AN709 – Valve Controller Truth Tables

Introduction

The purpose of this document is to describe how the Truth Table in the AX020510 and other Axiomatic Devices works for various applications

Truth Table

The Truth Table block implements a four-input truth table. Each of the four inputs are user selectable with source and number setpoint pair from available control sources REF. For each input there are "Switch On Point" and "Switch Off Point" setpoint to determine how the input signal is interpreted. When the selected input is equal or above the switch on value, it is interpreted as TRUE (1). When the input is equal or below the switch off value it is interpreted as FALSE (0). In between switching points interpretation does not change. If the switching points are set equal input is interpreted as TRUE (1) when its value is equal to the switching points. By Default, all inputs are disabled and 0 is used as the value of the input signals.

Input A	Input B	Input C	Input D	Output
0	0	0	0	Row1
0	0	0	1	Row2
0	0	1	0	Row3
0	0	1	1	Row4
0	1	0	0	Row5
0	1	0	1	Row6
0	1	1	0	Row7
0	1	1	1	Row8
1	0	0	0	Row9
1	0	0	1	Row10
1	0	1	0	Row11
1	0	1	1	Row12
1	1	0	0	Row13
1	1	0	1	Row14
1	1	1	0	Row15
1	1	1	1	Row16

For each condition row of the truth table there is output source and number setpoint pair. When condition of a row is evaluated as TRUE the selected output is set as output of the Truth Table. By default, all output sources are disabled, and the output of the Truth Table is 0.

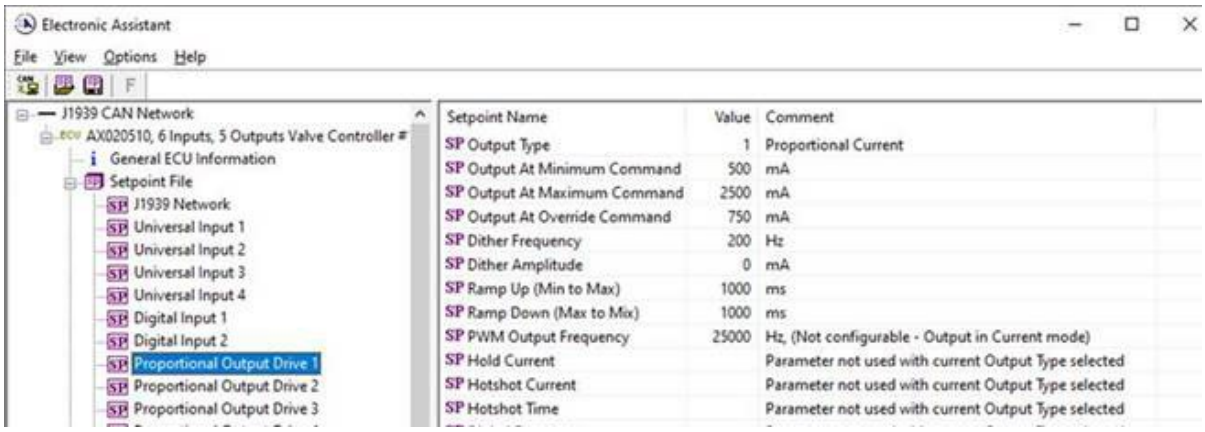
***UMAX020510 Version 1.0.5 page 27-65 User manual**

Axiomatic Technologies Oy
Höytämöntie 6
33880 LEMPÄÄLÄ, Finland
Tel. +358 103 375 750
salesfinland@axiomatic.com
www.axiomatic.fi

Axiomatic Technologies Corporation
1445 Courtneypark Dr. E.
Mississauga, ON Canada L5T 2E3
Tel. 1 905 602 9270
sales@axiomatic.com
www.axiomatic.com

