CRASH DATA RESEARCH CENTER

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**CALSPAN REMOTE SIDE IMPACT INFLATABLE OCCUPANT PROTECTION
INVESTIGATION**

NASS/SCI COMBO CASE NO: 04-041-066C

VEHICLE: 2004 JAGUAR S-TYPE

LOCATION: FLORIDA

CRASH DATE: JUNE 2004

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 remote investigation focused on the performance of the side impact inflatable occupant protection system in a 2004 Jaguar S-Type. The system consisted of seat back mounted side impact air bags for the front seating positions and curtain air bags for the four outboard seating positions. In addition, the Jaguar was equipped with advanced frontal air bags, buckle mounted safety belt pretensioners for the front safety belts, and retractor pretensioners for the rear safety belts. The Jaguar was occupied by a restrained 46-year-old male driver. The Jaguar was involved in an intersection crash with a 2002 Chevrolet Cavalier. The 2002 Chevrolet Cavalier was occupied by a 19-year-old male driver and 33-year-old male front right occupant. As a result of the crash, the driver's safety belt pretensioner fired, the driver's frontal air bag, left side seat back mounted side impact air bag, and left side curtain air bags deployed. The Chevrolet was involved in subsequent impacts with three additional vehicles. The Chevrolet was equipped with redesigned frontal air bags; however, the driver's air bag did not deploy, the front right deployed. The Chevrolet was also equipped with an Event Data Recorded (EDR). The Chevrolet's EDR printout is included as **Attachment A** of this report. The driver of the Jaguar sustained minor severity injuries and was transported to a trauma center where he was treated and released. He received additional follow-up treatment from his orthopedist four days post-crash. The Jaguar and Chevrolet sustained moderate severity damage and were towed from the crash site.			
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NASS/SCI CASE NO. – 2004-41-066C
VEHICLE – 2004 JAGUAR S-TYPE
LOCATION - STATE OF FLORIDA
CRASH DATE – JUNE 2004

BACKGROUND

This remote investigation focused on the performance of the side impact inflatable occupant protection system in a 2004 Jaguar S-Type (**Figure 1**). The system consisted of seat back mounted side impact air bags for the front seating positions and curtain air bags for the four outboard seating positions. In addition, the Jaguar was equipped with advanced frontal air bags, buckle mounted safety belt pretensioners for the front safety belts, and retractor pretensioners for the rear safety belts. The Jaguar was occupied by a restrained 46-year-old male driver. The Jaguar was involved in an intersection crash with a 2002 Chevrolet Cavalier. The 2002 Chevrolet Cavalier was occupied by a 19-year-old male driver and 33-year-old male front right occupant.

Figure 1. Subject vehicle 2004 Jaguar S-Type.

As a result of the crash, the driver's safety belt pretensioner fired, the driver's frontal air bag, left side seat back mounted side impact air bag, and left side curtain air bags deployed. The Chevrolet was involved in subsequent impacts with three additional vehicles. The Chevrolet was equipped with redesigned frontal air bags; however, the driver's air bag did not deploy, the front right deployed. The Chevrolet was also equipped with an Event Data Recorded (EDR). The Chevrolet's EDR printout is included as **Attachment A** of this report. The driver of the Jaguar sustained minor severity injuries and was transported to a trauma center where he was treated and released. He received additional follow-up treatment from his orthopedist four days post-crash. The Jaguar and Chevrolet sustained moderate severity damage and were towed from the crash site.

This crash was identified by the National Automotive Sampling System (NASS) PSU 41 during the weekly sampling of Police Accident Reports (PARs). This crash was selected and researched as CDS Case No. 04-41-066C. The NASS PSU performed the vehicle and scene inspections and driver interview. Due to the deployment of the side impact occupant protection system in the 2004 Jaguar S-Type, NHTSA assigned the tasks of case review and report preparation to the Calspan SCI team.

SUMMARY
Crash Site

This intersection crash occurred during the evening hours of June 2004. At the time of the crash it was daylight and the asphalt road surface was dry. The crash occurred at a four-leg intersection. The north/southbound roadway was configured with two travel lanes in each direction with a center left turn lane. The north/southbound lanes were delineated by a curbed

median. The east/westbound roadway was configured with three travel lanes in each direction with a center left turn lane. The east/westbound lanes were also delineated by a curbed median. Traffic flow through the intersection was controlled by three-phase overhead traffic signals that were functioning at the time of the crash. The posted speed limit for the north/southbound roadway was 48 km/h (30 mph) and 64 km/h (40 mph) for the east/westbound roadway. The NASS scene schematic is included as **(Figure 15)** of this report.

Vehicle Data – 2004 Jaguar S-Type

The 2004 Jaguar S-Type was identified by the Vehicle Identification Number (VIN): SAJEA01T04 (production sequence omitted). The odometer reading at the time of the inspection was unknown due to lack of power. The vehicle was a four-door sedan that was equipped with a 3.0-liter, V6 engine, 6-speed automatic transmission, rear-wheel drive, power-front and rear disc brakes with anti-lock, Emergency Brake Assist (EBA), Dynamic Stability Control (DSC), traction control, reverse park control, OEM alloy wheels, power-steering, tilt/telescoping steering wheel, and power adjustable pedals that were in mid the position. The Jaguar was configured with Continental ContiTouring Contact tires size P225/55R16. The manufacturer recommended tire pressure was 241 kPa (35 PSI). The specific tire data at the time of the NASS inspection was as follows:

Tire	Measured Pressure	Tread Depth	Restricted	Damage
LF	0 kPa	6 mm (8/32)	No	Unknown
LR	131 kPa (19 PSI)	6 mm (8/32)	No	None
RF	338 kPa (49 PSI)	6 mm (8/32)	No	None
RR	338 kPa (49 PSI)	6 mm (8/32)	No	None

The seating positions in the Jaguar were configured with leather upholstered front buckets seats with height adjustable head restraints. The front seat head restraints were both adjusted to the full-down position at the time of the vehicle inspection. The second row was configured with a three-passenger bench seat with height adjustable head restraints for the outboard seating positions. The rear seat head restraints were adjusted between the mid to full-down position at the time of the vehicle inspection.

