CDR File Information

Vehicle Identification Number	2MEFM74WX1X******
Investigator	
Case Number	
Investigation Date	
Crash Date	
Filename	2003-47-056-V1.CDR
Saved on	xxxxx
Collected with CDR version	Crash Data Retrieval Tool 2.10
Reported with CDR version	Crash Data Retrieval Tool 2.900
Event(s) recovered	Deployment

Module Information

The retrieval of this data has been authorized by the vehicle's owner, or other legal authority such as a subpoena or search warrant, as indicated by the CDR tool user on xxxxx .

Important Limitations on Vetronix Crash Data Retrieval (CDR) Tool Capabilities.

Disclaimer: This Restraint Control Module (RCM) records longitudinal deceleration data for the purpose of understanding the input data the Restraint Control Module used to determine whether or not to deploy restraint devices. This module does not record vehicle speed, throttle position, brake on-off, and other data, which may be recorded in some 1999 model year and later General Motors modules. The deceleration data recorded by Ford's module during a crash can subsequently be mathematically integrated into a longitudinal Delta-V. Delta-V is the change in velocity during the recording time and is NOT the speed the vehicle was traveling before the accident, and is also not the Barrier Equivalent Velocity. The Vetronix CDR Tool will read and interpret both acceleration in G's and Delta-V in mph. RCM's in Ford vehicles that can be read by the Vetronix CDR tool are listed in the Vetronix Help Files.

Important

If there is any question that the restraint system did not perform as it was designed to perform, please read the system only through the diagnostic link connector. The Vetronix CDR kit provides an RCM interface cable to plug directly into the restraint control module. The Vetronix CDR RCM Interface Cable connects only power, ground, and memory read pins to the relevant vehicle restraint control module. The other RCM pins normally connect to inputs, such as sensors, and outputs, such as airbags, are not connected when you use the RCM Interface Cable to plug directly into the module. Since the vehicle restraint control module is constantly monitoring airbag system readiness, it will detect that the sensors and airbags are not connected. The restraint control module may record a new diagnostic trouble code into memory for each device that is not connected. These new diagnostic trouble codes may record over previously written diagnostic trouble codes present prior to the accident and spoil evidence necessary to determine if the restraint system performed in the accident as it was designed to perform. Not only could this prevent Ford from being able to determine if the system performed as it was designed to perform, but, regardless of innocent inadvertence, you could raise issues of evidence spoliation in any litigation that may arise out of the accident. If you cannot read the module via the diagnostic link connector, and if you suspect improper system performance, contact Ford Motor Company and request their assistance to read the module with a proper vehicle simulator attached. If you choose to read via the module connector, Ford recommends that you do so in the vehicle and that you leave the second large connector plugged into the vehicle wiring harness to minimize the number of new diagnostic trouble codes created.

While data stored in RCM's is accurate, accident reconstructionists must be aware of the limitations of the data recorded in Ford's control modules and should compare the recorded data with the physical evidence at the accident scene using professional accident reconstruction techniques (i.e. vehicle crush characteristics, skid marks, etc) before making any assumptions about the import and validity of the data recorded in the module with respect to the crash event being analyzed. The following describes specific limitations that must be considered when analyzing recorded data. Investigators should obtain permission of the vehicle owner prior to reading any data.

1. There may be no deceleration data recorded in the module.
Loss of power (cut wires, damaged battery, crushed fuse box) to the module during or immediately after the crash may prevent the crash data from being recorded. A backup power supply within the module has sufficient power to continue to analyze the deceleration data and deploy restraint devices if needed, but there is no backup power for recording.

If the deceleration input does not create a vehicle longitudinal Delta-V above 4 mph within 100 milliseconds, there may not be any data recorded.

