CRASH DATA RESEARCH CENTER

Calspan Corporation
Buffalo, NY 14225

CALSPAN ON-SITE CERTIFIED ADVANCED-208 COMPLIANT VEHICLE CRASH INVESTIGATION

SCI CASE NO. – CA06-006

SUBJECT VEHICLE – 2006 PONTIAC G6

LOCATION - STATE OF NORTH CAROLINA

CRASH DATE – FEBRUARY 2006

Contract No. DTNH22-01-C-17002

Prepared for:

U.S. Department of Transportation
National Highway Traffic Safety Administration
Washington, D.C. 20590

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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 are 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.

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16. Abstract
This on-site investigation focused on the Certified Advanced 208-Compliant (CAC) safety system in a 2006 Pontiac G6. A CAC vehicle is certified by the manufacturer to be compliant to Advanced Air Bag portion of Federal Motor Vehicle Safety Standard (FMVSS) No. 208. The CAC safety system consisted of dual stage frontal air bags, an occupant presence sensor for the front right seat, and safety belt buckle switch sensors to monitor belt usage. Additionally, the vehicle was equipped with retractor mounted safety belt pretensioners and an Event Data Recorder (EDR). The EDR was downloaded during this on-site investigation. The EDR printout is included as **Attachment A** of the report. A restrained 16-year-old male driver and a 16-year-old male front right occupant occupied the G6. The Pontiac was involved in an intersection collision with a 1999 Lexus LS400. As a result of the crash, the frontal air bags deployed and the front safety belt pretensioners fired in the Pontiac. The driver and front right occupant of the G6 were not injured. Both vehicles sustained disabling frontal damage and were towed from the crash site.

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LOCATION - STATE OF NORTH CAROLINA
CRASH DATE – FEBRUARY 2006

BACKGROUND

This on-site investigation focused on the Certified Advanced 208-Compliant (CAC) safety system in a 2006 Pontiac G6 **(Figure 1)**. A CAC vehicle is certified by the manufacturer to be compliant to Advanced Air Bag portion of Federal Motor Vehicle Safety Standard (FMVSS) No. 208. The CAC safety system consisted of dual stage frontal air bags, an occupant presence sensor for the front right seat, and safety belt buckle switch sensors to monitor belt usage. Additionally, the vehicle was equipped with retractor mounted safety belt pretensioners and an Event Data Recorder (EDR). The EDR was downloaded during this on-site investigation. The EDR printout is included as **Attachment A** of the report. A restrained 16-year-old male driver and a 16-year-old male front right occupant occupied the G6. The Pontiac was involved in an intersection collision with a 1999 Lexus LS400. As a result of the crash, the frontal air bags deployed and the front safety belt pretensioners fired in the Pontiac. The driver and front right occupant of the G6 were not injured. Both vehicles sustained disabling frontal damage and were towed from the crash site.

Figure 1. Subject vehicle 2006 Pontiac G6.

This crash was identified from a list of claims provided by an insurance company to the National Highway Traffic Safety Administration (NHTSA) that identified Certified Advanced 208-Compliant vehicles that had been involved in crashes. The list was forwarded to the Calspan Special Crash Investigations (SCI) team for follow-up investigation. Both vehicles were located at a local salvage facilities and cooperation was established with the facilities to inspect the vehicles. An on-site investigation was assigned to the Calspan SCI team on March 24, 2006. The vehicles and crash site inspections were completed on March 30, 2005.

SUMMARY

Crash Site

This intersection crash occurred during the evening hours of February 2005. At the time of the crash, the weather was clear with no adverse conditions. The crash occurred within a four-leg intersection. The north and south legs of the intersection were configured with one travel lane in each direction that were delineated by double yellow centerlines. The east and westbound legs were configured with one travel lane in each direction and a center left turn lane. The east/westbound lanes were separated by double yellow centerlines. The posted speed limit for the roadways was 72 km/h (45 mph). The scene schematic is included as **Figure 12** of this report.

Vehicle Data – 2006 Pontiac G6

The 2006 Pontiac G6 was identified by the Vehicle Identification Number (VIN): 1G2ZG55886 (production sequence deleted) and was manufactured on 04/05. The odometer reading at the time of the SCI inspection was 5,693 kilometers (3,538 miles). The G6 was a four-door sedan that was equipped with a 3.5-liter, V6 engine, 4-speed automatic transmission, front-wheel drive, power-front and rear disc brakes, and a tilt steering wheel. The G6 was not equipped with a Tire Pressure Monitoring System (TPMS). The Pontiac was equipped with Uniroyal Tiger Paw Touring SR tires, size P215/60R16 mounted on five-spoke OEM alloy wheels. The manufacturer recommended front and rear tire pressure was 207 kPa (30 PSI). The specific tire data at the time of the SCI inspection was as follows:

