M-Flex CAN Bridge Module

User Guide

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Overview

The M-Flex CAN Bridge Modules are configurable via the Marlin Programming Tool. The Marlin Programming Tool connects to the CAN Bridge with a supported USB-to-CAN adapter. Information and downloads for the Marlin Programming Tool can be found on https://marlintech.com

Module Configuration

A configuration file (XML) allows the end user to read and modify parameters relevant to their application from within the Marlin Programming Tool. Interacting with the CAN bridge configuration within the programming tool will put the module into “beacon mode” in which all the CAN LEDs will light up yellow for easier identification.

Source Address

Each channel on the bridge has an associated J1939 source address. The source address is configurable for each channel independently. Additionally, source address arbitration can be enabled or disabled (0 = arbitration enabled, 1 = arbitration disabled). If arbitration is enabled, the bridge will attempt all available addresses in case of conflict, dropping off the bus if an address cannot be claimed. If arbitration is not enabled, the bridge will drop off the bus if the configured address is not available.

Baud Rate

Each channel on the bridge also has a configurable baud rate. Available values are detailed in the configuration file itself. It is possible to configure each channel with a different baud rate, as the module will handle passing messages between channels at their respective baud rate.

Filter Types

Each channel of the CAN bridge can be configured to filter incoming messages based on user-specified criteria. There are 7 filter types detailed below, with three additional filter types available for the 505611 3-Channel CAN Bridge. The number specified for “Filter Type” is what will go in the XML configuration file.

Filter Type 0 - All Pass

Setting a channel's filter type to 0 will configure it as an all-pass channel, meaning that all messages received on this channel will be transmitted to each respective channel. For example, setting CAN1 Filter Type to 0 will bridge all incoming messages to both CAN2 and CAN3.

Filter Type 1 – Block ID

Setting a channel's filter type to 1 will configure it as a block ID channel, meaning that any messages that match one of the user-configured ID filters for that channel will be blocked, and any messages that do not match any filter will pass through unaffected. In order to differentiate between standard and extended ID messages, the most-significant bit (MSB) of the 32-bit filter value is used. If the user wishes to specify a standard ID, the MSB is set to 1. For extended ID messages, the MSB is set to 0.

Example – Block Extended ID 0x18FFAA01:

Filter Type: 0x01
Filter n: 0x18FFAA01

Example – Block Standard ID 0x123:

Filter Type: 0x01
Filter n: 0x80000123

Note: when configuring standard IDs, it is helpful to use hexadecimal mode by checking the "HEX" box in the programming tool dialog. Adding 0x80000000 to the desired standard ID will ensure the bridge knows it is a standard ID filter

Filter Type 2 – Block J1939 PGN

Setting a channel's filter type to 2 will configure it as a block J1939 PGN channel. In this configuration, standard ID messages are ignored and will pass through to all other channels. Extended messages have their PGN compared to each of the channel's filters and, if a match is found, the message is discarded.

Example – Block PGN FFAA:

Filter Type: 0x02
Filter n: 0x0000FFAA

Filter Type 3 – Block J1939 Source Address

Setting a channel's filter type to 3 will configure it as a block J1939 Source Address channel. In this configuration, standard ID messages are ignored and will pass through to all other channels. Extended ID messages have their source address compared to each of the channel's filters and, if a match is found, the message is discarded.

Example – Block all messages from source address 0xAB:

Filter Type: 0x03
Filter n: 0x000000AB

Filter Type 4 - Pass ID

Setting a channel's filter type to 4 will configure it as a pass ID channel. This configuration is the same as filter type 1 (block ID) however messages are blocked by default unless their ID matches one of the configured filters.

Example – Pass Extended ID 0x18FFAA01:

Filter Type: 0x04
Filter Value: 0x18FFAA01

Example – Pass Standard ID 0x123:

Filter Type: 0x04
Filter n: 0x80000123

Filter Type 5 – Pass J1939 PGN

Setting a channel's filter type to 5 will configure it as a pass J1939 PGN channel. This configuration is the same as filter type 2 (block PGN) however messages are blocked by default unless their PGN matches one of the configured filters. In this configuration, all standard ID messages are blocked by default.

