CiS

CAN in Simulation

Switch Module
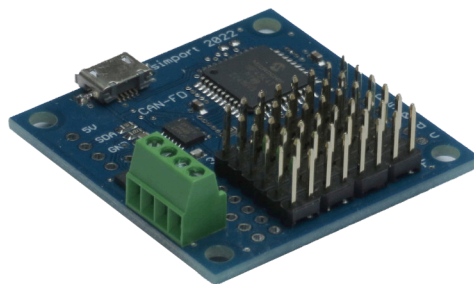
Switch Module

The Switch module is equipped with 24 input ports designed to connect various types of switches. These switches can range from common ones like SPST or SPDT switches, multi switches, pushbuttons, to more advanced options like relay contacts, optical switches, and electronic switches.

All the switches are designed to connect and switch to the ground.

CAN ID	node ID	data type	service code	message code	data byte 0	data byte 1	data byte 2	data byte 3
710h	node	0Bh	item	num	data	0	0	0

CAN Message

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
–	–	–	–	–	–	off	on

Data Byte

The on/off bits are set when the switch (or pushbutton) is either *closed* or *opened* (or *pressed* or *released*).

This is how the Configuration Tool views a Switch Module (more on page 7):
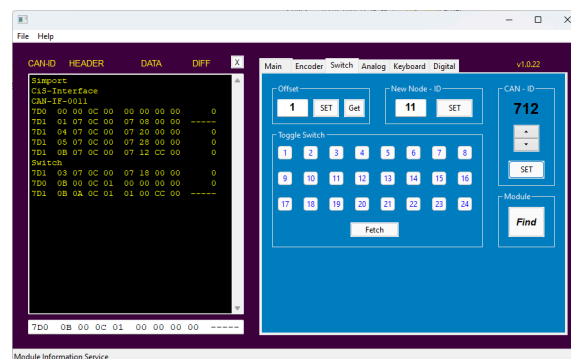
The CAN-ID is displayed as **712** (hexadecimal), and the node ID is identified as **11**.

The Find button searches for any attached Switch modules, which is useful when the modules are changed.

There is one parameter available that can be altered upon request:

Offset   The Switch module is capable of handling up to 24 switches, each of which is assigned a unique ID.

Starting with the *offset* value, the 24 switches are given consecutive ID values, which will be included in the CAN message sent by the board.

Since the ID values are 1 byte wide, up to 256 different switches can be distinguished under a given Node-ID.

Parameter Setting

To modify the parameters of a module, the Module Configuration Service (MCS) is utilized. The MCS is assigned a unique CAN-ID of 7D0h (equivalent to decimal value 2000):

CAN ID	node ID	data type	service code	message code	data byte 0	data byte 1	data byte 2	data byte 3
7D0h	node	0Ah	0Dh	pid	data	0	0	0

node ID: CAN node ID (*node*)

data type: UCHAR (*0Ah, 10d*)

service code: MCS (*0Dh*)

message code: Parameter index (*pid*)

message data: Parameter value (*data byte 0*)

The parameter ID (pid) is used to identify which specific parameter needs to be modified. Data byte 0 contains the value of the parameter.

index	parameter	value(s)
1	offset	1 ... 255

Upon completion of the parameter modification request, the response message will have a message code of **0** (zero) if the operation was successful. However, if the requested parameter is out of the valid range or the parameter ID is invalid, the response message will contain a message code of **–6**.

CAN-ID Setting

The CAN-ID range for Encoder board messages is **710h..71Fh** (decimal **1808..1815**).

To change the CAN-ID of the Encoder board, the CAN Identifier Setting Service (CSS) can be used. The message code should be set to 0.

CAN ID	node ID	data type	service code	message code	data byte 0	data byte 1	data byte 2	data byte 3
7D0h	node	0Ch	0Eh	0	0	0	xh	xl

	node ID:	CAN node ID (*node*)
	data type:	SHORT2 (*0Ch, 12d*)
	service code:	CSS (*0Eh, 14d*)
	message code:	0
	message data:	New CAN ID high byte (xh, data byte 2)
		New CAN ID low byte (xl, data byte 3)

Upon completion of the CAN Identifier Setting request, the response message will have a message code of **0** (zero) if the operation was successful, or **−6** if the ID is out of the valid range.

Node-ID Setting

To change the Node-ID of the Encoder board, the Node ID Setting Service (NIS) can be used. Node-ID values are in the range of 1 to 255.