Tire	Measured Pressure	Tread Depth	Restricted	Damage
LF	186 kPa (27 PSI)	7 mm (9/32)	No	No
LR	193 kPa (28 PSI)	8 mm (10/32)	No	No
RF	0 kPa	7 mm (9/32)	No	Cut sidewall
RR	207 kPa (30 PSI)	8 mm (10/32)	No	Rim scuffed

The seating positions in the Pontiac were configured with cloth upholstered front bucket seats with height adjustable head restraints. At the time of the SCI inspection, the front left head restraint was adjusted 6 cm (2.5”) above the seatback and the front right head restraint was adjusted to the full down position. The second row was configured with a three-passenger split (60/40) bench seat with height adjustable head restraints for the outboard seats. Both rear head restraints were adjusted 5 cm (2.0”) above the seatback. Furthermore, the vehicle was equipped with adjustable pedals that were set to the full rear position in relation to the front of the vehicle at the time of the SCI inspection.

1999 Lexus LS400

The non-subject vehicle in this crash was a 1999 Lexus LS400. The VIN of the Lexus was JT8BH28F8X (production number omitted) and was manufactured on 07/99. The vehicle was a four-door sedan that was equipped with a 4.0-liter, V8 engine linked to a five-speed automatic transmission. The Lexus was equipped with Michelin MXV4 Plus XSE tires, size P225/60R16 mounted on OEM alloy wheels. The manufacturer recommended front and rear tire pressure was 200 kPa (29 PSI) and 221 kPa (32 PSI), respectively. The specific tire data at the time of the SCI inspection was as follows:

Tire	Measured Pressure	Tread Depth	Restricted	Damage

LF	228 kPa (33 PSI)	7 mm (9/32)	No	No
LR	228 kPa (30 PSI)	7 mm (9/32)	No	No
RF	234 kPa (34 PSI)	7 mm (9/32)	No	No
RR	234 kPa (34 PSI)	7 mm (9/32)	No	No

Crash Sequence

Pre-Crash

The restrained 16-year-old male driver of the 2006 Pontiac G6 was operating the vehicle eastbound **(Figure 2)** approaching the four-leg intersection where the driver intended to turn left. The 50-year-old female was operating the 1999 Lexus LS400 westbound approaching the intersection **(Figure 3)**. Both vehicles were approaching and entering the intersection on a green signal phase. The driver of the Pontiac probably underestimated the speed and proximity of the Lexus and attempted to beat the Lexus across the intersection. The EDR data indicated that the driver of the Pontiac was traveling at 60 km/h (37 mph) five seconds prior to the Algorithm Enable (AE) and had slowed to 35 km/h (22 mph) one second prior to AE. The EDR data also indicated the driver applied braking through the five second recoded time frame prior to AE.

Furthermore, the Pontiac's EDR recorded a -32 degree (- equals left) steering input five seconds prior to AE and was returned to a 0 degree (straight) angle at four and three seconds prior. This appears to have occurred as the driver entered the left turn lane from the through lane and continued his travel to the intersection. The steering input increased to -16 degrees at two seconds prior and -96 degrees one second prior to AE. This indicated that the driver began a shallow left turn and decreased the turn radius within the intersection to complete the left turn.

Figure 2. Pontiac's eastbound approach to the intersection.

Figure 3. Lexus's westbound travel.

Crash

The initial contact involved the front right corner of the Pontiac and the front right corner of the Lexus **(Figure 4)**. The vehicles impacted in the westbound lane within the boundaries of the intersection. Due to the narrow corner impact, the vehicles proceeded forward and the front right corner of the Lexus engaged the right side of the Pontiac. The direct contact damage from this impact extended from the front of the Pontiac onto the right side, terminating on the right rear wheel. The resultant directions of force were 12 o'clock for the Pontiac and 11 o'clock for the Lexus.

Figure 4. Area of impact from the Pontiac's approach.

The WINSMASH damage algorithm was used to calculate a delta-V for this impact. The total delta-V for the Pontiac was 14 km/h (8.7 mph) and 13 km/h (8.1 mph) for the Lexus. The longitudinal and lateral components for the Pontiac were -14 km/h (8.6 mph) and -2 km/h (1.5 mph), and -12 km/h (7.5 mph) and 4 km/h (2.5 mph) for the Lexus. Additionally, the EDR recorded a maximum delta-V of 23 km/h (14.5 mph) at 150 milliseconds for the Pontiac. The WINSMASH delta-V was calculated using the frontal crush documented on the Pontiac. The WINSMASH model is a one-dimensional program. Therefore, the right side damage sustained by the Pontiac could not be captured for this reconstruction model. Thus, the WINSMASH delta-V was lower than the EDR recorded delta-V.

The vehicles separated and traveled to final rest with the intersection. The Pontiac came to rest facing in a northwest attitude near the northwest corner of the intersection. The Lexus came to final rest facing a southeast direction, straddling the east and westbound travel lanes.

As a result of the crash, the first and second stages of the CAC frontal air bag system deployed in the G6 and the front safety belt pretensioners fired.