2. In unusual circumstances, deceleration data stored in the module may be from a crash other than the one you are currently analyzing.
The module will record data from some non-deploy events. If, after the module has recorded data from a non-deploy event, and there is a subsequent event in which there is a loss of power and no new recording is made for that subsequent event, the deceleration data in the module's memory may be from the prior event. If the new, subsequent event is a deploy event and

recording has occurred, the deployment times should be recorded. If there are no deployment times recorded, but airbags or other restraint devices are observed to have deployed, the recorded data that you read are most likely from a prior event.

Once an airbag or other restraint device has been commanded to deploy, the data recorded in connection with that deployment are "locked", and subsequent crashes cannot be recorded.

If a vehicle is being repaired, the RCM should be replaced after any crash in which restraint devices deploy. Early printed shop manuals refer to re-using modules by clearing the "crash data memory full" code, but this is no longer true and the latest on-line electronic shop manual directs that modules be replaced.

Crashes that involve multiple impacts will record only one of the impacts. If there is a deployment, the deployment event will be recorded and locked. If no restraint device is commanded to deploy, the recorded data are not "locked", and subsequent impacts may record over any previous recorded data. Further analysis will be required to determine which of the events was actually recorded.

3. The computed longitudinal Delta-V may understate the total Delta-V

Many real-world crashes can last longer than the memory has the capacity to record. Therefore, the actual Delta-V of the event may be higher than the Delta-V calculated and displayed by the Vetronix CDR System output. Review the end of the longitudinal acceleration/deceleration pulse - if it has not settled to zero G's by the end of the recording, the vehicle longitudinal Delta-V is most likely understated. If there is a clear decaying trend line you may choose, at your own risk, to estimate the total Delta-V by extrapolating the decay trend to zero and to calculate the additional Delta-V not captured.

Under some circumstances where power is interrupted, during the recording of data, or the module re-sets during the recording of data, a partial recording may occur. This will be shown as "no data" in the data table and will not be plotted on the graph of acceleration. The "no data" sections may be at the beginning, in the middle, or at the end(s) - it will not be consistent from one occurrence to another. When some portion of the acceleration data is not recorded, the Delta-V during that time cannot be calculated. A Delta-V will be calculated for the points that are valid, but the user must be aware that the partial Delta-V calculated will further underestimate the actual event total Delta-V. Restraint device deployment times are recorded first in to memory, and the acceleration data is recorded last. Thus, even with partial acceleration traces, deployment times are valid.

4. This module records only longitudinal acceleration/deceleration of the vehicle. You must compute lateral or resultant total acceleration based on your estimated Principal Direction of Force (PDOF).

5. Vertical acceleration/decelerations are not recorded. Vehicle spin about a point not centered on the Restraints Control Module sensor may add or subtract from bulk vehicle motion.

