											
	GS											
	GS HV											
	SC											
	ES											
	LX											
	GX											
	Rx											
	RX HV											
	IS											
	IS-F											
	IS-C											
	HS											
	CT											
	LFA											
Toyota	Avalon											
	Camry											
	Camry Solara											
	Corolla											
	Echo											
	4Runner											
	Land Cruiser											
	RAV4											
	Sienna											
	Prius											
	Highlander											
	Highlander HV											
	Tacoma											
	Tundra											
	SEQUOIA											
	Yaris											
	Yaris Sedan											
	FJ Cruiser											
	Venza											
	Matrix											
SCION	iC											
	xA											
	xB											
	xD											

Type A and Type B EDR Reports

There are two types of EDR data displays: Type A and Type B. The type of display depends on the EDR and cannot be switched. The same information is displayed on Type A & Type B, but you will notice a difference in appearance.

Type A – Note: This is just an example report. Your EDR information may look different.

Event Data	
INVESTIGATION DATE	06/30/2010
INVESTIGATOR	Me
ACCIDENT DATE	06/30/2010
VEHICLE	GS
MODEL YEAR	2008
VIN NUMBER	680680680680680680
Tool Version(download)	Ver.1.4.1.0
Tool Version(display)	Ver.1.4.1.0

Data Table	
Data Name	Data
ECU Number	89170-30680
NewPage	2 Page
Freeze Signal	Freeze
Deployment Time	12 ms
Deployment Stage Driver	Hi
Deployment Stage Passenger	Not Fired

