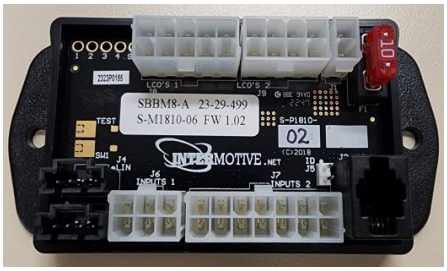
A-SBBM8-A
FlexTech Switch Backer Board

This product is not vehicle specific

Introduction

The **Switch Backer Board Mini 8 (SBBM8)** is an add-on module for the **FlexTech System.** The SBBM8 supports 8 switches (2 with 3 inputs each and 6 with 1 input each), 4 general purpose active low inputs, 14 Low Current Outputs, LCOs (2 at 1A and 12 at ½A). In addition, the SBB has a backlight output which can have its intensity set by the PRPC configuration. Refer to the instructions for the specific PRPC version that you are connecting this module to for information on programming (configuration).



Multiple Units

The FlexTech System can have up to 2 SBB modules, up to 2 EXP modules (Expander Module), Gateway panel, AFIS control module, and a PTM (Pre-Trip Module) connected to LIN. See page 5 for instructions on installing modules in this daisy chain.

Since there cannot be more than 2 SBB modules in 1 FlexTech system the following are the only possible configurations:

- For up to 8 switches use 1 SBB8
- For up to 16 switches use 2 SBB8's

IMPORTANT—READ BEFORE INSTALLATION

It is the installer's responsibility to route and secure all wiring harnesses where they cannot be damaged by sharp objects, mechanical moving parts or high heat sources. Failure to do so could result in damage to the system or vehicle, and create possible safety concerns for the operator and passengers. Avoid placing the module where it could encounter strong magnetic fields from high current cabling connected to motors, solenoids, etc. Avoid radio frequency energy from antennas or inverters next to the module. Avoid high voltage spikes in vehicle wiring by always using diode clamped relays when installing upfitter circuits.

Installation Instructions

Disconnect the battery before proceeding with the installation.

SBBM8 Module

Find a suitable location to mount the SBBM8 module. Do not mount the module where it will be exposed to excessive heat. Do not mount the module until all wire harnesses are routed and secure. The last step of the installation is to mount and connect the module. There is a drawing on the last page of these instructions that shows where each connector is located on the module. Consider this when picking the location and orientation of the module and the wiring harnesses such that connecting and mounting of the module does not stress the wiring harnesses. This module will only operate if it is connected to a PRPC using a LIN Bus cable.

SBB Power Connection

Connect a VBAT source to pin 1 of the 2-pin Molex Mini-Fit Junior connector J1. Connect a ground source to pin 2 of J1. Make sure the ground connection is firmly attached to a clean bare metal point on the vehicle chassis. The installer ***must*** provide strain relief on the cable outside of the SBB's enclosure. It is recommended that the strain relief is within 6" of the enclosure. The absence of strain relief could result in damage to the module.

Install a 10A fuse in the fuse holder (F1) next to connector J1. Do not exceed 10A for this fuse.

Note: when driving relays, a diode-protected type must be used. InterMotive recommends Digi-Key #PB682-ND Relay.

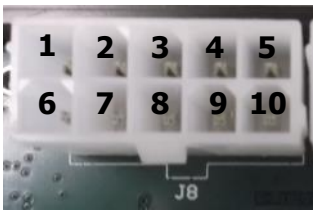
Note: If any SBBM8 outputs are parallel tapped into another driving circuit, diode isolation is required to prevent module damage.

