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ON-SITE CERTIFIED ADVANCED 208-COMPLIANT VEHICLE INVESTIGATION

CASE NUMBER - IN08006
LOCATION - MICHIGAN
VEHICLE - 2007 PONTIAC G6 SE
CRASH DATE - December 2007

Submitted:

September 16, 2008

Contract Number: DTNH22-07-C-00044

Prepared for:

U.S. Department of Transportation
National Highway Traffic Safety Administration
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The crash investigation process is an inexact science which requires that physical evidence such as skid marks, vehicular damage measurements, and occupant contact points be coupled with the investigator's expert knowledge and experience of vehicle dynamics and occupant kinematics in order to determine the pre-crash, crash, and post-crash movements of involved vehicles and occupants.

Because each crash is a unique sequence of events, generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicle(s) or their safety systems.

Technical Report Documentation Page

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15. *Supplementary Notes* On-site Certified Advanced 208-Compliant Vehicle Investigation involving a 2007 Pontiac G6 with manual safety belts and dual front advanced air bag system.			
16. *Abstract* This report covers an on-site investigation of a crash that involved a 2007 Pontiac G6, which ran off the road and impacted an impact attenuator and rolled over. This crash is of special interest because the supplemental restraint system in the Pontiac is certified by the manufacturer to be compliant to the Advanced Air Bag portion of the Federal Motor Vehicle Safety Standard (FMVSS) No. 208. The Pontiac was traveling southwest in the center lane of an interchange area and was approaching a left exit ramp. The driver steered left when a non-contact vehicle encroached into the center lane from the right lane. The Pontiac rotated counterclockwise and entered the gore of the exit ramp and the right side stuck an impact attenuator. The vehicle rotated clockwise off the impact attenuator and rolled over on the roadway, passenger side leading, two quarter turns. The vehicle came to final rest on its top, on the exit lane, heading southwest. The driver and sole occupant of the vehicle was transported to a hospital and was treated and released.			
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This crash was brought to the National Highway Traffic Safety Administration's attention on or before February 15, 2008 by the sampling activities of the National Automotive Sampling System. The crash involved a 2007 Pontiac G6 SE (**Figure 1**) that departed the roadway and struck an impact attenuator and rolled over. The crash occurred in December, 2007 at 00:56 hours, in Michigan and was investigated by the Michigan State Police. This crash is of special interest because the supplemental restraint system in the Pontiac is certified by the manufacturer to be compliant to the Advanced Air Bag portion of the Federal Motor Vehicle Safety Standard (FMVSS) No. 208. This contractor inspected the Pontiac and harvested the Sensing and Diagnostic Module (SDM), which contains the Event Data Recorder (EDR) on February 27, 2008. The driver interview and scene inspection were completed on February 28, 2008. This report is based on the police crash report, scene and vehicle inspections, driver interview, driver medical records, occupant kinematic principles, and this contractor's evaluation of the evidence.

Figure 1: The damaged 2007 Pontiac G6

SUMMARY

The Pontiac was traveling southwest in the center lane of an interchange area and was approaching a left exit ramp. The driver steered left when a non-contact vehicle encroached into the center lane from the right lane. The steering maneuver caused the Pontiac to rotate counterclockwise and it entered the gore of the exit ramp and the right side stuck an impact attenuator. The vehicle rotated clockwise off the impact attenuator and rolled over on the roadway, passenger side leading, two quarter turns. The vehicle came to final rest on its top, on the exit lane, heading southwest. The driver and sole occupant of the vehicle was transported to a hospital and was treated and released.

CRASH CIRCUMSTANCES

Crash Environment: The Pontiac was traveling southwest within a one way 3-lane interchange area of a 6-lane, divided, state highway. The vehicle was approaching a left exit ramp, which was equipped with a crash attenuator located within the gore. The roadway had a negative grade greater than 2% and was curved right, but it was not possible to document the specifics of the physical plant due to safety concerns. The speed limit for the Pontiac was 72 km/h (45 mph). At the time of the crash the light condition was dark with overhead lighting, the weather was cloudy, and the roadway pavement was dry bituminous. The site of the crash was urban and the traffic density was light. See the Crash Diagram on page 9 of this report.

Pre-Crash: The Pontiac was occupied by an unrestrained 24-year old male driver. He was traveling in the center lane approaching the exit ramp and intended to continue traveling

southwest. He stated during the interview that a non-contact vehicle encroached into his lane from the right and he steered left to avoid it, which redirected the vehicle toward an impact attenuator located within the gore of the exit ramp (**Figure 2**). He could not recall if he also applied the brakes. The EDR pre-crash data indicated that the driver applied the brakes and then initiated a hard left steer maneuver, which was followed by a right steer maneuver. The EDR recorded the vehicle traveling 146 km/h (91 mph) 5 seconds prior to Algorithm Enable (AE) and the brake switch was recorded as "on" beginning at 3 seconds prior to AE. The steering wheel angle was recorded as negative 192 degrees (left steer) at 2 seconds prior to AE and 48 degrees (right steer) at 1 second prior to AE. The brakes remained on until the end of the pre-crash recording at 1 second prior to AE where the vehicle's speed was recorded as 77 km/h (48 mph).

Crash: The Pontiac entered the gore in a counterclockwise yaw and the vehicle's right side (**Figure 3**) struck the impact attenuator (**Figure 2**, event 1) causing the right side curtain air bag to deploy. The center of the direct damage was aft of the vehicle's center of gravity, which caused the vehicle to reverse rotation and rotate clockwise off the attenuator. As the vehicle rotated, its lateral motion was resisted by the roadway friction against the right side tires, which induced a roll moment and the vehicle rolled over (event 2), passenger side leading, two quarter turns onto the top (**Figure 4**). Due to the lack of scene evidence, the amount of rotation prior to the rollover could not be determined, but was estimated to be approximately 285 degrees. As the vehicle was on its top, the left quarter panel (**Figure 4**) impacted a concrete traffic barrier (event 3) located on the south side of the exit ramp (**Figure 5**). The vehicle came to final rest on its top on the south shoulder of the exit ramp heading southwest.