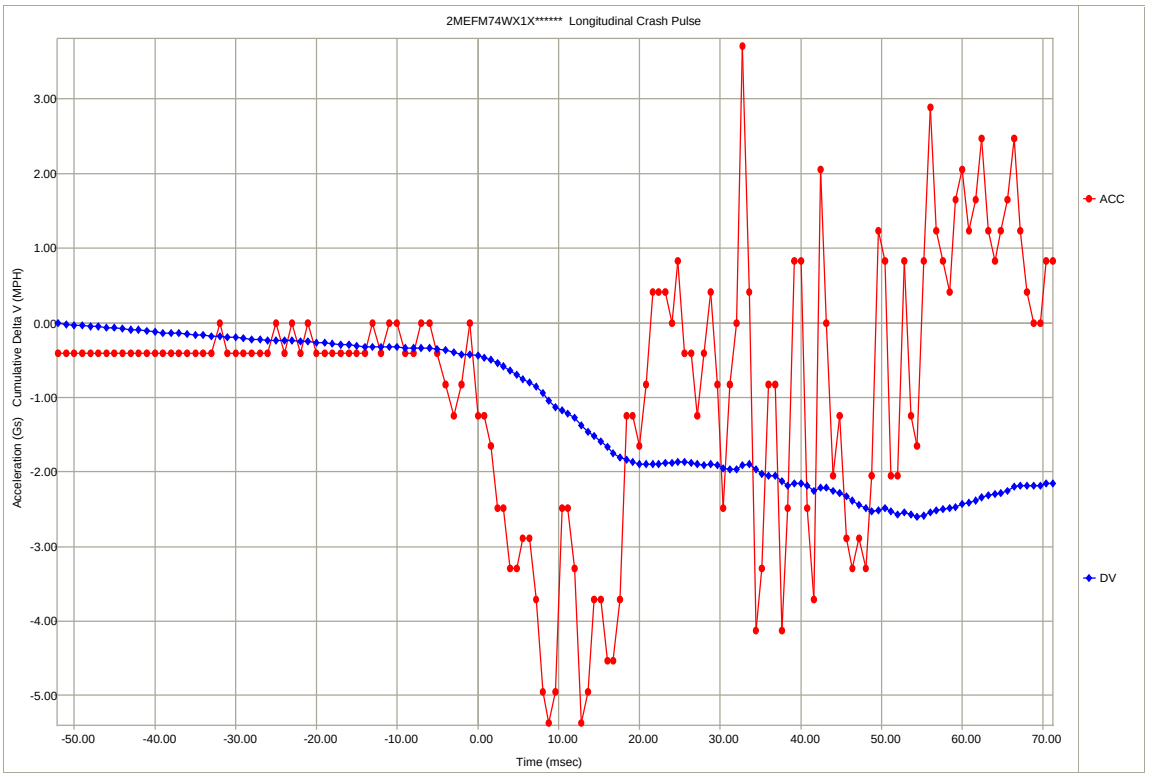
6. This module is not intended to record acceleration/deceleration in a side-impact event. If the side impact generates a longitudinal deceleration component sufficient to wake up the frontal deployment algorithm, there may be a recording of longitudinal deceleration in a side impact event.

Any Longitudinal Delta-V determined by using data read from the air bag module should be verified with physical evidence from the crash (such as vehicle crush, skid marks) and assumed accident sequence. Multiple impacts, angular collisions, side impacts, vehicle spin, etc should be considered in addition to the data read from the air bag module.

System Status At Deployment

Ford Part Number Prefix	1W7A
Diagnostic codes active when event occurred	0
Driver seat belt circuit status	Buckled
Driver seat forward of switch point	No
Right front passenger seat belt circuit status	Unbuckled
Passenger occupant classification status	Adult
Driver pretensioner	Deployment Enabled
Passenger Pretensioner	Deployment Enabled
Unbelted Stage 1	Deployment Enabled
Unbelted Stage 2	Not Enabled
Belted Stage 1	Not Enabled
Belted Stage 2	Not Enabled

Parameter	Driver	Passenger
Time between algorithm enable and seat belt pretensioner deployment (ms)	20.8	No deploy
Time between algorithm enable and air bag first stage deployment (ms)	No deploy	20.8
Time between algorithm enable and air bag second stage deployment (ms)	No deploy	120.8


2MEFM74WX1X****** Longitudinal Crash Pulse
Acceleration (Gs) Cumulative Delta V (MPH)
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
-4.00
-5.00
-50.00
-40.00
-30.00
-20.00
-10.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
Time (msec)
ACC
DV