10-pin Connector (labeled LCO'S 1)

On the SBBM8, the Molex Mini-Fit Junior connector J8 contains 6 general purpose Low Current Output pins (LCO's). Two of these outputs can supply up to 1A each, the remaining 4 can supply ½A each. These outputs are activated/de-activated (based on the configuration loaded onto the attached PRPC module) and are intended to drive relay coils or other low current loads. This connector also has two additional pins to drive the switch panel backlights. If there are separate locations where backlights are needed both pins could be used. The total current available from either pin OR from both pins combined is 2A. The brightness of the backlight is set in the PRPC configuration.

The output pins on connector J8 are defined as follows:

- Pin #1 - Backlighting.
- Pin #2 - No connection.
- Pin #3 - LCO 1, 1A maximum.
- Pin #4 - LCO 2, 0.5A maximum.
- Pin #5 - LCO 3, 0.5A maximum.
- Pin #6 - Backlighting.
- Pin #7 - No connection.
- Pin #8 - LCO 4, 1A maximum.
- Pin #9 - LCO 5, 0.5A maximum.
- Pin #10 - LCO 6, 0.5A maximum.

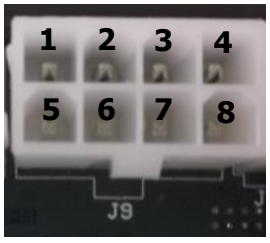


Connect the desired outputs to vehicle equipment as needed.

8-Pin Connector (labeled LCO'S 2)

On the SBBM8 the Molex Mini-Fit Junior connector J9 contains 8, ½A maximum, Low Current Output pins (LCO's). These outputs are intended to drive relay coils or other low current loads. These outputs are activated and deactivated (based on the configuration loaded onto the attached PRPC module). The LCO output pins on connector J9 are defined as follows:

- Pin #1 - LCO 7, 0.5A Maximum
- Pin #2 - LCO 8, 0.5A Maximum
- Pin #3 - LCO 9, 0.5A Maximum
- Pin #4 - LCO 10, 0.5A Maximum
- Pin #5 - LCO 11, 0.5A Maximum
- Pin #6 - LCO 12, 0.5A Maximum
- Pin #7 - LCO 13, 0.5A Maximum
- Pin #8 - LCO 14, 0.5A Maximum



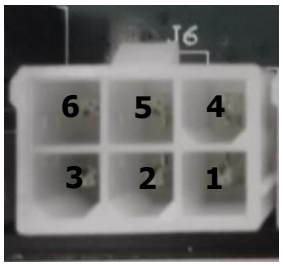
Connect the desired outputs to vehicle equipment as needed.

6-Pin Connector (labeled INPUTS 1)

On the SBBM8, the Molex Mini-Fit Junior connector J6 contains 4 general purpose active low inputs. These inputs can be used in the PRPC configuration logic to control other outputs. The input pins on connector J6 are defined as follows:

- Pin #1 - Ground
- Pin #2 - General Purpose Input 1 (Ground)
- Pin #3 - General Purpose Input 2 (Ground)
- Pin #4 - Ground
- Pin #5 - General Purpose Input 3 (Ground)
- Pin #6 - General Purpose Input 4 (Ground)

Connect the desired inputs to vehicle equipment as needed.

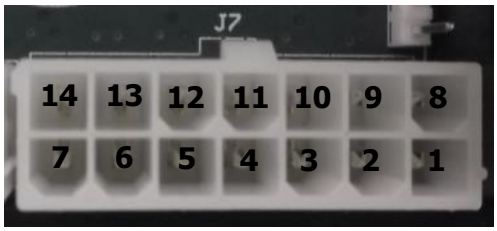


14-Pin Connector (labeled INPUTS 2)

On the SBBM8, the Molex Mini-Fit Junior connector J7 contains the inputs from all 8 of the switches being read by this module (2 with 3 inputs each and 6 with 1 input each). These switch inputs are reported to the PRPC where they are part of the configuration logic to control any output in the FlexTech system. There are 2 pins that are only for test purposes, one is the ground on the board and the other is the +12V (VBAT) on the board. The input connections on J7 are defined as follows:

