

REPORT NUMBER: 131SB-MGA-2007-004

**SAFETY COMPLIANCE TESTING FOR
FMVSS NO. 131
SCHOOL BUS PEDESTRIAN SAFETY DEVICES**

**Mid Bus Inc.
2006 Mid Bus Guide DW School Bus
NHTSA No. C60901**

**PREPARED BY:
MGA RESEARCH CORPORATION
5000 WARREN ROAD
BURLINGTON, WI 53105**

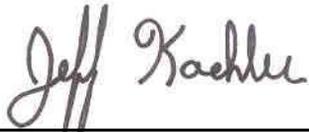


Final Report Date: December 22, 2006

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
MAIL CODE: NVS-220
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WASHINGTON, D.C. 20590**

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Prepared by:  Date: December 22, 2006
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Reviewed by:  Date: December 22, 2006
Mike Janovicz, Project Engineer

FINAL REPORT ACCEPTED BY:


12/22/06
Date of Acceptance

Technical Report Documentation Page

| | | | |
|--|---|--|------------------|
| 1. Report No. 131SB-MGA-2007-004 | 2. Government Accession No. | 3. Recipient's Catalog No. | |
| 4. Title and Subtitle Final Report of FMVSS 131 Compliance Testing of 2006 Mid Bus Guide DW School Bus NHTSA No.: C60901 | | 5. Report Date December 22, 2006 | |
| | | 6. Performing Organization Code MGA | |
| 7. Author(s) Jeff Koehler, Program Manager Mike Janovicz, Project Engineer | | 8. Performing Organization Report No. 131SB-MGA-2007-004 | |
| 9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105 | | 10. Work Unit No. | |
| | | 11. Contract or Grant No. DTNH22-02-D-01057 | |
| 12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Enforcement Office of Vehicle Safety Compliance Mail Code: (NVS-220) 400 Seventh Street, S.W. Room 6115 Washington, D.C. 20590 | | 13. Type of Report and Period Covered Final Report 10/9/06 - 12/22/06 | |
| | | 14. Sponsoring Agency Code NVS-220 | |
| 15. Supplementary Notes | | | |
| 16. Abstract Compliance tests were conducted on the subject, 2006 Mid Bus Guide DW School Bus NHTSA No. C60901, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-131SB-01 for the determination of FMVSS 131 compliance. Test failures identified were as follows: None | | | |
| 17. Key Words Safety Bus Compliance Testing Safety Engineering FMVSS 131 | | 18. Distribution Statement Copies of this report are available from: NHTSA, Technical Information Services (TIS), Room 2336 (NPO-405) 400 Seventh Street, S.W. Washington, D.C. 20590 | |
| 19. Security Classif. (of this report) Unclassified | 20. Security Classif. (of this page) Unclassified | 21. No. of Pages 27 | 22. Price |

Form DOT F1700.7 (8-72)

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SECTION 1
PURPOSE OF COMPLIANCE TEST

Tests were conducted by the MGA Research Corporation-Wisconsin Operations on a 2006 Mid Bus Guide DW School Bus, NHTSA No. C60901, in accordance with the specifications of the Office of Vehicle Safety Compliance (OVSC) Test Procedures TP-131SB-01 to determine compliance to the requirements of Federal Motor Vehicle Safety Standard (FMVSS) 131, "School Bus Pedestrian Safety Devices."

This program is sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-02-D-01057.

SECTION 2
TEST DATA SUMMARY

Based on the tests performed, the 2006 Mid Bus Guide DW School Bus, NHTSA No. C60901, appears to meet all of the requirements of FMVSS 131. See Test Summary Data Sheets on the following pages.

