



# *MultiFunction Module*<sup>TM</sup> (MFM)

## Installation Instructions

**PLEASE READ INSTRUCTIONS PRIOR TO INSTALLATION.**

### PRODUCT USE AND FEATURES

The MFM is designed to provide the following additional features to new OR existing *Signal*<sup>®</sup> mirror installations:

1. *Brake indicator in chevrons (turn indicator overrides brake)*
2. *Strobing reverse alert*
3. *Strobing door open alert*
4. *Alarm "tick" indication in chevrons while ignition is off*
5. *Allows for active high (positive) or active low (negative) inputs*

In addition, the MFM can be used to add *Signal*<sup>®</sup> mirrors to vehicles that are sensitive to current draw.



### SPECIFICATIONS

- \* Standby current less than 2 mA in normal use.
- \* Zero power standby mode available.
- \* Monitored line draw less than 1 mA.

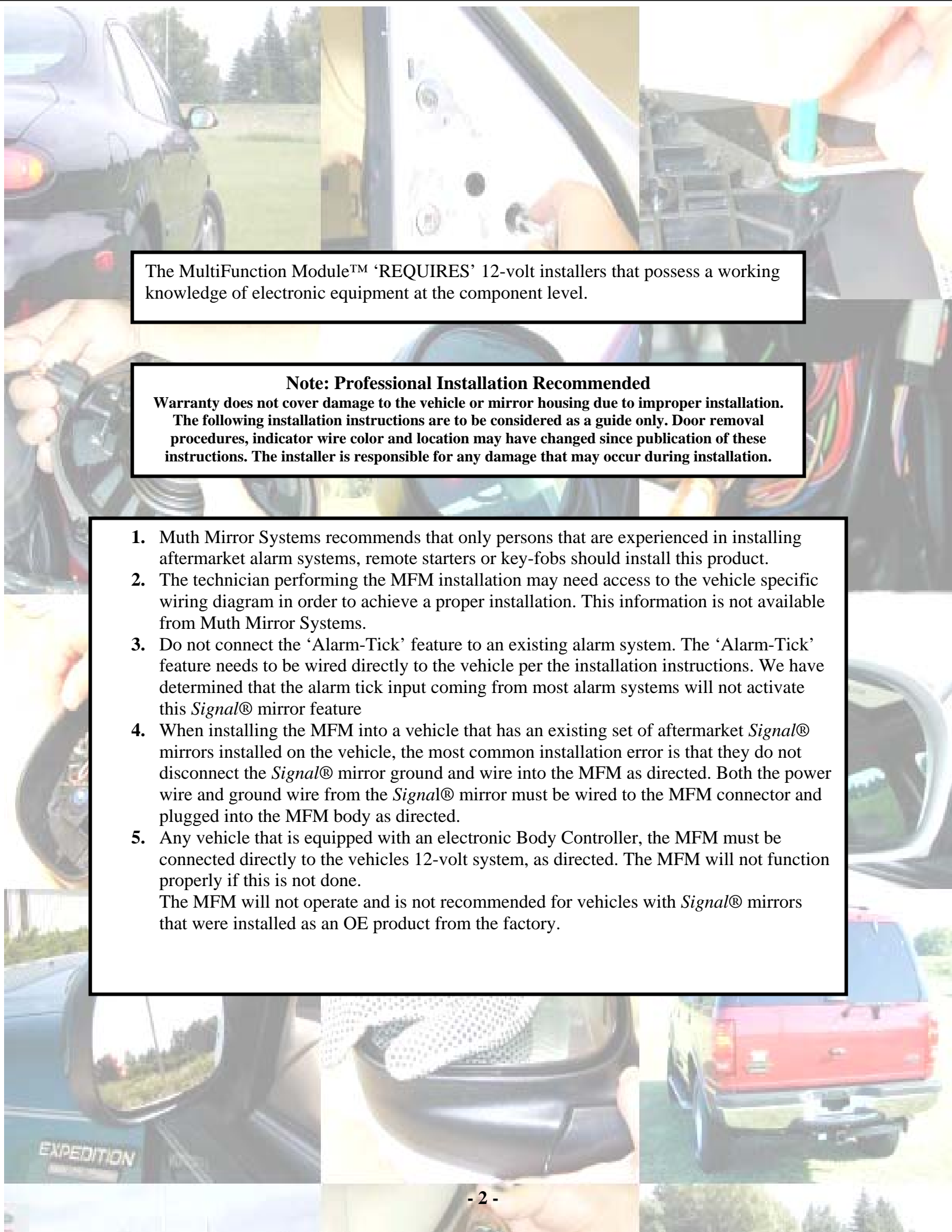