- Pin #1 - Switch 1A (+12V)
- Pin #2 - Switch 1B (+12V)
- Pin #3 - Switch 1C (+12V)
- Pin #4 - Switch 2A (+12V)
- Pin #5 - Switch 2B (+12V)
- Pin #6 - Switch 2C (+12V)
- Pin #7 - Ground
- Pin #8 - Switch 3 (+12V)
- Pin #9 - Switch 4 (+12V)
- Pin #10 - Switch 5 (+12V)
- Pin #11 - Switch 6 (+12V)
- Pin #12 - Switch 7 (+12V)
- Pin #13 - Switch 8 (+12V)
- Pin #14 - +12V (VBAT, for test purposes only)

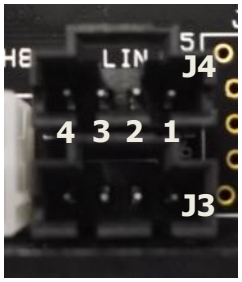
Connect the desired inputs to switches as needed.



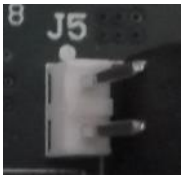
Connecting the SBBM8 to the PRPC and Other Modules:

The SBBM8 must be connected to a PRPC to work. This connection is done with the supplied LIN Bus cable. In the simplest system with a PRPC and 1 SBB module just connect one end of the LIN Bus cable to J5 on the PRPC and the other end to either J3 or J4 on the SBB module.

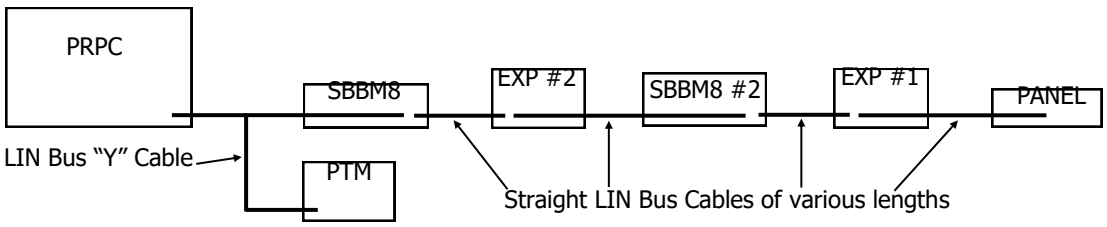
For more complex FlexTech configurations the modules are connected in a "daisy chain." The PRPC is always at the "Head End" of the chain and any Gateway or AFIS panel will be at the "Tail End" of the chain. The other modules can be connected in any order. This will be decided by their physical location. There can be up to 2 SBB modules and up to 2 EXP modules in the chain. In some systems there could also be a PTM module. A PTM is frequently added with a LIN Bus "Y" cable as shown in the example below. In connecting the SBB in the daisy chain, it does not matter what order the modules are in nor does it matter which LIN connector is used.



In order to use 2 SBB modules in one system a shunt (3M part number 929950-00) must be slid onto the 2 pin header J5 on one of the SBB modules. See the adjacent photo for the location of this connector (lower right corner). Keep track of which module has the shunt and which does not. For programming the configuration into the PRPC the SBB module without the shunt will be designated Switch Board 1 and the SBB module with the shunt will be designated Switch Board 2. Again, it does not matter in what physical order the modules are placed in the daisy chain.



An Example of a Maximum FlexTech Configuration



Finishing the Installation and Testing Operation

Module Mounting

1. Ensure all the harnesses are properly routed with strain relief where needed.
2. Mount the SBBM8 module as described on page two.
3. Verify that the module is in an area away from any external heat sources (engine heat, heater ducts, etc.).
4. Secure using screws or double sided tape.