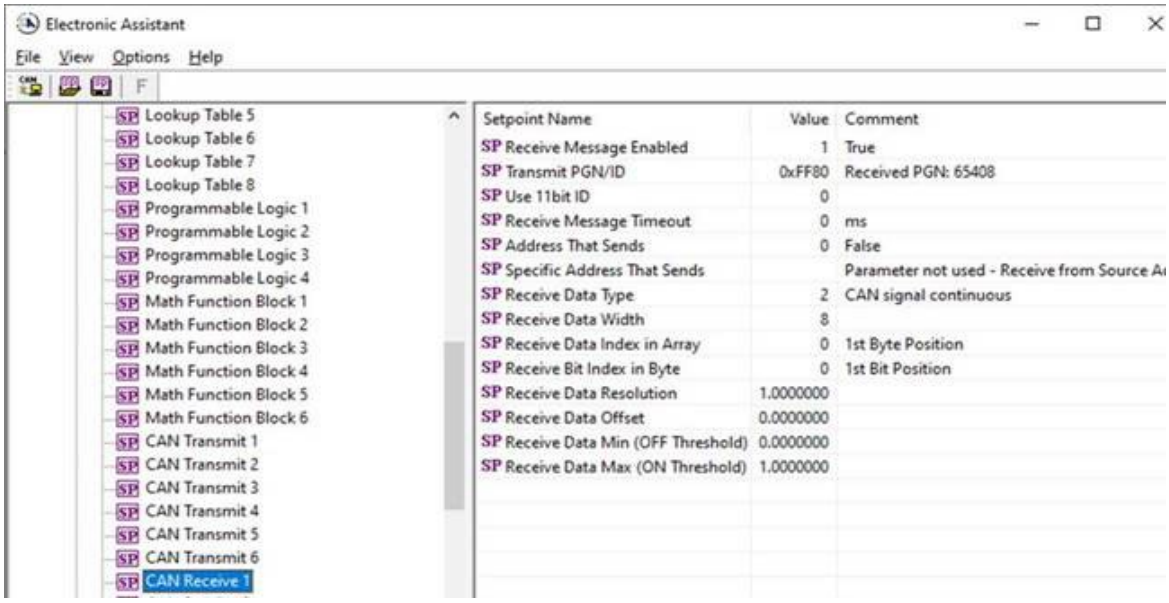
Example of using Truth Tables

This is an example of how to use the truth table to **enable** the proportional output drive 1. The example is simple, and it is easy to build more complex control schemes based on it.

