MultiFunction Module™ (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 aftermarket *Signal*® 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 positive triggered or negative triggered inputs*

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

FCC PART 15 COMPLIANCE

The MultiFunction Module™ was found to **MEET** the requirements as described within the specification of FCC Title 47 CFR, Sections 15.107, 15.109(a) and I.C. RSS-210, Section 7.3 for an unintentional radiator.

MFM INSTALLATION KIT CONTENTS

*	1	MultiFunction Module™
*	2	*Signal*® Mirror Harness Assemblies (Harness Pigtail)
*	1	Input Harness Cable
*	13	Splice Connectors (red)
*	1	Grounding Ring (pink)
*	1	Velcro Adhesive Mounting Strip
*	2	Cable Ties
*	2	Cable Tie Cradle Mounts
*	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
Or via E-mail: techsupport@muthco.com

For use with *Signal*® mirrors

THE Safety Accessory of the 21st Century.™

P/N 210-0113-0 Rev A (09-14-05), BD

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.

IMPORTANT: READ FIRST

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. When installing the MFM into a vehicle that has an existing set of aftermarket *Signal*® mirrors installed on the vehicle, all existing connections to both the positive (red) and negative (black) wires of each mirror must be removed. Both the positive (red) and negative (black) wires from each *Signa*l® mirror must **ONLY** be wired to the MFM connectors and plugged into the MFM body as directed (see "*Signal*® Mirror Connection" section)
4. If the vehicle is equipped with an electronic Body Controller, the MFM must be connected directly to the vehicle's 12-volt system, as directed. The MFM will not function properly if this is not done.
5. The MFM is not recommended for vehicles with *Signal*® mirrors that were installed as an OE product from the factory.
6. The MFM is not weather resistant and should be mounted inside the vehicle in a dry location.

ELECTRICAL SPECIFICATIONS

These electrical specifications relate only to the MultiFunction Module™ when connected to a single pair of Signal® Mirrors and installed following the provided instructions. Additionally, these specifications apply only if the input power (red) wire of the MFM is connected to a constant +12V DC battery wire.

- Nominal "standby" current of 5 mA when vehicle is on
  - Equivalent to 1 Amp-hour every 200 hours (8.33 days)
- Nominal "standby" current of 1 mA when vehicle is off
  - Equivalent to 1 Amp-hour every 1000 hours (41.67 days)
- Nominal current of 1.4 mA when vehicle is off and alarm tick feature is activated (this includes the load of the Signal® Mirrors)
  - Equivalent to 1 Amp-hour every 714 hours (29.75 days)

Notes:

- If you are unsure of the capacity of your vehicle's battery, please contact your dealership.
- The term "standby" refers to the normal operation of the MFM when no external signals are detected. In terms of current, it refers to the current draw of only the MFM when no external load is present or activated.

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 three Molex connectors. Two 2-pin Molex connectors (J2 and J3) provide outputs to the driver and passenger side *Signal*® mirrors. A 14-pin Molex connector (J1) is used to connect to power, ground, and various electrical inputs. There are 14 different colored wires connected to the 14-pin connector. Connecting one or more of the colored wires enables one or more MFM functions (i.e. brake indication, reverse strobe, etc.).

NOTE: When wiring the turn, brake, reverse, and/or door open features, connect ONLY the wire from the MFM that is used for the positive or negative triggered signal.