2002 Chevrolet Cavalier

The 2002 Chevrolet Cavalier was identified by the VIN: 1G1JC12462 (production sequence omitted). The driver stated to the NASS researcher that the odometer reading was 37,015 kilometers (23,000 miles) at the time of the crash. The vehicle was a two-door sedan that was equipped with a 2.2-liter, 4-cylinder engine, 5-speed manual transmission, front-wheel drive, and a tilt steering wheel. The Chevrolet was configured with Goodyear tires size P195/70R14. The manufacturer recommended tire pressure was 210 kPa (30 PSI). The specific tire data was as follows:

Tire	Measured Pressure	Tread Depth	Restricted	Damage
LF	0 kPa	5 mm (6/32)	No	De-beaded
LR	193 kPa (28 PSI)	6 mm (8/32)	No	None
RF	0 kPa	5 mm (6/32)	Yes	Punctured
RR	172 kPa (25 PSI)	6 mm (8/32)	No	None

Crash Sequence
Pre-Crash
The restrained 46-year-old male driver of the Jaguar was operating the vehicle northbound on the outboard lane approaching the intersection **(Figure 2)**. The 19-year-old male driver of the Chevrolet was operating the vehicle eastbound on the outboard lane approaching the same intersection **(Figure 3)**. The driver of the Jaguar stated to the NASS researcher that he could not see the traffic signal due to tree foliage that was near the intersection. The driver of the Jaguar proceeded into the intersection on a red traffic signal phase.

Figure 2. Jaguar's northbound approach to the intersection.

Figure 3. Chevrolet's eastbound approach to the intersection.

Crash
As the Jaguar entered the intersection, the front of the Chevrolet impacted the left front side of the Jaguar in the southeast quadrant of the intersection **(Figure 4)**. The resulting directions of force were 10 o'clock for the Jaguar and 2 o'clock for the Chevrolet. The WINSMASH missing vehicle algorithm was used to calculate a delta V for this impact due to the multiple overlapping frontal impacts to the Chevrolet. The total calculated delta V for the Jaguar was 20.0 km/h (13.0 mph). The longitudinal and lateral components were -12.9 km/h (-8.0 mph) and 15.3 km/h (6.2 mph), respectively. The total calculated delta V for the Chevrolet was 28.0 km/h (17.4 mph). The longitudinal and lateral components were -21.4 km/h (-13.3 mph) and -18.0 km/h (-11.2 mph).

Figure 4. Area of impact from the Jaguar's northbound travel lane.

A 1987 Mazda 323 subsequently impacted the rear of Chevrolet as the Jaguar and Chevrolet began to disengage and travel in a northeast direction. The Chevrolet rotated counterclockwise as the Jaguar began to rotate clockwise. The left aspect of the Jaguar side-slapped the right rear aspect of the Chevrolet. The resulting directions of force were 9 o'clock for the Jaguar and 3 o'clock for the Chevrolet. The WINSMASH missing vehicle algorithm was used to calculate a delta V for this impact due to the Chevrolet sustaining overlapping damage from a subsequent impact. The total delta V for the Jaguar was 9.0 km/h (5.6 mph). The longitudinal and lateral components were 0.0 km/h and 9.0 km/h (5.6 mph), respectively. The total delta V for the Chevrolet was 12.0 km/h (7.5 mph). The longitudinal and lateral components were 0.0 km/h and -12.0 km/h (-7.5 mph), respectively.

As a result of the crash the driver's frontal air bag, seat back mounted side impact air bag, and the left side curtain air bag deployed in the Jaguar. Additionally, the driver's buckle mounted safety belt pretensioner fired as a result of the crash. The Jaguar came to rest east of the intersection facing a northerly direction. The Chevrolet continued in a northeast direction across the intersection where it was involved in subsequent impacts. The Chevrolet's driver air bag did not deploy as a result of the crash; however the front right air bag deployed.

Post-Crash
Police and EMS personnel responded to the crash site shortly after the crash. The driver of the Jaguar sustained minor severity injuries and was transported to a trauma center where he was treated and released. The Jaguar and Chevrolet sustained moderate severity damage and were towed from the crash site.

Vehicle Damage
Exterior Damage – 2004 Jaguar S-Type
The 2004 Jaguar S-Type sustained moderate severity damage as a result of the initial impact with the Chevrolet (**Figure 5**). The direct contact damage began at the front left corner and extended rearward 145.0 cm (57.1"). The maximum crush measured 55.0 cm (21.7") and was located rear of the front left corner. Six equidistant measurements were used to document the crush at the mid-door level using a combined direct and induced damage width of 171.0 cm (67.3") and were as follows: C1 = 4.0 cm (1.6"), C2 = 7.0 cm (2.8"), C3 = 29.0 cm (11.4"), C4 = 55.0 cm (21.7"), C5 = 54.0 cm (21.3"), C6 = 28.0 cm (11.0"). The Collision Deformation Classification (CDC) for this impact was 10-LYEW-4.
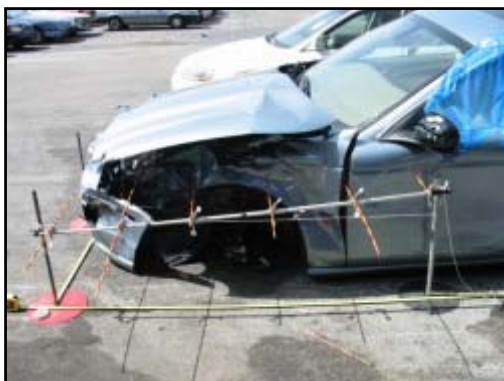

Figure 5. Front left damage from the initial impact with the Chevrolet.