### MFM INSTALLATION KIT CONTENTS

- \* 1 MFM Module
- \* 2 *Signal*<sup>®</sup> mirror Harness Assemblies (Harness Pigtail)
- \* 1 Input Harness Cable
- \* 16 Splice Connectors (red)
- \* 1 Grounding Ring (yellow)
- \* 2 Velcro Adhesive Mounting Strips
- \* 1 Installation Document

### PROBLEMS OR QUESTIONS?

Technical Assistance is available by calling Muth Mirror Systems Technicians at:  
1-800-844-6616  
Monday through Friday  
Between 8:00 a.m. and 5:00 p.m. CST  
Or through the Muth web site: [www.muthco.com](http://www.muthco.com)  
Or via E-mail: [techsupport@muthco.com](mailto:techsupport@muthco.com)

For use with *Signal*<sup>®</sup> mirrors  
***THE Safety Accessory of the 21<sup>st</sup> Century.***<sup>TM</sup>



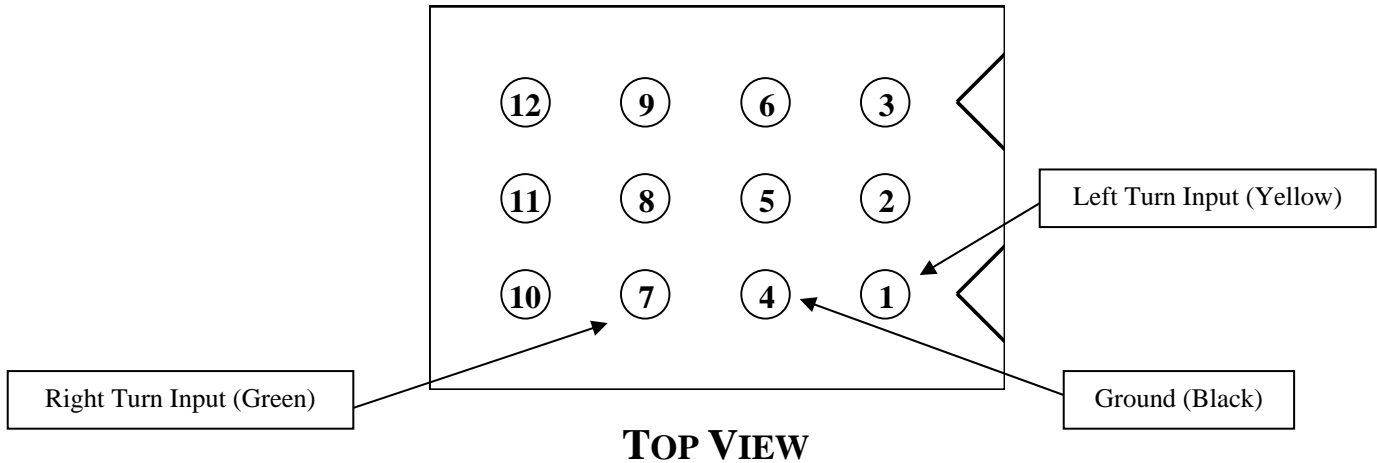
The MultiFunction Module™ ‘REQUIRES’ 12-volt installers that possess a working knowledge of electronic equipment at the component level.