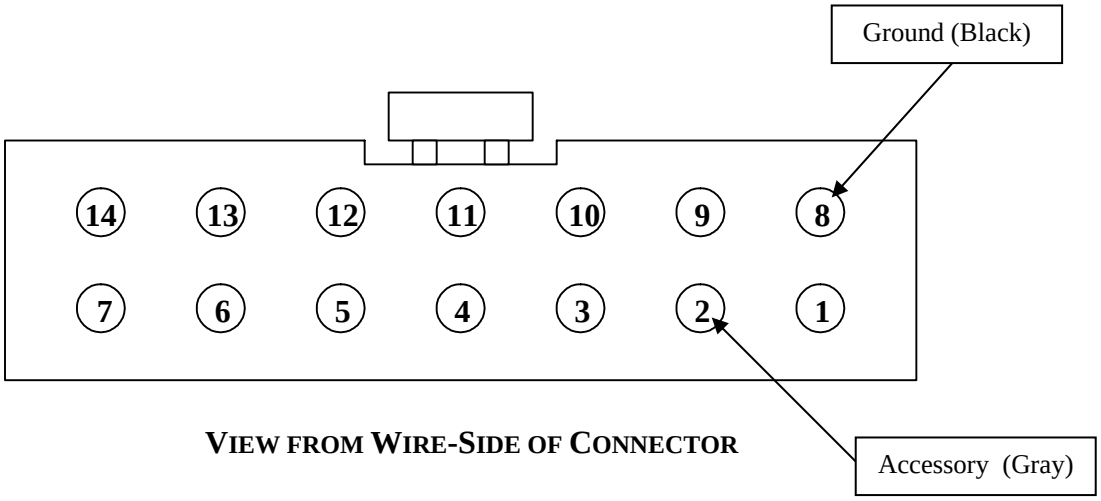
- If the vehicle circuit is "positive triggered", connect only the "positive triggered" (solid colored) wire from the MFM. Leave the "negative triggered" (solid with white stripe) wire unconnected.
- If the vehicle circuit is "negative triggered", connect only the "negative triggered" (solid with white stripe) wire from the MFM. Leave the "positive triggered" (solid) wire unconnected.
- Example: Positive triggered turn signals
    1. Left Turn
        a. Connect yellow wire from MFM to left-turn indicator wire on vehicle
        b. Leave yellow/white wire from MFM unconnected
    2. Right Turn
        a. Connect green wire from MFM to right-turn indicator wire on vehicle
        b. Leave green/white wire from MFM unconnected

WIRE COLOR REFERENCE

Vehicle Circuit	MFM Wire Color		Vehicle Circuit	MFM Wire Color
Power (+12VDC)	Red		Ground	Black
Left Turn (positive triggered)	Yellow		Left Turn (negative triggered)	Yellow/White
Right Turn (positive triggered)	Green		Right Turn (negative triggered)	Green/White
Brake (positive triggered)	Blue		Brake (negative triggered)	Blue/White
Reverse (positive triggered)	Orange		Reverse (negative triggered)	Orange/White
Door (positive triggered)	Violet		Door (negative triggered)	Violet/White
Accessory (ACC+)	Gray		Alarm	Brown

- **Positive Triggered** - refers to a signal where the voltage is +12V when the associated function is ON, and is at ground level or zero volts when OFF. Also referred to as "active high"
- **Negative Triggered** – refers to a signal where the voltage is at ground level or zero volts when the associated function is ON, and is at +12V when OFF. Also referred to as "active low"
- **Note**: In some systems, a switched signal may be "open" or may "float" when it is OFF. In this case, only the ON voltage is of concern.

MFM Preliminary Connections (REQUIRED)



VIEW FROM WIRE-SIDE OF CONNECTOR

Ground (REQUIRED):

- Connect the **BLACK** wire from pin 8 to a suitable ground location on the framework of the vehicle.

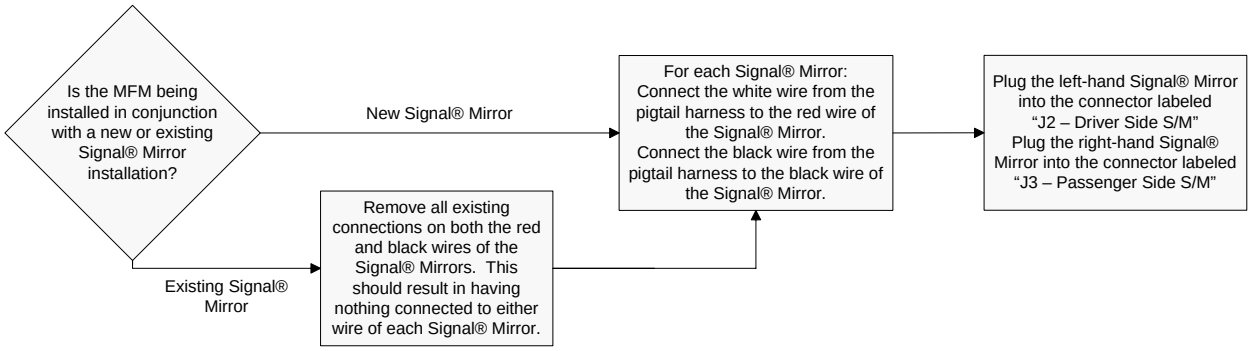
Accessory (ACC) (REQUIRED):

The vehicle's accessory ignition switch (ACC) wire is tapped so that the MFM can monitor when the vehicle is on and off. Failure to make this connection may result in the MFM operating improperly.

