MURR ELEKTRONIK

stay connected

xtreme DB

DP-34044-2 User Guide

| CONTENTS

* This user manual applies to firmware revision 34044-562-0101 or higher

1. CONCERNING THIS MANUAL

The text, illustrations, diagrams and examples used in this manual exist solely for the purpose of explaning the operation and usage of xtremeDB Input/Output modules. If you have any further questions regarding the installation and set-up of the equipment described in this manual, please do not hesitate to contact us. We will be glad to assist you. Murrelektronik reserves the right to make technical changes or modifications to this manual without prior notice.

2. SAFETY INFORMATION

2.1 DESIGNATED USE

The input/output modules of the XtremeDB series are designated for use only in those areas as described in this manual. Strict adherence to the data specified in this manual must be ensured. The products have been developed, manufactured, tested and documented in compliance with currently valid safety codes. The equipment poses no danger to operating personnel or material if configuration, assembly and operation are performed in compliance with the stated handling and safety regulations. Unqualified intervention in the hardware and software of our equipment, disregard of warning labels found on the equipment or non-observance of the information in this manual can result in injury or serious damage to man and/or material. Any application or usage beyond and above this shall be regarded as non-designated.

Warning!
Good chemical and oil resistance. When using aggressive mediums, material resistance based on application must be checked.

2.2 TARGET GROUPS

This manual addresses itself exclusively to qualified and trained electricians knowledgeable in the safety standards of automation technology. Only a qualified, trained electrical tradesman knowledgeable in the safety standards of mobile industry may perform configuration, installation, set-up, maintenance and testing of the equipment.

2.3 REGULATIONS

Current safety and accident prevention laws valid for a specific application must be observed in the configuration, installation, setup, and maintenance and testing of the equipment.

2.3.1 GENERAL INFORMATION

a) The designated function of this equipment is guaranteed only if the conditions for installation, system extension, operation and maintenance are complied with.
b) Only system accessories and cables are allowed that meet the requirements and regulations for safety, electromagnetic compatibility and, where applicable, telecommunications transmission equipment and specifications.
The installation of other accessories may violate these requirements and regulations or damage the equipment.
Information concerning the type of authorized system extensions and cables can be obtained from your Murrelektronik distributor or taken from this manual.
c) The designated operation of the equipment is guaranteed only with the housing fully installed.
d) This product is designed and manufactured to assure protection against damage and hazards if designated usage and proper maintenance are observed.

2.4 LICENSE DISCLAIMER

EXCLUSION OF INCIDENTAL, CONSEQUENTIAL AND CERTAIN OTHER DAMAGES:
To the maximum extent permitted by applicable law, in no event shall Murrelektronik be liable for any special, incidental, indirect, or consequential damages whatsoever (including, but not limited to, damages for loss of profits or confidential or other information, for business interruption, for personal injury, for loss of privacy, for failure to meet any duty including of good faith or of reasonable care, for negligence, and for any other pecuniary or other loss whatsoever) arising out of or in any way related to the use of or inability to use the software product, the provision of or failure to provide support services, or otherwise under or in connection with any pro

vision of this End User License, even in the event of the fault, tort (including negligence), strict liability, breach of contract or breach of warranty of Murrelektronik, or any supplier, and even if Murrelektronik or any supplier has been advised of the possibility of such damages.

2.5 EXAMPLE OF SYMBOLS

2.5.1 USE OF ATTENTION SIGNS

Notes containing important information are specially marked. These are illustrated as follows:

Attention text...

2.5.2 USE OF DANGER SIGNS

Danger signs are indicated by text and a corresponding symbol inside of a frame

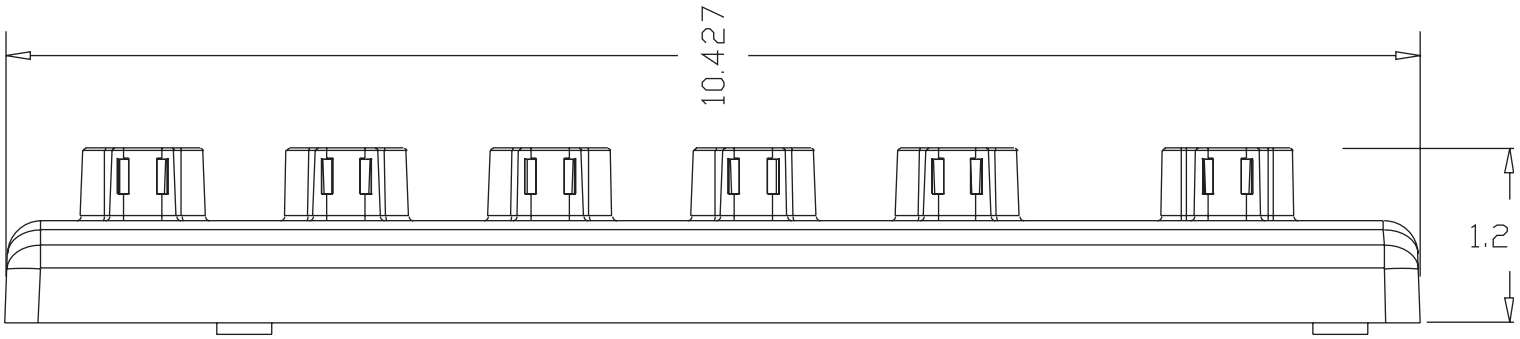
CAUTION!
Disregard of safety measures may result in damage to equipment and other serious consequences.