Figure 2: Approach of the Pontiac to the crash site; arrow shows location of the crash with the impact attenuator

Figure 3: Damage to right side doors from contact with impact attenuator; left arrow shows damage from impact with concrete traffic barrier; right arrow show damage to right fender from the rollover

Figure 4: Damage to the hood and roof from the rollover

Post-Crash: The driver exited the vehicle through the left front window, which was open as a result of the glazing disintegrating during the rollover. The police were notified of the crash and the driver waited on the roadside for their arrival. Both police and emergency medical personnel responded to the scene and the driver was transported by ambulance to a hospital. He was treated in the emergency room and released. The Pontiac was towed from the scene due to damage.

Figure 5: Police on-scene photo showing back view of Pontiac at final rest against concrete traffic barrier on southeast side of exit ramp; arrow shows scratches in concrete from right quarter panel impact

CASE VEHICLE

The 2007 Pontiac G6 SE was a front wheel drive, 4-door, sedan (VIN: 1G2ZF58B074------) equipped with a 2.4L, 4-cylinder engine and automatic transmission. The front row was equipped with dual stage driver and front right passenger frontal air bags, bucket seats with adjustable head restraints, and lap-and-shoulder belts. The second row was equipped with a bench seat with adjustable head restraints, Lower Anchors and Tethers for Children (LATCH) in the outboard seating positions, and lap-and-shoulder belts. The Pontiac was also equipped with right and left side curtain air bags protecting the outboard seating positions. Front seat back-mounted side impact air bags were an option, but the vehicle was not so equipped. The vehicle's mileage at inspection could not be determined due to the electronic odometer. The driver estimated that the vehicle's mileage was approximately 9656 kilometers (6000 miles). The vehicle's specified wheelbase was 285 centimeters (112.3 inches).

CASE VEHICLE DAMAGE

Exterior Damage: The Pontiac's collision with the impact attenuator (event 1) involved the right side plane and the right front door and rear doors (**Figure 1**) were directly damaged. The direct damage began 89 centimeters (35 inches) rear of the right front axle and extended 145 centimeters (57.1 inches) rearward along both doors. The crush measurements were taken at the mid-door level and the residual maximum crush was 7 centimeters (2.8 inches) occurring at C_4. The table below shows the vehicle's right side crush profile.

Units	Event	Direct Damage		Field L	C_1	C_2	C_3	C_4	C_5	C_6	Direct	Field L
		Width CDC	Max Crush								±D	±D
cm	1	145	7	213	0	6	5	7	0	0	-15	-9
in		57.1	2.8	83.9	0.0	2.4	2.0	2.8	0.0	0.0	-5.9	-3.5

The damage from the rollover (event 2) involved the right side plane and the top plane. The right fender, A-pillar, quarter panel, front and rear wheels, hood, windshield, and roof were

directly damaged. The front portion of the roof was crushed and the most extensive scratching was on the right A-pillar (**Figure 6**). The maximum vertical crush was 11 centimeters (4.3 inches) and occurred to the windshield header (**Figure 7**) 5 centimeters (2 inches) left of the vehicle's centerline. There was no measurable lateral crush to the roof structure.

Figure 6: Pavement scratches from the rollover on the right A-pillar

Figure 7: Maximum crush occurred at windshield header; each increment on rods is 5 cm (2 in)

The impact to the concrete traffic barrier (event 3) involved the right quarter panel. The direct damage began 30 centimeters forward of the right rear axle and extended 100 centimeters rearward. This was a non-horizontal impact, which occurred during the rollover as the vehicle was on its top. It partially overlapped the damage from the rollover and no crush measurements were taken.

The induced damage involved the roof and hood. The vehicle's left side wheelbase was unchanged and the right side wheelbase was extended 1 centimeter (0.4 inches).

Damage Classification: The CDCs for the Pontiac were **03-RPEW-1** (**100** degrees) for the contact with the impact attenuator (event 1), **00-TYDO-3** for the rollover (event 2) and **00-RBMW-3** (event 3) for the impact with concrete traffic barrier. An impact with a yielding object such as the impact attenuator are out of scope for the WinSMASH reconstruction program. However, the Barrier Algorithm was used to calculate a Barrier Equivalent Speed (BES) based on the right side crush, and the BES was 14.7 km/h (9.1 mph). The severity of the rollover was moderate based on the extent of roof crush. The severity of the quarter panel impact was minor due to the absence of passenger compartment intrusion.

The manufacturer's recommended tire size was P215/60R16. The Pontiac was equipped with tires of the recommended size. The vehicle's tire data are shown in the table below.

Tire	*Measured Pressure*		*Vehicle Manufacturer's Recommended Pressure*		*Tread Depth*		*Damage*	*Restricted*	*Deflated*
	kPa	psi	kPa	psi	milli-meters	32nd of an inch			
LF	200	29	207	30	6	8	None	No	No
LR	Flat	Flat	207	30	8	10	None	No	Yes
RR	110	16	207	30	8	10	None	No	No
RF	83	12	207	30	7	9	None	No	No

Vehicle Interior: The Pontiac's left front and left rear doors were closed and operational and the right front and right rear doors were jammed shut. The side windows were closed at the time of the crash and the glazing in the left front, right front, and right rear windows as well as the backlight was disintegrated due to impact forces. Evidence of occupant contact was found on the left side of the center floor console, which was cracked and broken (**Figures 8** and **9**). The console was loaded by the driver's right hip, thigh and lower leg during the right side impact. The most severe passenger compartment intrusions involved the roof and right rear door. The roof intruded vertically 10 centimeters (3.9 inches) into the left and middle front row sectors (**Figure 9**). The right rear door intruded 10 centimeters (3.9 inches) laterally into the second row right sector. There was no evidence of deformation of the steering wheel rim or compression of the energy absorbing steering column.

Figure 8: View of driver's seat and broken floor console (arrow)

Figure 9: View of roof, windshield, and windshield header intrusion; arrow shows broken console

MANUAL RESTRAINT SYSTEM

The Pontiac was equipped with lap-and-shoulder belts in all five seating positions. The front row seat belts were equipped with retractor mounted pretensioners, load limiters, and buckle switch sensors. The driver's seat belt consisted of continuous loop belt webbing, an Emergency Locking Retractor (ELR), sliding latch plate, and an adjustable upper anchor that was adjusted to the middle position. The front right seat belt was equipped with a switchable ELR/Automatic

Locking Retractor (ALR), sliding latch plate, and adjustable upper anchor that was adjusted to the full down position.