Post-Crash

Police and Emergency Medical Services (EMS) personnel responded to the crash site. The driver and the front right occupant of the Pontiac were not injured. Both vehicles sustained disabling damage and were towed from the crash site and subsequently deemed total losses by the insurance companies.

Vehicle Damage

Exterior Damage – 2006 Pontiac G6

The 2006 Pontiac G6 sustained moderate severity front and right side damage as result of the corner impact with the Lexus. The damaged components involved the front bumper fascia, upper radiator support, right headlight assembly, right fender, right front wheel and suspension components, and right doors.

Figure 5. Lateral view of the front bumper of the Pontiac. No crush was noted at the bumper.

The direct contact damage on the front of the vehicle began 51 cm (20.0”) right of the vehicle centerline and extended 18 cm (7.0”) to the front right corner. The crush damage was outboard of the corner of the bumper beam. Therefore, no residual crush occurred at bumper level **(Figure 5)**.

Figure 6. Upper support radiator crush to the G6.

Frontal crush did occur to the upper radiator support. A crush profile was documented at the upper radiator support using a combined direct and induced damage width (Field L) of 111 cm (43.5”) and were as follows: C1 = 0 cm, C2 = 0 cm, C3 = 0 cm, C4 = 1 cm (0.3”), C5 = 2 cm (0.8”), C6 = 17 cm (6.7”). **Figure 6** is a lateral view of the crush at the upper radiator support. The Collision Deformation Classification (CDC) for this impact was 12-FREE-9.

Figure 7. View of the front and right side damage to the G6.

The damage to the right side plane resulted in 27 cm (10.7”) of longitudinal crush to the leading edge of the right fender. Additionally, the right side wheelbase was reduced 10 cm (3.9”) from contact to the right front wheel and suspension components. Abrasions and white paint transfers were noted on the right side, which measured 211 cm (83.0”), and began at the front right corner and extended to the right front door **(Figure 7)**. As the Lexus continued down the right plane, the protruding right fender of the Lexus remained engaged with the Pontiac. This area of contact began rear of the right rear door and extended 91 cm (36”) rearward terminating on the right rear wheel.

Exterior Damage – 1999 Lexus LS400

The 1999 Lexus LS400 sustained moderate severity frontal damage as result of the intersection crash **(Figures 8 and 9)**. The direct contact damage began 15 cm (6.0) right of the vehicle centerline and extended to the front right corner. The total direct contact damage measured 39 cm (15.5”). Six equidistant measurements along the bumper beam were used to document the longitudinal crush using a combined direct and induced damage width (Field L) of 112 cm (44.0”). The residual crush was as follows: C1 = 0 cm, C2 = 0 cm, C3 = 7 cm (2.8”), C4 = 8 cm (3.1”), C5 = 12 cm (4.7”), C6 = 23 cm (9.1”). The CDC for this impact was 11-FREE-3.

Figure 8. Front right view of the damage to the Lexus.

Figure 9. Lateral view of the residual crush to the bumper beam.

Interior Damage – 2006 Pontiac G6

The driver and passenger of the 2006 Pontiac G6 were restrained during the crash. They loaded the manual safety belt systems, and as a result there were no occupant contact points to the interior of the G6. Additionally, there was no passenger compartment intrusion.

Certified Advanced 208-Compliant Safety System – 2006 Pontiac G6

The 2006 Pontiac G6 was equipped with a CAC frontal safety system. A CAC vehicle is certified by the manufacturer to be compliant to Advanced Air Bag portion of Federal Motor Vehicle Safety Standard (FMVSS) No. 208. The system consisted of dual stage frontal air bags, an occupant presence sensor for the front right seat, and safety belt buckle switch sensors to monitor belt usage. The CAC system was monitored and controlled by the EDR, which measures and predicts the crash severity and commands deployments of the appropriate safety system.

Figure 10. Deployed driver's frontal air bag.

In the subject crash, the first and second stages of the frontal air bags deployed **(Figure 10)**. The driver's air bag was conventionally located in the center of the steering wheel hub and was concealed by two symmetrical I-configuration cover flaps. The cover flaps measured 13 cm (5.0") in height and 7 cm (2.8") in width. The driver's air bag measured 61 cm (24") in diameter in its deflated state. The air bag contained two tethers at the 3 and 9 o'clock positions and was vented by a single vent port at the 12 o'clock position. There were no damage or occupant contact points present on the air bag membrane.

The front right passenger air bag was a top-mount design in the right instrument panel **(Figure 11)**. Two non-symmetrical H-configuration cover flaps concealed the air bag within the instrument panel. The top cover flap measured 10 cm (3.8") in height and the lower cover flap measured 5 cm (2.0") in height. Both cover flaps measured 30 cm (11.8") cm in width. The air bag membrane measured 66 cm (26") in height and 53 cm (21") in width. The air bag was tether by a single wide band tether across the face of the membrane. Two vent ports vented the air bag at the 11 and 1 o'clock positions on the side panels. The air bag membrane was not damaged and was free of occupant contact. The CAC system appeared to have performed as designed in the subject crash. The CAC system identified the presence of the front right occupant and deployed the appropriate safety system.