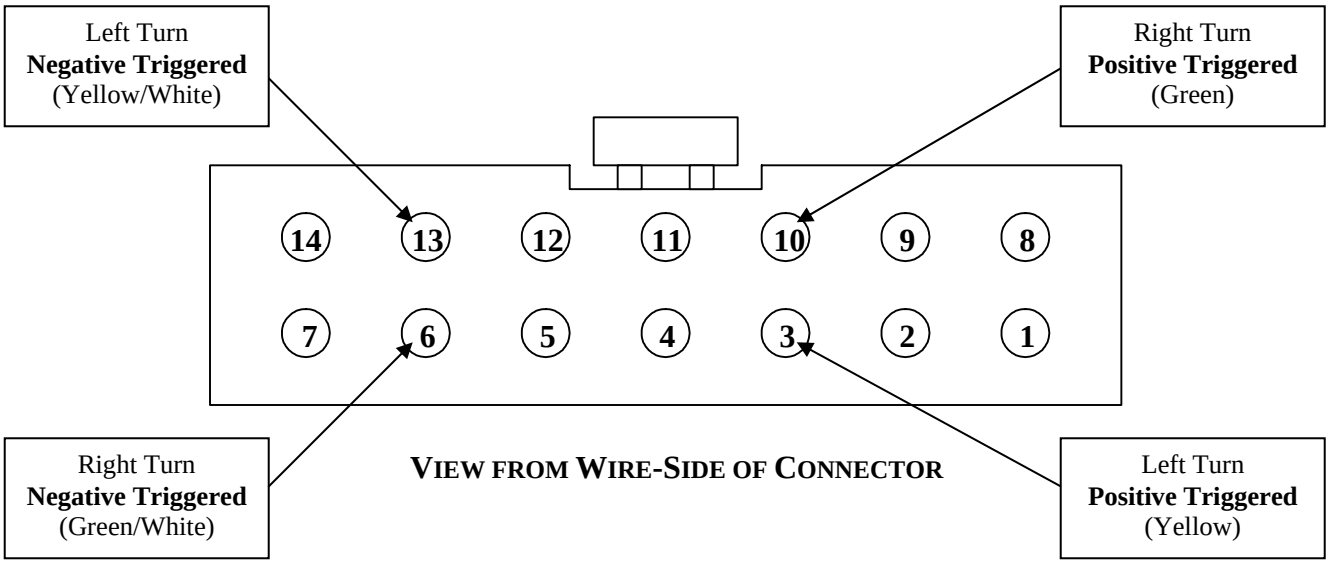
- Connect the **GRAY** wire from pin 2 to the accessory (ACC) wire of the vehicle

Signal® Mirror Connection (REQUIRED):

The correct order of installation depends on whether the MFM is being installed with a new or existing Signal® Mirror installation. Refer to the following flowchart for proper installation:



Turn Indicator Circuit Connections (REQUIRED)



Left Turn Indicator (REQUIRED):

If the left turn indicator is "positive triggered":

- Connect the **YELLOW** wire from pin 3 to the left turn indicator wire of the vehicle
- Leave the **YELLOW/WHITE** wire from pin 13 unconnected

If the left turn indicator is "negative triggered":

- Connect the **YELLOW/WHITE** wire from pin 13 to the left turn indicator wire of the vehicle
- Leave the **YELLOW** wire from pin 3 unconnected

Right Turn Indicator (REQUIRED):