The inspection of the driver's seat belt assembly revealed that the belt was not used during the crash. There was no evidence of loading and the pretensioner had actuated during the crash locking the seat belt tightly in the retracted position. The EDR also recorded the driver's belt switch circuit as unbuckled. The front right seat position was not occupied.

The second row lap-and-shoulder belts were equipped with continuous loop belt webbing, switchable ELR/ALR retractors, sliding latch plates and fixed upper anchors. They were not equipped with pretensioners. The second row seating positions were not occupied.

AUTOMATIC RESTRAINT SYSTEM

The Pontiac was equipped with a manufacturer Certified Advanced 208-Compliant (CAC) frontal air bag system that consisted of dual stage driver and front right passenger air bags, seat belt usage sensors, retractor mounted pretensioners and a front right passenger presence sensor. The various sensors in the CAC system analyze a combination of factors including the predicted crash severity and driver and front right passenger seat belt usage to determine the front air bag inflation level appropriate for the severity of the crash. For the front right seat position, an occupant weight sensor in the seat cushion determines if an occupant is on the seat and enables or suppresses deployment of the passenger air bag based on the amount of weight on the seat. For the side curtain air bag system, a side impact sensor is located in the left front and right front doors. The side curtain air bag system is designed to provide additional occupant head protection in the event of a side impact.

The driver's frontal air bag was located in the steering wheel hub. The front right passenger's frontal air bag was located in the middle of the instrument panel. The vehicle did not sustain a front impact and neither of these air bags deployed.

The right side curtain air bag was located along the right roof side rail inside the headliner and extended from the A-pillar to the C-pillar (**Figures 10** and **11**). The air bag was attached to right A-pillar by a cloth tether and there was no visible tether at the C-pillar. The air bag was 155 centimeters (61 inches) in length and 29 centimeters (11.4 inches) in height. There were no visible vent ports. Inspection of the right side curtain air bag revealed no discernable occupant contacts and the air bag was not damaged. The left side curtain air bag did not deploy.

Figure 10: Front portion of right side curtain air bag; each increment on rods is 5 cm (2 in)

Figure 11: Rear portion of right side curtain air bag

The Pontiac's EDR was harvested during the vehicle inspection and subsequently downloaded with version 2.9 of the Vetronix Crash Data Retrieval tool. The EDR recorded a deployment event and a non-deployment event. The deployment event was associated with the impact attenuator impact (event 1). The System Status at Deployment record indicated that the pre-crash data was associated with the deployment event and the recording of the data was complete. The SIR warning lamp was recorded as off and the driver's seat belt switch circuit was recorded as unbuckled. The time from AE to the deployment command criteria being met for the right side curtain air bag was 1.25 milliseconds, and the driver and front right seat belt pretensioners were commanded to deploy. The maximum lateral velocity change was -74.17 km/h (-46.09 mph) and was recorded at 300 milliseconds after AE. The longitudinal velocity change at 300 milliseconds was recorded as 9.82 km/h (6.10 mph). The EDR report is attached at the end of this report.

CASE VEHICLE DRIVER KINEMATICS

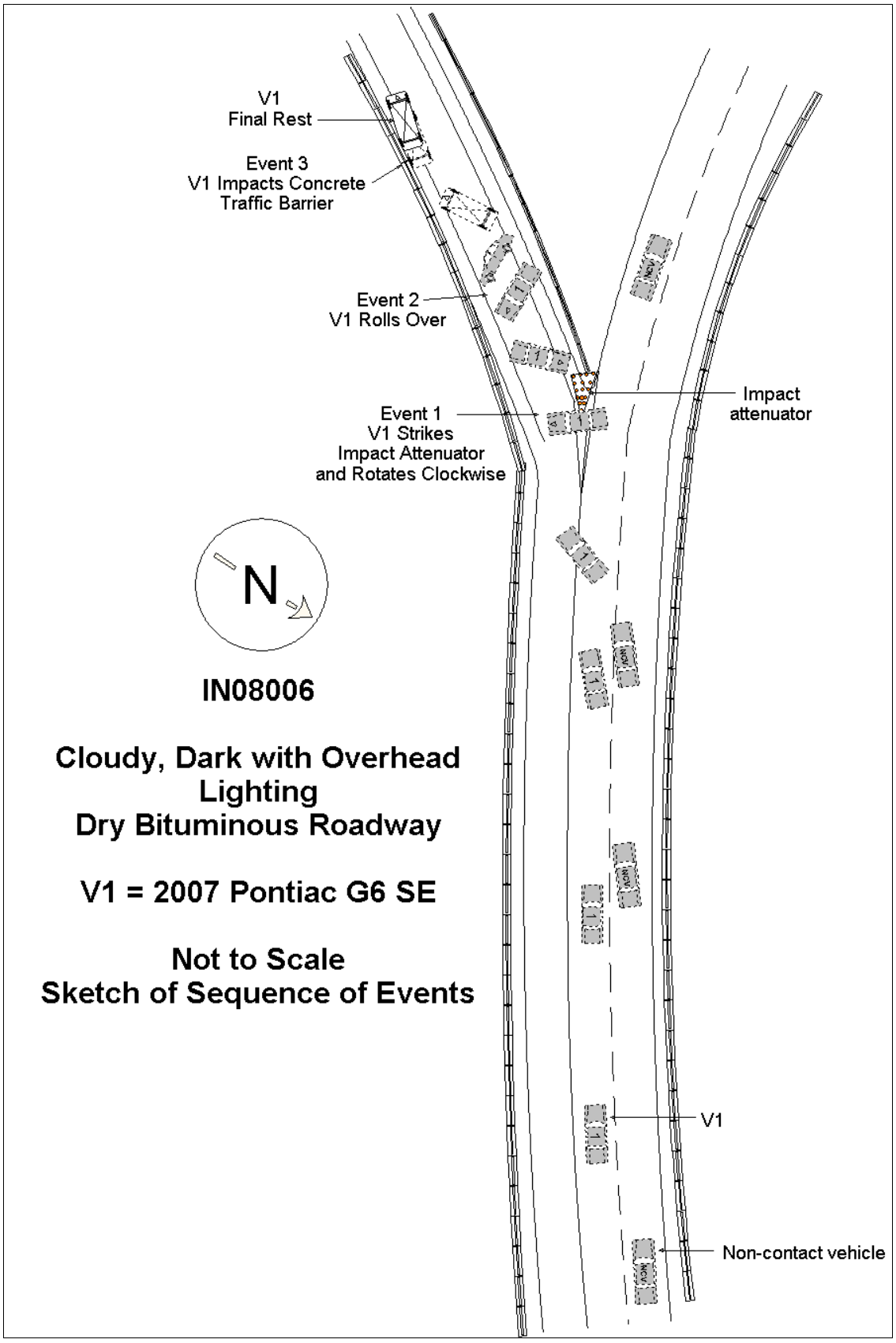
The Pontiac's driver [24-year-old, male, 178 centimeters and 104 kilograms (70 inches and 230 pounds)] stated during the interview that he was seated in an upright posture with his back against the seat back and both hands on the steering wheel at the 10 and 2 o'clock positions. The driver's seat track was located in the full rear position and the seat back was slightly reclined. The tilt and telescoping steering column was adjusted to the full up and full forward positions, respectively. The driver was not restrained and not wearing glasses at the time of the crash

