CDR File Information

Vehicle Identification Number	1FAFP53UX1G******
Investigator	
Case Number	
Investigation Date	
Crash Date	
Filename	2003-11-082-V1.CDR
Saved on	xxxxx
Collected with CDR version	Crash Data Retrieval Tool 2.00
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 June 19, 2003, at 1:44 PM.

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

Disclaimer: This Restraint Control Module (RCM) records 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 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 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 previously recorded data. Further analysis will be required to determine which of the events was actually recorded.

3. The computed longitudinal and lateral Delta-V's may understate the total Delta-V.

The memory in the 2000 Taurus module records 40 acceleration data points at 2 ms intervals, for a total recording length of 80 milliseconds. 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 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 calculating 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.

4. This module records longitudinal acceleration/deceleration of the vehicle and separately records the lateral acceleration/deceleration. You must combine and integrate the longitudinal and lateral recordings to get a resultant total change in velocity (Delta-V).

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.

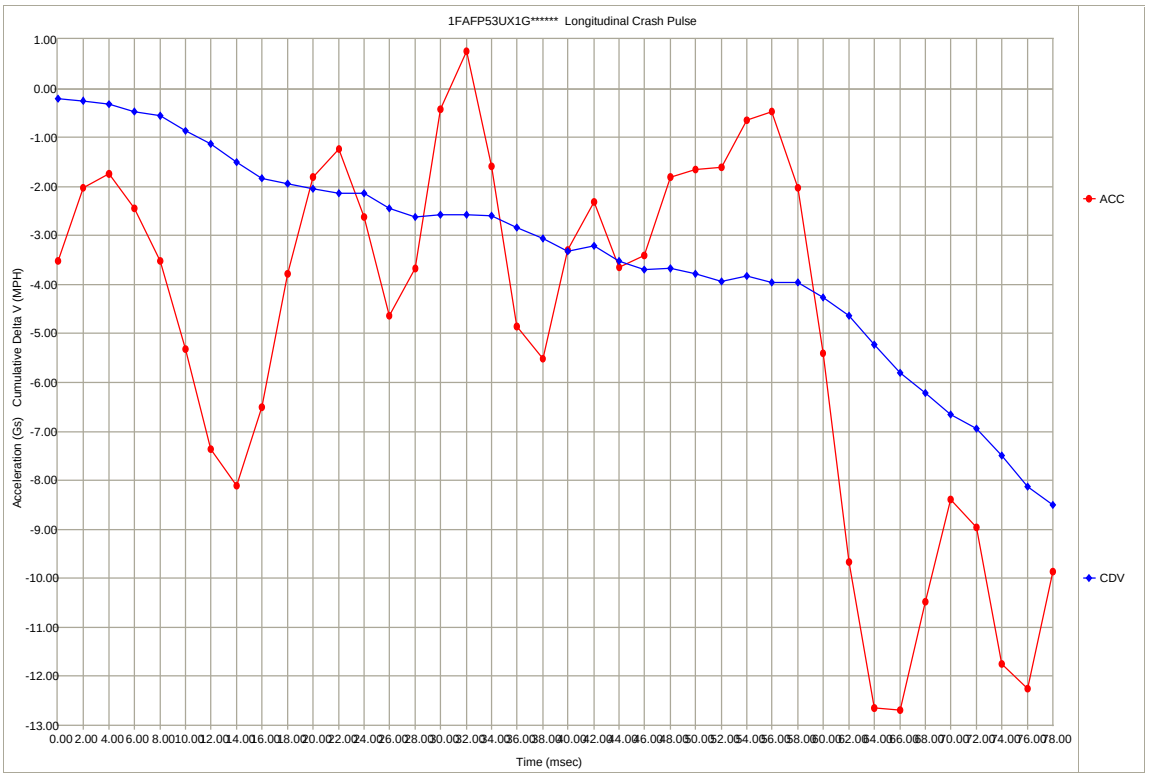
6. This module may not record any lateral or longitudinal acceleration/deceleration in a side-impact event. If the side impact generates a longitudinal deceleration component sufficient to wake up the frontal deployment algorithm, there may be a recording of both longitudinal and lateral deceleration.