Page 1

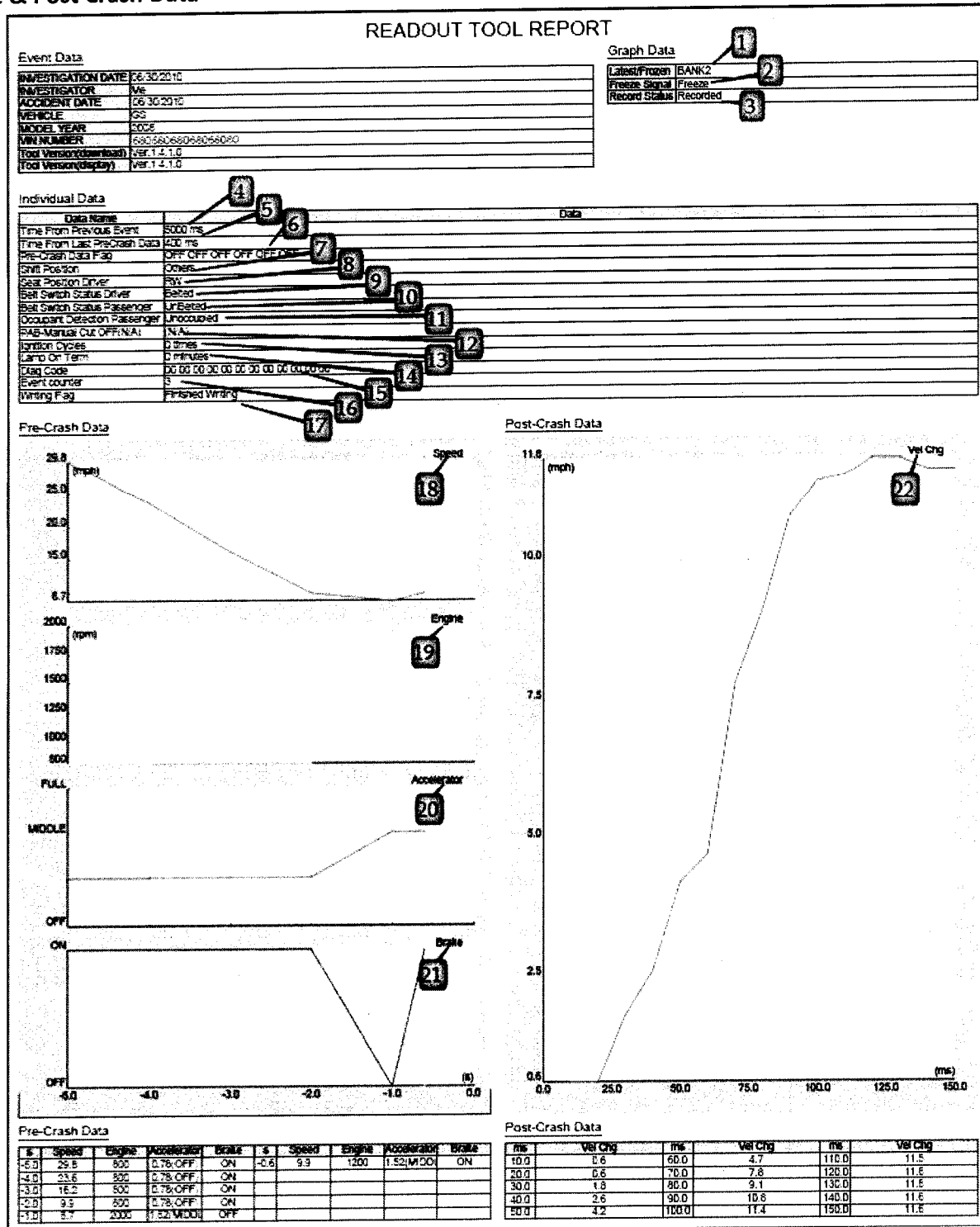
Event Data

1. *Investigation date* - image date
 2. *Investigator* - image tool operator
 3. *Accident date*- collision date (if known)
 4. *Vehicle* - vehicle model
 5. *Model year* - model year of vehicle
 6. *VIN Number*- Vehicle Identification Number of the vehicle
- At the time of data retrieval, all of the above information is manually entered into the report by the tool operator. This information is NOT stored or pulled from the EDR.
7. *Tool Version (download)*- software version used in tool when performing EDR image
 8. *Tool Version(display)*- software version being used to display EDR image

Data Table

9. *ECU number* - Electronic Control Unit part number
10. *New Page* – most recent recorded page number among frontal pages
11. *Freeze Signal*- an airbag fire signal will 'freeze' data so that it cannot be overwritten
12. *Deployment Time* – time from the recording trigger to an airbag fire signal
13. *Deployment Stage Driver*- level of deployment for multistage airbags
14. *Deployment Stage Passenger* – level of deployment for multistage airbags

Pre & Post Crash Data



Graph Data

1. Latest/Frozen -Page of most recent data
2. Freeze Signal - an airbag fire signal will 'freeze' data so that it cannot be overwritten
3. Record Status - indicates whether data was recorded

Individual Data

4. *Time from Previous Event*- time from the previous event trigger
5. *Time from Last PreCrash Data*- time from last full second record
6. *Pre-crash Data Flag*- indicates if pre-crash information has been recorded or not
7. *Shift Position*- transmission gear setting
8. *Seat Position Driver*- driver's seat position (FW – forward, RW - rearward)
9. *Belt Switch Status Driver*- seat belt usage at time of impact
10. *Belt Switch Status Passenger*- seat belt usage at time of impact