FMVSS 131, SCHOOL BUS PEDESTRIAN SAFETY DEVICES
VEHICLE INFORMATION AND TEST SUMMARY

Test Vehicle: **2006 Mid Bus Guide DW School Bus**
 Test Lab: **MGA Research-Wisconsin Operations**

NHTSA No.: **C60901**
 Test Date: **10/9/06**

| | | | |
|----------------------------------|-------------------------|--------------------|-------------|
| VIN | 1GBJG31U461237309 | Chassis Cab | Yes |
| No. of Stop Signal Arms | 1 | Rear Engine | No |
| Pass. Capacity (driver included) | 27 | Tire Size (on bus) | LT225/75R16 |
| Stop Signal Arm Manufacturer | Specialty Manufacturing | | |

DATA FROM CERTIFICATION LABEL

| | | | |
|---------------------------------|-----------|-----------------|---------|
| Final Stage Manufacturer | Mid Bus | Date of Mfg. | 09/2006 |
| Incomplete Vehicle Manufacturer | Chevrolet | Date of Mfg. | 04/2006 |
| GVWR (kg) | 5579 | GAWR Front (kg) | 1951 |
| | | GAWR Rear (kg) | 3901 |

TEST SUMMARY

| | Pass/Fail or N/A |
|---|------------------|
| Dimensional Requirements (S5.1) | PASS |
| Surface Content and Labeling (S5.2) | PASS |
| Conspicuity Requirements (S5.3) | PASS |
| Location and Position Requirements (S5.4) | PASS |
| Arm Operation Requirements (S5.5) | PASS |

SECTION 3
COMPLIANCE TEST DATA

FMVSS 131 – DATA SHEET 1
DIMENSIONS OF STOP SIGNAL ARM (S5.1)

Test Vehicle: **2006 Mid Bus Guide DW School Bus**
 Test Lab: **MGA Research-Wisconsin Operations**

NHTSA No.: **C60901**
 Test Date: **10/9/06**

“Regular octagon” with diameter of at least 450 mm (point to point).

| | Forward Signal Arm (mm) | Rearmost Signal Arm (mm) |
|---------------------|-------------------------|--------------------------|
| Diameter 1 | 495 | --- |
| Diameter 2 | 495 | --- |
| Diameter 3 | 495 | --- |
| Diameter 4 | 495 | --- |
| Range (max. – min.) | 0 | --- |

| REQUIREMENTS | Yes, No, N/A |
|---|--------------|
| Are all octagon diameter values ≥ 450 mm? | Yes |
| Is range of octagon diameter values ≤ 12 mm? | Yes |
| Are all octagon chord dimensions equal within 6 mm? | Yes |

| Test Results | | Pass/Fail |
|--------------|-------------------------------|-------------|
| S5.1 | Dimensions of Stop Signal Arm | PASS |

Tested By: Jeff Kachler
 Date: October 9, 2006

Approved By: Michael Janoj

FMVSS 131 – DATA SHEET 2
SURFACE CONTENT AND LABELING (S5.2)

Test Vehicle: **2006 Mid Bus Guide DW School Bus**
 Test Lab: **MGA Research-Wisconsin Operations**

NHTSA No.: **C60901**
 Test Date: **10/9/06**

| REQUIREMENTS | Forward Signal Arm | | Rearmost Signal Arm | |
|--|--------------------|----------|---------------------|----------|
| | Front Side | Aft Side | Front Side | Aft Side |
| Color RED except for border & legend (Yes/No) | YES | YES | --- | --- |
| Color of border is WHITE (Yes/No) | YES | YES | | --- |
| Color of word "STOP" is WHITE (Yes/No) | YES | YES | | --- |
| Word "STOP" is in upper case letters (Yes/No) | YES | YES | | --- |
| Width of border (≥ 12 mm) | 16 mm | 16 mm | | --- |
| Percent of border obscured by mounting brackets, clips, or bolts, or other components* ($\leq 15\%$) | 0% | 14% | | --- |
| Height of letters (≥ 150 mm) | 150 mm | 150 mm | | --- |
| Stroke width of letters (≥ 20 mm) | 25 mm | 25 mm | | --- |

* = In addition to area obscured by 2 optional red lamps, if installed.

NOTE:

1. Front side of rearmost signal arm shall not contain any lettering or border.

| Test Results | | Pass/Fail |
|--------------|------------------------------|-------------|
| S5.2 | Surface content and labeling | PASS |

Tested By: Jeff Koehler
 Date: October 9, 2006

Approved By: Michal Janoj

**FMVSS DATA SHEET 3
CONSPICUITY (S5.3)**

Test Vehicle: **2006 Mid Bus Guide DW School Bus**
 Test Lab: **MGA Research-Wisconsin Operations**

NHTSA No.: **C60901**
 Test Date: **10/9/06**

The Stop Signal Arm shall comply with either S5.3.1 or S5.3.2, or both.