**Note: Professional Installation Recommended**

Warranty does not cover damage to the vehicle or mirror housing due to improper installation. The following installation instructions are to be considered as a guide only. Door removal procedures, indicator wire color and location may have changed since publication of these instructions. The installer is responsible for any damage that may occur during installation.

1. Muth Mirror Systems recommends that only persons that are experienced in installing aftermarket alarm systems, remote starters or key-fobs should install this product.
2. The technician performing the MFM installation may need access to the vehicle specific wiring diagram in order to achieve a proper installation. This information is not available from Muth Mirror Systems.
3. Do not connect the ‘Alarm-Tick’ feature to an existing alarm system. The ‘Alarm-Tick’ feature needs to be wired directly to the vehicle per the installation instructions. We have determined that the alarm tick input coming from most alarm systems will not activate this *Signal*® mirror feature
4. When installing the MFM into a vehicle that has an existing set of aftermarket *Signal*® mirrors installed on the vehicle, the most common installation error is that they do not disconnect the *Signal*® mirror ground and wire into the MFM as directed. Both the power wire and ground wire from the *Signal*® mirror must be wired to the MFM connector and plugged into the MFM body as directed.
5. Any vehicle that is equipped with an electronic Body Controller, the MFM must be connected directly to the vehicles 12-volt system, as directed. The MFM will not function properly if this is not done.  
The MFM will not operate and is not recommended for vehicles with *Signal*® mirrors that were installed as an OE product from the factory.

## MultiFunction Module™ Overview

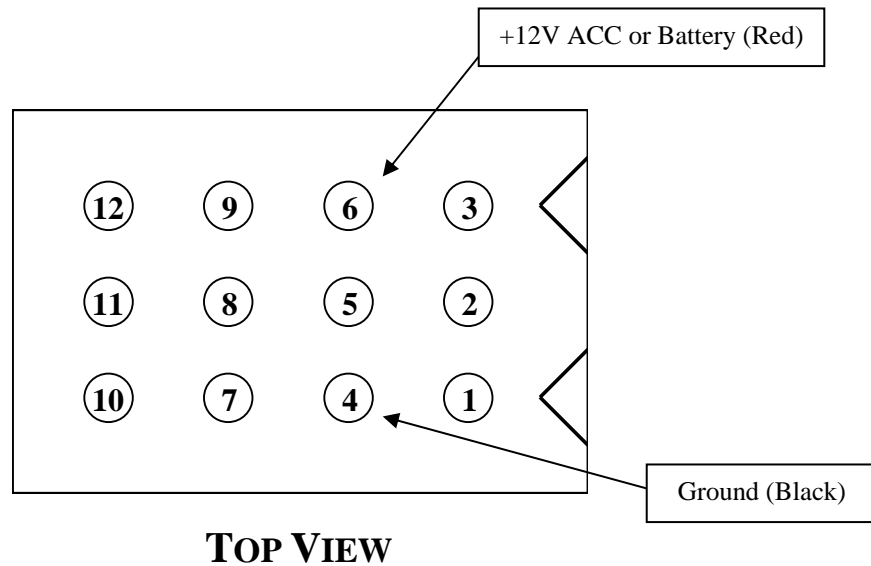


The MFM can be mounted underneath the dashboard or behind the side floor kick plates. It can be tie wrapped to a nearby brace or attached to a flat mounting surface using the adhesive Velcro included in the kit.

The wiring consists of hooking up three Molex connectors. Two 2-pin Molex connectors (J2 and J3) provide outputs to the driver and passenger side *Signal*® mirrors. A 12-pin Molex connector (J1) is used to connect to power, ground, and various electrical inputs. There are 12 different colored wires connected to the 12-pin connector. Connecting one or more of the colored wires enables one or more MFM functions (i.e. brake indication, reverse strobe, etc.).

