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Marlin Technologies Configurable CANbus Bridge

Overview

The 505601 is a 2 channel CANbus bridge for connecting CANbus networks. Each channel has two pins for CANH and CANL allowing for termination to be added externally without splicing. It is fully encapsulated in urethane and is IP67 rated. While connected to CAN channel 1 with Marlin's CAN USB Programmer, the user can configure settings on channel 1 and channel 2 via xml 13292S_. See 13291U_ for a detailed user guide.

Connections

J1-1	Power
J1-2	Channel 1 CANH
J1-3	Channel 1 CANH
J1-4	Channel 1 CANL
J1-5	Channel 1 CANL
J1-6	Channel 1 CAN Shield
J1-7	Channel 2 CANL
J1-8	Channel 2 CANL
J1-9	Channel 2 CANH
J1-10	Channel 2 CANH
J1-11	Channel 2 CAN Shield
J1-12	Ground

Operating Voltage: 9-36VDC

Operating Temperature: -40°C to 85°C

Mechanical: Ref MTI Drawing 013284O

Ingress Protection Rating: IP67

Channel 1 Baud Rate: 250Kbit/s, 500Kbit/s, 1Mbit/s (configurable)

Channel 2 Baud Rate: 250Kbit/s, 500Kbit/s, 1Mbit/s (configurable)

Filtering

To allow bus load management, each channel can be configured to pass or block messages based upon the entire CAN ID, J1939 PGN or J1939 Source Address. Up to 20 filters can be applied to each channel.

Filter Types:

Each channel has a filter type that will determine whether a message received on one channel is bridged to the other channel.

1. **None:** Filtering is disabled. All messages received on this channel are bridged to the other channel.
2. **Block ID:** The entire CAN ID of the received message is compared to all 20 filter parameters for the channel. If a match is found, the message is discarded. If no match found, the message is bridged to the other channel.
3. **Block J1939 PGN:** The J1939 PGN of the received message is compared to all 20 filter parameters for the channel. If a match is found, the message is discarded. If no match found, the message is bridged to the other channel.
4. **Block J1939 Source Address:** The J1939 Source Address of the received message is compared to all 20 filter parameters for the channel. If a match is found, the message is discarded. If no match found, the message is bridged to the other channel.
5. **Pass ID:** The entire CAN ID of the received message is compared to all 20 filter parameters for the channel. If a match is found, the message is bridged to the other channel. If no match found, the message is discarded.
6. **Pass J1939 PGN:** The J1939 PGN of the received message is compared to all 20 filter parameters for the channel. If a match is found, the message is bridged to the other channel. If no match found, the message is discarded.
7. **Pass J1939 Source Address:** The J1939 Source Address of the received message is compared to all 20 filter parameters for the channel. If a match is found, the message is bridged to the other channel. If no match found, the message is discarded.

EEPROM Memory Locations For Filter Parameters**CAN 1 Filter Type: 0x10**

- 0 = No Filtering
- 1 = Block ID
- 2 = Block J1939 PGN
- 3 = Block J1939 Source Address
- 4 = Pass ID
- 5 = Pass J1939 PGN
- 6 = Pass J1939 Source Address
- All other = No filter

CAN 2 Filter Type: 0x80

- 0 = No Filtering
- 1 = Block ID
- 2 = Block J1939 PGN
- 3 = Block J1939 Source Address
- 4 = Pass ID
- 5 = Pass J1939 PGN
- 6 = Pass J1939 Source Address
- All other = No filter

CAN 1 Baud Rate: 0x11

- 0 = 1 Mb/sec
- 1 = 500Kb/sec
- 3 = 250 Kb/sec
- *Any other value will result in no change

CAN 2 Baud Rate: 0x81

- 0 = 1 Mb/sec
- 1 = 500Kb/sec
- 3 = 250 Kb/sec
- *Any other value will result in no change