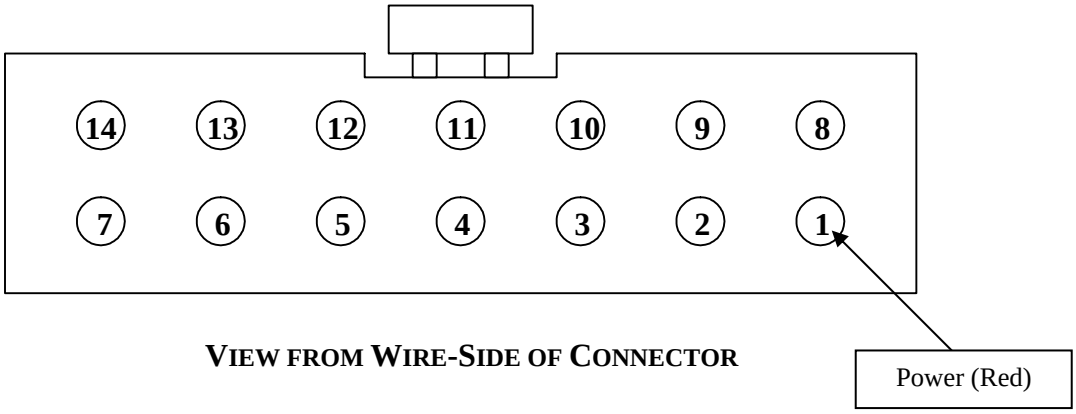
If the right turn indicator is "positive triggered":

- Connect the **GREEN** wire from pin 10 to the right turn indicator wire of the vehicle
- Leave the **GREEN/WHITE** wire from pin 6 unconnected

If the right turn indicator is "negative triggered":

- Connect the **GREEN/WHITE** wire from pin 6 to the right turn indicator wire of the vehicle
- Leave the **GREEN** wire from pin 10 unconnected

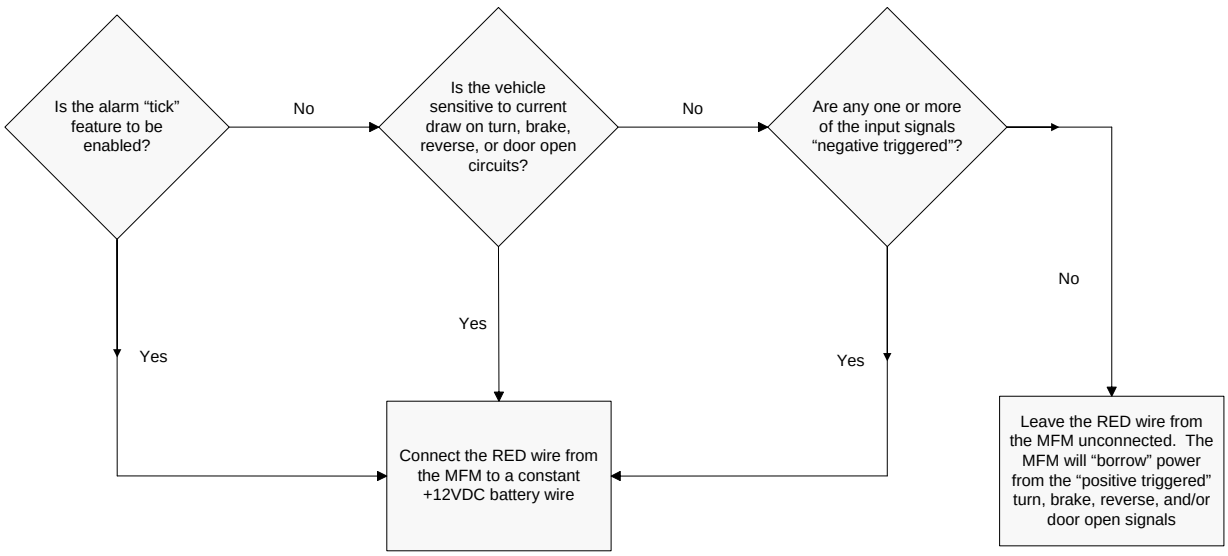
MFM Power Connection (*OPTIONAL*)