11. *Occupant Detection Passenger*- passenger type as determined by the system
12. *PAB Manual Cut Off (N/A)* – the status of the passenger airbag cutoff switch (if equipped)
13. *Ignition Cycles*- number of ignition cycles after airbag system detected trouble condition
14. *Lamp On term* – time that airbag lamp has been on
15. *Diag Code*- displays airbag diagnostic system trouble code numbers
16. *Event Counter*- the number of events and the order the system has recorded
17. *Writing Flag* – indicates whether all the input data was transferred to the permanent EDR memory

Pre-Crash Data

Pre Crash Data- if the vehicle is equipped with pre-crash capability, four charts are generated

18. *Speed*- indicates the vehicle speed at one second intervals. The last recording is at the time of the impact, between -1.0 and 0 seconds. The maximum recordable speed is between 75 and 78 mph. If the vehicle speed is greater than the maximum recordable speed, the chart will show between 75 and 78 mph.
19. *Engine*- indicates the engine speed in 400 rpm increments and is recorded in the same sequence as the vehicle speed
20. *Accelerator*- indicates the accelerator pedal application. In some models, sensor voltage reading is also recorded
21. *Brake*- indicates whether the brake lamp switch has been activated or not

Post-Crash Data

22. *Vel Chg*- this shows the longitudinal velocity (speed) change of the vehicle from the trigger event. The data is positive for deceleration (such as a frontal crash) and negative for acceleration (such as a rear impact). This data is taken where the airbag center sensor assembly ECU is located. If it is determined that there is the onset of a severe frontal collision, power is routed to the seatbelt pretensioners and the frontal airbags to deploy them. A small triangle indicates when the airbag deployment signal was sent.