Figure 6. Left side damage from the secondary impact with the Chevrolet.

The Jaguar sustained minor severity damage as a result of the side-slap with the Chevrolet (**Figure 6**). The direct contact damage began on the left rear door and extended rearward 181.0 cm (71.3"). The maximum crush measured 10.0 cm (3.9") and was located on the center of the left rear door. Six measurements were used to document the crush using a combined direct and induced damage width of 199.0 cm (78.3") and were as follows: $C1 = 0.0$ cm, $C2 = 6.0$ cm (2.4"), $C3 = 9.0$ cm (3.5"), $C4 = 10.0$ cm (3.9"), $C5 = 2.0$ cm (0.8"), $C6 = 3.0$ cm (1.2"). The CDC for this impact was 09-LZEW-1.

Interior Damage – 2004 Jaguar S-Type

The 2004 Jaguar S-Type sustained minor damage as a result of occupant contacts. There was no intrusion of the passenger compartment. The occupant contacts points consisted of two scuffs that were noted to the driver's seat back from contact with the driver's upper left arm and upper right arm. Body fluid was noted on the driver's frontal air bag from possible contact with the driver's face. A scuffmark on the driver's safety belt was identified from contact with the driver's chest. A scuffmark was present on the knee bolster from probable contact with the driver's right knee. Additionally, a contact was noted to the front left windowsill that was evidenced by a

Figure 7. Overall view of the driver's area.

scuff. The scuff was most likely a result of interaction between the left curtain air bag deployment and the windowsill. **Figure 7** is an overall of the driver's area.

Exterior Damage – 2002 Chevrolet Cavalier

The 2002 Chevrolet Cavalier sustained moderate severity frontal damage as result of the impact with the Jaguar (**Figure 8**). The direct contact damage extended the full frontal width of 136.0 cm (53.5"). The maximum crush was located near the centerline of the vehicle and measured 20.0 cm (7.9"). Six crush measurements were used to document the crush along the front bumper support using a combined direct and induced damage width of 136.0 cm (53.5") and were as follows: $C1 = 2.0$ cm (0.8"), $C2 = 11.0$ cm (4.3"), $C3 = 17.0$ cm (6.7"), $C4 = 20.0$ cm (7.9"), $C5 = 20.0$ cm (7.9"), $C6 = 14.0$ cm (5.5"). The CDC for this impact was 02-FDEW-1 with and incremented shift value of 80.

Figure 8. Frontal damage from the initial impact with the Jaguar.

Figure 9. Right side damage from the secondary impact with the Jaguar. Damage was overlapped by a rear impact.

The Chevrolet sustained moderate severity damage as a result of the secondary impact with the Jaguar (**Figure 9**). The NASS researcher was unable to differentiate the direct damage from this impact due to a subsequent rear impact that resulted in overlapping damage. The CDC for this impact was 03-RZEW-9.

Frontal Air Bags – 2002 Chevrolet Cavalier

The 2002 Chevrolet Cavalier was equipped with redesigned frontal air bags. The air bags were monitored and controlled by a Sensing and Diagnostic Module (SDM) that was equipped with an Event Data Recorder (EDR). The NASS researcher downloaded the EDR, which recorded a Deployment file and a Non-Deployment file. The EDR printout is included as **Attachment A** of this report. The EDR data indicated that the driver's safety belt was buckled and the maximum-recorded delta V was -34.1 km/h (-21.2 mph). In the subject crash, the SDM deployed the front right air bag and suppressed the driver's frontal air bag (**Figure 10**). According to the EDR, the Supplemental Inflatable Restraint (SIR) warning lamp was in the on

Figure 10. View of the non-deployed driver's air bag and the deployed front right air bag.

position at the time of Algorithm Enable (AE), which probably resulted in the non-deployment of the driver's frontal air bag. The non-deployment event occurred 30 ignition cycles prior to the deployment event; therefore, it was not associated with this crash.

Side Impact Inflatable Occupant Protection System – 2004 Jaguar S-Type

The 2004 Jaguar S-Type was equipped with seat back mounted side impact air bags for the front seating positions and curtain air bags for the outboard seating positions. In the subject crash, the left seat back mounted side impact air bag and the left side curtain air bag deployed. The seatback mounted air bag module was located in the outboard aspect of the seatback. The air bag measurements were obtained from an exemplar vehicle, which were 39.0 cm (15.4") in height and 20.0 cm (7.9") in width in its deflated state (**Figure 11**). The side impact air bag was not tether and was vented by a single vent port on the lower aspect of the forward edge. No occupant contacts or failures were noted to the air bag.

Figure 11. Deployed left side seat back mounted side impact air bag.

Figure 12. Deployed left side curtain air bag.