The driver's left steer maneuver prior to the collision with the impact attenuator displaced the driver slightly to the right within the seat. The Pontiac's right side impact with the attenuator displaced the driver to the right, opposite the 9 o'clock direction of principal force. His right thigh and hip loaded the center console and his right lower chest loaded to top of the center console. The interaction with the console fractured several right lower ribs (the driver was not sure if it was 2 or 3). There was no evidence within the vehicle that the unrestrained driver was displaced out of the seat position and contacted the right front door or the deployed right side curtain air bag. As the vehicle rolled over passenger side leading, the driver was displaced out of his seat position and his head contacted the roof, which resulted in a nonanatomic brain injury and a large left parietal scalp contusion. The driver also sustained several lacerations and abrasions to his head and face from flying glass particles.

The Pontiac's driver sustained moderate injuries. He was treated in the emergency room and then admitted to the general surgery service where he was kept under observation for 9 hours and then released. The table below shows the driver's injuries and injury sources.

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source	Source Confidence	Source of Injury Data
1	Nonanatomic brain injury with amnesia and possible loss of consciousness for a short duration	moderate 160410.2,0	Roof	Probable	Emergency room records
2	Laceration, 4-5 cm (1.6-2 in), left parietal scalp, horizontally above left ear	minor 190602.1,2	Noncontact injury: flying glass, unknown source	Probable	Hospitalization records
3	Contusion {hematoma}, large, left parietal scalp with multiple foreign bodies (glass) embedded	minor 190402.1,2	Roof	Probable	Hospitalization records
4	Abrasions right temporal region, including right ear	minor 290202.1,1	Noncontact injury: flying glass, right front glazing	Probable	Hospitalization records
5	Lacerations {cuts}, multiple, vertically on right side of face, including one 7.6 cm (3 in)	minor 290600.1,1	Noncontact injury: flying glass, right front glazing	Probable	Emergency room records
6 7	Abrasions nose and lip with foreign bodies (glass) inside nasal cavity	minor 290202.1,4 290202.1,8	Noncontact injury: flying glass, unknown source	Probable	Hospitalization records
8	Fracture ribs: 2 or 3 right lateral lower side, not further specified[1]	moderate 450220.2,1	Center console	Possible	Interviewee (same person)

[1] X-rays were taken of the chest with the focus on the lungs, heart, and mediastinum; no mention was made of the osseous structures.


V1
Final Rest
Event 3
V1 Impacts Concrete
Traffic Barrier
Event 2
V1 Rolls Over
Event 1
V1 Strikes
Impact Attenuator
and Rotates Clockwise
Impact
attenuator
N
IN08006
Cloudy, Dark with Overhead
Lighting
Dry Bituminous Roadway
V1 = 2007 Pontiac G6 SE
Not to Scale
Sketch of Sequence of Events
V1
Non-contact vehicle

CDR File Information

Vehicle Identification Number	1G2ZF58B074******
Investigator	
Case Number	
Investigation Date	
Crash Date	
Filename	IN08006.CDR
Saved on	Friday, March 14 2008 at 08:52:28 AM
Collected with CDR version	Crash Data Retrieval Tool 2.900
Reported with CDR version	Crash Data Retrieval Tool 2.900
Event(s) recovered	Deployment Non-Deployment

SDM Data Limitations

SDM Recorded Crash Events:
There are two types of SDM recorded crash events. The first is the Non-Deployment Event. A Non-Deployment Event is an event severe enough to "wake up" the sensing algorithm but not severe enough to deploy the air bag(s). It can contain Pre-Crash and Crash data. The SDM can store up to one Non-Deployment Event. This event can be overwritten by an event that has a greater SDM recorded vehicle forward velocity change. This event will be cleared by the SDM after the ignition has been cycled 250 times.
The second type of SDM recorded crash event is the Deployment Event. It also can contain Pre-Crash and Crash data. The SDM can store up to two different Deployment Events, if they occur within five seconds of one another. Deployment Events cannot be overwritten or cleared from the SDM. Once the SDM has deployed the air bag, the SDM must be replaced.
The data in the Non-Deployment Event file will be locked after a Deployment Event, if the Non-Deployment Event occurred within 5 seconds before the Deployment Event unless a Deployment Level Event occurs within 5 seconds after the Deployment Event, then the Deployment Level Event will overwrite the Non-Deployment Event file.