Some models may also display the following data (not displayed in this document)

Side Crash Data

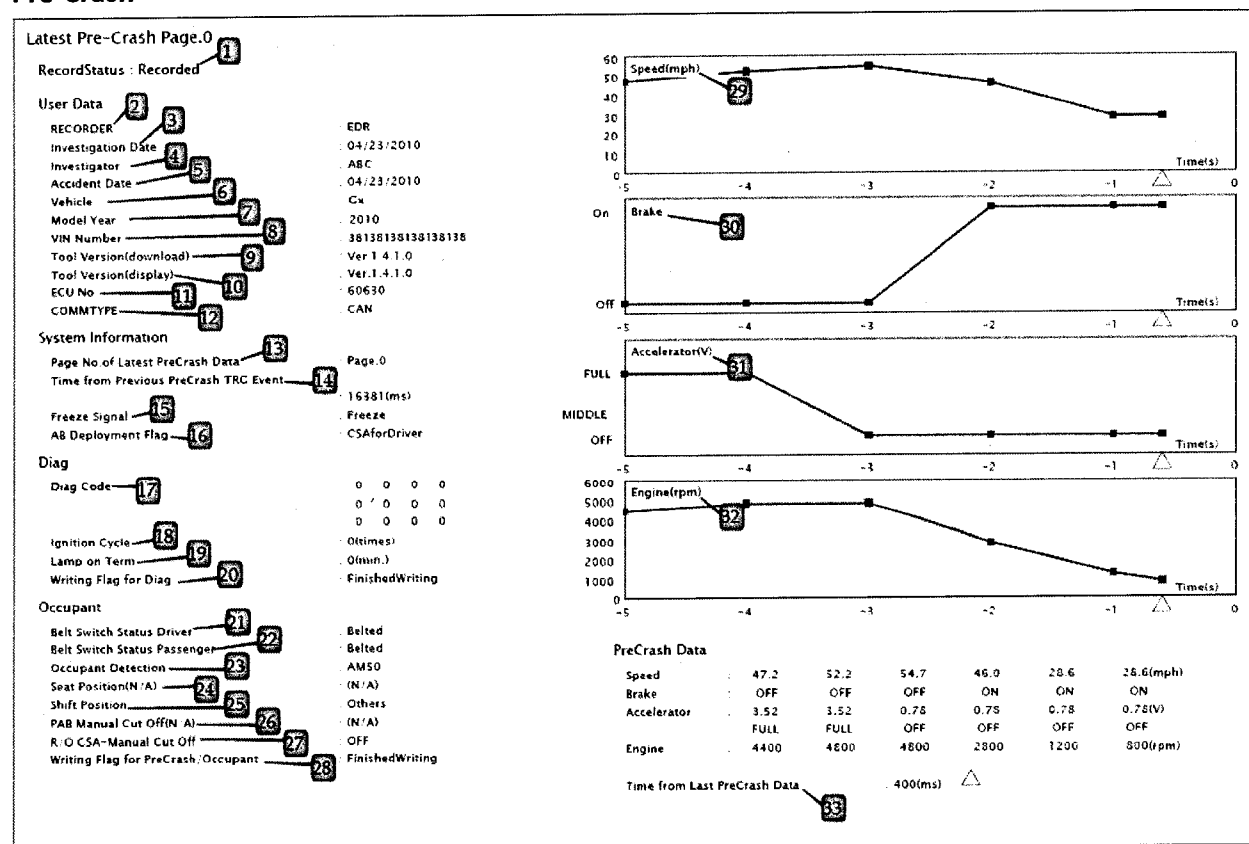
1. *B pillar* –there is a sensor located in the pillar near the driver's or front passenger's shoulder, that reacts to lateral (sideways) forces. The data shows the change in speed of the vehicle at that point.
2. *C Pillar* –there is a side sensor located in the pillar near the rear seat that reacts like the B pillar sensor.
3. *Floor sensor*- there is a lateral sensor that is part of the airbag center sensor assembly. It reacts to lateral impacts and analyzes data from the pillar sensors and safing sensor. If it is determined that there is an onset of a severe side impact, power is sent to the side curtain shield airbag and/or the torso bag to deploy them.

Rollover data

1. *Rollover angle*-indicates the sideways angle of the vehicle relative to the horizontal
2. *Rollover rate*-indicates amount of lateral Gs

Type B - Note: This is just an example report. Your EDR report information may look different.

