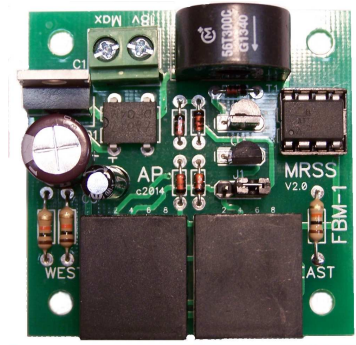# .: Model Railroad Signal Systems

Free-mo Block Module - Installation Instructions

Board version 2.0

FBM-1

- Provides DCC Block Detection.

- Detects any rolling stock that draws current while occupying a block or section of track when connected to the FBM-1 board.

- Designed for the Modular Signal System used on Free-mo modules.

- Can be used on any layout, not just Free-mo.

Cut gaps in both rails   Cut gaps in both rails

DCC Bus
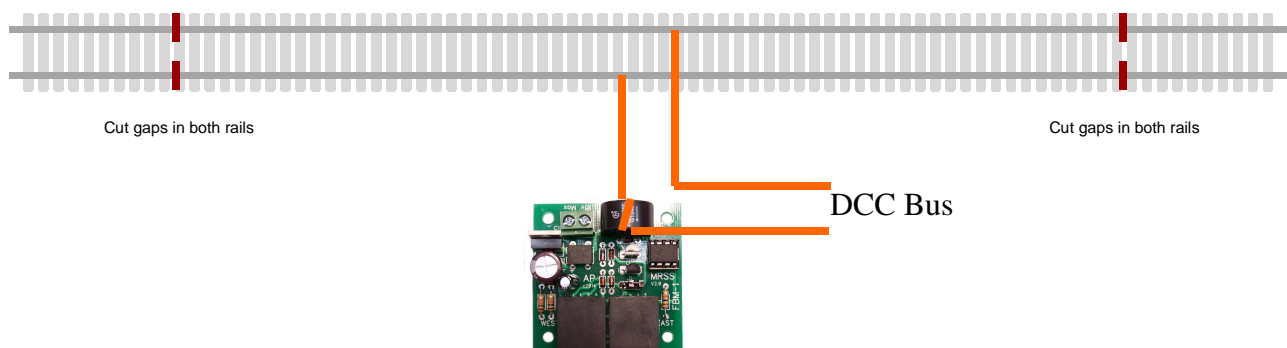
Please read these instructions before you begin to ensure the installation is done correctly. Failure to properly connect the board may result in damage to the circuitry. Ensure all power is turned off before you begin the installation.

Handling of the circuit board

Use care when handling the circuit board. Most electronic circuits are sensitive to static electricity and can easily be damage. Be sure work in an area where static is not an issue.

STEP 1 – Mounting the FMB-1 board

Choose an area under your Free-mo module that is suitable for mounting the FBM-1 board. Keep in mind the length of your track feeders when mounting the board.

STEP 2 – Track Feeders

In order to detect current through the tracks, your track feeders need to pass through the air core transformers on the FBM-1 board as shown in Figure 1. Loop the track feeder through the hole twice or three times if more sensitivity is required for detecting your trains. Use care when feeding the wire through the transformer. Pulling on the wire while looped through the transformer will tear the transformer from the circuit board. This will not be covered under warranty. Recommended wire size is between 16 and 18 gauge.
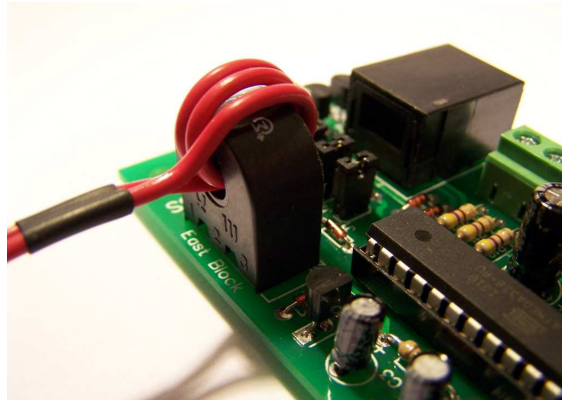

Figure 1

STEP 3 – Power Connections

The Free-mo Block Module has been designed to accept several different power supplies.

-- A separate AC adapter that can supply between 8 and 18 volts AC or DC.
-- Connecting the board to the accessory bus.
-- Connecting the board to the DCC bus.
-- A 12 volt battery.