REFLECTORIZED MATERIAL (S5.3.1)

| Requirements | Forward Signal Arm | | Rearmost Signal Arm | |
|---|--------------------|--------------------|---------------------|----------|
| | Front Side | Aft Side | Front Side | Aft Side |
| Entire surface of stop signal arm reflectorized except for mounting brackets, clips, bolts, or other necessary components. Front side of rearmost stop signal arm must not be reflectorized. (Yes/No) | No ¹ | No ¹ | --- | --- |
| Percent of entire surface obscured by mounting brackets, clips, bolts or other components necessary for mechanical or electrical operation. (7.5% max. each side) | 0% ² | 3.65% ² | --- | --- |

Test Notes:

¹ Flashing lights are present meeting the requirements of S5.3.2.

² Percentages do not include area obscured by red flashing lights.

FMVSS 131 DATA SHEET 3...continued
CONSPICUITY (S5.3)

Test Vehicle: **2006 Mid Bus Guide DW School Bus**
 Test Lab: **MGA Research-Wisconsin Operations**

NHTSA No.: **C60901**
 Test Date: **10/9/06**

OPTIONAL ILLUMINATED LETTERING (S5.3.1.1)

| Item | Stop Signal Arm | |
|--|-----------------|----------|
| | Forward | Rearmost |
| Does the stop sign(s) have illuminated lettering? If optional illuminated lettering is installed, the following requirements apply in addition to reflectorized surface. | NO | --- |

| Requirements | Forward Signal Arm | | Rearmost Signal Arm | |
|---|--------------------|----------|---------------------|----------|
| | Front Side | Aft Side | Front Side | Aft Side |
| Only Red lamps used (Yes/No) | N/A | N/A | --- | --- |
| Red lamps form the complete shape of each letter of the legend. (Yes/No) | N/A | N/A | --- | --- |
| Red lamps centered within stroke of each letter (Yes/No) or Red lamps outline each letter in immediately surrounding area (Yes/No) | N/A | N/A | --- | --- |
| The shape of each letter remains constant (Yes/No) | N/A | N/A | --- | --- |
| Net stroke width \geq 15 mm (stroke width minus lamp width) | "S" | N/A | N/A | --- |
| | "T" | N/A | N/A | --- |
| | "O" | N/A | N/A | --- |
| | "P" | N/A | N/A | --- |
| Lamps on each side of the signal arm flash (60-120 flashes/min.) | N/A | N/A | --- | --- |
| Lamps current "on" time of 30% to 75% of the total flash cycle | N/A | N/A | --- | --- |
| Total current "on" time for the two terminals shall be between 90-110% of the total flash cycle. | N/A | N/A | --- | --- |
| If Xenon short-arc lamps – "off" time before each flash of at least 50% of the total flash cycle. | N/A | N/A | --- | --- |

| Lamp Type | x | Filament |
|-----------|---|----------------------|
| | | Gaseous Discharge |
| | | Light emitting diode |

FMVSS 131 DATA SHEET 3...continued
CONSPICUITY (S5.3)

Test Vehicle: **2006 Mid Bus Guide DW School Bus**
 Test Lab: **MGA Research-Wisconsin Operations**

NHTSA No.: **C60901**
 Test Date: **10/9/06**

RED FLASHING LAMPS (S5.3.2)