CAN ID	node ID	data type	service code	message code	data byte 0	data byte 1	data byte 2	data byte 3
7D0h	node	0	0Bh	x	0	0	0	0

	node ID:	CAN node ID (*node*)
	data type:	NODATA (*00h, 0d*)
	service code:	NIS (*0Bh, 11d*)
	message code:	New node ID (*1 ≤ X ≤ 255*)
	message data:	0

Upon completion of the Node Identifier Setting request, the response message will have a message code of 0 (zero) if the operation was successful.

Status Transmission

The CAN bus bus messages are designed to be triggered only when there is a change in the state of any switch. The Status Transmission Service (STS) allows for the simultaneous interrogation of all switches at once. As a result, a total of 24 messages are generated, providing an up-to-date reflection of the current states of all switches on the board.

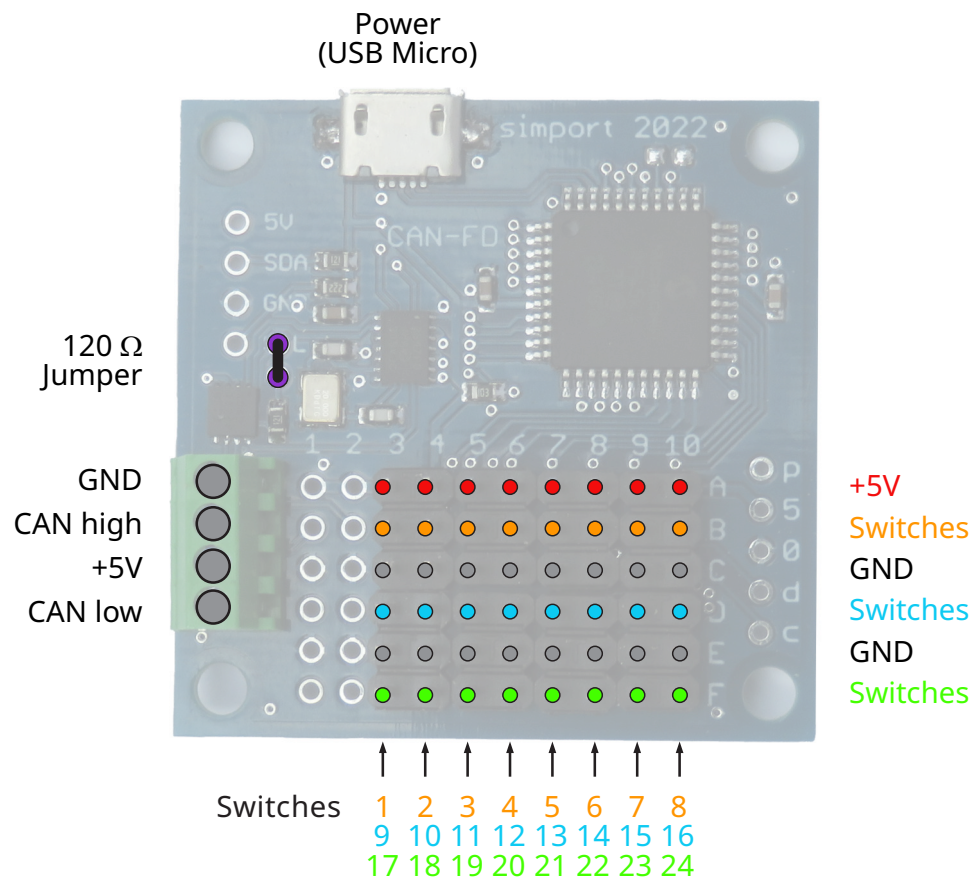| CAN ID	node ID	data type	service code	message code	data byte 0	data byte 1	data byte 2	data byte 3
7D0h	node	0	07h	0	0	0	0	0

node ID: CAN node ID (*node*)