The curtain air bag deployed downward from the left roof side rail and extended from the A-pillar to the C-pillar **(Figure 12)**. A single tether at the A-pillar and two tethers at the C-pillar tethered the curtain air bag. The air bag membrane from an exemplar vehicle measured 132.0 cm (52.0") in width and 27.0 cm (10.6") in height in its deflated state. The NASS researcher did not note any occupant contacts or failures to the air bag.

The front right seat back mounted side impact air bag and the right side curtain air bag did not deploy in this crash.

Advanced Frontal Air Bag System – 2004 Jaguar S-Type

The 2004 Jaguar S-Type was equipped with advanced frontal air bag system. The system utilized dual stage inflators, driver seat track position sensor, safety belt buckle sensors, ultrasonic position sensing for the right front seat, and a weight sensor in the front right seat to deploy the appropriate safety system. In the subject crash, the driver's frontal air bag deployed **(Figure 13)**. The driver's frontal air bag was located in the center of the steering wheel hub. The air bag contained one tether and was vented by two circular vent ports that were located at the 11 and 1 o'clock positions on the rear aspect. The NASS researcher noted body fluid on the air bag from possible contact with the driver's face. No failures were noted to the air bag.

Figure 13. Deployed driver's frontal air bag.

The front right air bag was mid-mounted on the front right instrument panel. The front right seat was not occupied at the time of the crash, therefore the air bag did not deploy.

Manual Restraint Systems – 2004 Jaguar S-Type

The 2004 Jaguar S-Type was equipped with continous loop manual 3-point lap and shoulder safety belts for the five seating positions. The driver's safety belt was configured with a sliding latch plate, an Emergency Locking Retractor (ELR), and buckle mounted safety belt pretensioner that fired as a result of the crash **(Figure 14)**. The driver's used the safety belt in the crash, which was evidenced by the loading on the safety belt. The front right safety belt was configured with a sliding latch plate, a switchable Emergency Locking Retractor/Automatic Locking Retractor (ALR), and a buckle mounted pretensioner. Although the front right seat was not occupied, the safety belt pretensioner fired during the crash. The rear safety belts were configured with sliding latch plates, switchable ELR/ALR, and retractor pretensioners, which fired as a result of the crash.

Figure 14. Fired driver's safety belt pretensioner.

Driver Occupant Demographics – 2004 Jaguar S-Type
 Driver
Age/Sex: 46-year-old male
Height: 175.0 cm (68.9")
Weight: 77.0 kgs (169.7 lbs)
Seat Track Position: Mid-track (Driver statement)
Manual Restraint Use: Manual 3-point lap and shoulder
Usage Source: Vehicle inspection
Eyewear: None
Type of Medical Treatment: Transported and released

Driver Injuries

Injury	Injury Severity (AIS 90/Update 98)	Injury Source
Left 6th rib fracture (midaxillary, spiral, slightly displaced)	Minor (450212.1,2)	Left front door panel
Left forehead abrasion	Minor (290202.1,2)	Frontal air bag
Left chest contusion	Minor (490402.1,2	Left front door panel
Cervical spine strain	Minor (640278.1,1)	Impact forces
Thoracic spine strain	Minor (640478.1,7)	Impact forces
Lumbar spine strain	Minor (640678.1,8)	Impact forces
Right shoulder sprain	Minor (751020.1,1)	Impact forces
Right sternoclavicular sprain	Minor (751220.1,1)	Impact forces

 Driver Kinematics
The 46-year-old male driver of the 2004 Jaguar S-Type was seated in a presumed upright posture. The NASS researcher reported the seat track to be at the full forward position at the time of the NASS inspection. However, the driver stated to the NASS researcher that the seat was adjusted to a mid-track position at the time of the crash.

At impact with the Chevrolet, the driver's frontal air bag, seat back mounted side impact air bag, and left side curtain air bags deployed. In addition, the driver's safety belt buckle pretensioner fired. The driver initiated a left and slightly forward trajectory in response to the 10 o'clock impact force. The driver's forehead contacted the deploying frontal air bag, which resulted in the left forehead abrasion.

The seatback mounted side impact air bag measured 20.0 cm (7.9") in width, which did not extend the full width of the front left door panel. Therefore, the forward trajectory caused the driver's torso to be displaced away from the deploying seatback mounted side impact, which allowed in his torso to contact the exposed portion of the front left door panel. The door panel contact resulted in the left 6th rib fracture (midaxillary, spiral, slightly displaced) and the left chest contusion.

The driver's left and forward movement resulted in the cervical spine strain, thoracic spine strain, lumbar spine strain, right shoulder sprain, and the right sternoclavicular sprain.