Example - Pass PGN FFAA:

Filter Type: 0x05
Filter n: 0x0000FFAA

Filter Type 6 - Pass J1939 Source Address

Setting a channel's filter type to 6 will configure it as a pass J1939 source address channel. This configuration is the same as filter type 3 (block source address) however messages are blocked by default unless their source address matches one of the configured filters. In this configuration, all standard ID messages are blocked by default.

Example – Pass all messages from source address 0xAB:

Filter Type: 0x06
Filter n: 0x000000AB

Additional Filter Types (**505611 Only**)

Filter Type 7 – All Pass (CAN1)

Setting a channel's filter type to 7 will configure it as an all pass only to CAN1. Note that configuring CAN1 as an All Pass CAN1 channel will block all messages received on CAN1.

Filter Type 8 – All Pass (CAN2)

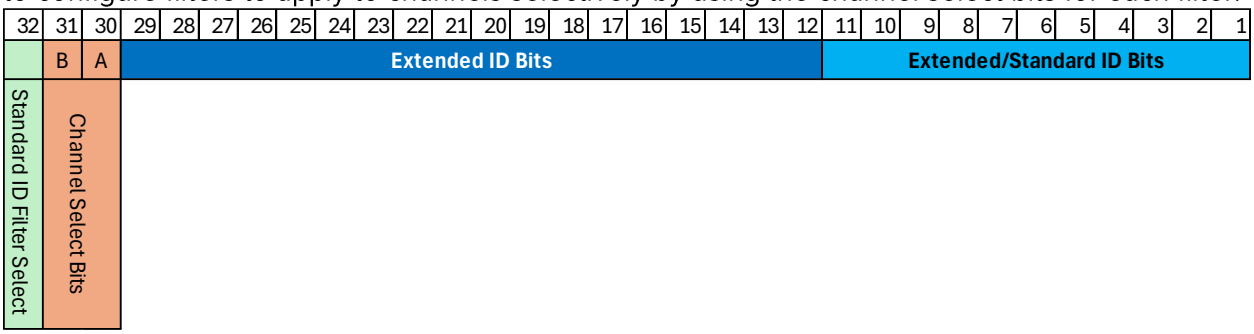
Setting a channel's filter type to 8 will configure it as an all pass only to CAN2. Note that configuring CAN2 as an All Pass CAN2 channel will block all messages received on CAN2.

Filter Type 9 – All Pass (CAN3)

Setting a channel's filter type to 9 will configure it as an all pass only to CAN3. Note that configuring CAN3 as an All Pass CAN3 channel will block all messages received on CAN3.

Filter Channel Selection (**505611 only**)

By default, each filter for a given channel will apply to both other channels. However, it is possible to configure filters to apply to channels selectively by using the channel select bits for each filter:



The two bits in positions 30 and 31 are the channel select bits for each filter, labeled as 'A' and 'B'. Setting either of these bits indicates to the bridge that the applicable filter does not apply to that respective channel. See below for selection for how the select bits map to the filter for a configured filter channel:

Filter Channel	Select Bit A	Select Bit B
CAN1	CAN2	CAN3
CAN2	CAN1	CAN3
CAN3	CAN1	CAN2

Example – Pass all messages from source address 0xAB only from CAN1 to CAN3

CAN1 Filter Type**:** 0x06
CAN1 Filter n: 0x200000AB

> In this configuration, Select Bit A is set and thus the filter will *not* apply to CAN2, thus any messages matching this filter will only pass from CAN1 to CAN3

Example – Block all messages with Standard ID 0x123 only from CAN2 to CAN1

CAN1 Filter Type**:** 0x01
CAN1 Filter n: 0xC0000123

> In this configuration, Select Bit B is set and thus the filter will *not* apply to CAN3, thus any messages with standard ID 0x123 received on CAN2 will be blocked from CAN1, but will pass through to CAN3

Note: Setting both channel select bits to 1 will either pass all messages or block all messages (depending on selected filter configuration) regardless of filter criterion, and is thus not recommended.