Crash Pulse Data

Milliseconds	Long. Acceleration (Gs)	Long. Cumulative Delta V (MPH)
-52.0	-0.41	-0.01
-51.0	-0.41	-0.02
-50.0	-0.41	-0.03
-49.0	-0.41	-0.04
-48.0	-0.41	-0.05
-47.0	-0.41	-0.05
-46.0	-0.41	-0.06
-45.0	-0.41	-0.07
-44.0	-0.41	-0.08
-43.0	-0.41	-0.09
-42.0	-0.41	-0.10
-41.0	-0.41	-0.11
-40.0	-0.41	-0.12
-39.0	-0.41	-0.13
-38.0	-0.41	-0.14
-37.0	-0.41	-0.14
-36.0	-0.41	-0.15
-35.0	-0.41	-0.16
-34.0	-0.41	-0.17
-33.0	-0.41	-0.18
-32.0	0.00	-0.18
-31.0	-0.41	-0.19
-30.0	-0.41	-0.20
-29.0	-0.41	-0.21
-28.0	-0.41	-0.22
-27.0	-0.41	-0.23
-26.0	-0.41	-0.24
-25.0	0.00	-0.24
-24.0	-0.41	-0.24
-23.0	0.00	-0.24
-22.0	-0.41	-0.25
-21.0	0.00	-0.25
-20.0	-0.41	-0.26
-19.0	-0.41	-0.27
-18.0	-0.41	-0.28
-17.0	-0.41	-0.29
-16.0	-0.41	-0.30
-15.0	-0.41	-0.31
-14.0	-0.41	-0.32
-13.0	0.00	-0.32
-12.0	-0.41	-0.33
-11.0	0.00	-0.33
-10.0	0.00	-0.33
-9.0	-0.41	-0.34
-8.0	-0.41	-0.34
-7.0	0.00	-0.34
-6.0	0.00	-0.34
-5.0	-0.41	-0.35
-4.0	-0.83	-0.37
-3.0	-1.24	-0.40
-2.0	-0.83	-0.42
-1.0	0.00	-0.42

Milliseconds	Long. Acceleration (Gs)	Long. Cumulative Delta V (MPH)
0.0	-1.24	-0.44
0.8	-1.24	-0.47
1.6	-1.65	-0.49
2.4	-2.48	-0.54
3.2	-2.48	-0.58
4.0	-3.30	-0.64
4.8	-3.30	-0.70
5.6	-2.89	-0.75
6.4	-2.89	-0.80
7.2	-3.72	-0.86
8.0	-4.95	-0.95
8.8	-5.37	-1.05
9.6	-4.95	-1.13
10.4	-2.48	-1.18
11.2	-2.48	-1.22
12.0	-3.30	-1.28
12.8	-5.37	-1.37
13.6	-4.95	-1.46
14.4	-3.72	-1.52
15.2	-3.72	-1.59
16.0	-4.54	-1.67
16.8	-4.54	-1.75
17.6	-3.72	-1.81
18.4	-1.24	-1.84
19.2	-1.24	-1.86
20.0	-1.65	-1.89
20.8	-0.83	-1.90
21.6	0.41	-1.89
22.4	0.41	-1.89
23.2	0.41	-1.88
24.0	0.00	-1.88
24.8	0.83	-1.86
25.6	-0.41	-1.87
26.4	-0.41	-1.88
27.2	-1.24	-1.90
28.0	-0.41	-1.91
28.8	0.41	-1.90
29.6	-0.83	-1.91
30.4	-2.48	-1.96
31.2	-0.83	-1.97
32.0	0.00	-1.97
32.8	3.72	-1.91
33.6	0.41	-1.90
34.4	-4.13	-1.97
35.2	-3.30	-2.03
36.0	-0.83	-2.05
36.8	-0.83	-2.06
37.6	-4.13	-2.13
38.4	-2.48	-2.18
39.2	0.83	-2.16
40.0	0.83	-2.15
40.8	-2.48	-2.19
41.6	-3.72	-2.26
42.4	2.06	-2.22
43.2	0.00	-2.22