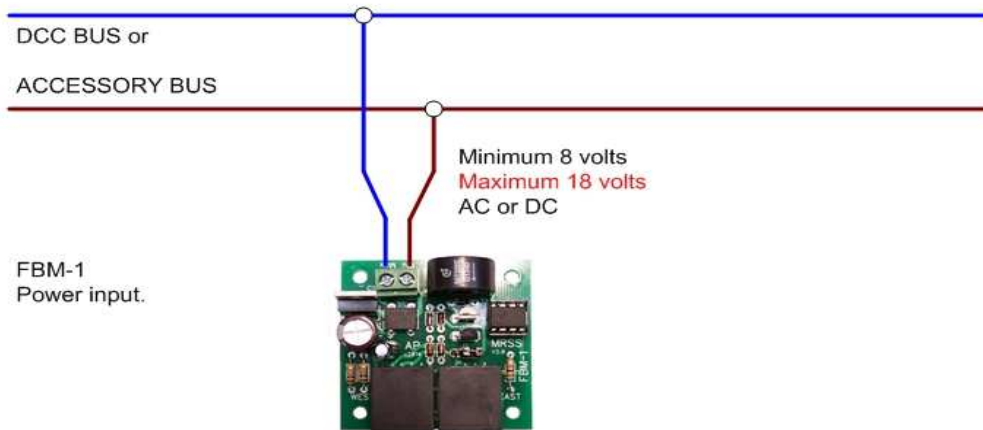Refer to figure 2 on the next page when making power connections.

Figure 2

STEP 4 – Occupancy Bus

The RJ45 jacks are used to connect your Free-mo Block Module to other modules. The cable type to be used between modules must be a cross over Ethernet cable. The use of a strait through cable will not allow your signals to function properly.
If the module next to yours does not have an Occupancy bus, you can extend your cable with a strait through cable as long as there is an odd number of cross over cables between circuit modules. See figure 3 for more details.
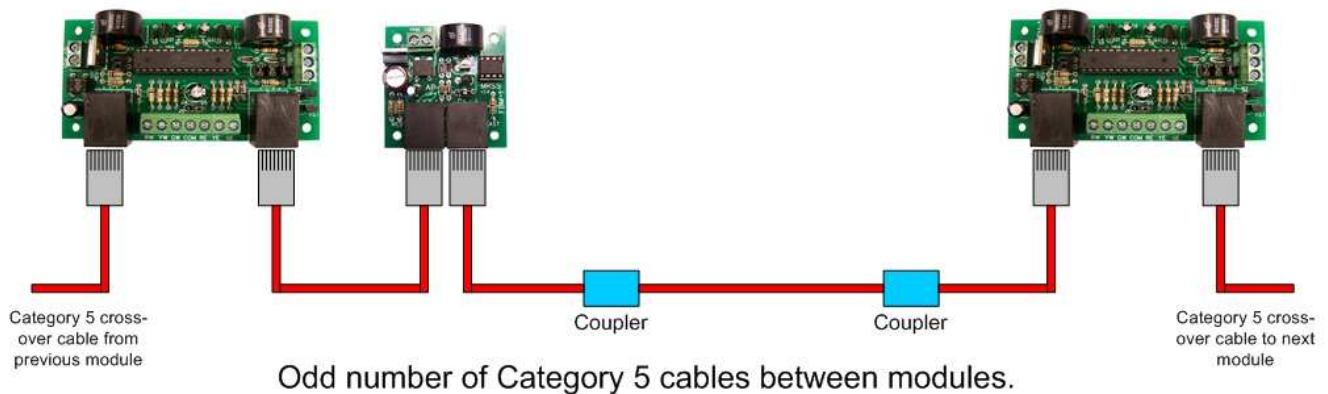

Odd number of Category 5 cables between modules.

Figure 3

STEP 5 – Applying Power

The last step is to turn on the power and test your module. Double check all your connections prior to applying power. A second look can save you a lot of frustration if connections are made incorrectly.

Disclaimer

All the circuits designed and posted on the Model Railroad Signal Systems website have been designed and created as a hobby. Many hours of research and development have gone into the design of each circuit so that they will operate as described without any problems.

The circuits will work as designed and will not be dangerous to persons or property when used in their intended manner. However, if you choose not to follow the installation instructions as stated above and use the circuits in any other fashion, you may pose a risk to yourself and property.

I am not responsible for any injuries or damages whatsoever that may arise from the use or misuse of these circuits as I have no control over the actions of the user or installer.

Warranty

All the circuits here are inspected and tested before they are shipped. If there is a defect due to manufacturing or programming, I will gladly replace your board for a new one within 90 days of purchase.

Misuse, abuse, or the use of cheap power supply to power these circuits which will cause damage to the board, is not covered by warranty. If you have any doubts about the use of any type of power supply, please contact me before applying power to your board.

Questions or Comments

If you have any questions or comments please send them to me by using the email address on the Model Railroad Signal Systems Website.