Connect the Harnessing:

The following sequence should be performed **prior to** reconnecting the vehicle battery:

1. Connect each of the harness connectors to the corresponding connector on the SBBM8. Each connector has a different number of pins and will only fit into the connector on the board with the same number of pins. Do not use excessive force to insert a connector.
2. Ensure that the PRPC has been completely installed.
3. Confirm that there is a 10A fuse firmly seated in the fuse holder (F1) on the SBBM8.
4. The vehicle battery may now be reconnected.

Post Installation Testing

1. Turn the ignition ON to wake up and initialize the PRPC module.
2. When the PRPC is up and operating it will tell the SBB to wake up.
3. With these conditions met, ensure that **all** desired outputs are responding correctly per their programmed set of conditions in the PRPC configuration (For example, depending on the actual configuration, PRPC relay 4 activates when SBB switch 3 is turned on).

The SBBM8 is properly installed only if it passes the above tests. If any irregular operational issues persist, recheck the set of conditions in the PRPC configuration. Contact InterMotive at 530-823-1048 for technical assistance.

FlexTech System Operation:

Turning the vehicle ignition ON will wake up and initialize the attached PRPC. The PRPC will then wake up the SBBM8 through the LIN Bus. Outputs are controlled based on the PRPC's configuration.

When the key is turned OFF, the attached PRPC will tell the SBB8 to go into low power sleep mode, and then the PRPC will go into low power sleep mode. This may take up to TEN minutes. Other vehicle activity such as opening doors, inserting key in the ignition, etc. may delay sleep mode.

Backlight

The backlight intensity can be set by the PRPC configuration. The intensity can be anywhere between 0% (off) to 100% (very bright). Note the backlight will turn on and off with the key.

Diagnostic Displays

The part that the SBBM8 uses for the LCO's, monitors overvoltage or overcurrent faults. An overcurrent fault could be caused by a short in the load being driven by that LCO's. The part shuts off the faulted output when a fault is detected, and keeps it off until the fault is cleared.

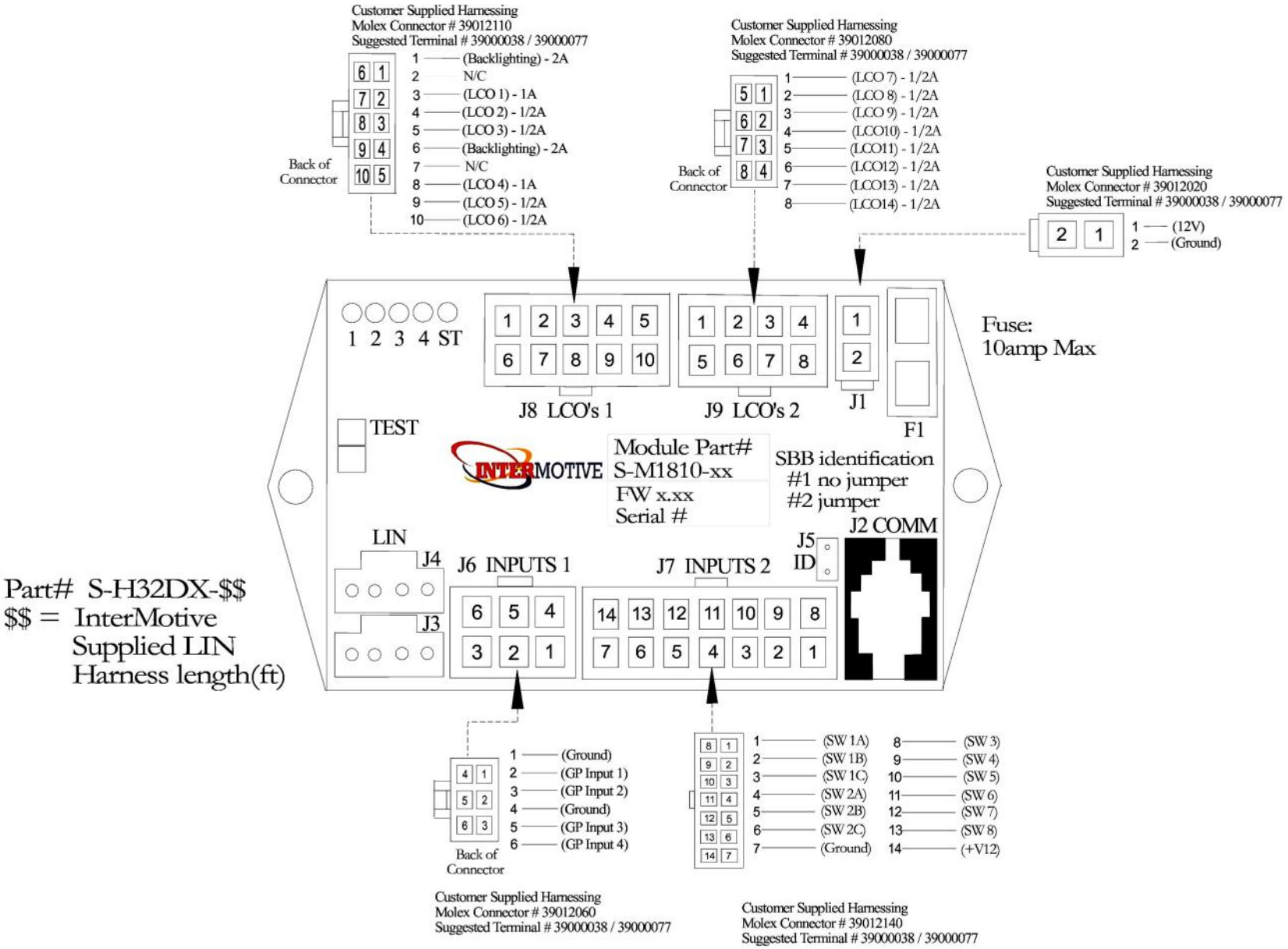
There is a fault code display available while the SSBM8 is powered up. To enter the Fault Code display mode, momentarily short the test pads together. The on-board amber status LED will blink in a way that indicates whether there is a fault or not and, if so, which output is faulted.