| Requirements | Forward Signal Arm | | Rearmost Signal Arm | |
|--|------------------------------------|------------------------------------|---------------------|----------|
| | Front Side | Aft Side | Front Side | Aft Side |
| Red lamps centered on the vertical centerline (At least 2, enter quantity) | 2 – YES | 2 – YES | --- | --- |
| One lamp at extreme top and another at extreme bottom (Yes/No) | YES | YES | --- | --- |
| Lamps on each side of the signal arm flash alternately (60-120 flashes/min.) | YES | YES | --- | --- |
| Lamps current "on" time of 30% to 75% of the total flash cycle. | YES | YES | --- | --- |
| Total current "on" time for two terminals shall be between 90 and 110% of the total flash cycle. | YES | YES | --- | --- |
| If Xenon short-arc lamps-"off" time before each flash of at least 50% of total flash cycle. | N/A | N/A | --- | --- |
| Symbol "DOT" on each lamp lens (Yes/No) | NO | NO | --- | --- |
| Additional markings on lamp lenses | SMC-194C SAE J1133 FMVSS 131 | SMC-194C SAE J1133 FMVSS 131 | --- | --- |

MARKINGS ON THE FLASHER

| | | | |
|-------|--------------------------|--------------|-----|
| Make | Weldon Technologies Inc. | Serial No. | N/A |
| Model | 7000 | Date of Mfg. | N/A |

| TEST RESULTS | | Pass/Fail or N/A |
|--------------|--------------------------------|------------------|
| S5.3.1 | Reflectorized Material | N/A |
| S5.3.1.1 | Optional Illuminated Lettering | N/A |
| S5.3.2 | Red Flashing Lamps | PASS |

Tested By: Jeff Koehler

Approved By: Michael Janoy

Date: October 9, 2006

FMVSS 131 DATA SHEET 4
STOP SIGNAL ARM INSTALLATION (S5.4)

Test Vehicle: **2006 Mid Bus Guide DW School Bus**
 Test Lab: **MGA Research-Wisconsin Operations**

NHTSA No.: **C60901**
 Test Date: **10/9/06**

Dimensions and angles measured with Signal Arm in the extended position.

| Requirements | Stop Signal Arm | |
|--|-----------------|----------|
| | Forward | Rearmost |
| Signal arm perpendicular to side of bus (Measure angle between vertical plane of side of bus and vertical plane of the signal arm.) $90 \pm 5^\circ$ | YES 89.8° | --- |
| Top edge of signal arm parallel to horizontal plane (Measure angle between vertical plane of side of bus and the top edge of the signal arm.) $90 \pm 5^\circ$ | YES 90° | --- |
| Top edge of signal arm not more than 152.4 mm from a horizontal plane tangent to lower edge of frame of passenger window immediately behind the driver's window: | | |
| Measure top corner closest to the school bus | 129 mm | --- |
| Measure top corner furthest from school bus | 129 mm | --- |
| Vertical centerline of signal arm not less than 228.6 mm away from side of bus | 375 mm | --- |
| Stop signal arm(s) installed on left side of bus (Yes, No, or Not Applicable) | YES | --- |

| TEST RESULTS | | Pass/Fail or N/A |
|--------------|------------------------------|------------------|
| S5.4 | Stop Signal Arm Installation | PASS |

Tested By: Jeff Kaehler
 Date: October 9, 2006

Approved By: Michael Janusz

FMVSS 131 DATA SHEET 5
STOP SIGNAL ARM OPERATION (S5.5)

Test Vehicle: **2006 Mid Bus Guide DW School Bus**
 Test Lab: **MGA Research-Wisconsin Operations**

NHTSA No.: **C60901**
 Test Date: **10/9/06**

Stop Signal Arm(s) shall be automatically extended, at a minimum, whenever the red signal lamps on the bus required by FMVSS 108 are activated; except that a manual override device may be installed that prevents automatic extension.

| Requirements | Stop Signal Arm | |
|---|-----------------|----------|
| | Forward | Rearmost |
| Signal Arm(s) automatically extended when red lights are activated and override device is not activated. (Yes, No, or Not Applicable) | YES | --- |
| If a MANUAL OVERRIDE DEVICE is installed, enter applicable data below: | | |
| Mechanism for activating the override device is within reach of the school bus driver (Yes/No) | N/A | --- |
| While the override device is activated; there is a continuous or intermittent signal audible to the driver unless equipped with optional cut-off timing device (Measure duration \geq 10 min.) | N/A | --- |
| If audible signal is equipped with optional cut-off timing device, it sounds for at least 60 seconds while the manual override is activated. (Measure 3 times, duration \geq 60 sec.) | N/A | --- |
| If audible signal is equipped with optional cut-off timing device, it automatically recycles every time the service entry door is opened while the engine is running and the manual override is engaged. (Recycle 3 times, Yes/No each cycle) | N/A | --- |