SDM Data Limitations:
-SDM Recorded Vehicle Forward Velocity Change reflects the change in forward velocity that the sensing system experienced during the recorded portion of the event. SDM Recorded Vehicle Forward Velocity Change is the change in velocity during the recording time and is not the speed the vehicle was traveling before the event, and is also not the Barrier Equivalent Velocity. This data should be examined in conjunction with other available physical evidence from the vehicle and scene when assessing occupant or vehicle forward velocity change. For Deployment Events and Deployment Level Events, the SDM will record 220 milliseconds of data after deployment criteria is met and up to 70 milliseconds before deployment criteria is met. For Non-Deployment Events, the SDM will record up to the first 300 milliseconds of data after algorithm enable. The minimum SDM Recorded Vehicle Forward Velocity Change, that is needed to record a Non-Deployment Event, is 5 MPH.
-Maximum Recorded Vehicle Velocity Change is the maximum recorded velocity change in the vehicle's combined "X" and "Y" axis.
-Event Recording Complete will indicate if data from the recorded event has been fully written to the SDM memory or if it has been interrupted and not fully written.
-SDM Recorded Vehicle Speed accuracy can be affected if the vehicle has had the tire size or the final drive axle ratio changed from the factory build specifications.
-Brake Switch Circuit Status indicates the status of the brake switch circuit.
-Pre-Crash Electronic Data Validity Check Status indicates "Data Invalid" if the SDM receive an invalid message from the module sending the pre-crash data.
-Driver's and Passenger's Belt Switch Circuit Status indicates the status of the seat belt switch circuit. The Passenger Belt Switch Circuit Status for 2005 vehicles is only available on the Cadillac STS. Also, the Passenger Belt Switch Circuit Status for 2006 Chevrolet Cobalt Sport Coupe (AP) model vehicles, with the option package that includes Recaro brand seats (RPO ALV), will always report a default value of "Buckled".
-The Time Between Non-Deployment and Deployment Events is displayed in seconds. If the time between the two events is greater than 5 seconds, "N/A" is displayed in place of the time. If the value is negative, then the Deployment Event occurred first. If the value is positive, then the Non-Deployment Event occurred first.
-If power to the SDM is lost during a crash event, all or part of the crash record may not be recorded.
-The ignition cycle counter relies upon the transitions through OFF->RUN->CRANK power-moding messages, on the GMLAN communication bus, to increment the counter. Applying and removing of battery power to the module will not increment the ignition counter.
-Steering Wheel Angle data is displayed as a positive value, when the steering wheel is turned to the right, and a negative value, when the steering wheel is turned to the left.
SDM Data Source:
All SDM recorded data is measured, calculated, and stored internally, except for the following:
-Vehicle Status Data (Pre-Crash) is transmitted to the SDM, by various vehicle control modules, via the vehicle's communication network.
-The Belt Switch Circuit is wired directly to the SDM.

Multiple Event Data

Associated Events Not Recorded	0
An Event(s) Preceded the Recorded Event(s)	No
An Event(s) was in Between the Recorded Event(s)	No
An Event(s) Followed the Recorded Event(s)	No
The Event(s) Not Recorded was a Deployment Event(s)	No
The Event(s) Not Recorded was a Non-Deployment Event(s)	No

System Status At AE

Vehicle Identification Number	**2ZF58B*7*******
Low Tire Pressure Warning Lamp (If Equipped)	Invalid
Vehicle Power Mode Status	Run
Remote Start Status (If Equipped)	Inactive
Run/Crank Ignition Switch Logic Level	Active
Brake System Warning Lamp (If Equipped)	OFF

System Status At 1 second

Transmission Range (If Equipped)	Fourth Gear
Transmission Selector Position (If Equipped)	Fourth Gear
Traction Control System Active (If Equipped)	Invalid
Service Engine Soon (Non-Emission Related) Lamp	OFF
Service Vehicle Soon Lamp	OFF
Outside Air Temperature (degrees F) (If Equipped)	28
Left Front Door Status (If Equipped)	Closed
Right Front Door Status (If Equipped)	Closed
Left Rear Door Status (If Equipped)	Unused
Right Rear Door Status (If Equipped)	Unused
Rear Door(s) Status (If Equipped)	Closed

Pre-crash data

Parameter	-2 sec	-1 sec
Reduced Engine Power Mode	OFF	OFF
Cruise Control Active (If Equipped)	No	No
Cruise Control Resume Switch Active (If Equipped)	No	No
Cruise Control Set Switch Active (If Equipped)	No	No