Pre-Crash



Latest Pre-Crash Page.0

1. RecordStatus- Displays if data has been recorded

User Data

2. RECORDER – type of recording device
3. Investigation date- image date
4. Investigator - image tool operator
5. Accident date- collision date (if known)
6. Vehicle- vehicle model
7. Model year - model year of vehicle
8. VIN Number- Vehicle Identification Number of the vehicle

At the time of data retrieval, the information for lines 2 through 7 are manually entered into the report by the tool operator. This information is NOT stored or imaged from the EDR.

9. Tool Version (download) – software version used in tool when performing EDR image
10. Tool Version(display) – software version being used to display EDR image
11. ECU no - Electronic Control Unit part number
12. COMMTYPE – EDR communication type

System Information

13. Page No. of Latest PreCrash Data- Page number of most recent Pre-Crash Data
14. Time from Previous PreCrash TRG Event- time from a most recent recording

15. *Freeze Signal*- an airbag fire signal will 'freeze' data so that it cannot be overwritten
16. *AB Deployment Flag*- indicates which airbags have deployed

Diag

17. *Diag Code*- displays airbag diagnostic system trouble code numbers
18. *Ignition Cycles*- number of ignition cycles after airbag system detected trouble condition
19. *Lamp On term* – indicates time that airbag lamp has been on
20. *Writing Flag for Diag* –indicates whether during the event, diag code data, ignition cycles and lamp on term information was transferred to the permanent EDR memory

Occupant

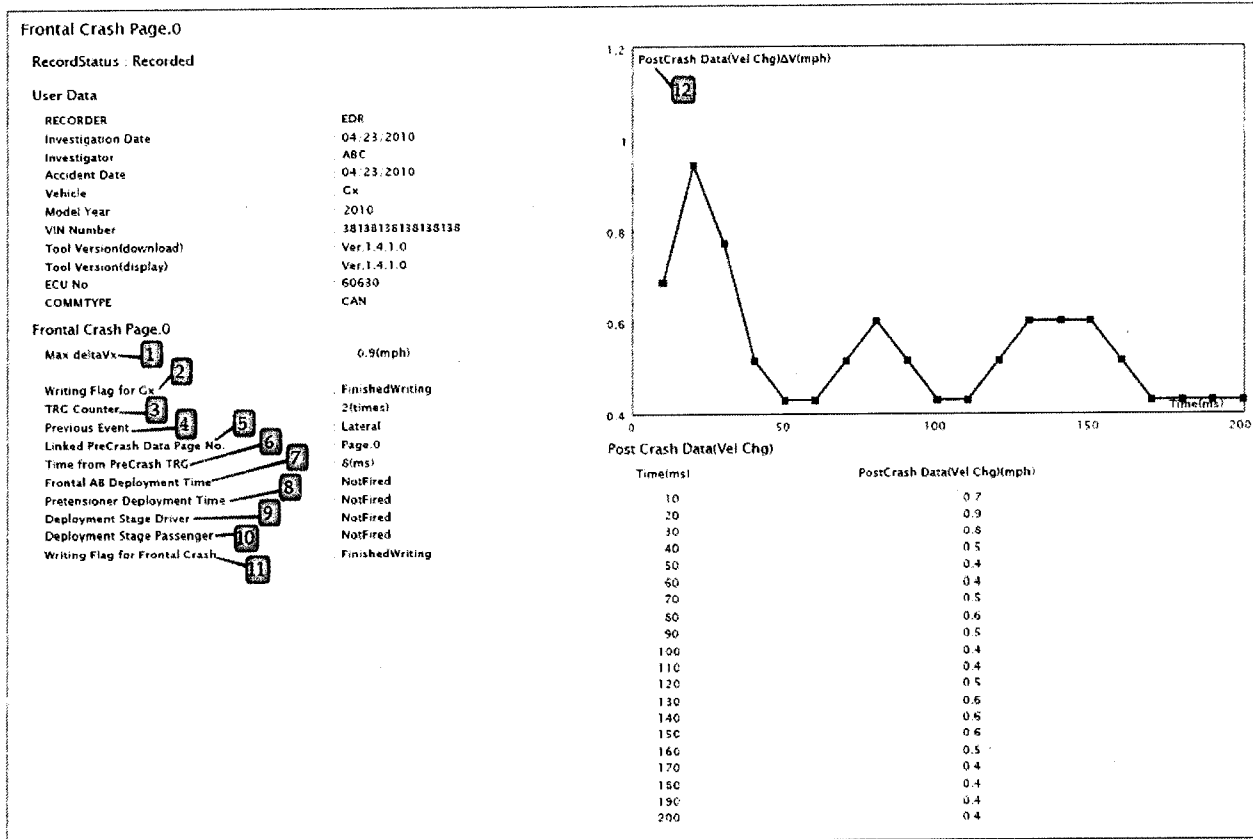
21. *Belt Switch Status Driver*- seat belt usage at time of impact
22. *Belt Switch Status Passenger*- seat belt usage at time of impact
23. *Occupant Detection* - passenger type as determined by the system
24. *Seat Position(N/A)* – position of the driver's seat at impact
25. *Shift Position*- transmission gear setting
26. *PAB Manual Cut Off (N/A)* – status of the passenger airbag cutoff switch (if equipped)
27. *R/O CSA- Manual Cut Off*- status of the rollover curtain shield airbag manual cutoff switch at impact (if equipped)
28. *Writing Flag for PreCrash/Occupant* – indicates whether the data during the impact was transferred to the permanent EDR memory