Figure 11. Deployed front right air bag.

Event Data Recorder – 2006 Pontiac G6

The 2006 Pontiac G6 was equipped with an Event Data Recorder (EDR) that was downloaded during this on-site investigative effort. The EDR output is included as **Attachment A** of this report. In order to facilitate the download, a power box was connected to the vehicle's battery terminals, which temporarily restored electrical power to the vehicle. The SCI investigator downloaded the EDR data through the Diagnostic Link Connector (DLC) using the Vetronix Controller Area Network (CAN) plus interface module and the 2.8 version of the Vetronix software. Although the ignition key was with the Pontiac, it was not required for the download of this EDR.

The EDR recorded a single deployment file. The EDR indicated that both front safety belts were buckled at the time of AE and both pretensioners were commanded to fire. The EDR data showed that the first stage deployment of the frontal air bag system was commanded at 28 milliseconds from AE with the second stage deploying at 30 milliseconds of AE. The EDR data indicated the brake switch status was in the on-position during the five-second pre-crash recording which was consistent with the reduction in speed from 60 km/h (37 mph) five seconds prior to AE to 35 km/h (22 mph) one second prior to AE.

Manual Restraint Systems – 2006 Pontiac G6

The 2006 Pontiac G6 was equipped with manual 3-point lap and shoulder safety belts for the five seating positions. The driver's safety belt was configured with continuous loop webbing, sliding latch plate, height adjustable D-ring that was in the full-up position at the time of the SCI inspection, retractor mounted pretensioner, and an Emergency Locking Retractor (ELR). The driver utilized the safety belt during the crash, which was supported by frictional abrasions on the latch plate, D-ring and the webbing. The abrasions on the webbing were vertically oriented and resulted from the firing of the pretensioner, which created the frictional abrasions. The abrasions from the latch plate were located 13-18 cm (5.0-7.0") above the stop button. The D-ring abrasions were located 90-97 cm (35.5-38.0") above the stop button. Furthermore, the fired pretensioner restricted the safety belt in the used position.

The front right safety belt was configured with continuous loop webbing, sliding latch plate, height adjustable D-ring that was in the full-up position at the time of the SCI inspection, retractor mounted pretensioner, and a switchable ELR/Automatic Locking Retractor (ALR). The front right occupant used the safety belt in the crash, which was supported by frictional abrasions on the latch plate, D-ring, and safety belt webbing from the firing of the pretensioner. The abrasions on the safety belt from the latch plate were located 18-19 cm (7.0-7.5") above the stop button. The abrasions from the D-ring were located 86-104 cm (34.0-41.0") above the stop button. Although the pretensioner fired, the locking mechanism did not restrict the safety belt in the used the position.

The second and row safety belts were configured with continuous loop webbing, sliding latch plates and switchable ELR/ALR retractors.

Occupant Demographics – 2006 Pontiac G6

Driver

Age/Sex:	16-year-old/ Male
Height:	Not available
Weight:	Not available
Seat Track Position:	Rear third track position
Manual Restraint Use:	3-point manual lap and shoulder safety belt
Usage Source:	Vehicle inspection
Eyewear:	Unknown
Type of Medical Treatment:	None

Driver's Injuries

Injury	**Injury Severity (AIS 90/Update 98)**	**Injury Source**
Not Injured	N/A	N/A

Driver Kinematics

The 16-year-old male driver of the 2006 Pontiac G6 was seated in a rear track position. At impact with the 1999 Lexus LS400, the driver's frontal air bag deployed (stage two) and the safety belt pretensioner fired. The driver initiated a forward trajectory in response to the 12 o'clock direction of force and loaded the safety belt and deployed air bag, which prevented him from further forward travel. The driver was not injured as result of the crash. The combination of the safety belt usage and the deployed frontal air bag prevented the driver from possible injury.

Front Right Occupant

Age/Sex:	16-year-old/Male
Height:	Not available
Weight:	Not available
Seat Track Position:	Mid track
Manual Restraint Use:	3-point manual lap and shoulder safety belt
Usage Source:	Vehicle inspection
Eyewear:	Unknown
Type of Medical Treatment:	Not injured

Front Right Occupant Injuries

Injury	**Injury Severity (AIS 90/Update 98)**	**Injury Source**
Not Injured	N/A	N/A

Front Right Occupant Kinematics

The 16-year-old male front right occupant of the Pontiac was seated in a mid track position in a presumed upright posture. At impact, the front right air bag deployed and the safety belt pretensioner fired. The front right occupant initiated a forward trajectory in response to the 12 o'clock direction force. Safety belt usage and air bag deployment prevented him from contact with interior components. The front right occupant was not injured as result of the crash.