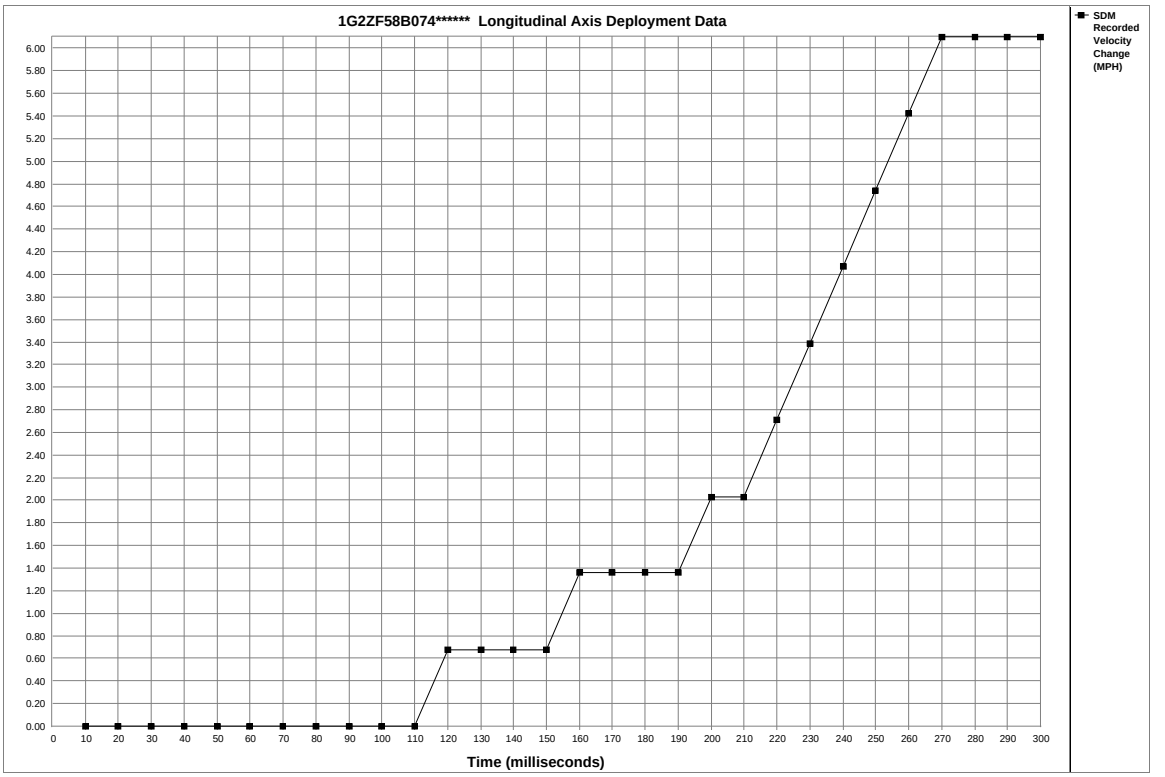
Pre-crash data

Parameter	-5 sec	-4 sec	-3 sec	-2 sec	-1 sec
Vehicle Speed (MPH)	91	91	71	75	48
Engine Speed (RPM)	5120	4096	2496	2560	1728
Percent Throttle	88	22	16	15	13
Brake Switch Circuit Status	OFF	OFF	ON	ON	ON
Accelerator Pedal Position (percent)	83	0	0	0	0
Antilock Brake System Active (If Equipped)	Invalid	Invalid	Invalid	Invalid	Invalid
Lateral Acceleration (feet/s^2)(If Equipped)	Invalid	Invalid	Invalid	Invalid	Invalid
Yaw Rate (degrees per second) (If Equipped)	Invalid	Invalid	Invalid	Invalid	Invalid

Parameter	-5 sec	-4 sec	-3 sec	-2 sec	-1 sec
Steering Wheel Angle (degrees) (If Equipped)	0	16	16	-192	48
Vehicle Dynamics Control Active (If Equipped)	Invalid	Invalid	Invalid	Invalid	Invalid

System Status At Deployment

Ignition Cycles At Investigation	1166
SIR Warning Lamp Status	OFF
SIR Warning Lamp ON/OFF Time (seconds)	655200
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	1163
Ignition Cycles At Event	1164
Ignition Cycles Since DTCs Were Last Cleared	254
Driver's Belt Switch Circuit Status	UNBUCKLED
Passenger's Belt Switch Circuit Status	UNBUCKLED
Diagnostic Trouble Codes at Event, fault number: 1	N/A
Diagnostic Trouble Codes at Event, fault number: 2	N/A
Diagnostic Trouble Codes at Event, fault number: 3	N/A
Diagnostic Trouble Codes at Event, fault number: 4	N/A
Diagnostic Trouble Codes at Event, fault number: 5	N/A
Diagnostic Trouble Codes at Event, fault number: 6	N/A
Automatic Passenger SIR Suppression System Validity Status at AE	Valid
Automatic Passenger SIR Suppression System Status at AE	Air Bag Suppressed
Automatic Passenger SIR Suppression System Validity Status at First Deployment Command	Valid
Automatic Passenger SIR Suppression System Status at First Deployment Command	Air Bag Suppressed
Driver 1st Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	N/A
Driver 2nd Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	N/A
Passenger 1st Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	N/A
Passenger 2nd Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	N/A
Driver Side or Roof Rail/Head Curtain Time From Algorithm Enable to Deployment Command Criteria Met (msec)	N/A
Passenger Side or Roof Rail/Head Curtain Time From Algorithm Enable to Deployment Command Criteria Met (msec)	1.25
Time Between Events (sec)	-.56
Driver First Stage Deployment Loop Commanded	No
Driver Second Stage Deployment Loop Commanded	No
Driver Side Deployment Loop Commanded	No
Driver Pretensioner Deployment Loop Commanded	Yes
Driver (Initiator 1) Roof Rail/Head Curtain Loop Commanded	No
Driver (Initiator 2) Roof Rail/Head Curtain Loop Commanded	No
Driver Knee Deployment Loop Commanded	No
Passenger First Stage Deployment Loop Commanded	No
Passenger Second Stage Deployment Loop Commanded	No
Passenger Side Deployment Loop Commanded	No
Passenger Pretensioner Deployment Loop Commanded	Yes
Passenger (Initiator 1) Roof Rail/Head Curtain Loop Commanded	Yes
Passenger (Initiator 2) Roof Rail/Head Curtain Loop Commanded	No
Passenger Knee Deployment Loop Commanded	No
Second Row Left Side Deployment Loop Commanded	No
Second Row Left Pretensioner Deployment Loop Commanded	No
Third Row Left Roof Rail/Head Curtain Loop Commanded	No
Second Row Right Side Deployment Loop Commanded	No
Second Row Right Pretensioner Deployment Loop Commanded	No
Third Row Right Roof Rail/Head Curtain Loop Commanded	No
Second Row Center Pretensioner Deployment Loop Commanded	No
Driver 2nd Stage Deployment Loop Commanded for Disposal	No
Passenger 2nd Stage Deployment Loop Commanded for Disposal	No
Crash Record Locked	Yes
Vehicle Event Data (Pre-Crash) Associated With This Event	Yes
Deployment Event Recorded in the Non-Deployment Record	No
Event Recording Complete	Yes