<b><u>WIRE COLOR REFERENCE</u></b>			
Yellow	Left turn indicator	Orange/White	Reverse (active low)
Green	Right turn indicator	Orange	Reverse (active high)
Black	Ground	Gray	Door (active low)
Red	+12v	White	Door (active high)
Violet	Brake (active low)	Brown/White	Alarm (active low)
Blue	Brake (active high)	Brown	Alarm (active high)

## MFM Power Connections

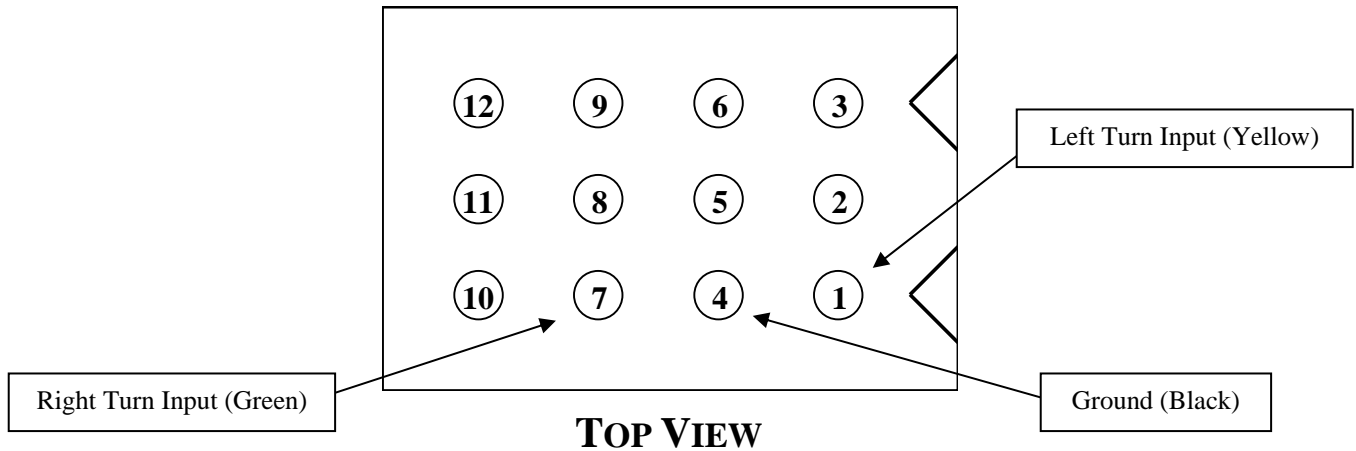


The MFM can be powered from a constant +12v battery wire, +12v accessory (ACC) ignition switch wire, or directly from the monitored circuits (i.e. turn indicator wires, reverse wire, etc.). Powering the MFM using only monitored circuits allows the MFM to work in **ZERO POWER STANDBY MODE**. In order to decide how your MFM should be powered, review the following:

- \* If the alarm “tick” indication is to be enabled the MFM must be powered from a constant +12v battery wire.
- \* If the vehicle is sensitive to accessories connected to the turn, brake, reverse, or door circuits, the MFM should be powered from a constant +12v battery wire or +12v ACC ignition switch wire.
- \* If a constant +12v power supply is not available or not desired, the red MFM +12v wire can be left unconnected. Instead, the MFM will borrow power from the turn, brake, or reverse circuits when they are active. In this mode, the active circuit is what is powering the *Signal*<sup>®</sup> mirrors. However, some vehicles with built in diagnostics will detect a fault condition in this configuration.

**NOTE:** **ZERO POWER STANDBY MODE** only works with vehicles that have active high turn, brake, reverse, or door open wires. See Appendix for a definition of active high and active low circuits.