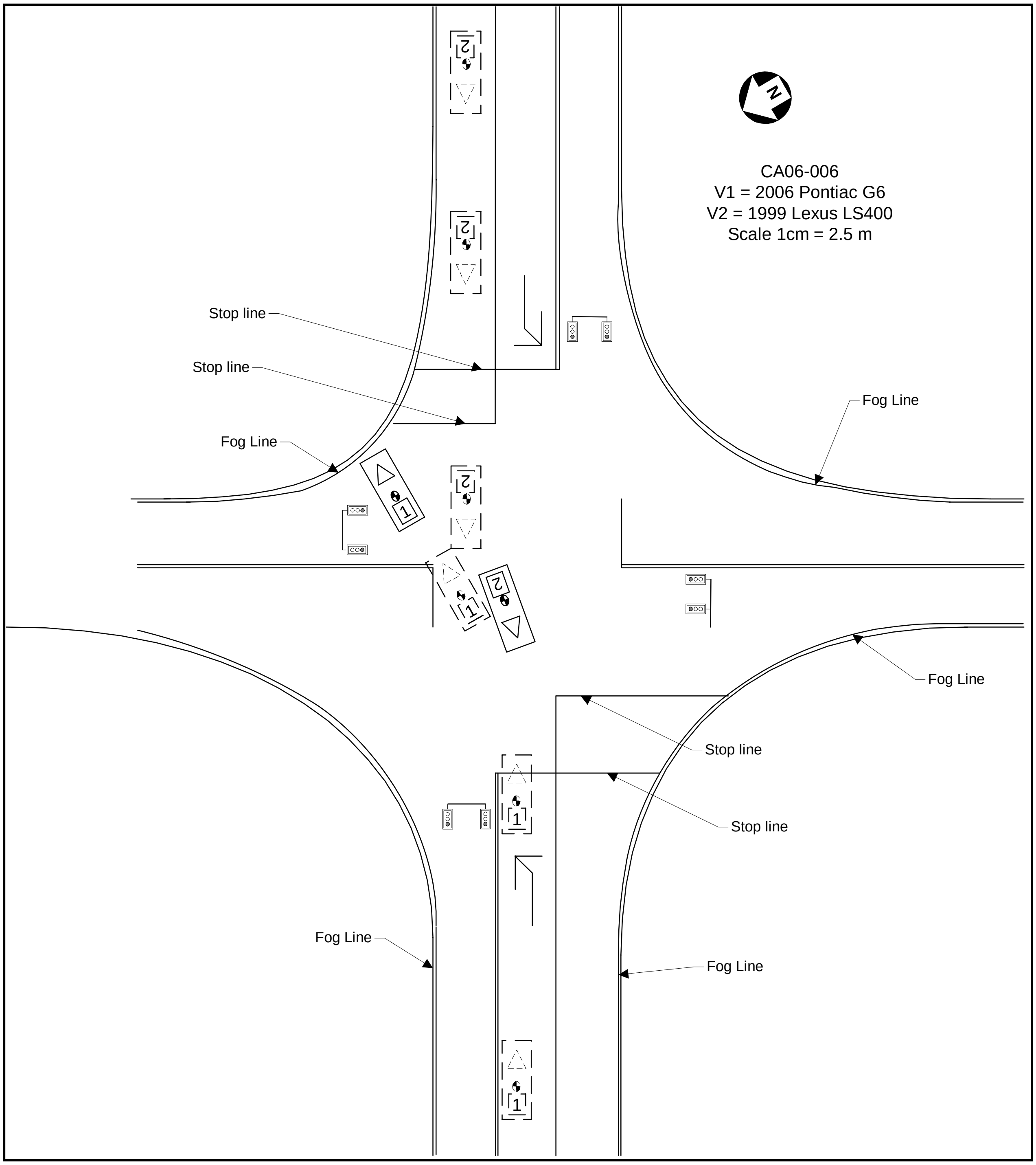


Figure 12. Scene schematic

Attachment A: EDR Printout

CDR File Information

Vehicle Identification Number	1G2ZG558864******
Investigator	
Case Number	
Investigation Date	
Crash Date	
Filename	
Saved on	Thursday, March 30 2006 at 12:52:41 PM
Collected with CDR version	Crash Data Retrieval Tool 2.800
Collecting program verification number	9238B95E
Reported with CDR version	Crash Data Retrieval Tool 2.800
Reporting program verification number	9238B95E
Interface used to collected data	Block number: 00 Interface version: 4A Date: 11-08-05 Checksum: 7500
Event(s) recovered	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.
-Calculated Principal Direction of Force (PDOF) is the arctangent of the maximum observed lateral velocity change divided by the maximum observed longitudinal velocity change. PDOF is displayed where zero degrees is located at the front of the vehicle, with 90 degrees is displayed to the right side of the vehicle and so on, clockwise around the vehicle.
-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 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.
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.