PreCrash Data

29. *Speed*- indicates the vehicle speed at one second intervals. The last recording is at the time of the impact, between -1.0 and 0 seconds. The maximum recordable speed is between 75 and 78 mph. If the vehicle speed is greater than the maximum recordable speed, the chart will show between 75 and 78 mph.
30. *Brake*- indicates whether the brake lamp switch has been activated
31. *Accelerator(V)*- indicates the accelerator pedal application. In some models, sensor voltage reading is also recorded
32. *Engine (rpm)*- indicates the engine speed in 400 rpm increments and is recorded in the same sequence as the vehicle speed
33. *Time from Last PreCrash Data*- indicates the time between the last precrash data and event trigger

Note: Some reports may have data in another PreCrash page titled "Next Most Recent Pre-Crash Page.1" This data precedes information from "Latest Pre-Crash Page.0".

Frontal Crash – Post Crash



Frontal Crash Page.0

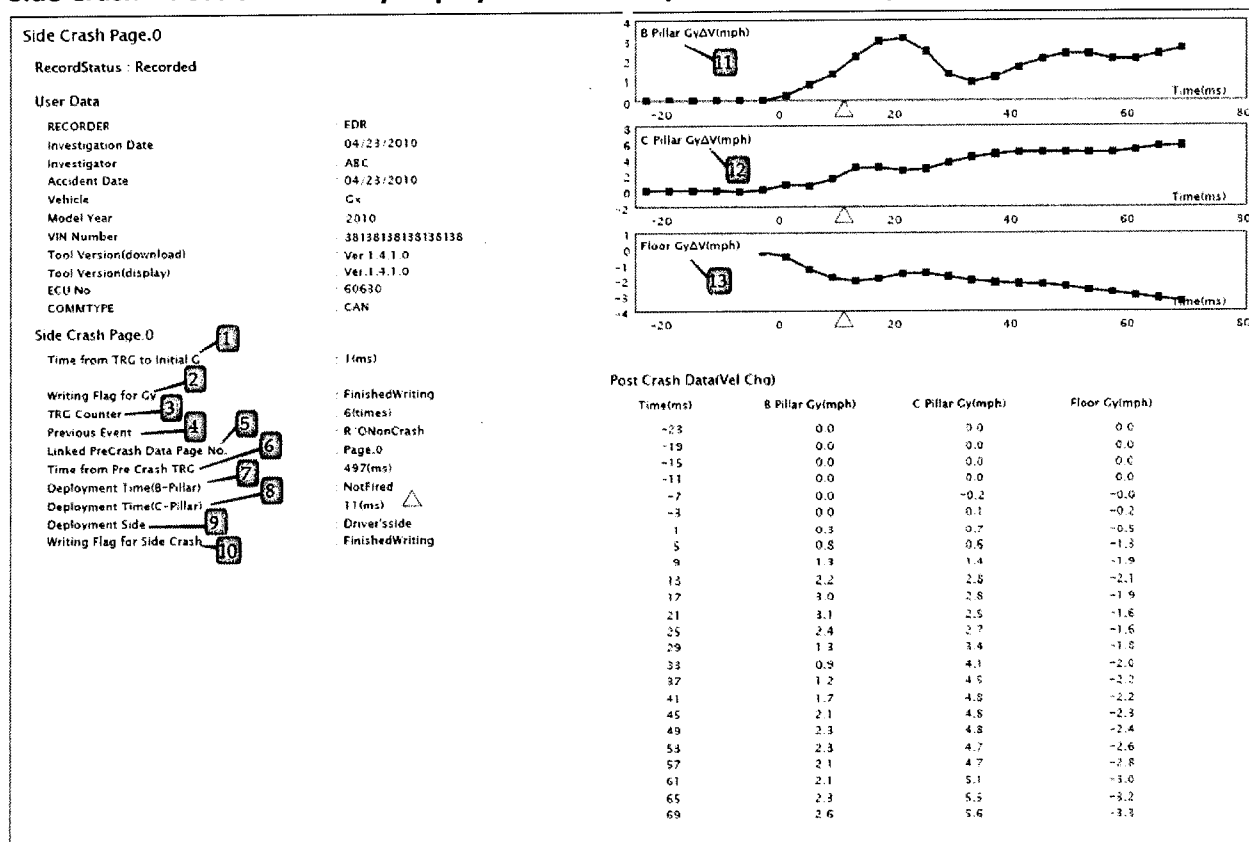
1. *Max deltaVx*- Maximum change in longitudinal speed
2. *Writing Flag for Gx*- indicates whether the data during the impact was transferred to the permanent EDR memory
3. *TRG Counter*- number of EDR event triggers
4. *Previous Event*- type of previous event
5. *Linked PreCrash Data Page No.*- page number of linked data
6. *Time from PreCrash TRG*- amount of time from PreCrash trigger to start of delta V calculation
7. *Frontal AB Deployment Time*- Amount of time from event trigger to airbag deployment
8. *Pretensioner Deployment Time*- amount of time from event trigger to pretensioner deployment
9. *Deployment Stage Driver*- level of deployment for multistage airbags
10. *Deployment Stage Passenger*- level of deployment for multistage airbags
11. *Writing Flag for Frontal Crash*- indicates whether the data during the impact was written to the permanent EDR memory

Frontal Post Crash Data (Vel Chg) Chart

12. *PostCrash Data (Vel Chg) ΔV(mph)*-change in vehicle longitudinal speed in mph over milliseconds

Note: Some reports may have data in a page titled "Frontal Crash Page.1" This data is from a second frontal impact event that was above the EDR threshold.

Side Crash – Post Crash = Only displayed if EDR is capable of recording Side Crash events