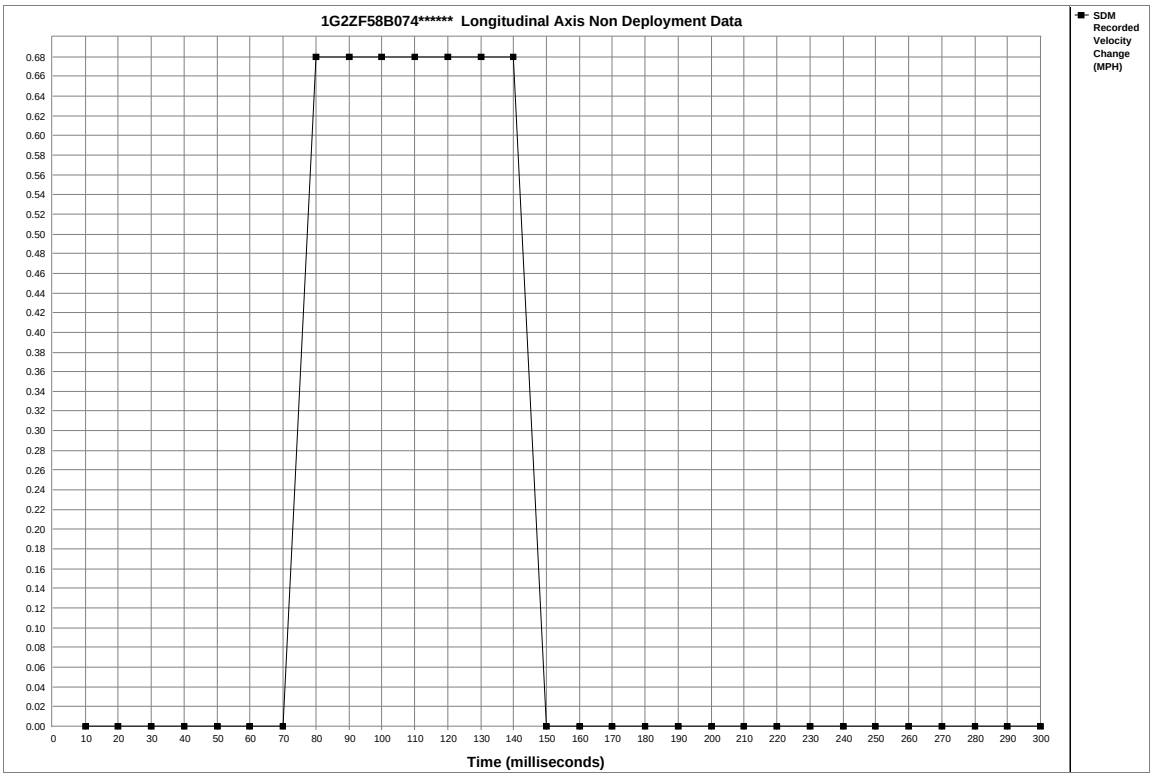


Time (milliseconds)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Longitudinal Axis Recorded Velocity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.68	0.68	0.68
Time (milliseconds)	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300
Longitudinal Axis Recorded Velocity	1.36	1.36	1.36	1.36	2.03	2.03	2.71	3.39	4.07	4.74	5.42	6.10	6.10	6.10	6.10

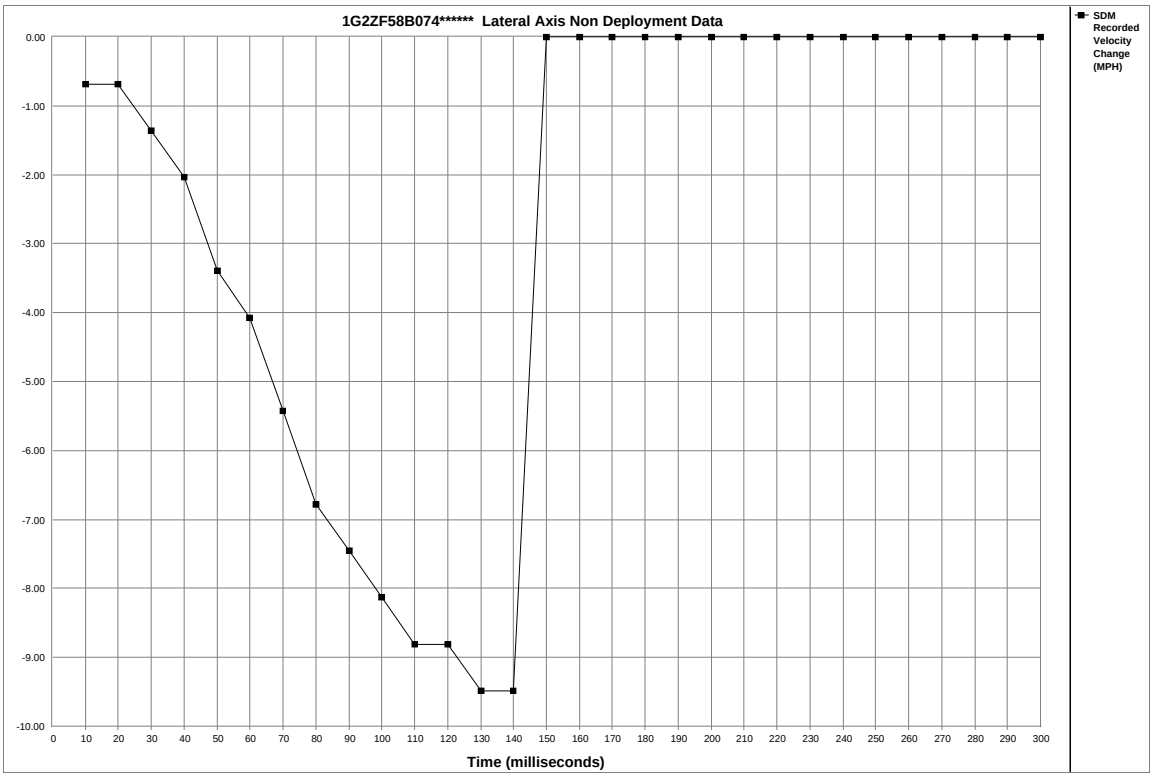
Time (milliseconds)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Lateral Axis Recorded Velocity Change (MPH)	0.00	0.00	0.00	0.00	0.00	0.00	-1.36	-3.39	-6.10	-7.46	-8.81	-11.52	-13.56	-15.59	-17.62
Time (milliseconds)	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300
Lateral Axis Recorded Velocity Change (MPH)	-19.66	-21.01	-22.37	-23.72	-25.76	-28.47	-30.50	-32.54	-34.57	-36.60	-38.64	-40.67	-42.03	-44.06	-46.09