System Status At AE

Vehicle Identification Number	**2ZG558*6*******
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)	Third Gear
Transmission Selector Position (If Equipped)	Drive
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)	37.4
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

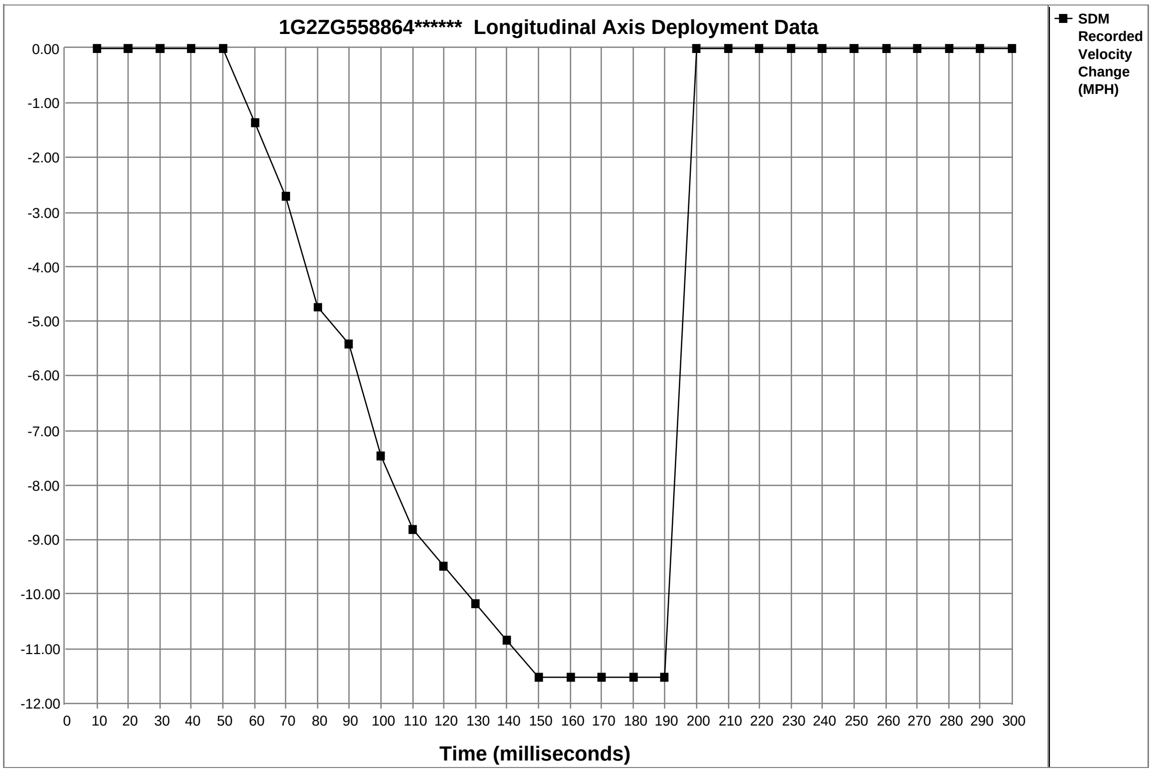
Parameter	-2 sec	-1 sec
Reduced Engine Power Mode	OFF	OFF
Cruise Control Active (If Equipped)	No	No
Cruise Control Resume Switch Active (If Equipped)	No	No
Cruise Control Set Switch Active (If Equipped)	No	No