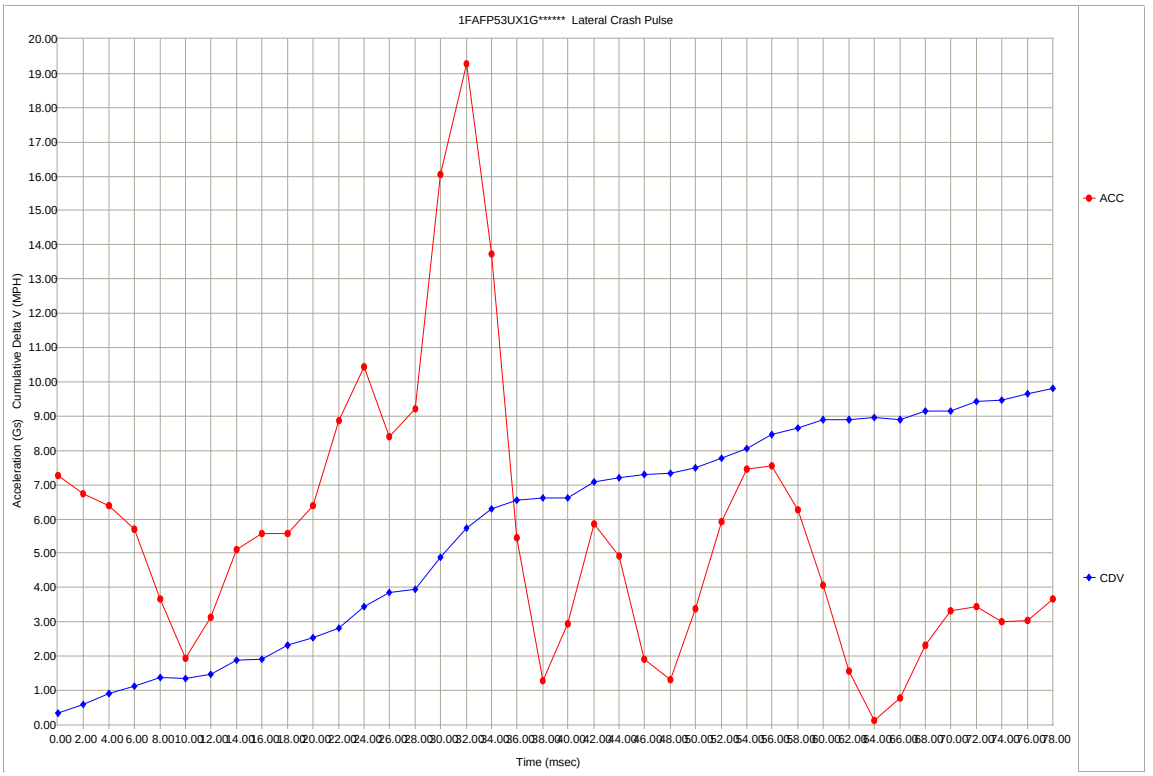
Any Delta-V determined by using data read from the air bag module should be verified with physical evidence from the crash (such as vehicle crush, skid marks) and assumed accident sequence. Multiple impacts, angular collisions, side impacts, vehicle spin, etc should be considered in addition to the data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

System Status At Deployment

Diagnostic codes active when event occurred	0
Algorithm runtime (msec)	251
Data Validity Check	Valid
EDR Model Version	141
Driver seat belt circuit status	Unbuckled
Driver seat forward of switch point	No
Right front passenger seat belt circuit status	Unbuckled
Time From Algorithm Wakeup to Pretensioner (msec)	121
Time From Algorithm Wakeup to First Stage - Unbelted (msec)	121
Time From Algorithm Wakeup to First Stage - Belted (msec)	0
Time From Algorithm Wakeup to Second Stage (msec)	0

Parameter	Driver	Passenger
Time between algorithm enable and seat belt pretensioner deployment (ms)	Unbuckled	Unbuckled
Time between side safing and side air bag deployment (msec)	Not Deployed	Not Deployed
Time between algorithm enable and air bag first stage deployment (ms)	121	121
Time between algorithm enable and air bag second stage deployment (ms)	0	0


1FAFP53UX1G****** Longitudinal Crash Pulse
Acceleration (Gs) Cumulative Delta V (MPH)
Time (msec)
ACC
CDV


1FAFP53UX1G****** Lateral Crash Pulse
Acceleration (Gs) Cumulative Delta V (MPH)
Time (msec)
ACC
CDV