Medical Treatment

The driver was transported to a trauma center where he was treated and released. The driver went to an orthopedist for follow-up treatment four days post-crash. The orthopedist diagnosed the left 6th rib fracture (midaxillary, spiral, slightly displaced), left chest contusion, cervical spine strain, thoracic spine strain, lumbar spine strain, right shoulder sprain, and the right sternoclavicular sprain which were not identified during emergency room visit.
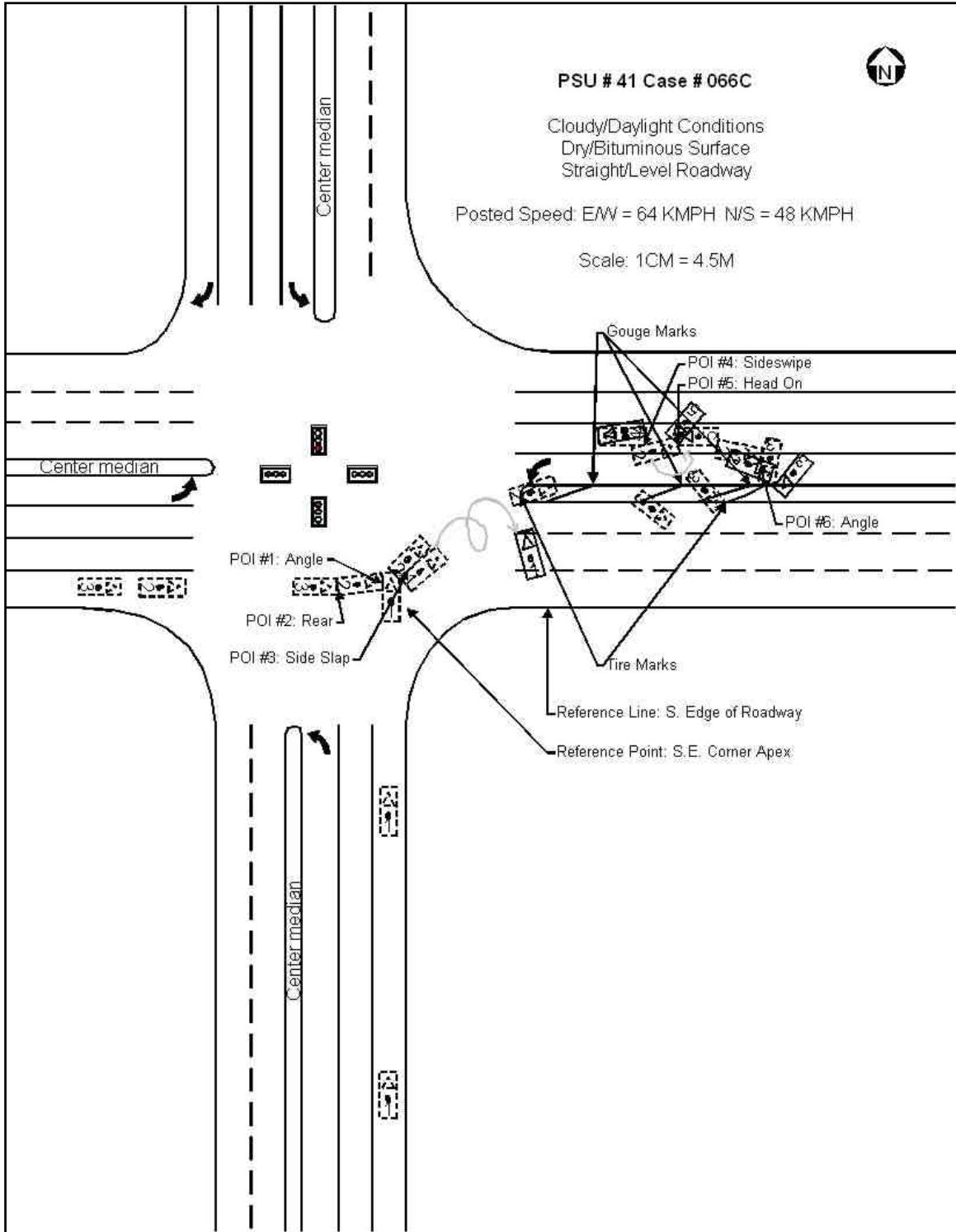
Figure 15. Scene schematic

Attachment A: 2002 Chevrolet Cavalier EDR Report

CDR File Information

Vehicle Identification Number	1G1JC124627xxxxxx
Investigator	
Case Number	
Investigation Date	
Crash Date	
Filename	
Saved on	
Data check information	
Collected with CDR version	Crash Data Retrieval Tool 2.24
Collecting program verification number	
Reported with CDR version	Crash Data Retrieval Tool 2.40
Reporting program verification number	32B7A917
Interface used to collected data	Block number: 00 Interface version: 39 Date: 10-09-03 Checksum: 0300
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 contains 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 contains 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 can not 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 file will be locked after a deployment, if the non-deployment occurred within 5 seconds before the deployment or a deployment level event occurs within 5 seconds after the deployment.

SDM Data Limitations:

-SDM Recorded Vehicle Forward Velocity Change is one of the measures used to make air bag deployment decisions. 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 deployments, the SDM will record 100 milliseconds of data after deployment criteria is met and up to 50 milliseconds before deployment criteria is met. For non-deployments and deployment level events, the SDM will record the first 150 milliseconds of data after algorithm enable.

-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 does not receive a valid message.

-Driver's Belt Switch Circuit Status indicates the status of the driver's seat belt switch circuit

-Passenger Front Air Bag Suppression Switch Circuit Status indicates the status of the suppression switch circuit.

-The Time Between Non-Deployment and Deployment Events is displayed in seconds. If the time between the two events is greater than five seconds, "N/A" is displayed in place of the time.