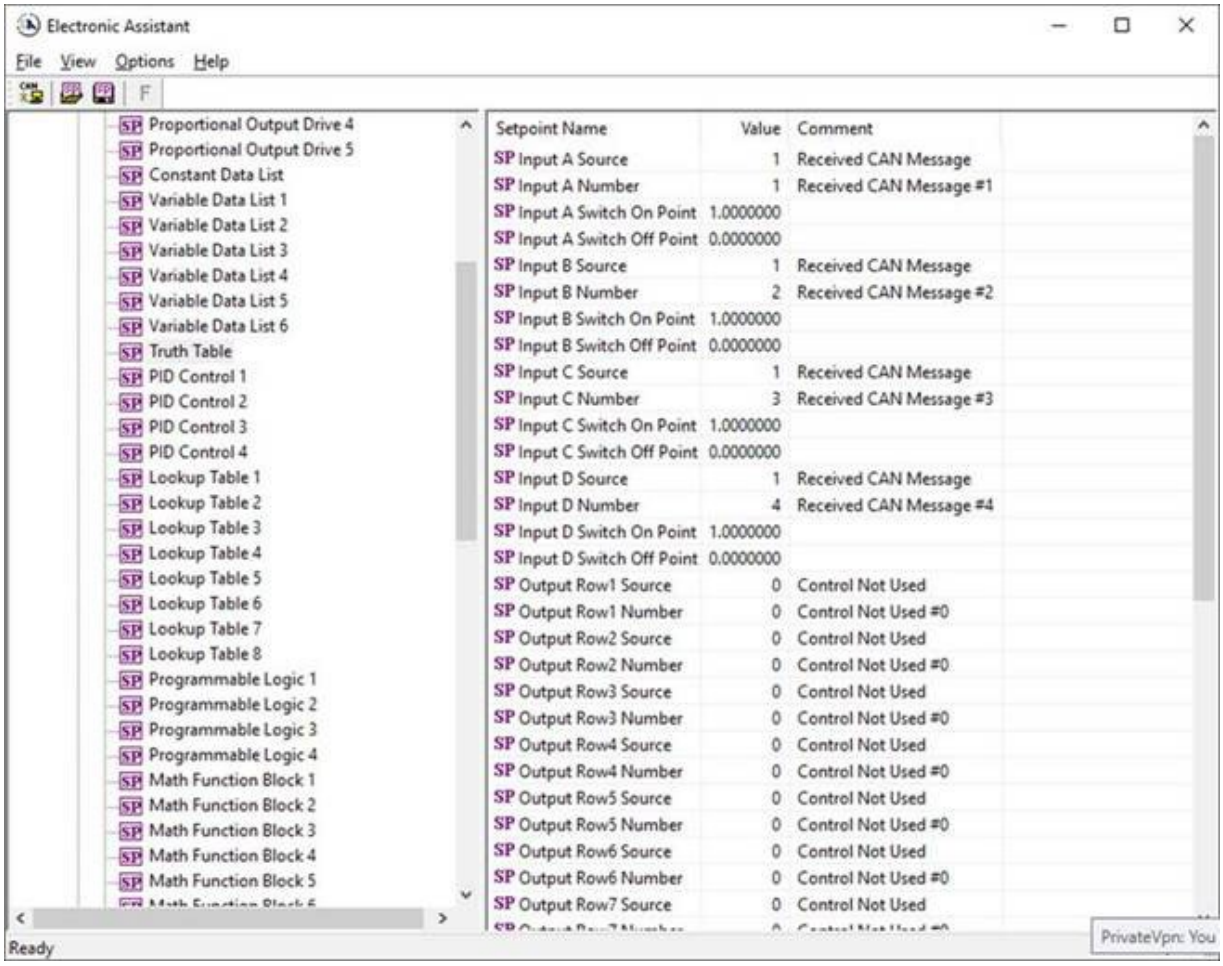


CAN Receive Message

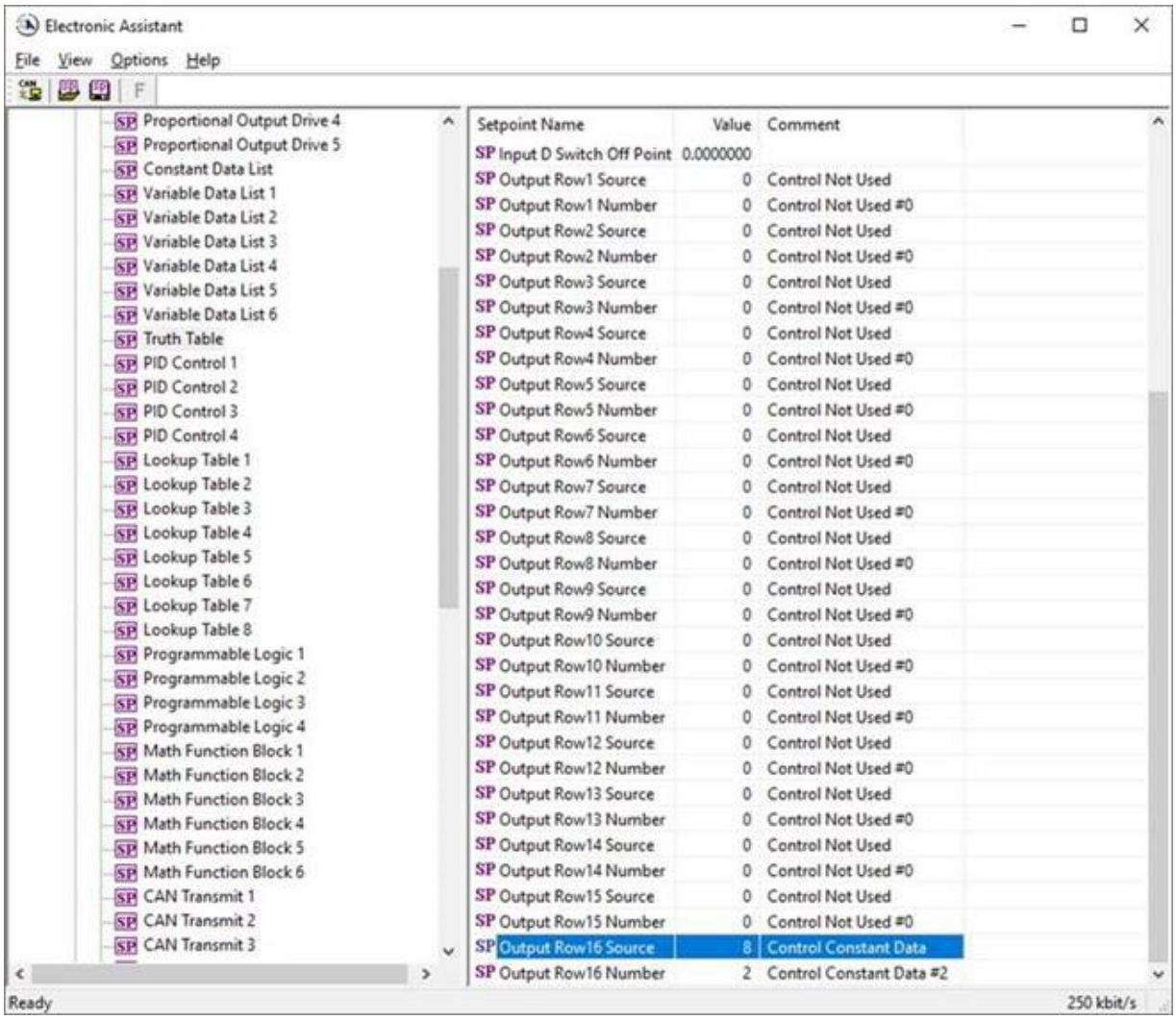
CAN Receive 1 to 4 are set up as a discrete control. Using PGN 0XFF80 bytes 1 to 4 respectively.