## Turn Indicator Circuit Connection



The MFM is designed to be connected to active high turn indicator circuits. To determine the correct turn indicator wires, please refer to the specific *Signal*<sup>®</sup> mirror installation instructions for the model vehicle you are installing on. Connect the turn indicator wires from the MFM as follows:

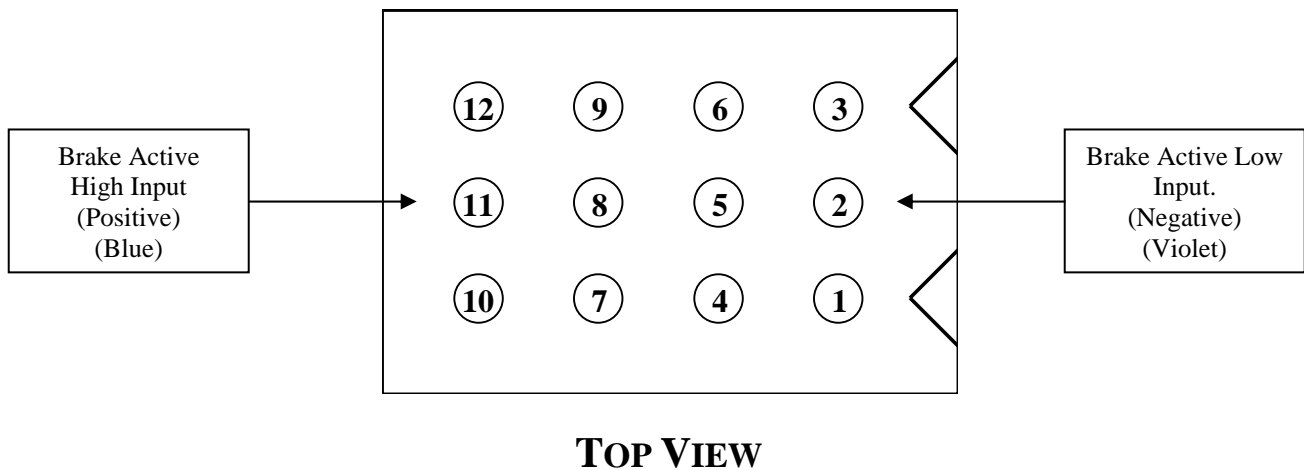
- Connect the **YELLOW** wire from pin 1 to the driver side turn indicator wire.
- Connect the **GREEN** wire from pin 7 to the passenger side turn indicator wire.
- Connect the **BLACK** wire from pin 4 to a suitable ground location on the framework of the vehicle.

## *Signal*<sup>®</sup> Mirror Connection

Using both 2-pin wire connector harnesses provided, connect the white wires from the MFM harnesses to the red wires of the *Signal*<sup>®</sup> mirror harnesses. Connect the black wires from the MFM harnesses to the black wires of the *Signal*<sup>®</sup> mirror harnesses. Plug each MFM harness into the appropriate 2-pin output connector on the MFM module. Each connector is labeled either J2 - Driver Side SM or J3 - Passenger Side SM.

## Brake Circuit Connection (Optional)

“The brake indicator appears as a steady on chevron in both rearview mirrors any time the brakes are applied. If a turn indicator is active at the same time, the turn indicator will over ride the brake indicator in the mirror.”