Describe location and mode of operation of the manual override control, if installed:

No manual override device, which allowed overhead lights to flash and stop signal arm NOT to extend, was installed on this vehicle.

| TEST RESULTS | | Pass/Fail or N/A |
|--------------|---------------------------|------------------|
| S5.5 | Stop Signal Arm Operation | PASS |

Tested By: Jeff Koehler
 Date: October 9, 2006

Approved By: Michael Janoy

**SECTION 4
INSTRUMENTATION AND EQUIPMENT LIST**

Test Vehicle: **2006 Mid Bus Guide DW School Bus**
 Test Lab: **MGA Research-Wisconsin Operations**

NHTSA No.: **C60901**
 Test Date: **10/9/06**

Identify the instruments used during this test and record their make, model, serial number, range, accuracy, and calibration date.

| | Digital Caliper | Inclinometer | Tape Measure |
|--------------|------------------------|---------------------|---------------------|
| Make | Mitutoyo | Digital Protractor | Stanley |
| Model | CD-6"CS | Pro 360 | Powerlock |
| Serial # (s) | 04401288 | Complab | 269 |
| Range | 0 to 150 mm | 0 to 360 degrees | 0 to 8 m |
| Accuracy | 0.01 mm | 0.1 degree | 1 mm |
| Cal. Date | 9/11/06 | 9/25/06 | 8/16/06 |
| Cal. Due | 9/11/07 | 3/25/07 | 2/16/07 |

SECTION 5
PHOTOGRAPHS

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Test Vehicle: **2006 Mid Bus Guide DW**
Procedure: **FMVSS 131**

NHTSA No.: **C60901**
Test Date: **10/09/06**



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Photo 1 - 3/4 Frontal View from Left Side of Vehicle with Stop Signal Arm(s) Extended

Test Vehicle: **2006 Mid Bus Guide DW**
Procedure: **FMVSS 131**

NHTSA No.: **C60901**
Test Date: **10/09/06**



Photo 2 - Vehicle Certification Label

Test Vehicle: **2006 Mid Bus Guide DW**
Procedure: **FMVSS 131**

NHTSA No.: **C60901**
Test Date: **10/09/06**

MID BUS INC.
505 EAST JEFFERSON STREET
BLUFFTON, OHIO 45817-1398
PH:419-358-2500 FAX:419-358-2400

CHASSIS VIN NO.: 1GBJG31U461237309
BODY NO.: CSD-7450-C-063336
MODEL NO: CSD-7450-C
VEHICLE TYPE: School Bus
SEQUENCE NO.: 3990 COMPLETION DATE: 9/06
MAX DESIGN CAP.: 27 EQUIPPED CAP.: 27

THIS BUS MEETS ALL APPLICABLE FEDERAL MOTOR VEHICLE
SAFETY STANDARDS.

P/N 360447

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Photo 3 - Manufacturer Information Label