System Status At Non-Deployment

Ignition Cycles At Investigation	1166
SIR Warning Lamp Status	ON
SIR Warning Lamp ON/OFF Time (seconds)	0
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	0
Ignition Cycles At Event	1164
Ignition Cycles Since DTCs Were Last Cleared	254
Driver's Belt Switch Circuit Status	UNBUCKLED
Passenger's Belt Switch Circuit Status	UNBUCKLED
Diagnostic Trouble Codes at Event, fault number: 1	B0052
Diagnostic Trouble Codes at Event, fault number: 2	N/A
Diagnostic Trouble Codes at Event, fault number: 3	N/A
Diagnostic Trouble Codes at Event, fault number: 4	N/A
Diagnostic Trouble Codes at Event, fault number: 5	N/A
Diagnostic Trouble Codes at Event, fault number: 6	N/A
Automatic Passenger SIR Suppression System Validity Status at AE	Valid
Automatic Passenger SIR Suppression System Status at AE	Air Bag Suppressed
Automatic Passenger SIR Suppression System Validity Status at First Deployment Command	Valid
Automatic Passenger SIR Suppression System Status at First Deployment Command	Air Bag Suppressed
Maximum SDM Recorded Velocity Change (MPH)	9.11
Algorithm Enable to Maximum SDM Recorded Velocity Change (msec)	130
Driver First Stage Deployment Loop Commanded	No
Driver Second Stage Deployment Loop Commanded	No
Driver Side Deployment Loop Commanded	No
Driver Pretensioner Deployment Loop Commanded	No
Driver (Initiator 1) Roof Rail/Head Curtain Loop Commanded	No
Driver (Initiator 2) Roof Rail/Head Curtain Loop Commanded	No
Driver Knee Deployment Loop Commanded	No
Passenger First Stage Deployment Loop Commanded	No
Passenger Second Stage Deployment Loop Commanded	No
Passenger Side Deployment Loop Commanded	No
Passenger Pretensioner Deployment Loop Commanded	No
Passenger (Initiator 1) Roof Rail/Head Curtain Loop Commanded	No
Passenger (Initiator 2) Roof Rail/Head Curtain Loop Commanded	No
Passenger Knee Deployment Loop Commanded	No
Second Row Left Side Deployment Loop Commanded	No
Second Row Left Pretensioner Deployment Loop Commanded	No
Third Row Left Roof Rail/Head Curtain Loop Commanded	No
Second Row Right Side Deployment Loop Commanded	No
Second Row Right Pretensioner Deployment Loop Commanded	No
Third Row Right Roof Rail/Head Curtain Loop Commanded	No
Second Row Center Pretensioner Deployment Loop Commanded	No
Crash Record Locked	Yes
Vehicle Event Data (Pre-Crash) Associated With This Event	No
Deployment Event Recorded in the Non-Deployment Record	No
Event Recording Complete	Yes



Time (milliseconds)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Longitudinal Axis Recorded Velocity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.00
Time (milliseconds)	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300
Longitudinal Axis Recorded Velocity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



Time (milliseconds)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Lateral Axis Recorded Velocity Change (MPH)	-0.68	-0.68	-1.36	-2.03	-3.39	-4.07	-5.42	-6.78	-7.46	-8.13	-8.81	-8.81	-9.49	-9.49	0.00
Time (milliseconds)	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300
Lateral Axis Recorded Velocity Change (MPH)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hexadecimal Data

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$03  00 00 00 00 00 00 00
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$08  00 00 00 00 00 00 00
$09  00 00 00 00 00 00 00
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$0B  00 00 0F 0F 03 00 00
$0C  00 00 00 00 00 00 00
$0D  00 00 40 00 00 00 00
$0E  00 00 00 00 00 00 00
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$20  40 00 00 00 00 00 00
$21  00 00 00 00 F0 00 00
$22  00 8D 00 00 00 00 00
$24  00 00 00 00 00 00 00
$25  00 00 00 00 00 00 00
$26  00 00 00 00 00 00 00
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$33  20 25 29 39 E0 00 00
$34  1B 28 27 40 50 00 00
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$46   00 00 00 00 00 00 00
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$67   A0 A5 00 00 00 00 00
$68   10 18 00 00 00 00 00
$69   00 FF F0 04 8B 00 00
$6A   FE 04 8C 00 00 00 00
$6B   00 00 00 00 00 00 00
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$6F   00 00 00 00 00 00 00
$70   FE 00 FB 00 F7 00 00
$71   F5 00 F3 00 EF 01 00
$72   EC 01 E9 01 E6 01 00
$73   E3 02 E1 02 DF 02 00
$74   DD 02 DA 03 D6 03 00
$75   D3 04 D0 05 CD 06 00
$76   CA 07 C7 08 C4 09 00
$77   C2 09 BF 09 BC 09 00
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$79   00 00 00 10 00 00 00
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$7B   00 00 00 00 00 01 F2

$01   41 55 36 34 37 32 52 37 30 32 32 32 41 46 4A 43
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$03   41 54 36 34 37 32 52 37 30 31 38 33 41 44 37 59
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$07   42 54 FF FF FF FF FF FF FF FF FF FF FF FF FF FF
$08   FF FF FF FF
$0D   41 48 36 34 37 33 52 37 31 32 34 31 52 37 43 31
$0E   01 5A 39 A4
$0F   41 4A 36 34 37 33 52 37 31 32 34 31 52 37 47 53
$10   01 5A 39 A4
$13   42 52 39 35 32 38 44 31 37 31 35 36 41 42 4B 39
$14   16 46 3D 35
$17   42 54 FF FF FF FF FF FF FF FF FF FF FF FF FF FF
$18   FF FF FF FF
$21   32 16 B8 0B 5E 11 91 9A
$22   60 06
$23   32 5A FA FA FA FA FA
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$25   32 5A FA FA FA FA FA
$26   32 5A FA FA FA FA FA
$40   00 00
$41   3F 30 00 66 00 1A
$42   D0 E4
$43   00 00 8E 80
$44   C6 00 00 FC 80 C0
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$45  07 01 07 01 05 01
$46  00 0F 0F 64 64
$47  0A 64 02 04 04 05 0A 06 04 0A 00 00 FA 00 00 FF 04 64
$48  18 08 08
$B0  58
$B1  FD FE 00
$B2  FF FF FF FF FF
$B4  41 53 36 30 30 36 32 31 33 48 46 45 20 20 20 20
$B7  50 AA 01 0F 02
$B8  4C 54 69 09 30
$C1  30 46 30 32
$CA  30 46 30 32
$CB  00 E8 C9 C6
$CC  00 E8 C9 C6
$D1  00 00
$DB  00 00
$DC  00 00
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