Pre-crash data

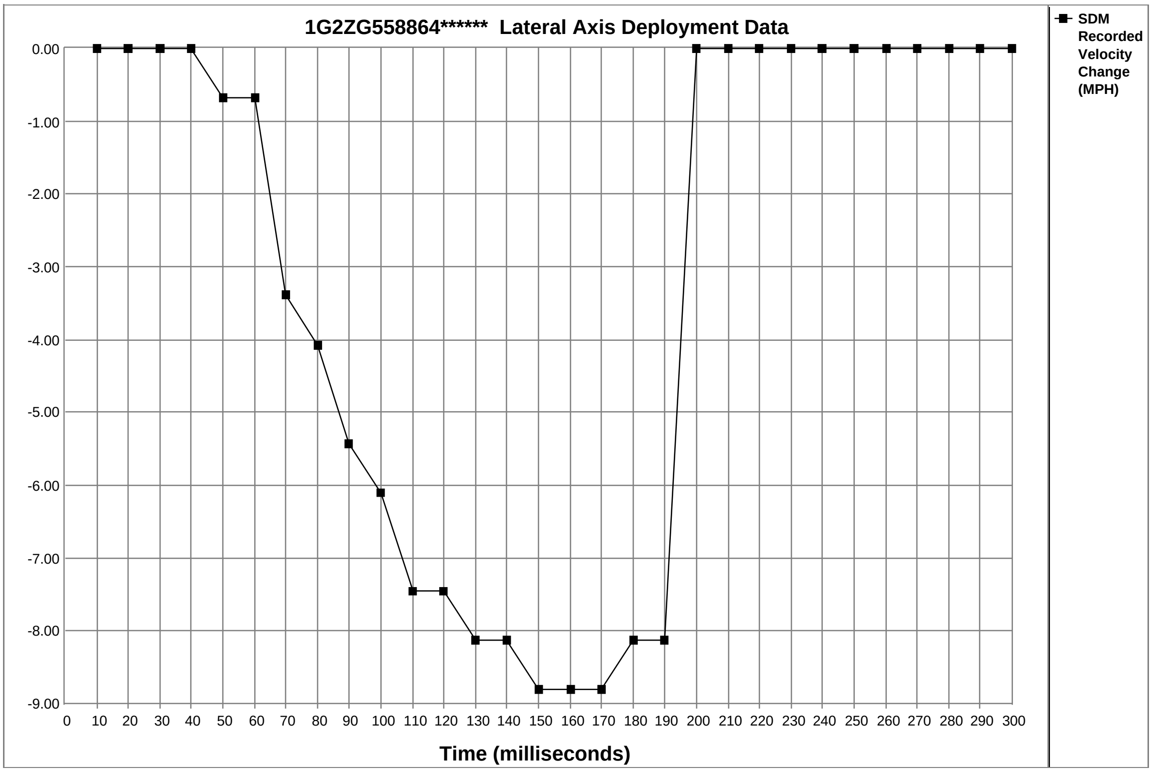
Parameter	-5 sec	-4 sec	-3 sec	-2 sec	-1 sec
Vehicle Speed (MPH)	37	34	33	29	22
Engine Speed (RPM)	1024	960	896	832	704
Percent Throttle	0	0	0	0	0
Brake Switch Circuit Status	ON	ON	ON	ON	ON
Accelerator Pedal Position (percent)	0	0	0	0	0
Antilock Brake System Active (If Equipped)	Invalid	Invalid	Invalid	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
Steering Wheel Angle (degrees) (If Equipped)	-32	0	0	-16	-96
Vehicle Dynamics Control Active (If Equipped)	Invalid	Invalid	Invalid	Invalid	Invalid

System Status At Deployment

Ignition Cycles At Investigation	522
SIR Warning Lamp Status	OFF
SIR Warning Lamp ON/OFF Time (seconds)	431050
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	449
Ignition Cycles At Event	522
Ignition Cycles Since DTCs Were Last Cleared	254
Driver's Belt Switch Circuit Status	BUCKLED
Passenger's Belt Switch Circuit Status	BUCKLED
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 Not 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 Not Suppressed
Driver First Stage Time Algorithm Enabled to Deployment Command Criteria Met (msec)	28
Driver Second Stage Time Algorithm Enabled to Deployment Command Criteria Met (msec)	30
Passenger First Stage Time Algorithm Enabled to Deployment Command Criteria Met (msec)	28
Passenger Second Stage Time Algorithm Enabled to Deployment Command Criteria Met (msec)	30
Time Between Events (sec)	N/A
Driver First Stage Deployment Loop Commanded	Yes
Driver Second Stage Deployment Loop Commanded	Yes
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	Yes
Passenger Second Stage Deployment Loop Commanded	Yes
Passenger Side Deployment Loop Commanded	No
Passenger Pretensioner Deployment Loop Commanded	Yes
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
Driver 2nd Stage Deployment Loop Commanded for Disposal	No
Passenger 2nd Stage Deployment Loop Commanded for Disposal	No
Multiple Event Counter	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
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
Estimated Principal Direction of Force (PDOF) degrees	35



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	-1.36	-2.71	-4.74	-5.42	-7.46	-8.81	-9.49	-10.17	-10.85	-11.52
Time (milliseconds)	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300
Longitudinal Axis Recorded Velocity	-11.52	-11.52	-11.52	-11.52	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)	0.00	0.00	0.00	0.00	-0.68	-0.68	-3.39	-4.07	-5.42	-6.10	-7.46	-7.46	-8.13	-8.13	-8.81
Time (milliseconds)	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300
Lateral Axis Recorded Velocity Change (MPH)	-8.81	-8.81	-8.13	-8.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hexadecimal Data

This page displays all the data retrieved from the air bag module.
It contains data that is not converted by this program.

