

AN408 – Configuring a GIM 140 with Protocol Converter

Introduction

Axiomatic Technologies' module AX140200 can be used in conjunction with the Baumer GIM 140 inclination sensor to convert messages from CANopen® to J1939 without a CANopen® master on the network. The module can be modified by the user to function as desired.

GIM 140 TPDO

TPDO1		GIM140 Angle Sensor A	Tx	COB ID 0x1DA
Transmission Rate		25 ms		
Data Length		6 bytes		
Byte	Bits	Parameter		
1 & 2	1-8	Sensor Temperature		
3 & 4	1-8	Slope X		
5 & 6	1-8	Slope Y		

TPDO1		GIM140 Angle Sensor B	Tx	COB ID 0x1DB
Transmission Rate		25 ms		
Data Length		6 bytes		
Byte	Bits	Parameter		
1 & 2	1-8	Sensor Temperature		
3 & 4	1-8	Slope X		
5 & 6	1-8	Slope Y		

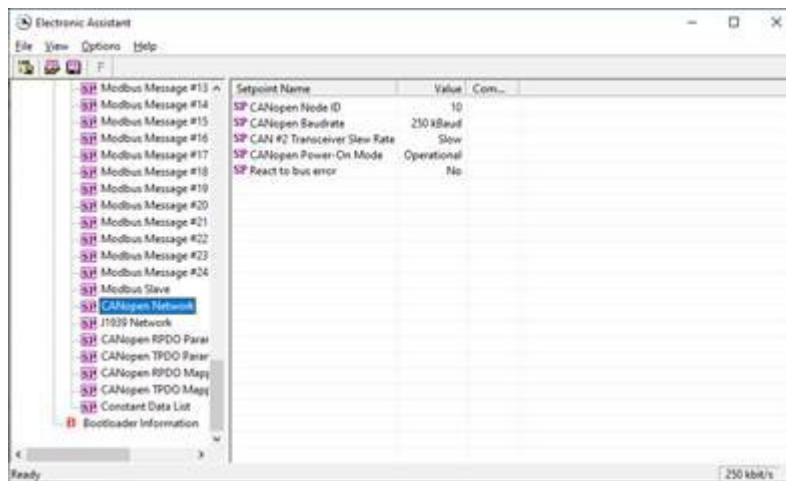
It is configured to receive the GIM 140 slope sensor data from COB ID 0x1DAh and 0x1DBh on the CANopen® port and forward it to the J1939 port. The data is transmitted on PGNs 0xFF14h and 0xFF15h.

Setting Up Transmission

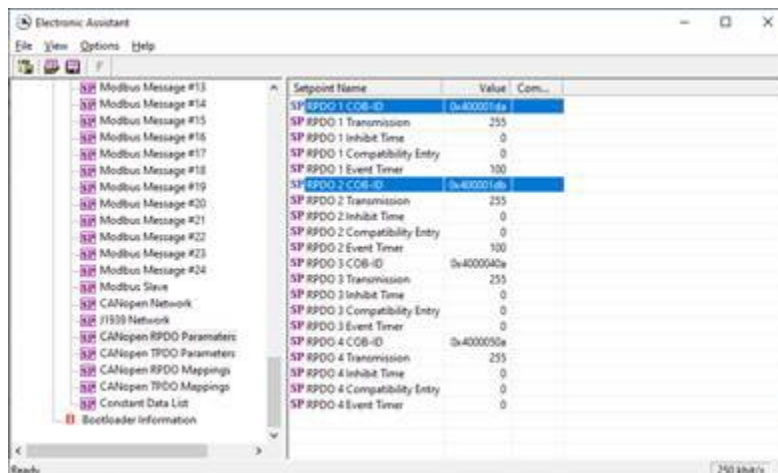
The setpoint will transmit the data exactly as it is received on the CANopen® port.

Here are the steps to set up the transmission:

1. In the CANopen® Network settings:
 - a. Set the baud rate (250kbps).
 - b. Set the Power on mode to 'Operational'.



2. Go to the CANopen® RPDO parameters:
 - a. Set the COB-ID for RPDO1 to "1DA" (Angle Sensor A TPDO1).
 - b. Set the COB-ID for RPDO2 to "1DB" (Angle Sensor B TPDO1).
 - c. Set the event timer for RPDO1 and 2 to 100 (ms).



3. Go to the CANopen® RPDO Mappings:
 - a. Change the number of mapped objects in RPDO1 to three.
 - b. Map three 2 byte objects (Sensor temp, Slope X, Slope Y)(Angle Sensor A) to Mapping entries 1 to 3 of RPDO1.
Where in the Mapping entry 0x2000h (CAN RX data 1), 0x01h (Sub index 1), 0x10h(2 bytes).
 - c. Change the number of mapped objects in RPDO2 to three.
 - d. Map three 2 byte objects (Sensor temp, Slope X, Slope Y)(Angle Sensor B) to Mapping entries 1 to 3 of RPDO2.

Setpoint Name	Value	Com...
SP RPDO 1 Number of Mapped Objects	3	
SP RPDO 1 Mapping Entry #1	0x20000110	
SP RPDO 1 Mapping Entry #2	0x20000210	
SP RPDO 1 Mapping Entry #3	0x20000310	
SP RPDO 1 Mapping Entry #4	0x00	
SP RPDO 2 Number of Mapped Objects	3	
SP RPDO 2 Mapping Entry #1	0x20010110	
SP RPDO 2 Mapping Entry #2	0x20010210	
SP RPDO 2 Mapping Entry #3	0x20010310	
SP RPDO 2 Mapping Entry #4	0x00	
SP RPDO 3 Number of Mapped Objects	1	
SP RPDO 3 Mapping Entry #1	0x20020120	
SP RPDO 3 Mapping Entry #2	0x00	
SP RPDO 3 Mapping Entry #3	0x00	
SP RPDO 3 Mapping Entry #4	0x00	
SP RPDO 4 Number of Mapped Objects	1	
SP RPDO 4 Mapping Entry #1	0x20030120	
SP RPDO 4 Mapping Entry #2	0x00	
SP RPDO 4 Mapping Entry #3	0x00	
SP RPDO 4 Mapping Entry #4	0x00	

4. Go to the CAN Output Message #1:
 - a. Set the CAN interface to “#1”.
 - b. Set the Transmit Message PGN.
 - c. Set the Transmit Message Enabled to “Yes”.
 - d. Set the transmission rate to “100ms”.
 - e. Set the Input #1 Signal Source to “CANopen® RPDO”.
 - f. Set the Signal Type to “Continuous”.
 - g. Set the Input #1 byte position. “0”.
 - h. Set the Data Size to “16” bits (2 bytes).
 - i. Set the Data Resolution. Default = “1”.
 - j. Set the CANopen® Message number “1” (Sensor Temp).
 - k. Set the CANopen® Message subindex “1” (Sensor Temp).
 - l. Repeat steps e to f to set up Slope X and Y for sensor A.
 - m. For each new parameter, the byte position should be incremented by 2.
 - n. For each new parameter, the CANopen® Message subindex should be increased by “1”.

Electronic Assistant

File View Options Help

CAN ECU F

J1939 CAN Network

AX140200, J1939-CANopen-ModbusRTU (

General ECU Information

Setpoint File

CAN Output Message #1

CAN Output Message #2

CAN Output Message #3

CAN Output Message #4

CAN Output Message #5

CAN Output Message #6

CAN Output Message #7

CAN Output Message #8

CAN Output Message #9

CAN Output Message #10

CAN Output Message #11

CAN Output Message #12

CAN Input Signal #1

CAN Input Signal #2

CAN Input Signal #3

CAN Input Signal #4

CAN Input Signal #5

CAN Input Signal #6

CAN Input Signal #7

CAN Input Signal #8

CAN Input Signal #9

CAN Input Signal #10

CAN Input Signal #11

CAN Input Signal #12

CAN Input Signal #13

CAN Input Signal #14

CAN Input Signal #15

CAN Input Signal #16

CAN Input Signal #17

CAN Input Signal #18

CAN Input Signal #19

CAN Input Signal #20

CAN Input Signal #21

CAN Input Signal #22

CAN Input Signal #23

CAN Input Signal #24

CAN Input Signal #25

CAN Input Signal #26

CAN Input Signal #27

CAN Input Signal #28

CAN Input Signal #29

CAN Input Signal #30

CAN Input Signal #31

CAN Input Signal #32

J1939 Diagnostics To Monitor, CAN

J1939 Outgoing Diagnostics Messa

J1939 Outgoing Diagnostics Messa

J1939 Outgoing Diagnostics Messa

Setpoint Name	Value	Comment
SP CAN Interface	CAN Interface #1	
SP Transmit Message PGN	0x114	
SP Use 11-bit ID	False	
SP Transmit Message Enabled	Yes	
SP Transmit Trigger Source	Constant Rate	
SP Transmit Trigger Source Parameter	0	Not used in this mode
SP Transmission Rate	100 (ms)	
SP Transmit Message Priority	6	
SP Override Source Address	No	
SP Source Address	128	
SP Input #1 Signal Source	CANopen RPDO	
SP Input #1 Data Inverted	No	
SP Input #1 Byte Order	Intel	
SP Input #1 Signal Type	Continuous	
SP Input #1 Byte Position	0	
SP Input #1 Bit Position	0	
SP Input #1 Data Size	16	
SP Input #1 Resolution	1 [signal units / bit]	
SP Input #1 Offset	0 [signal units]	
SP Input #1 Maximum Value	65535 [signal units]	
SP Input #1 Minimum Value	0 [signal units]	
SP Input #1 Modbus Type	Coil Status	Not used in this mode
SP Input #1 Modbus Address	0	Not used in this mode
SP Input #1 Modbus Data Resolution	1	Not used in this mode
SP Input #1 Modbus Data Offset	0	Not used in this mode
SP Input #1 Modbus Maximum	65535	Not used in this mode
SP Input #1 Modbus Minimum	0	Not used in this mode
SP Input #1 CANopen Message Number	1	
SP Input #1 CANopen Message Subindex	1	
SP Input #2 Signal Source	CANopen RPDO	
SP Input #2 Data Inverted	No	
SP Input #2 Byte Order	Intel	
SP Input #2 Signal Type	Continuous	
SP Input #2 Byte Position	2	
SP Input #2 Bit Position	0	
SP Input #2 Data Size	16	
SP Input #2 Resolution	1 [signal units / bit]	
SP Input #2 Offset	0 [signal units]	
SP Input #2 Maximum Value	65535 [signal units]	
SP Input #2 Minimum Value	0 [signal units]	
SP Input #2 Modbus Type	Coil Status	Not used in this mode
SP Input #2 Modbus Address	0	Not used in this mode
SP Input #2 Modbus Data Resolution	1	Not used in this mode
SP Input #2 Modbus Data Offset	0	Not used in this mode
SP Input #2 Modbus Maximum	65535	Not used in this mode
SP Input #2 Modbus Minimum	0	Not used in this mode
SP Input #2 CANopen Message Number	1	
SP Input #2 CANopen Message Subindex	2	
SP Input #3 Signal Source	CANopen RPDO	
SP Input #3 Data Inverted	No	
SP Input #3 Byte Order	Intel	
SP Input #3 Signal Type	Continuous	
SP Input #3 Byte Position	4	
SP Input #3 Bit Position	0	
SP Input #3 Data Size	16	

RPDO Mapping Parameters

To access the RPDO mapping parameters, users must first destroy the RPDO. Users can do this by writing a 'C' value as the leading byte of the COB-ID:

1. Set RPDO1 'COB-ID' = 0xC000020A (destroy RPDO1)

SP RPDO 1 COB-ID	0xc000020a
SP RPDO 1 Transmission	255
SP RPDO 1 Inhibit Time	0
SP RPDO 1 Compatibility Entry	0
SP RPDO 1 Event Timer	0

2. Set RPDO1 'Number of Mapped Objects' = 0 (this opens access to the mapping objects. Users should do this if they are configuring by CANopen® SDO writes. If the Axiomatic EA software is being used, then this is not needed)
3. Set RPDO1 'Mapping Entry #1' = 0x20000110 (this means: 'store a 16-bit data in object 0x2000_sub-index_1')
4. Set RPDO1 'Mapping Entry #2' = 0x20000210 (this means: 'store a 16-bit data in object 0x2000_sub-index_2')
5. Set RPDO1 'Mapping Entry #3' = 0x20000310 (this means: 'store a 16-bit data in object 0x2000_sub-index_3')
6. Set RPDO1 'Mapping Entry #2' = 0x20000410 (this means: 'store a 16-bit data in object 0x2000_sub-index_4')
7. Set RPDO1 'Number of Mapped Objects' = 4 (now there are four mapped entries)

SP RPDO 1 Number of Mapped Objects	4
SP RPDO 1 Mapping Entry #1	0x20000110
SP RPDO 1 Mapping Entry #2	0x20000210
SP RPDO 1 Mapping Entry #3	0x20000310
SP RPDO 1 Mapping Entry #4	0x20000410

- Set RPDO1 'COB-ID' = 0x4000020A (activate RPDO1)

SP RPDO 1 COB-ID	0x4000020a
SP RPDO 1 Transmission	255
SP RPDO 1 Inhibit Time	0
SP RPDO 1 Compatibility Entry	0
SP RPDO 1 Event Timer	0

So now with that done, RPDO1 should be sent on ID 0x20A and contain four 16-bit data signals.

Version	Date	Authors	Comments
1.00	September 17, 2019	Lawrence Durham / Sue Thomas	Initial Release
1.01	January 27, 2020	Lawrence Durham / Sue Thomas	To update the header from AN409 to AN408.
1.02	July 6, 2023	Kiril Mojsov	Legacy Update & Marketing Review

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