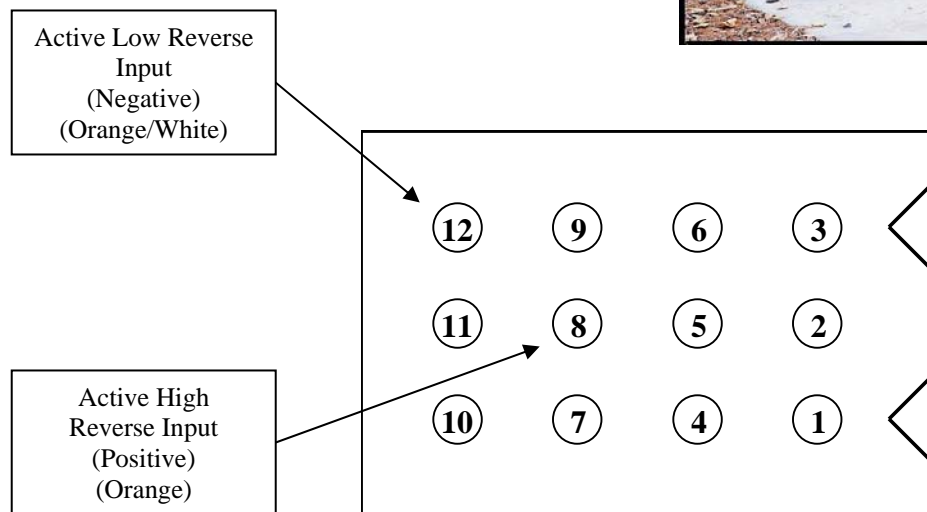


If brake light function in the mirror is desired, determine if the available brake circuit is active high or active low. Once the type of circuit is determined, connect **ONE** of the brake wires from the MFM as follows:

- ACTIVE LOW - connect the **VIOLET** wire from pin 2 to the brake wire.
- OR**
- ACTIVE HIGH - connect the **BLUE** wire from pin 11 to the brake wire.

## Reverse Circuit Connection (Optional)

Strobing of both mirrors indicates the vehicle is in reverse gear. This makes it evident to surrounding vehicles and pedestrians the vehicle is backing up.”



**TOP VIEW**

If reverse strobing in the mirror is desired, determine if the available reverse circuit is active high or active low. Once the type of circuit is determined, connect **ONE** of the reverse wires from the MFM as follows:

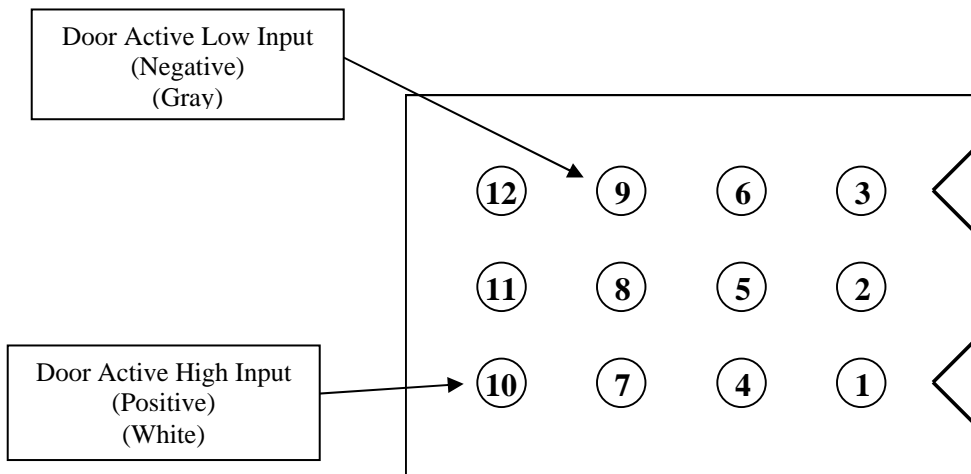
- ACTIVE LOW - connect the **ORANGE/WHITE** wire from pin 12 to the reverse wire.

**OR**

- ACTIVE HIGH - connect the **ORANGE** wire from pin 8 to the reverse wire.

## Fourth Door Open (Optional)

“The fourth door open alert is particularly important for minivans. Children may jump into the roadway out of the sliding fourth door located behind the driver. The module can be set to strobe when this or any door is open.”