Crash Pulse Data

Milliseconds	Long. Acceleration (Gs)	Long. Cumulative Delta V (MPH)	Lat. Acceleration (Gs)	Lat. Cumulative Delta V (MPH)
0	-3.51	-0.20	7.26	0.33
2	-2.03	-0.24	6.75	0.61
4	-1.74	-0.31	6.39	0.90
6	-2.44	-0.48	5.71	1.12
8	-3.52	-0.55	3.66	1.38
10	-5.33	-0.86	1.95	1.36
12	-7.37	-1.12	3.13	1.47
14	-8.10	-1.51	5.11	1.87
16	-6.51	-1.82	5.58	1.91
18	-3.78	-1.93	5.59	2.31
20	-1.81	-2.04	6.38	2.55
22	-1.23	-2.13	8.88	2.81
24	-2.63	-2.13	10.43	3.45
26	-4.64	-2.44	8.39	3.86
28	-3.68	-2.61	9.23	3.95
30	-0.42	-2.57	16.06	4.90
32	0.75	-2.57	19.28	5.75
34	-1.60	-2.59	13.73	6.30
36	-4.86	-2.85	5.47	6.56
38	-5.51	-3.07	1.28	6.61
40	-3.29	-3.32	2.94	6.63
42	-2.31	-3.21	5.87	7.07
44	-3.65	-3.53	4.91	7.20
46	-3.42	-3.69	1.92	7.29
48	-1.80	-3.67	1.32	7.33
50	-1.66	-3.78	3.39	7.49
52	-1.62	-3.93	5.94	7.77
54	-0.64	-3.82	7.47	8.06
56	-0.46	-3.97	7.54	8.45
58	-2.03	-3.95	6.28	8.65
60	-5.40	-4.26	4.09	8.91
62	-9.67	-4.63	1.58	8.91
64	-12.64	-5.23	0.14	8.98
66	-12.70	-5.80	0.77	8.91
68	-10.48	-6.21	2.32	9.16
70	-8.39	-6.65	3.33	9.16
72	-8.97	-6.94	3.44	9.44
74	-11.74	-7.49	3.00	9.48
76	-12.25	-8.12	3.04	9.64
78	-9.86	-8.50	3.68	9.81

Hexadecimal Data

```
0800:  10 4A 40 76 14 FB FF FF FF FF 0E 24 0F 2D 3A 57
0810:  C8 FF 00 FF 52 60 52 60 60 52 E3 20 3C 78 D6 A0
0820:  08 03 28 37 5F 0F 0F 0A F5 0A B7 84 A1 5E C9 95
0830:  03 0C 1B 1E 00 FF 3C 3C 80 06 28 64 64 00 0C 01
0840:  5A 96 50 FF FF FF EF DF D5 E7 FF 72 4E 13 25 B1
0850:  EC 14 09 0F 01 FF FF 73 7F FF CD 44 08 FF FF 95
0860:  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0870:  05 3C AE 48 E4 00 8F FF 59 46 31 41 00 03 FF 10
0880:  0F FF 80 13 FF 80 17 FF 80 1C FF 80 25 FF 80 FF
0890:  02 FF 80 03 FF 80 04 FF 80 09 FF 80 0A FF 80 FF
08A0:  5C 86 8C 10 20 3A 38 01 00 00 FF FF FF FF FF FF
08B0:  02 FF 81 38 00 8D 01 FF FF FF FF FF 38 01 E3 C3
08C0:  FF 31 01 E3 C3 22 01 E3 C3 08 50 93 98 34 FF FE
08D0:  01 0E 0C 80 02 58 16 87 1F BE 01 0A 00 8C 01 04
08E0:  00 F0 01 36 00 A0 01 54 00 3F 02 30 02 C7 02 8A
08F0:  05 14 07 08 01 2C 03 CA 04 CE 06 40 73 33 00 A0
0900:  3F FF 00 03 00 4B 01 CC 00 03 0F FF 00 14 00 78
0910:  00 A0 00 6E 0A 16 FF 01 00 00 00 7F 0F 0C 0F 02
0920:  03 5A 32 46 05 50 02 02 FA 1E 08 0C 0A 1C 02 23
0930:  09 06 28 32 16 20 16 1F 5F FF FF 02 FF FF FF 11
0940:  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0950:  79 00 00 00 79 00 00 0F 1A 00 02 13 1D 43 42 00
0960:  11 00 00 2E 79 1B 0A 00 00 00 00 1F 60 0D 21 D9
0970:  00 00 FB 10 A5 80 B3 B1 AF AC AB A9 AF B0 AC AA
0980:  A3 A1 A7 B1 AE AD A7 A7 AD B4 B0 B2 AA A4 A4 A6
0990:  AC B0 B3 B7 B2 A8 A5 A9 AD A8 AC AF AA AE AB 9C
09A0:  A3 A2 9D A2 97 99 93 97 A0 A0 A1 A5 97 9D A7 A5
09B0:  A4 99 9B 9A AA 96 9E A6 A0 9E AA 9E A6 97 94 8A
09C0:  8B 92 91 98 8C 88 94 8F 8D 8D 8A 8C 7F 85 92 82
09D0:  92 8B 8C 9D 93 84 AB A7 99 8C 82 81 94 86 84 82
09E0:  87 8D 8D 92 89 8C 80 83 7D 8B 80 8D 82 87 88 00
09F0:  00 00 00 00 00 00 00 FF FF 65 00 FF FF FF FF 04
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