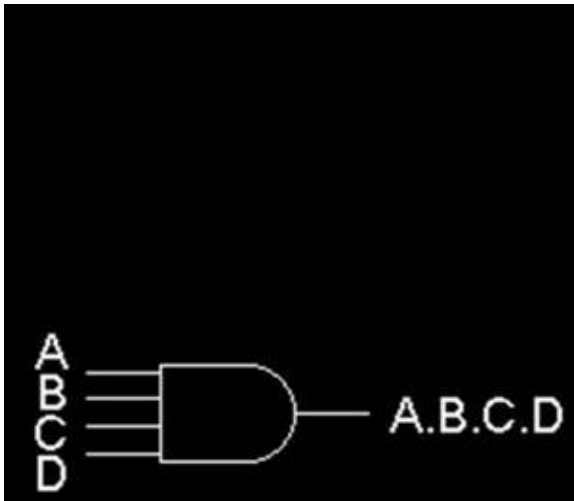
The Received CAN Message # 1 to 4 are used as the Input A to D source of the Truth Table. With the Switch On point = “1”, Switch Off point = “0”



Output Row 16 Source is then enabled to use a Control constant Data source (#2) = “1” as an output



In this specific example, the condition in the Truth Table configured for Row 16: Inputs A-D: 1,1,1,1 = 1 is represented by a logic AND gate, as the picture below:

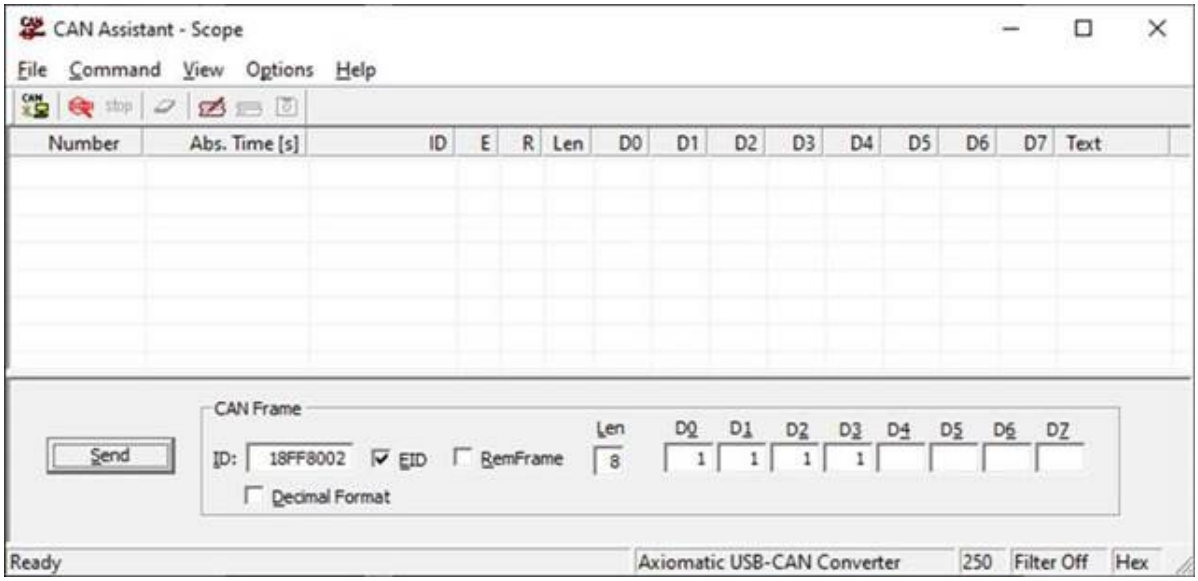


4 Input AND gate				
A	B	C	D	A.B.C.D
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	0
1	1	0	0	0
1	1	0	1	0
1	1	1	0	0
1	1	1	1	1

If the message below is sent using the CAN Assistant Scope the Proportional Output 1 will output 500mA.

Set the Imin = 500mA so that there would be a noticeable change when the output was enabled.

Note that any of the other 15 remaining combinations will disable the output.



Any valid combination of sources can be mapped as the truth table source. CAN Rx, Voltage, Current, Discrete etc. each with its own switch on/switch off thresholds.

The output value of the truth table can be a constant, analog, discrete value, or the output from another block (Lookup Table, Math, Logic block, etc.).

The Truth Table output can also be used as an input for other functional blocks (Lookup Table, Math, Logic block, etc.).

Notes

A few things when using the Look up Tables, the Time response works like this, the unit is powered, and the output will cycle through the changes in the Look up Table once then return to 0mA.

If the Look up Table is set to Data response the output will respond proportionally to the input and the values in the Look up Table.

Version	Date	Author	Comments
1.00	December 17, 2021	Lawrence Durham/ Sue Thomas	