data type: NODATA (*00h, 0d*)
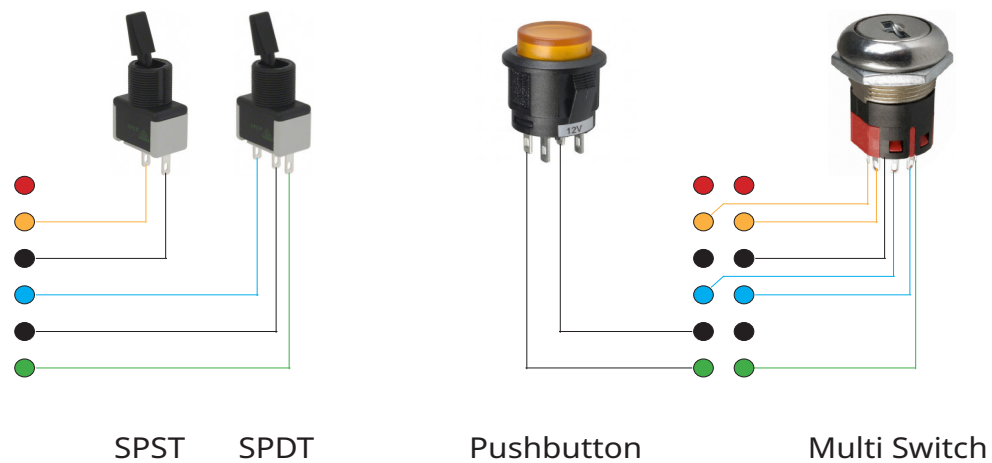
service code: STS (*07h, 7d*)
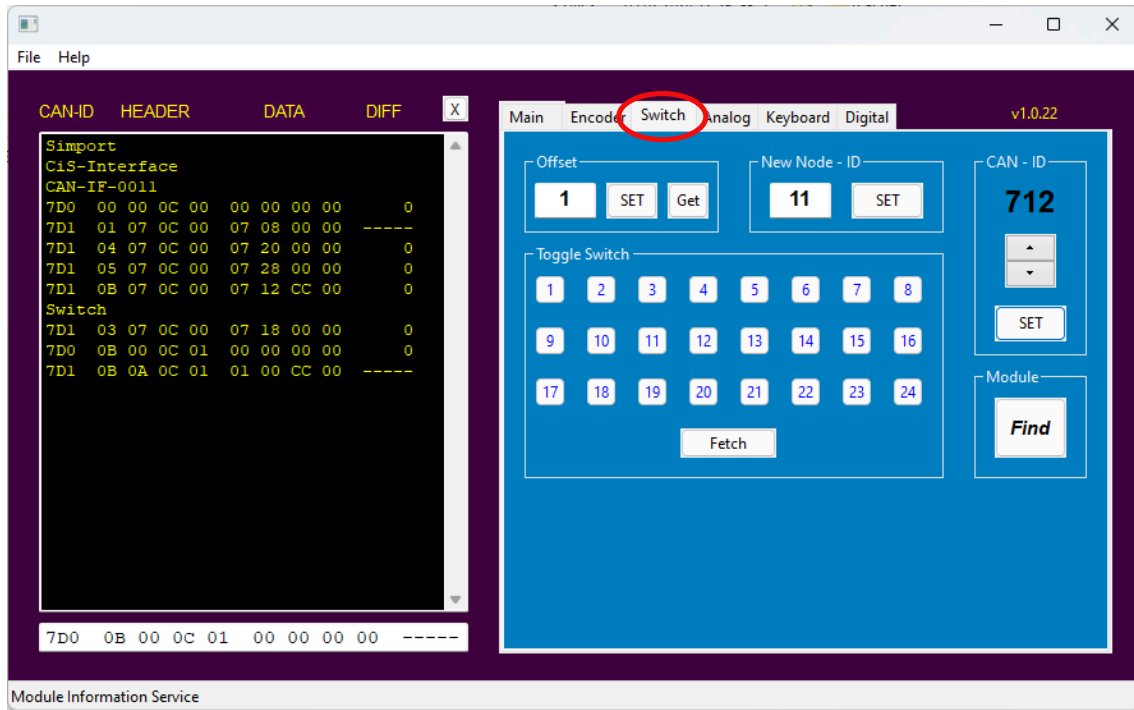
message code: 0

message data: 0

Board Layout

The 120 Ω jumper places a termination resistor between the CAN high and CAN low line.

Wiring Examples

SPST   SPDT   Pushbutton   Multi Switch

The Configuration Tool

The configuration tool features a "Switch" panel on the right side, which appears as follows:

When you open this panel for the first time, it automatically searches for a Switch Board on the CAN bus. If a board is found, its *Node-ID*, *CAN-ID*, and *Offset* parameter are displayed. Subsequently, clicking the (**Find**) button initiates a new search.

The *Node-ID* and *Offset* parameters can be adjusted by editing the numbers in their respective fields. Pressing the (**SET**) button will immediately update these parameters in the module. The *CAN-ID* can be adjusted using the spin buttons.

In the ‚Toggle Switch' field, the (**Fetch**) button retrieves the current switch states from the board and displays them. A green background behind the switch number indicates that the corresponding switch is closed or pressed, while a white background signifies an open or released state.

To transmit a switch message on the CAN bus, simply click the corresponding button.

You can monitor all CAN bus activity in the left window.

Board Dimensions [mm]

4 x 3,2 Ø

34

40

34

40