Side Crash Page.0-

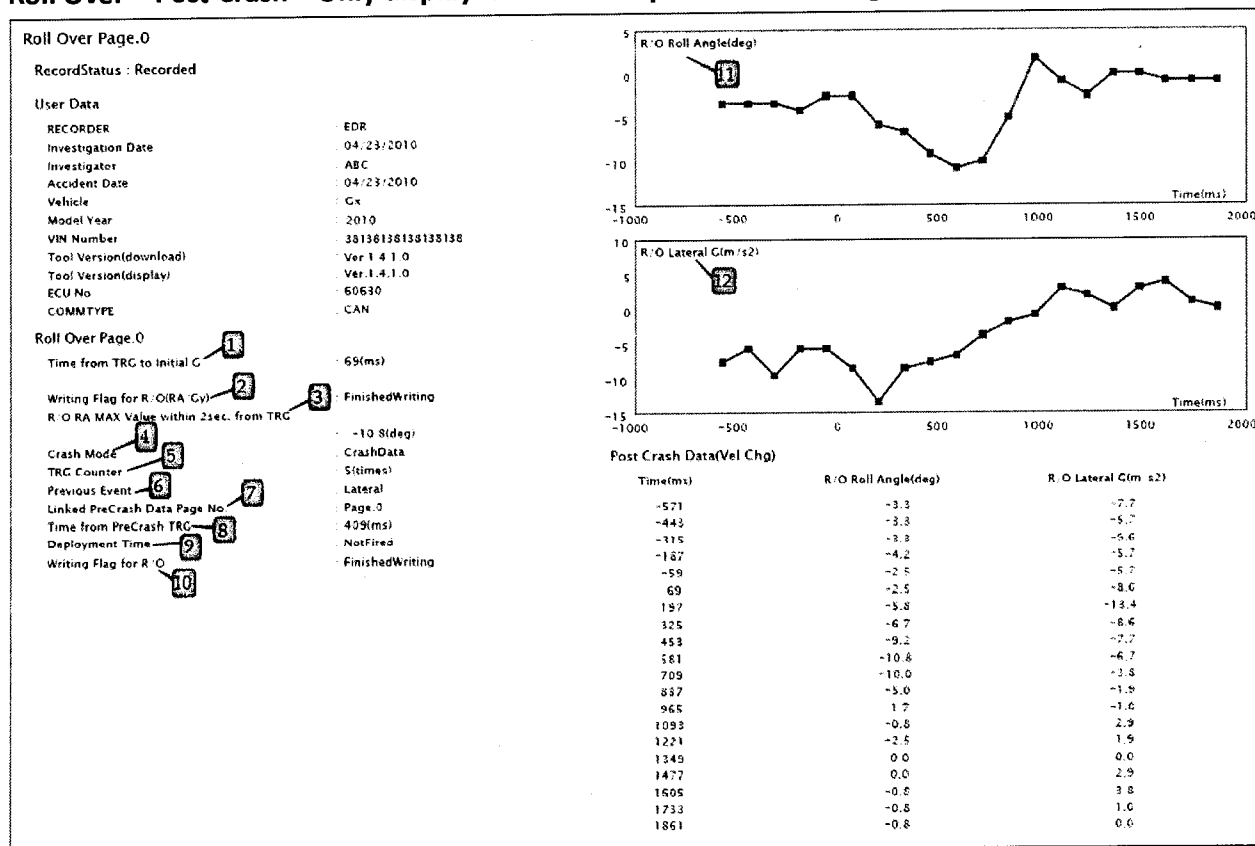
1. Time from TRG to Initial G- Elapsed time from event trigger to the next sample
2. Writing Flag for Gy- indicates whether the data during the impact was transferred to the permanent EDR memory
3. TRG Counter- number of EDR event triggers
4. Previous Event- type of previous event
5. Linked PreCrash Data Page No.- page number of linked data
6. Time from Pre Crash TRG- amount of time from Pre Crash trigger
7. Deployment Time(B-Pillar)- indicates when airbag was deployed after event trigger
8. Deployment Time(C-Pillar)- indicates when airbag was deployed after event trigger
9. Deployment Side- indicates which side of vehicle was impacted
10. Writing Flag for Side Crash- indicates whether the data during the impact was written to the permanent EDR memory

Side Post Crash Data Chart

11. B Pillar Gy ΔV(mph)- change in vehicle lateral speed in mph
12. C Pillar GyΔ(mph)- change in vehicle lateral speed in mph
13. Floor GyΔV(mph)- change in vehicle lateral speed in mph

Note: Some reports may have data in a page titled "Side Crash Page.1" This data is from a second side impact event that was above the EDR threshold.

Roll Over – Post Crash = Only displayed if EDR is capable of recording Roll Over events



Roll Over Page.0

1. *Time from TRG to Initial G*- Elapsed time from event trigger to the next sample
2. *Writing Flag for R/O(RA/Gy)*- indicates whether the data during the impact was written to the permanent EDR memory
3. *R/O RA MAX Value within 2sec. from TRG*- Maximum roll angle within 2 seconds of event trigger
4. *Crash Mode*- The type of roll event
5. *TRG Counter*- number of EDR event triggers
6. *Previous Event*- type of previous event
7. *Linked PreCrash Data Page No.*- page number of linked data
8. *Time from PreCrash TRG*- amount of time from Pre Crash trigger
9. *Deployment Time*- indicates if or when airbag was deployed after the event trigger
10. *Writing Flag for R/O*- indicates whether the data during the impact was written to the permanent EDR memory

Roll Over Post Crash Data Chart

11. *R/O Roll Angle(deg)*- angle of roll measured in degrees
12. *R/O Lateral G(m/s^2)*- amount of lateral Gs

Note: Some reports may have data in a page titled "Roll Over Page.1" This data is from a second Roll Over event that was above the EDR threshold.

EDR - Frequently Asked Questions

What is an EDR? An Event Data Recorder (EDR) is part of the Supplemental Restraint System (SRS) ECU that records data for some types of collision events for future safety research or analysis. An event is a change in vehicle speed that is more than typical of everyday use. For example, stopping hard with the brakes would not cause a recording, but hitting a curb may cause the EDR to record an event.