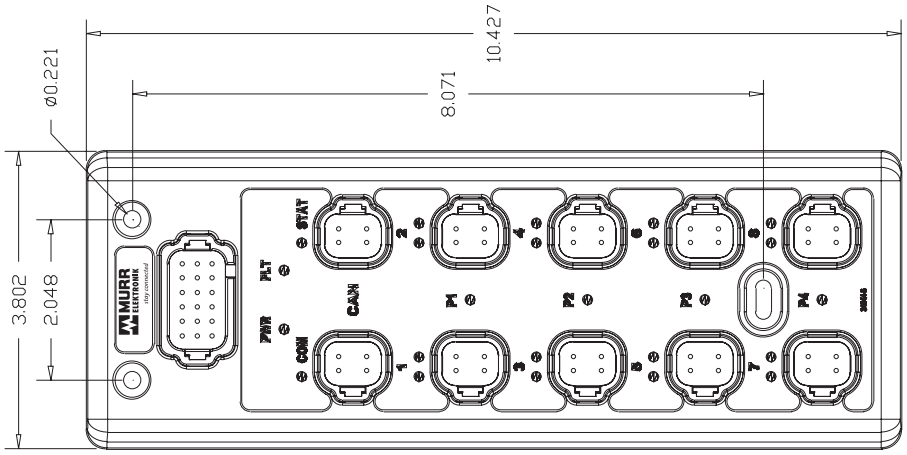
3. INSTALLATION

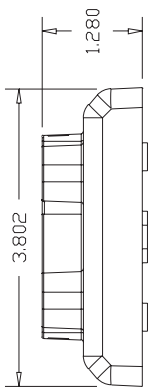
3.1 XtremeDB INSTALLATION

The XtremeDB blocks can be mounted directly on an installation panel or on a machine. The module features three mounting holes for this purpose. It must be assured that the mounting surface is smooth and flat to prevent mechanical stress in the module housing.

Proper installation and operation of the XtremeDB blocks requires the use of all ground connections. This includes Ground (A) for module power and Ground (B) for port power on the 18 pin configuration and power plug.