When everything is working properly the status LED will blink twice with about a half second between blinks and will repeat this after a 1 full second delay. This is a code of 1-1 which means NO fault has been detected.

When there is a fault the status LED will blink a two digit code that tells what the fault condition is. The first digit will be from 1 to 5 blinks quickly to indicate the type of fault, after about half a second the status LED will blink the second digit quickly. The status LED will repeat the fault code after a full second delay. This blinking will continue until the fault is cleared or the test pads are again shorted momentarily which turns status mode off. The fault codes are summarized below:

- 1-1 No faults detected
- 2-1 Fault detected for LCO #1
- 2-2 Fault detected for LCO #2
- 2-3 Fault detected for LCO #3
- 2-4 Fault detected for LCO #4
- 2-5 Fault detected for LCO #5
- 2-6 Fault detected for LCO #6
- 3-1 Fault detected for LCO #7
- 3-2 Fault detected for LCO #8
- 3-3 Fault detected for LCO #9
- 3-4 Fault detected for LCO #10
- 3-5 Fault detected for LCO #11
- 3-6 Fault detected for LCO #12
- 3-7 Fault detected for LCO #13
- 3-8 Fault detected for LCO #14
- 4-1 Fault detected for Backlight Output
- 5-3 LCO hardware failure

Only 1 fault can be shown with this method. If there is more than 1 fault in the board only the highest numbered fault will be shown. For example, if both LCO #6 is in fault and the backlight output is in fault then only the backlight fault will be shown. Likewise, if both General Purpose LCO #3 and #7 are in fault, only General Purpose LCO #7 will be shown.



Submit product registration at www.intermotive.net

If the SBBM8 fails any step in the Post Installation Test, review the installation instructions and the loaded PRPC configuration. If necessary, call

InterMotive technical support @ (530) 823-1048.