$01	68	00	00	00	00	00	00
$02	30	00	00	00	00	00	00
$03	00	00	00	00	00	00	00
$04	04	00	00	00	00	00	00
$05	00	00	00	00	00	00	00
$06	00	4A	00	00	19	53	52
$07	00	00	00	00	00	00	00
$08	00	00	00	00	00	00	00
$09	03	FF	7B	00	00	00	00
$0A	00	00	00	00	00	00	00
$0B	00	00	01	0F	00	00	00
$0C	80	00	80	00	00	00	00
$0D	00	00	80	00	00	00	00
$0E	00	00	00	00	00	00	00
$0F	A2	00	00	00	00	00	00
$10	47	32	5A	47	35	35	38
$11	38	36	34	31	30	32	39
$12	36	30	00	00	00	00	00
$13	00	00	00	00	00	00	00
$14	00	00	00	00	00	00	00
$15	00	00	00	00	00	00	00
$16	03	06	0C	16	34	00	00
$17	07	07	07	07	00	00	00
$18	00	07	00	00	00	00	00
$19	07	07	00	00	00	00	00
$1B	3F	00	00	67	00	7A	00
$1C	3F	00	00	06	00	1A	00
$1D	00	00	00	00	00	00	00
$1E	00	00	00	00	00	00	00
$1F	20	C1	00	00	00	00	00
$20	40	00	00	00	00	00	00
$21	FF	FF	00	00	50	00	00
$22	00	9D	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
$27	FF	00	FF	00	00	00	00
$2A	00	00	00	00	00	00	00
$2B	00	00	00	00	00	00	00
$2D	00	00	00	00	00	00	00
$2E	80	00	25	00	00	00	00
$2F	00	FE	02	0A	00	00	00
$30	9D	00	00	00	00	00	00
$31	00	00	00	00	00	00	00
$32	F8	00	00	00	00	00	00
$33	00	00	00	00	00	00	00
$34	0B	0D	0E	0F	10	00	00
$35	23	2F	35	37	3B	00	00
$36	FA	FF	00	00	FE	00	00
$37	00	00	00	03	0B	00	E2
$38	56	00	40	00	03	C0	00
$39	00	00	00	00	00	80	00
$3A	00	00	00	00	00	80	00
$3B	03	06	0C	00	00	00	00
$3C	00	00	00	00	00	00	C0
$3D	32	5A	47	35	35	38	00
$3E	36	10	29	60	00	00	00
$3F	00	00	90	00	00	00	00
$40	00	00	00	00	00	00	00
$41	F8	F8	90	00	00	00	00
$42	80	FF	FF	FF	FF	00	00

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$43   FF FF FF 00 00 00 00
$44   FF FF FF FF FF FF 00
$45   FF FF FF FF FF FF 00
$46   FF FF FF FF FF FF 00
$47   FF FF FF FF FF FF 00
$48   FF FF FF FF FF FF 00
$49   FF FF FF FF FF FF 00
$4A   FF FF FF FF FF FF 00
$4B   FF FF FF FF FF FF 00
$4C   FF FF FF FF FF FF 00
$4D   FF FF FF FF FF FF 00
$4E   FF FF FF FF FF FF 00
$4F   FF FF FF FF FF FF 00
$50   FF FF FF FF FF FF 00
$51   F0 00 00 F0 00 00 00
$52   81 FF FF FF 00 00 00
$53   FF FF FF 00 00 00 00
$54   82 FF FF 00 00 00 00
$55   FF FF FF FF FF FF 00
$67   A0 A5 00 00 00 00 00
$68   D0 D0 00 00 00 00 00
$69   00 A8 61 01 C1 00 00
$6A   FE 02 0A 00 00 00 00
$6B   00 00 00 00 00 00 00
$6C   00 00 00 00 00 00 00
$6D   00 00 00 00 00 00 00
$6E   00 00 00 00 00 00 00
$6F   00 00 FF 00 FF FE 00
$70   FB FC FA F9 F8 F8 00
$71   F7 F5 F5 F3 F5 F2 00
$72   F4 F1 F4 F0 F3 EF 00
$73   F3 EF F3 EF F4 EF 00
$74   F4 EF 00 00 00 00 00
$75   00 00 00 00 00 00 00
$76   00 00 00 00 00 00 00
$77   00 00 00 00 00 00 00
$78   F0 00 00 00 00 00 00
$79   01 00 00 00 00 00 00
$7A   02 00 00 00 00 00 00
$7B   0E 0F 0E 0F 00 00 00

$01   41 55 01 02 03 04 52 53 41 32 03 09 01 AA AA 01
$02   01 02 03 04
$03   41 54 01 02 03 04 52 53 41 32 03 09 01 AA AA 01
$04   01 02 03 04
$05   42 55 FF FF FF FF FF FF FF FF FF FF FF FF FF FF
$06   FF FF FF FF
$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 35 30 36 33 33 30 4B 48 39
$0E   01 5A 39 A4
$0F   41 4A 36 34 37 33 52 35 30 34 39 32 30 39 54 39
$10   01 5A 39 A4
$13   42 52 39 38 32 30 44 31 35 30 39 30 30 35 34 30
$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   53 52
$23   32 5A FA FA FA FA FA
$24   32 5A FA FA FA FA FA
$25   32 5A FA FA FA FA FA
$26   32 5A FA FA FA FA FA
$40   00 00
$41   3F 00 00 06 00 1A
$42   D0 E4
$43   00 00 8E 80
```

```
$44  C6 00 00 FC 80 C0
$45  07 01 07 01 05 01
$46  00 0F 0F 64 64
$47  0A 64 04 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 35 33 35 32 32 31 30 35 58 51 20 20 20 20
$B7  50 AA 01 0F 02
$B8  54 41 68 06 15
$C1  30 46 30 32
$CA  30 46 30 32
$CB  00 F0 B6 78
$CC  00 F0 B6 78
$D1  00 00
$DB  00 00
$DC  00 00
```