CAN 1, Filter 01: 0x12 – 0x15

CAN 1, Filter 02: 0x16 – 0x19

CAN 1, Filter 03: 0x1A – 0x1D

CAN 1, Filter 04: 0x1E – 0x21

CAN 1, Filter 05: 0x22 – 0x25

CAN 1, Filter 06: 0x26 – 0x29

CAN 1, Filter 07: 0x2A – 0x2D

CAN 1, Filter 08: 0x2E – 0x31

CAN 1, Filter 09: 0x32 – 0x35

CAN 1, Filter 10: 0x36 – 0x39

CAN 1, Filter 11: 0x3A – 0x3D

CAN 1, Filter 12: 0x3E – 0x41

CAN 1, Filter 13: 0x42 – 0x45

CAN 1, Filter 14: 0x46 – 0x49

CAN 1, Filter 15: 0x4A – 0x4D

CAN 1, Filter 16: 0x4E – 0x51

CAN 1, Filter 17: 0x52 – 0x55

CAN 1, Filter 18: 0x56 – 0x59

CAN 1, Filter 19: 0x5A – 0x5D

CAN 1, Filter 20: 0x5E – 0x61

CAN 2, Filter 01: 0x82 – 0x85

CAN 2, Filter 02: 0x86 – 0x89

CAN 2, Filter 03: 0x8A – 0x8D

CAN 2, Filter 04: 0x8E – 0x91

CAN 2, Filter 05: 0x92 – 0x95

CAN 2, Filter 06: 0x96 – 0x99

CAN 2, Filter 07: 0x9A – 0x9D

CAN 2, Filter 08: 0x9E – 0xA1

CAN 2, Filter 09: 0xA2 – 0xA5

CAN 2, Filter 10: 0xA6 – 0xA9

CAN 2, Filter 11: 0xAA – 0xAD

CAN 2, Filter 12: 0xAE – 0xB1

CAN 2, Filter 13: 0xB2 – 0xB5

CAN 2, Filter 14: 0xB6 – 0xB9

CAN 2, Filter 15: 0xBA – 0xBD

CAN 2, Filter 16: 0xBE – 0xC1

CAN 2, Filter 17: 0xC2 – 0xC5

CAN 2, Filter 18: 0xC6 – 0xC9

CAN 2, Filter 19: 0xCA – 0xCD

CAN 2, Filter 20: 0xCE – 0xD1

J1939 Source Address and NAME Field (Ref SAE J1939-81)

Default Source Address = 0x99

Self-Configurable from 0x99 to 0xA4

J1939 NAME Manufacturer Code = 0xA9 (Marlin Technologies, Inc.)

J1939 NAME Identity Number = 505601

Filter Operation

Each filter is comprised of 32 bits stored in the microcontroller's EEPROM memory in Big Endian or Motorola format. The example below shows the bit arrangement for CAN1 Filter 01.

EEPROM Address 0x12

Bit 8: Standard CAN Frame Select bit*
 Bit 7: Unused
 Bit 6: Unused
 Bit 5: CAN ID Bit 29**
 Bit 4: CAN ID Bit 28**
 Bit 3: CAN ID Bit 27**
 Bit 2: CAN ID Bit 26**
 Bit 1: CAN ID Bit 25**

EEPROM Address 0x13

Bit 8: CAN ID Bit 24**
 Bit 7: CAN ID Bit 23**
 Bit 6: CAN ID Bit 22**
 Bit 5: CAN ID Bit 21**
 Bit 4: CAN ID Bit 20**
 Bit 3: CAN ID Bit 19**
 Bit 2: CAN ID Bit 18**
 Bit 1: CAN ID Bit 17**

EEPROM Address 0x14

Bit 8: CAN ID Bit 16**
 Bit 7: CAN ID Bit 15**
 Bit 6: CAN ID Bit 14**
 Bit 5: CAN ID Bit 13**
 Bit 4: CAN ID Bit 12**
 Bit 3: CAN ID Bit 11
 Bit 2: CAN ID Bit 10
 Bit 1: CAN ID Bit 9

EEPROM Address 0x15

Bit 8: CAN ID Bit 8
 Bit 7: CAN ID Bit 7
 Bit 6: CAN ID Bit 6
 Bit 5: CAN ID Bit 5
 Bit 4: CAN ID Bit 4
 Bit 3: CAN ID Bit 3
 Bit 2: CAN ID Bit 2
 Bit 1: CAN ID Bit 1

* Set to 1 for Standard CAN Message, 0 for Extended ID Message

** Set to 0 if Standard CAN Frame Select bit = 1

CAN Bridge Beacon

In an application using multiple CAN bridges, the diagnostic LEDs can be commanded remotely by the Marlin CAN USB Programmer to determine which CAN bridge is being configured. PGN 65451 is used for this purpose. When a CAN Bridge receives 65451 with Byte 3 = 0x00(EEPROM Read Command), the CAN LEDs will both turn to solid amber and remain this way until 65451 with Byte 3 = 0x01(EEPROM Write Command) is received. Alternatively, if an EEPROM Write is undesirable, power to the CAN Bridge can manually be cycled. At this point, control of the LEDs will be given back to the CAN Bridge module.

PGN 65451 Marlin EEPROM Read/Write

Used to remotely command diagnostic LEDs

Source Address: N/A

Transmission Repetition Rate: N/A

Data Length: 8 Bytes

Extended Data Page: 0

Data Page: 0

PDU Format: 255

PDU Specific: 171

Default Priority: 6

Parameter Group Number: 65451 (0xFFAB)

Start Position	Length	Parameter Name
1.1-8	8 bits	EEPROM Address
2.1-8	8 bits	Don't Care
3.1-8	8 bits	0x00(EEPROM Read Command)
4.1-8	8 bits	Don't Care
5.1-8	8 bits	CAN Bridge HWID Low
6.1-8	8 bits	CAN Bridge HWID High
7.1-8	8 bits	Source Address of CAN Bridge being commanded
8.1-8	8 bits	Don't Care