Test Vehicle: 2006 Mid Bus Guide DW
Procedure: FMVSS 131

NHTSA No.: C60901
Test Date: 10/09/06

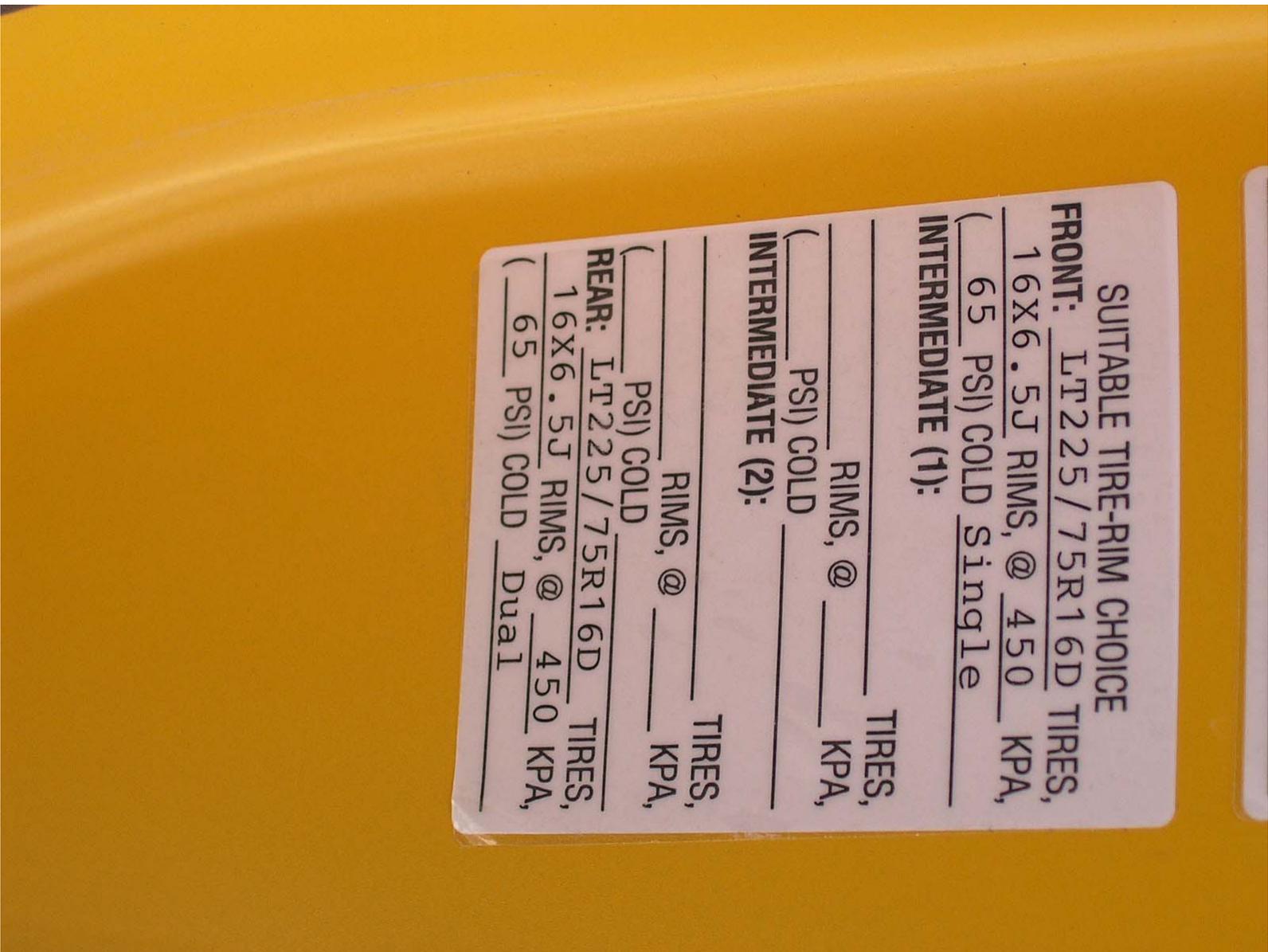


Photo 4 - Vehicle Tire Placard

Test Vehicle: **2006 Mid Bus Guide DW**
Procedure: **FMVSS 131**

NHTSA No.: **C60901**
Test Date: **10/09/06**



Photo 5 - Front Close Up View of Stop Signal Arm

Test Vehicle: **2006 Mid Bus Guide DW**
Procedure: **FMVSS 131**

NHTSA No.: **C60901**
Test Date: **10/09/06**



Photo 6 - Back Close Up View of Stop Signal Arm

Test Vehicle: **2006 Mid Bus Guide DW**
Procedure: **FMVSS 131**

NHTSA No.: **C60901**
Test Date: **10/09/06**



Photo 7 - Close Up View of the Switches That Allow Extension of the Stop Signal Arm(s)