**TOP VIEW**

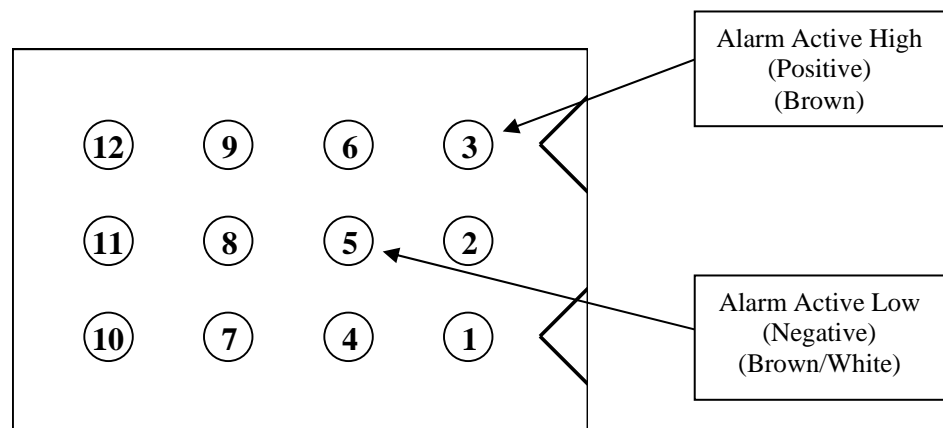
If the vehicle has a fourth door or if it is desirable for the mirrors to strobe when any door is open, determine if the available door switch or interior light circuit is active high or active low. Connecting the MFM to an interior light circuit will cause the mirrors to strobe when any door is opened. Once the type of circuit is determined, connect **ONE** of the door wires from the MFM as follows:

- **ACTIVE LOW** - connect the **GRAY** wire from pin 9 to the door switch or interior light wire.
- OR**
- **ACTIVE HIGH** - connect the **WHITE** wire from pin 10 to the door switch or interior light wire.



## Alarm Tick (Optional)

“The alarm tick indicates the vehicle’s security system is activated or it may simulate one.”



### TOP VIEW

If an alarm “tick” in the mirror is desired and you would like to synchronize the vehicle’s security system “tick” with the mirror “tick”, determine if the available alarm circuit is active high or active low. Once the type of circuit is determined, connect **ONE** of the alarm wires from the MFM as follows:

- ACTIVE LOW - connect the **BROWN/WHITE** wire from pin 5 to the security “tick” wire.
- **OR**
- ACTIVE HIGH - connect the **BROWN** wire from pin 3 to the security “tick” wire.

The MFM can also simulate an alarm “tick” for vehicles without security systems. This will provide a “tick” in both mirrors approximately every 5 seconds. To simulate an alarm “tick”, connect the **BROWN/WHITE** wire from pin 5 (active low) to a suitable ground location on the framework of the vehicle. Also, connect the **BROWN** wire from pin 3 (active high) to the +12v ACC ignition switch wire. In addition, the MFM must be powered through pin 6 from a constant +12v battery wire.

## Appendix

**ACTIVE HIGH** – An active high input is one where the voltage is +12 volts when the associated function is ON, and is at GROUND level or zero volts when OFF.

**ACTIVE LOW** – An active low input is one where the voltage is at GROUND level or zero volts when the associated function is ON and is at +12 volts when OFF.

Note: In some systems an input may “float” when OFF or the vehicle is shut down. In these cases, only the ON voltage is of concern.

L. S. COMPLIANCE, Inc. 



## Declaration of Conformity

**Manufacturer's Name:** Muth Mirror Systems

**Manufacturer's Address:** 4221 High Tech Lane  
Sheboygan, WI 53082

**declares, that the product:** MFM (Multi Function Module)

Product Name: MFM (Multi-Function Module)  
Model Number: 200-0064-0  
Serial Number: MFMB-0004-911

**conforms** to the following  EMC Product Testing Specifications:

**FCC, Title 47, CFR, Part 15, subpart B.**

**This device complies with Part 15 of the FCC rules.**

**Operation is subject to the following two conditions: ( 1 ) This device may not cause harmful interference, and ( 2 ) this device must accept any interference received, including interference that may cause undesired operation.**

**Supplementary Information:**

The product herewith has been successfully tested according to the FCC Code of Federal Regulations, Title 47, Part 15, subpart B, General Telecommunications - Radio Frequency Devices. This product was tested in a typical configuration.

Cedarburg, Wisconsin

10 November 1999



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Kenneth Boston, PE  
EMC Laboratory Manager