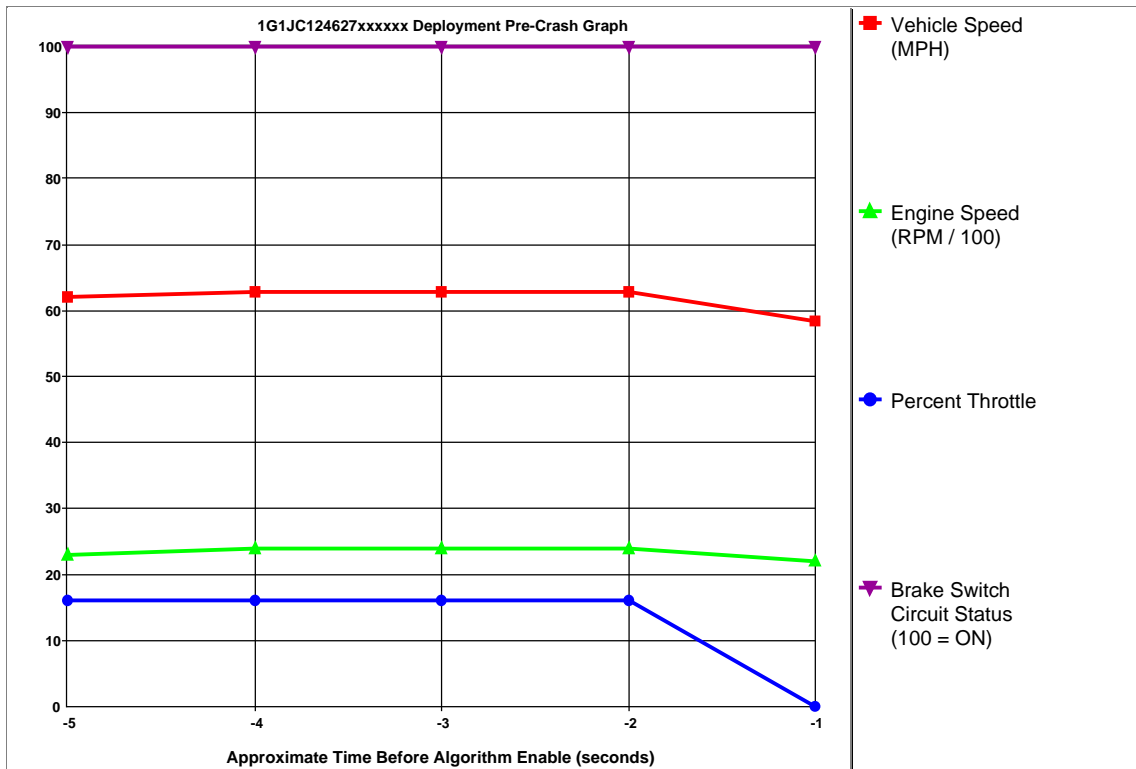-If power to the SDM is lost during a crash event, all or part of the crash record may not be recorded.

SDM Data Source:

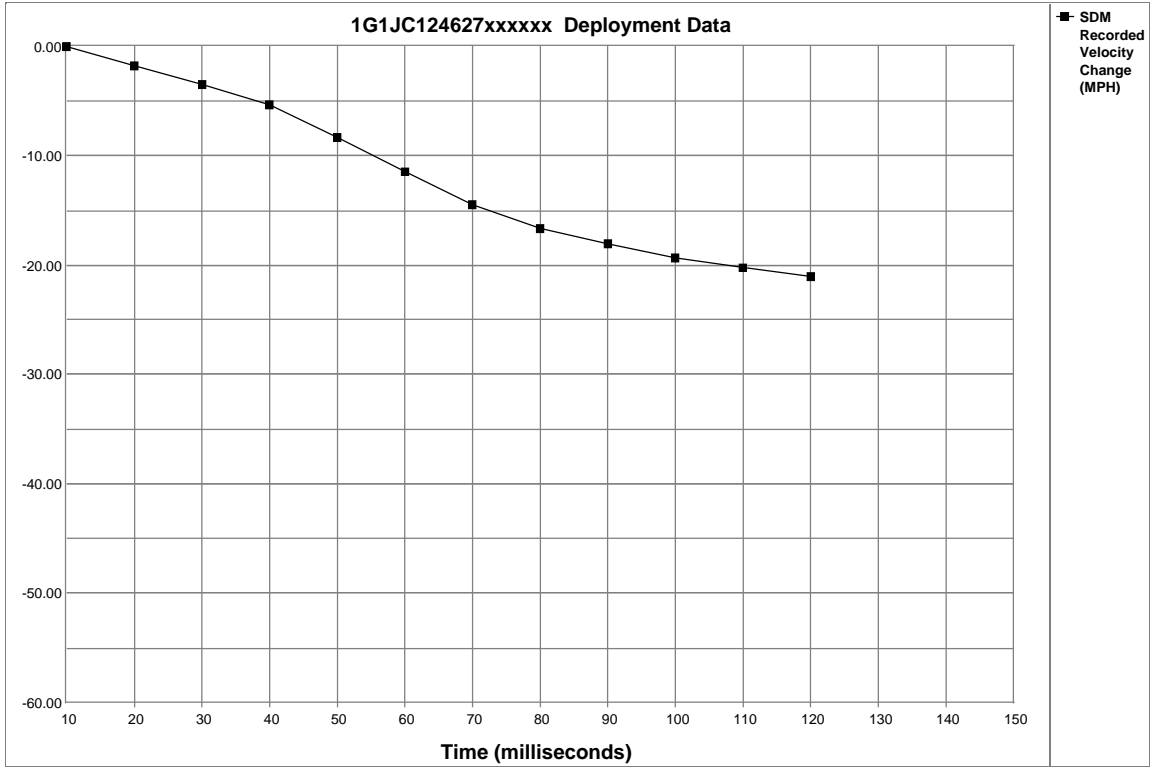All SDM recorded data is measured, calculated, and stored internally, except for the following:

-Vehicle Speed, Engine Speed, and Percent Throttle data are transmitted once a second by the Powertrain Control Module (PCM), via the Class 2 data link, to the SDM.