VIEW FROM WIRE-SIDE OF CONNECTOR

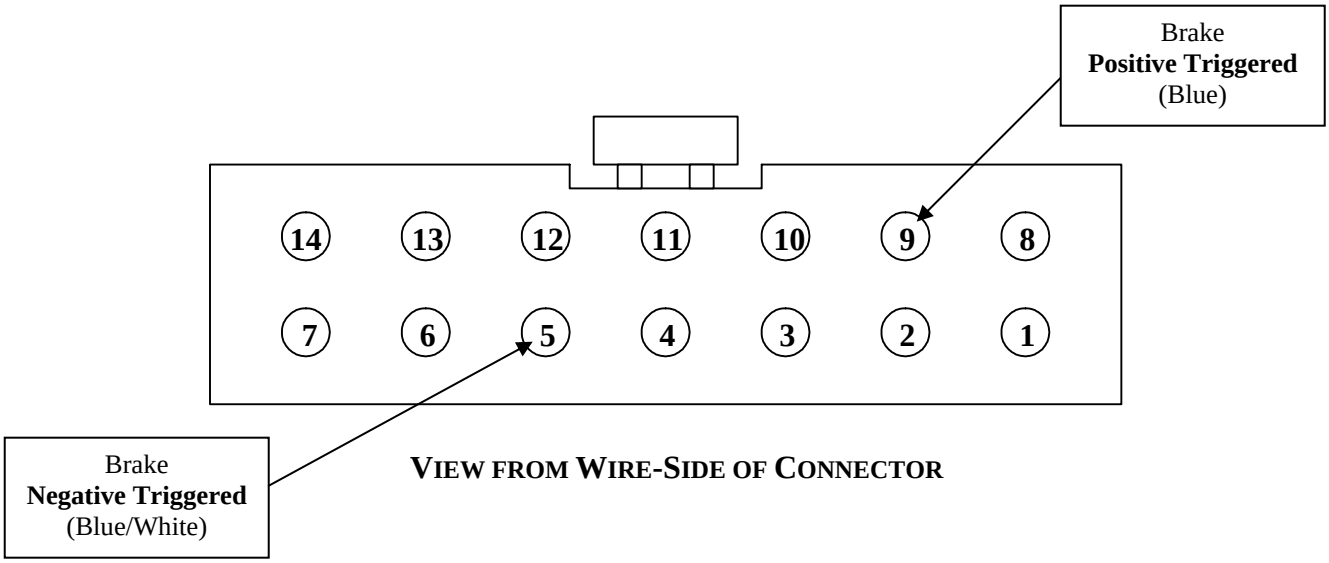
<u>Power Connection (*OPTIONAL* – see below):</u>

The MFM can be powered from a constant +12V DC battery wire or directly from the monitored circuits (i.e. turn indicator, brake, reverse, and/or door open wires). Powering the MFM using only monitored circuits allows the MFM to work in **ZERO POWER STANDBY MODE**. Note, however, that this mode works only when **<u>ALL</u>** monitored circuits are "positive triggered". In order to decide how your MFM should be powered, review the following flowchart:



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."



VIEW FROM WIRE-SIDE OF CONNECTOR

If a brake light function in the mirror is desired, determine if the available brake circuit is positive triggered or negative triggered.

If the brake circuit is "positive triggered":

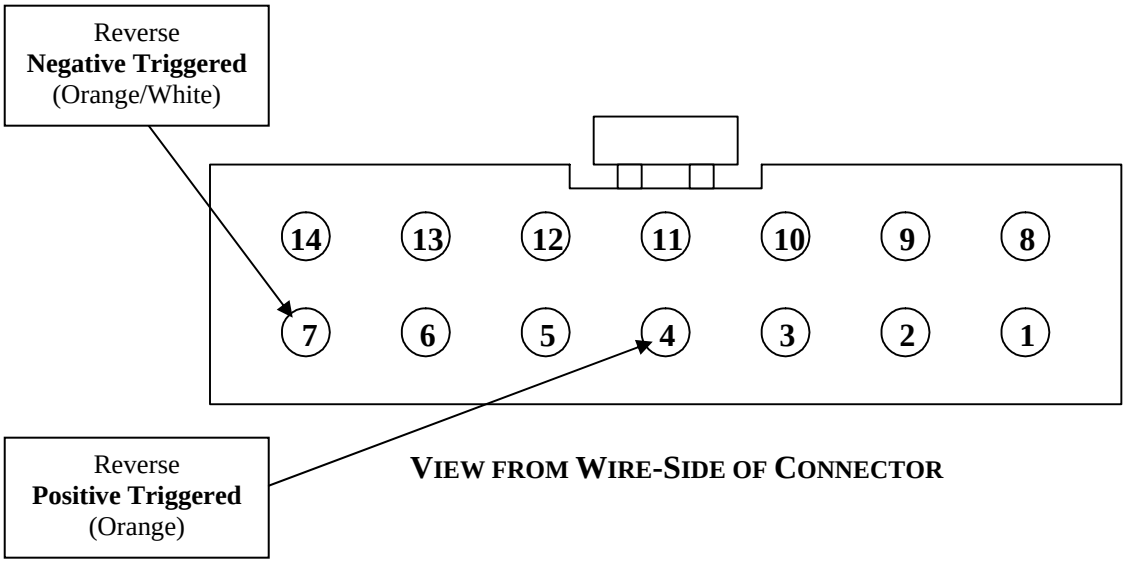
- Connect the **BLUE** wire from pin 9 to the brake circuit wire of the vehicle
- Leave the **BLUE/WHITE** wire from pin 5 unconnected

If the brake circuit is "negative triggered":

- Connect the **BLUE/WHITE** wire from pin 5 to the brake circuit wire of the vehicle
- Leave the **BLUE** wire from pin 9 unconnected

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."