Are EDRs required in cars? They are currently not required.

Is the EDR a black box? No, the EDR is not a black box like on an airplane. It does not record sounds or conversations and does not have the capacity like an airplane blackbox. The EDR is simply part of the Supplemental Restraint System (SRS) ECU that only records certain vehicle data for a short period of time before or during a collision.

What causes the EDR to record? The EDR starts to record when the vehicle experiences a rapid change in speed (like acceleration or deceleration) that exceeds a specified threshold higher than normal use. Hard braking will not cause an EDR to record, because that may be considered normal use. Impacting a curb hard may cause a recording as the vehicle body may change speed much quicker than normal use.

Why were EDRs installed in Toyota/Lexus/Scion vehicles? EDRs have the capability to serve several purposes, such as assisting in vehicle development, quality control or safety research. Airbag deployment occurs very rapidly and it may be difficult to determine exactly what occurred during a collision. Although indirect methods may be used to determine airbag deployment circumstances, an EDR is a more direct method to understand airbag deployment circumstances.

Do all EDRs record the same information? No. Due to different vehicle designs and changes in equipment, the information recorded varies by model and model year.

Were there other recording systems before EDR in Toyota vehicles? Yes, some vehicles in the past had some impact recording capabilities, but these were not considered reliable for field use. There is no current capability to read these predecessors to EDRs.

How accurate is the EDR data? The accuracy of the data from the EDR depends on the collision and the EDR capabilities. Government studies of Toyota EDRs indicate that Toyotas EDRs have similar capabilities to other vehicle manufacturers.

What has Toyota done to validate its EDRs and EDR tools? Toyota has been analyzing data from vehicles since they were first introduced to ensure the reliability of the EDR technology. Toyota performs imaging of our own vehicles as part of crash testing. Toyota also performs EDR imaging from U.S. Government crash testing and investigations, and when requested, in law enforcement investigations.

How does the EDR record information? During a collision, the EDR calculates the delta V based on accelerometer data every 10 milliseconds and puts it into the permanent memory. During the intervals, other data is also placed into memory. If all the data is not transferred into the permanent memory, a writing flag is put on the report. If all data is successfully transferred, the report states 'Finished writing'. In some very severe

impacts, electrical connections or internal EDR components may be damaged, resulting in incomplete data transfer to the permanent memory.

How long is an event stored in the EDR? If the airbags are deployed in a collision, the EDR data is locked and cannot be erased or overwritten. If the airbags have not been deployed in previous EDR events, an event that causes the vehicle to experience a rapid change in speed (example: hitting a curb) that exceeds a specified threshold will overwrite previous EDR events.

Why is a signed consent form required before performing imaging? Various states have privacy regulations that require consent before performing an EDR image.

How is EDR data retrieved and does the retrieval process affect/change the data contained in the EDR? Depending on the vehicle's condition, data can be imaged in one of two ways. The EDR tool is either connected through the vehicle's DLC port, or the EDR is removed from the vehicle and the EDR tool is connected directly to the SRS ECU. Neither method alters or erases EDR data during the process. In some rare circumstances such as water immersions- the EDR data may not be able to be imaged using the EDR tool.

What will I receive after the EDR image process has taken place on my vehicle? After the imaging has been completed, the EDR report and other reference documents will be provided.

What is the difference between vehicle speed and delta V? Vehicle speed is how fast the vehicle moves relative to the ground - usually in miles per hour. It is understood that vehicle speed is the straight line speed of the entire vehicle. Delta V is the change in vehicle speed over milliseconds and is usually discussed as longitudinal, lateral or total delta V.

Is there more than one deltaV? In some EDR reports there are longitudinal and lateral delta V data.

When I review the data, the first airbag record looks good, but the other records make no sense. What's going on? Some EDRs contain initial data in the registers. If "RecordStatus" displays "Initial", the information contained on that page is default data from the factory.

Why can't the EDR tool operator just tell the customer what the report says? Crashes can be very complex events. The EDR report is just one piece of information and without knowing other critical crash information, the EDR data could be misinterpreted with the context for the overall crash.

Can the EDR tell me the date and time of collision? No, the EDR does not have a time stamp function.

When will Toyota have a commercially available EDR tool? A commercially available EDR tool for Toyota/Scion/Lexus vehicles will be available before the government requirement date.