-Brake Switch Circuit Status data is transmitted once a second by either the ABS module or the PCM, via the Class 2 data link, to the SDM. Depending on vehicle option content, the Brake Switch Circuit Status data may not be available.

-If the vehicle is a 2000 - 2002 Chevrolet Cavalier Z24 or a Pontiac Sunfire GT, with a manual transmission (RPO MM5) and a 2.4L engine (RPO LD9), the Brake Switch Circuit Status data will be reported in the opposite state than what actually occurred, e.g. an actual brake switch status of "ON" will be reported as "OFF".

-In most vehicles, the Driver's Belt Switch Circuit is wired directly to the SDM. In some vehicles, the Driver's Belt Switch Circuit Status data is transmitted from the Body Control Module (BCM), via the Class 2 data link, to the SDM.

-The Passenger Front Air Bag Suppression Switch Circuit is wired directly to the SDM.

System Status At Deployment

SIR Warning Lamp Status	ON
Driver's Belt Switch Circuit Status	BUCKLED
Passenger Front Air Bag Suppression Switch Circuit Status	Air Bag Not Suppressed
Ignition Cycles At Deployment	774
Ignition Cycles At Investigation	775
Maximum SDM Recorded Velocity Change (MPH)	-21.17
Algorithm Enable to Maximum SDM Recorded Velocity Change (msec)	115
Time Between Non-Deployment And Deployment Events (sec)	.1
Time From Algorithm Enable to Deployment Command Criteria Met (msec)	15

1G1JC124627xxxxxx Deployment Pre-Crash Graph

Legend:
- Vehicle Speed (MPH)
- Engine Speed (RPM / 100)
- Percent Throttle
- Brake Switch Circuit Status (100 = ON)

Approximate Time Before Algorithm Enable (seconds)

Seconds Before AE	Vehicle Speed (MPH)	Engine Speed (RPM)	Percent Throttle	Brake Switch Circuit Status
-5	62	2304	16	ON
-4	63	2368	16	ON
-3	63	2368	16	ON
-2	63	2368	16	ON
-1	58	2176	0	ON

1G1JC124627xxxxxx Deployment Data

SDM Recorded Velocity Change (MPH)

Time (milliseconds)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
SDM Recorded Velocity Change	0.00	-1.76	-3.51	-5.27	-8.34	-11.41	-14.48	-16.67	-17.99	-19.31	-20.18	-21.06	N/A	N/A	N/A

Time (milliseconds)

System Status At Non-Deployment

SIR Warning Lamp Status	ON
Driver's Belt Switch Circuit Status	BUCKLED
Passenger Front Air Bag Suppression Switch Circuit Status	Air Bag Not Suppressed
Ignition Cycles At Non-Deployment	744
Ignition Cycles At Investigation	775
Maximum SDM Recorded Velocity Change (MPH)	-1.63
Algorithm Enable to Maximum SDM Recorded Velocity Change (msec)	85
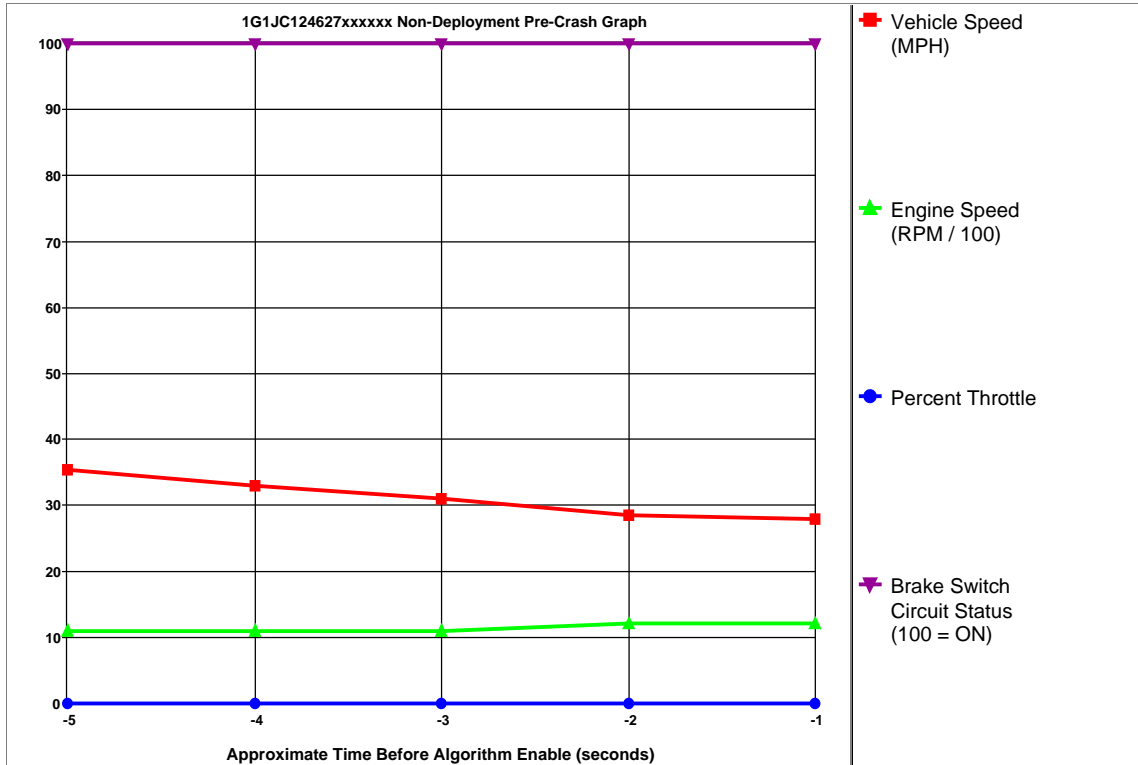
1G1JC124627xxxxxx Non-Deployment Pre-Crash Graph

- ■ Vehicle Speed (MPH)
- ▲ Engine Speed (RPM / 100)
- ● Percent Throttle
- ▼ Brake Switch Circuit Status (100 = ON)

Approximate Time Before Algorithm Enable (seconds)

Seconds Before AE	Vehicle Speed (MPH)	Engine Speed (RPM)	Percent Throttle	Brake Switch Circuit Status
-5	35	1088	0	ON
-4	33	1088	0	ON
-3	31	1088	0	ON
-2	29	1152	0	ON
-1	28	1152	0	ON
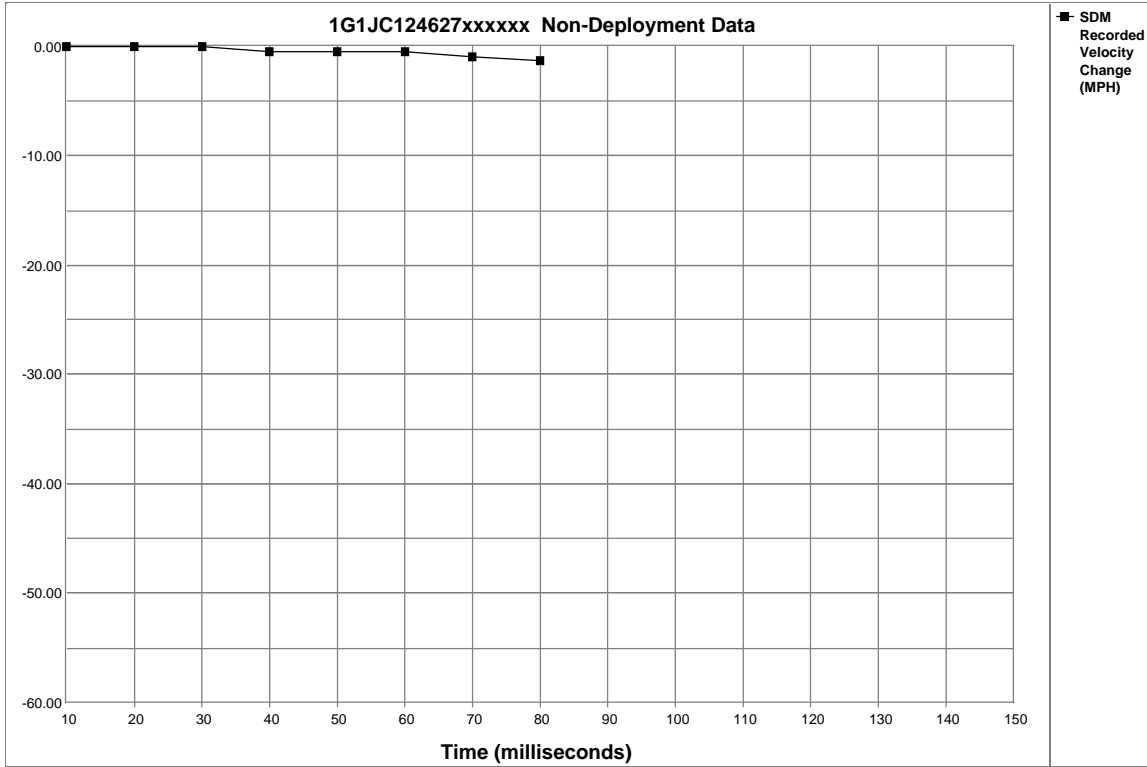
1G1JC124627xxxxxx Non-Deployment Data

Time (milliseconds)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
SDM Recorded Velocity Change	0.00	0.00	0.00	-0.44	-0.44	-0.44	-0.88	-1.32	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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   08 23 00 00
$02   95 6B
$03   41 53 31 32 31 32
$04   4B 34 55 4E 5A 31
$05   00
$06   22 67 40 98
$10   FF 9F 80
$11   83 85 85 FD 8C 01
$14   03 84 AB 80
$18   84 83 85 B9 FF 00
$1C   FA 32 4A FA FA FA
$1D   FA FA 32 4A FA FA
$1E   FA FA
$1F   FF 02 00 00 00
$20   A3 07 00 80 90 80
$21   DF FF FF FF FF FF
$22   FF FF FF FF FF FF
$23   FF 00 00 77 03 00
$24   00 00 01 01 01 02
$25   03 FF FF FF FF FF
$26   FF FF 08 2D 2E 32
$27   35 39 00 FF 00 00
$28   00 00 00 00 00 12
$29   12 11 11 11 00 FF
$2A   A2 FF FE 02 80 01
$2B   85 01 BA 00 00 00
$2C   00 00 00 00
$2D   22 0C 15 00
$30   A3 07 00 80 90 80
$31   DF BF FE FF FF FF
$32   FF FF FF FF FF FF
$33   7C 0C 03 03 00 04
$34   08 0C 13 1A 21 26
$35   29 2C 2E 30 FF FF
$36   FF 0C 5C 06 09 5E
$37   65 65 65 64 00 FF
$38   00 00 29 29 29 29
$39   00 22 25 25 25 24
$3A   00 FF 9F C0 31 00
$3B   00 04 00
$3C   06 2E 5C 2E
$40   FF FF FF FF FF FF
$41   FF FF FF FF FF FF
$42   FF FF FF FF FF FF
$43   FF
```