VIEW FROM WIRE-SIDE OF CONNECTOR

If a reverse strobing function in the mirror is desired, determine if the available reverse circuit is positive triggered or negative triggered.

If the reverse circuit is "positive triggered":

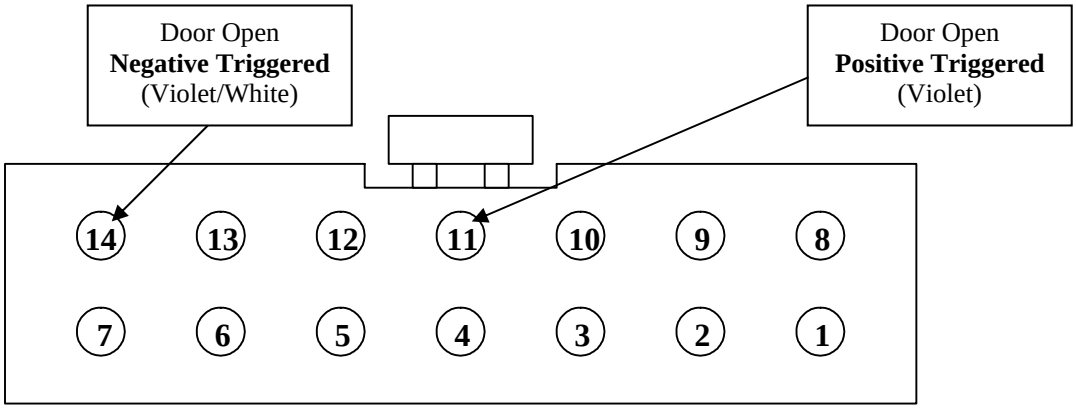
- Connect the **ORANGE** wire from pin 4 to the reverse circuit wire of the vehicle
- Leave the **ORANGE/WHITE** wire from pin 7 unconnected

If the reverse circuit is "negative triggered":

- Connect the **ORANGE/WHITE** wire from pin 7 to the reverse circuit wire of the vehicle
- Leave the **ORANGE** wire from pin 4 unconnected

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."



VIEW FROM WIRE-SIDE OF CONNECTOR

If a strobing function in the mirror is desired when one or more doors are opened, determine if the available door switch or interior light circuit is positive triggered or negative triggered.

If the door switch or interior light circuit is "positive triggered":

- Connect the **VIOLET** wire from pin 11 to the door switch or interior light circuit wire of the vehicle
- Leave the **VIOLET/WHITE** wire from pin 14 unconnected

If the door switch or interior light circuit is "negative triggered":

- Connect the **VIOLET/WHITE** wire from pin 14 to the door switch or interior light circuit wire of the vehicle
- Leave the **VIOLET** wire from pin 11 unconnected

Alarm Tick (Optional)

"The alarm tick indicates the vehicle's security system is activated or it may simulate one."

The alarm "tick" feature has two modes of operation:

1. The MFM may be tied to an existing alarm system and flash in sync with the alarm LED. Commonly, the **BROWN** wire from pin 12 of the MFM would be tied to the positive wire of the alarm LED; however, it will work with any "positive triggered" pulsed signal that is between 1.5 Volts and 12 Volts DC when active. In this mode, the MFM will "tick" the Signal® Mirrors, will wait five seconds, and then will re-sync and "tick" again with the next edge of the pulsed signal.
2. The MFM may also simulate an alarm system. To use this mode of operation, the **BROWN** wire from pin 12 of the MFM should be connected to a constant +12VDC battery wire. In this mode, the MFM will "tick" the Signal® Mirrors once every five seconds while the vehicle is off.

In order to decide whether to synchronize to an existing alarm system or to simulate one, refer to the following flowchart: