AN408 – Configuring a GIM 140 with Protocol Converter

Introduction

The Axiomatic Technologies module AX140200 can be used in conjunction to the Baumer GIM 140 inclination sensor to convert the 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 1-8	Sensor Temperature
3 & 4	1-8 1-8	Slope X
5 & 6	1-8 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 1-8	Sensor Temperature
3 & 4	1-8 1-8	Slope X
5 & 6	1-8 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 PGN's 0xFF14h and 0xFF15h.

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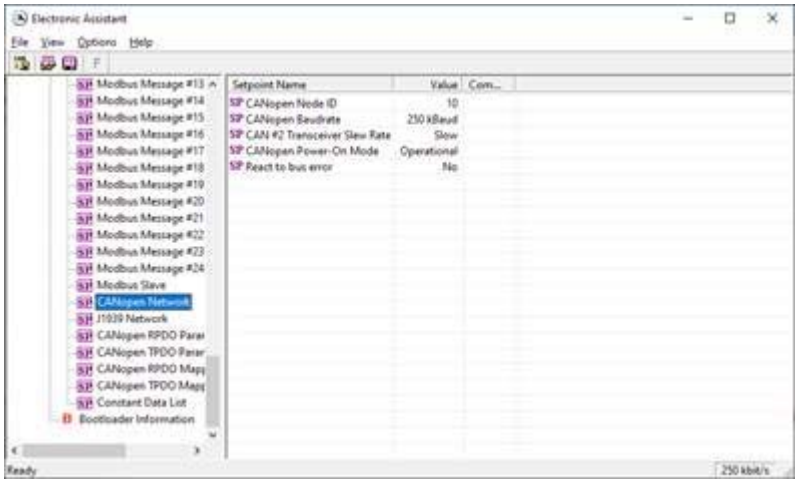
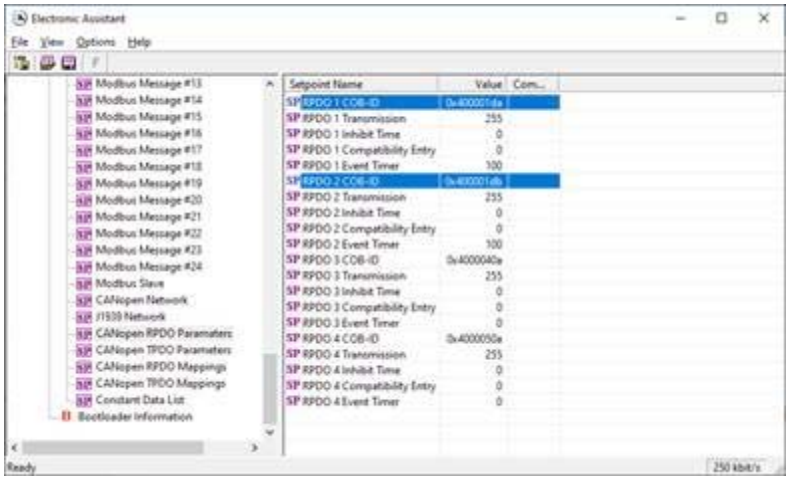
Setting Up Transmission

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 baudrate (250kbps).
   b. Set the Power on mode to 'Operational'.



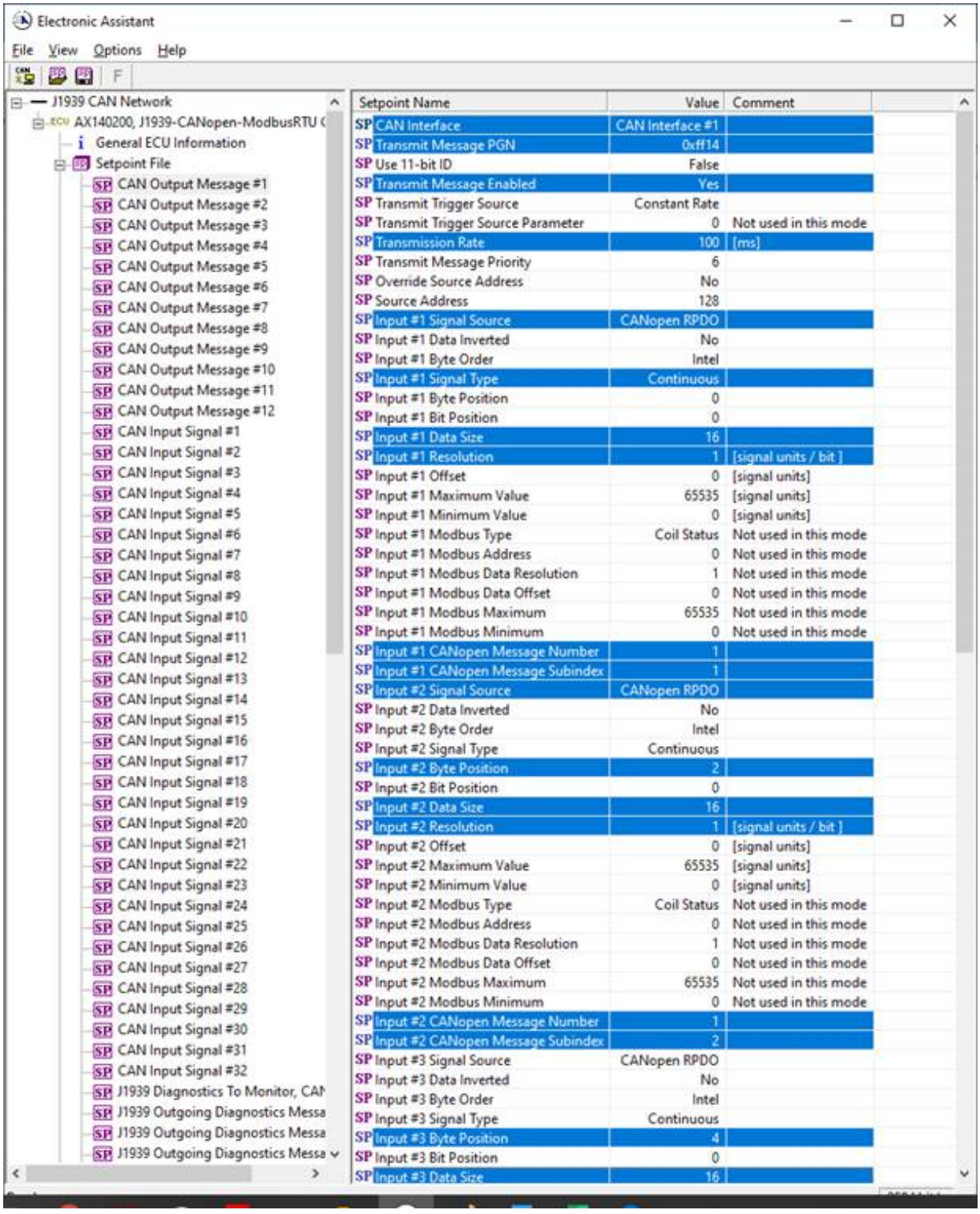
2. Go to the CANopen RPDO parameters.
   a. Set the COB-ID for RPDO1 to "1DA" (Angle Sensor A TPDO1).
   b. Set the COB-ID for RPDO2 to "1DB" (Angle Sensor B TPDO1).
   c. Set the event timer for RPDO1 and 2 to 100 (ms).



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
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
CAN Interface | CAN Interface #1
Transmit Message PGN | 0xff14
Use 11-bit ID | False
Transmit Message Enabled | Yes
Transmit Trigger Source | Constant Rate
Transmit Trigger Source Parameter | 0 | Not used in this mode
Transmission Rate | 100 | [ms]
Transmit Message Priority | 6
Override Source Address | No
Source Address | 128
Input #1 Signal Source | CANopen RPDO
Input #1 Data Inverted | No
Input #1 Byte Order | Intel
Input #1 Signal Type | Continuous
Input #1 Byte Position | 0
Input #1 Bit Position | 0
Input #1 Data Size | 16
Input #1 Resolution | 1 | [signal units / bit]
Input #1 Offset | 0 | [signal units]
Input #1 Maximum Value | 65535 | [signal units]
Input #1 Minimum Value | 0 | [signal units]
Input #1 Modbus Type | Coil Status | Not used in this mode
Input #1 Modbus Address | 0 | Not used in this mode
Input #1 Modbus Data Resolution | 1 | Not used in this mode
Input #1 Modbus Data Offset | 0 | Not used in this mode
Input #1 Modbus Maximum | 65535 | Not used in this mode
Input #1 Modbus Minimum | 0 | Not used in this mode
Input #1 CANopen Message Number | 1
Input #1 CANopen Message Subindex | 1
Input #2 Signal Source | CANopen RPDO
Input #2 Data Inverted | No
Input #2 Byte Order | Intel
Input #2 Signal Type | Continuous
Input #2 Byte Position | 2
Input #2 Bit Position | 0
Input #2 Data Size | 16
Input #2 Resolution | 1 | [signal units / bit]
Input #2 Offset | 0 | [signal units]
Input #2 Maximum Value | 65535 | [signal units]
Input #2 Minimum Value | 0 | [signal units]
Input #2 Modbus Type | Coil Status | Not used in this mode
Input #2 Modbus Address | 0 | Not used in this mode
Input #2 Modbus Data Resolution | 1 | Not used in this mode
Input #2 Modbus Data Offset | 0 | Not used in this mode
Input #2 Modbus Maximum | 65535 | Not used in this mode
Input #2 Modbus Minimum | 0 | Not used in this mode
Input #2 CANopen Message Number | 1
Input #2 CANopen Message Subindex | 2
Input #3 Signal Source | CANopen RPDO
Input #3 Data Inverted | No
Input #3 Byte Order | Intel
Input #3 Signal Type | Continuous
Input #3 Byte Position | 4
Input #3 Bit Position | 0
Input #3 Data Size | 16

RPDO Mapping Parameters

In order to access the RPDO mapping parameters we must first destroy the RPDO. Do this by writing a value 'C' as the leading byte of the COB-ID.

1. Set RPDO1 'COB-ID' = 0x**C**000020A (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, do this if you are configuring by CANopen SDO writes, if using Axiomatic EA software then it 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' = 0x**4**000020A (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	Author	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.