Milliseconds	Long. Acceleration (Gs)	Long. Cumulative Delta V (MPH)
44.0	-2.06	-2.26
44.8	-1.24	-2.28
45.6	-2.89	-2.33
46.4	-3.30	-2.39
47.2	-2.89	-2.44
48.0	-3.30	-2.49
48.8	-2.06	-2.53
49.6	1.24	-2.51
50.4	0.83	-2.49
51.2	-2.06	-2.53
52.0	-2.06	-2.57
52.8	0.83	-2.55
53.6	-1.24	-2.57
54.4	-1.65	-2.60
55.2	0.83	-2.59
56.0	2.89	-2.54
56.8	1.24	-2.52
57.6	0.83	-2.50
58.4	0.41	-2.49
59.2	1.65	-2.47
60.0	2.06	-2.43
60.8	1.24	-2.41
61.6	1.65	-2.38
62.4	2.48	-2.34
63.2	1.24	-2.31
64.0	0.83	-2.30
64.8	1.24	-2.28
65.6	1.65	-2.25
66.4	2.48	-2.20
67.2	1.24	-2.18
68.0	0.41	-2.18
68.8	0.00	-2.18
69.6	0.00	-2.18
70.4	0.83	-2.16
71.2	0.83	-2.15

Hexadecimal Data

```
0000:  16 BB F2 00 0B 00 00 32 0E 22 0E 2B 38 55 18 06
0010:  00 7D 0C 19 0C 19 05 CC 31 57 37 41 02 03 71 7D
0020:  61 00 35 31 30 42 38 32 43 36 00 00 00 00 00 00
0030:  00 00 00 00 00 00 00 00 00 00 32 31 30 46 30 34
0040:  46 44 00 00 00 00 00 00 00 00 17 00 1D 00 00 00
0050:  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0060:  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0070:  00 00 00 00 01 00 00 00 00 00 00 00 00 00 33 01
0080:  83 81 7E 7E 7E 7F 7D 80 80 82 80 7E 81 85 81 7F
0090:  76 7E 89 87 81 81 89 85 7D 7D 85 88 7A 7F 84 82
00A0:  86 87 86 87 84 7C 7D 84 84 7D 82 83 7D 78 7C 7D
00B0:  7E 7B 7A 7C 7B 79 7C 7D 7C 7B 79 7C 7E 7F 7F 7D
00C0:  7D 80 80 80 80 80 80 80 80 80 80 80 80 80 80 80
00D0:  80 80 80 80 80 7F 80 80 80 80 80 80 7F 80 7F 80
00E0:  7F 80 80 80 80 80 80 80 7F 80 7F 7F 80 80 7F 7F
00F0:  80 81 82 81 7F 82 82 83 85 85 87 87 86 86 88 8B
0100:  8C 8B 85 85 87 8C 8B 88 88 8A 8A 88 82 82 00 00
0110:  00 00 00 16 00 93 00 16 00 00 00 16 00 00 19 1B
0120:  19 00 00 04 00 19 00 00 00 55 00 59 42 41 7F 21
0130:  20 33 8E 03 02 6C 0A 0C 02 02 0E 85 07 43 09 AE
0140:  01 00 00 00 05 05 03 04 05 05 03 FE 00 24 00 5E
0150:  00 61 00 DF 00 A9 00 00 00 C2 09 AE 01 5C 00 F9
0160:  00 ED 00 FE 01 2A 01 1B 00 80 01 8F 00 C6 01 8F
0170:  00 8C 01 2A 01 1B 00 D0 00 E3 02 B2 01 F0 01 6D
0180:  01 99 00 F9 00 94 00 BF 00 C6 00 A9 00 ED 00 85
0190:  FF FE FF FE 00 6D FF FE 00 72 00 B3 00 BD 00 00
01A0:  00 BD 07 02 0A 02 02 6C 04 D7 13 5C 09 AE 00 00
01B0:  00 01 03 0A 03 06 04 04 05 04 00 63 00 C2 00 79
01C0:  01 83 00 C2 00 3D 00 49 00 91 09 AE 01 F0 00 2C
01D0:  00 63 00 C6 00 63 00 F7 00 63 00 A2 00 50 01 3F
01E0:  FF FE 02 2F 01 0D 00 94 01 0D 01 E9 01 8F 00 C6
01F0:  00 79 00 B6 00 DF 00 96 00 C4 00 C6 29 00 8A A5
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