Test Vehicle: **2006 Mid Bus Guide DW**
Procedure: **FMVSS 131**

NHTSA No.: **C60901**
Test Date: **10/09/06**



Photo 8 - Switch Console Relative to the Driver Seating Position

Test Vehicle: 2006 Mid Bus Guide DW
Procedure: FMVSS 131

NHTSA No.: C60901
Test Date: 10/09/06

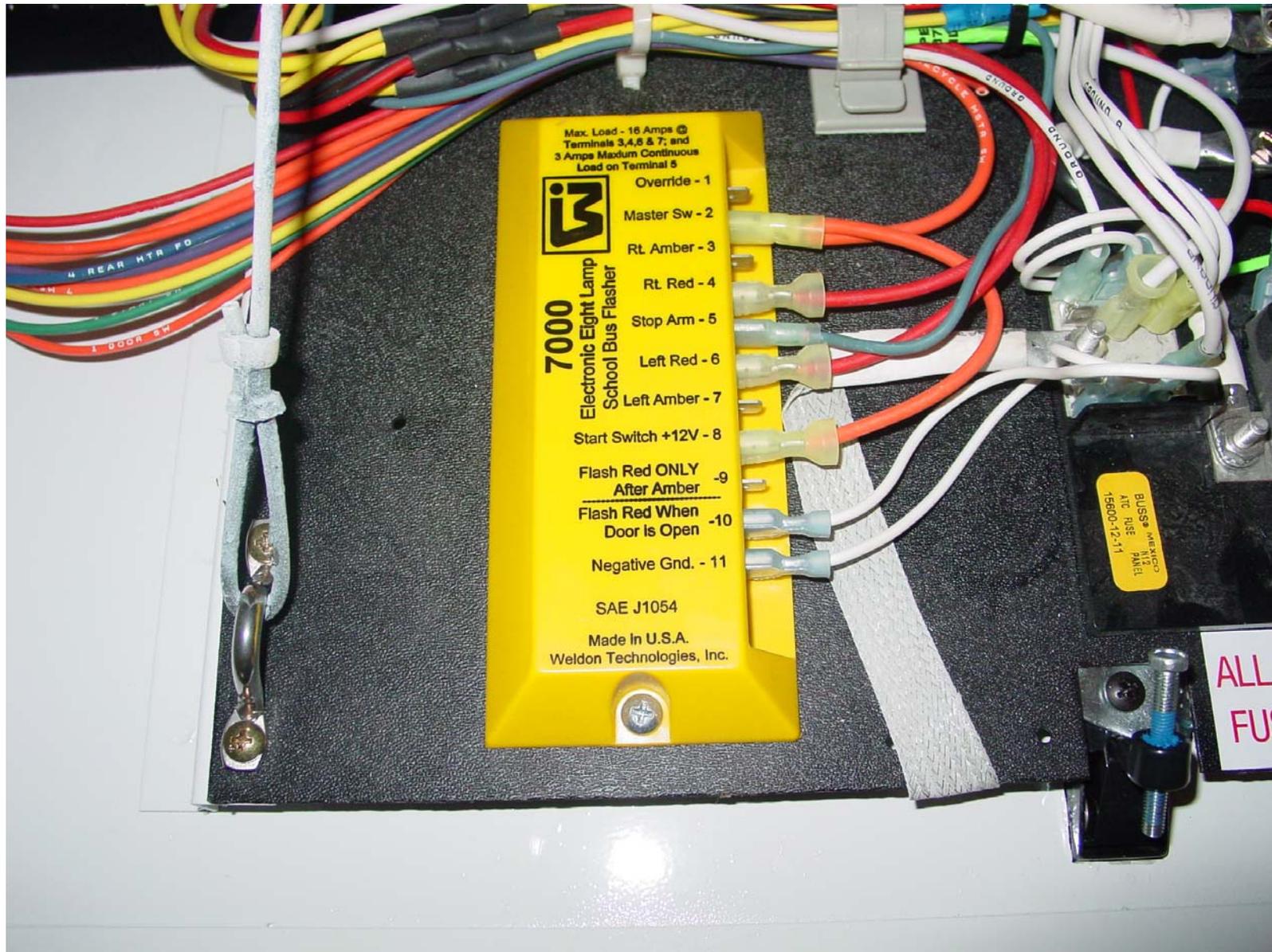


Photo 9 - Flasher Unit