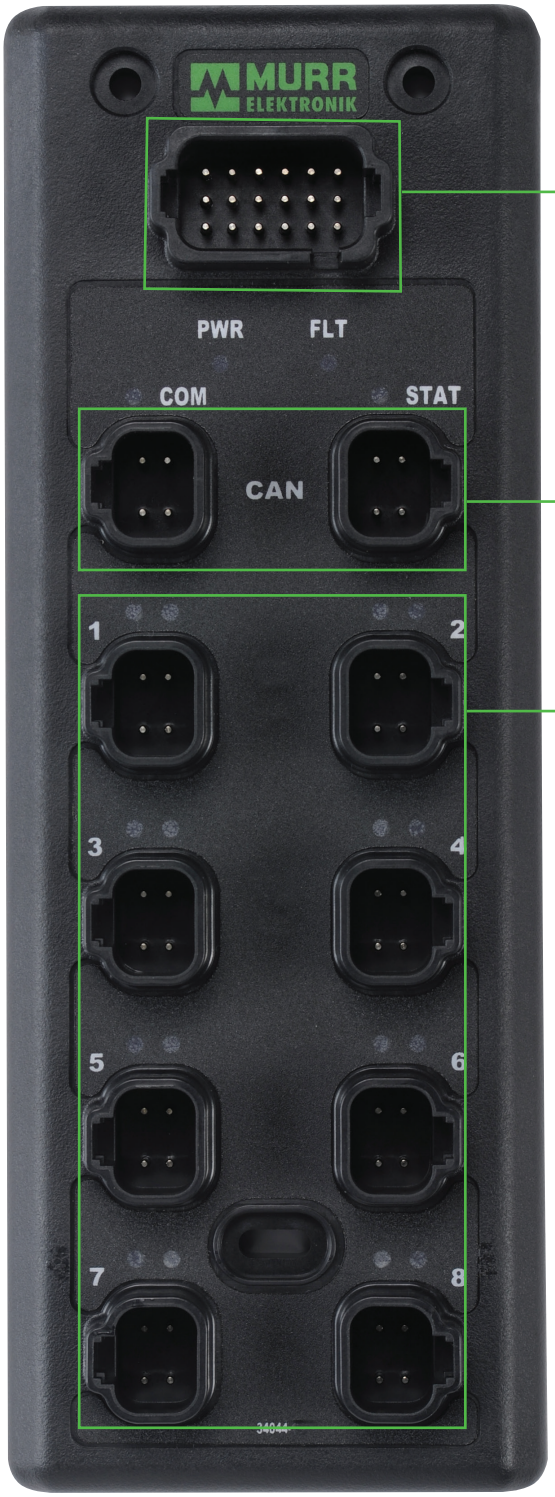






ATTENTION!
Modules must be mounted a minimum of 3mm from each other.

4. MODULE OVERVIEW



Configuration & Power Plug

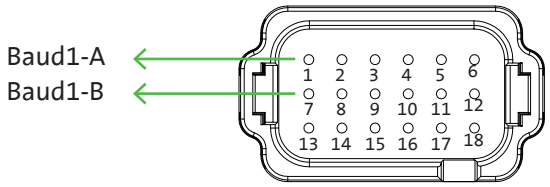
CAN Ports 1 & 2 Non-Isolated

16 Inputs

4.1 CONFIGURING THE BAUD RATE

Configuration of the baud rate is done using pins 1 & 7 of the Power and Configuration plug shown below. Currently there are 2 baud rates supported, 250kb and 500kb. If you are connecting to a 250kb network no jumpers are required. If connecting to a 500kb network, jumper pin 1 to pin 7.

Configuration & Power Plug



Baud Rate
No Jumper = 250kb
Baud1-A to Baud1-B = 500kb

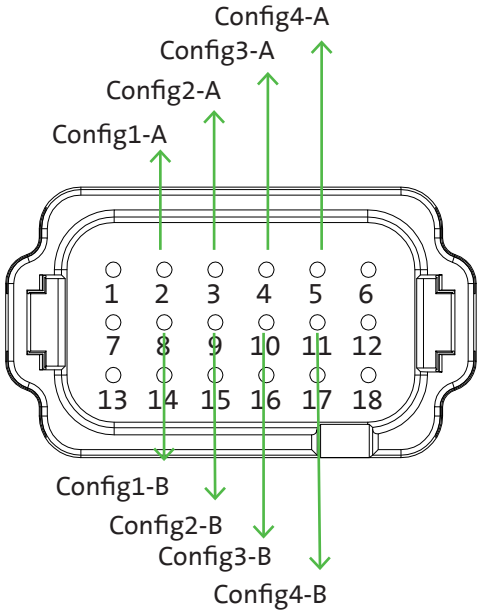
Please note that all devices on the same J1939 network must have the same baud rate

All unused pins need to be plugged with a Deutsch #114017 sealing plug to maintain the IP67 rating

A power cycle is required to "set" the baud rate.

4.2 CONFIGURING THE NODE ID

The Node ID is configured by jumpering the matching Config-A to Config-B. The Node ID starts with a base source address of **61408** (0xEFE0) with no jumpers installed. The offset address is configured with the use of binary coded decimal (BCD). A power cycle is required when changing the Node ID. If a duplicate source address is on the network on a power up our module will stay in address arbitration mode and will not function.



Node ID (0-15 Offset) in BCD

Config1-A (pin 2) to Config1-B (pin 8) = 1's
Config2-A (pin 3) to Config2-B (pin 9) = 2's
Config3-A (pin 4) to Config3-B (pin 10) = 4's
Config4-A (pin 5) to Config4-B (pin 11) = 8's

Node ID	1's	2's	4's	8's	Node ID
0	0	0	0	0	**61408**
1	1	0	0	0	**61409**
2	0	1	0	0	**61410**
3	1	1	0	0	**61411**
4	0	0	1	0	**61412**
5	1	0	1	0	**61413**
6	0	1	1	0	**61414**
7	1	1	1	0	**61415**
8	0	0	0	1	**61416**
9	1	0	0	1	**61417**
10	0	1	0	1	**61418**
11	1	1	0	1	**61419**
12	0	0	1	1	**61420**
13	1	0	1	1	**61421**
14	0	1	1	1	**61422**
15	1	1	1	1	**61423**

|EXAMPLE

Jumpers from pin 2 to pin 8 (1's) and pin 4 to pin 10 (4's)
offset= 1+4=5
61408 (base address) + 5 (Node ID) = 61413 (Node ID))

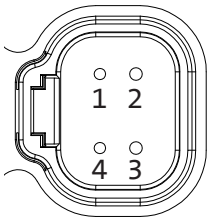
Please note that all devices on the same J1939 network must have a different Node ID

All unused pins need to be plugged with a Deutsch #114017 sealing plug to maintain the IP67 rating

4.3 POWERING THE MODULE

The module recieves its power from the CAN ports. The module power is limited to 13 amps and is used to power connected modules down the line. This power is also used for all input ports as well.

CAN Ports 1 & 2 Non-Isolated



CAN	Power
(J1939)	
Pin 2 = CAN High	Pin 1 = 8-32V DC
Pin 4 = CAN Low	Pin 3 = Module & Input Ground (A)

The connection between CAN1 & CAN2 for the power feed is not fused (protected from short circuit current). During installation the module power wiring on CAN1 & CAN2 pin 1 should have a 10-12A fuse before the modules

Please note that module power should NOT be used to power any output devices.

The first and last Node on the network must have a 120 Ohm terminating resistor.

4.4 LEDs

During start up the LEDs will come on for 3-5 seconds to verify that they are working (bulb test).

PWR LED - Blue
Indicates module power is connected

COM LED - Green
Communication Status

FLT LED - Red
Fault Status

STAT LED - Green
Module Status

PORT I/O LED - Yellow
Left LED = Input A
Right LED = Input B

Status
1. Steady On = Input is on
2. Flashing On (Input Port)= Input is pulsing

4.4.1 LED STATUS

COM LED - Green
Communication Status

ID	COM Fault Description	ON	OFF
n/a	Bootload Mode	Indicates traffic on bus	N/A
C0	Valid Communication Network	ON	
C1	Source Address (SA) Arbitration	1 Short	1 Long
C2	CANBUS Hardware Fault	2 Short	
C3	Output Control Message Missing	3 Short	
C4	DM13 Detected*	4 Short	

* See J1939-73 diagnostics, another device has requested module to stop broadcasting

FLT LED - Red
Fault Status

ID	Fault Description	ON	OFF
F0	Bootload Mode	1 Short	1 Short
F1	Output Over Current Fault	1 Short	1 Long
F2	Low Voltage Warning	2 Short	
F3	Over Voltage Warning	3 Short	
F4	Over Temperature Warning	4 Short	
F5	Low Volts	5 Short	
F6	Spare	6 Short	
F7	Internal Module Fault	7 Short	

For 12V DC system, over voltage is defined as input voltage > 18V DC, low voltage is defined as < 11V DC.
For 24V DC system, over voltage is defined as input voltage > 32V DC, low voltage is defined as < 20V DC.

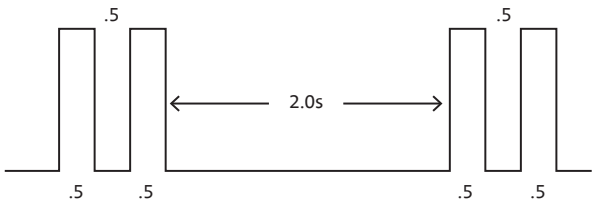
STAT LED - Green

ID	Fault Description	ON	OFF
S0	Configuration Saved	ON	

PORT I/O LED - Yellow
Left LED = Input A
Right LED = Input B

1. Steady on indicated input is on
2. Flashing indicates input is faulted

For All Tables:
Short = ON 500ms and OFF 500ms
Long = OFF defined as 2.0 s
Pulse Width is ± 50ms



Example: C2 CANBUS Hardware Fault

4.5 CIRCUIT PROTECTION

Sensor Power

The module shall monitor Port Sensor Power current and shut off the sensor power in a port if the maximum current exceeds 3 amps per port. Both short circuit and overcurrent protection is provided.

S1 = Port 1 power, 3 amps.
S2 = Port 2 power, 3 amps.
S3 = Port 3 power, 3 amps.
S4 = Port 4 power, 3 amps.
S5 = Port 5 power, 3 amps.
S6 = Port 6 power, 3 amps.
S7 = Port 7 power, 3 amps.
S8 = Port 8 power, 3 amps.

Module Power

The module power delivered by the CAN ports has short circuit protection. This circuit has a separate ground that is supplied by the CAN port as well, Ground (A)

5. MODULE CONFIGURATION

5.1 CONFIGURATION STEPS

Module default configuration:

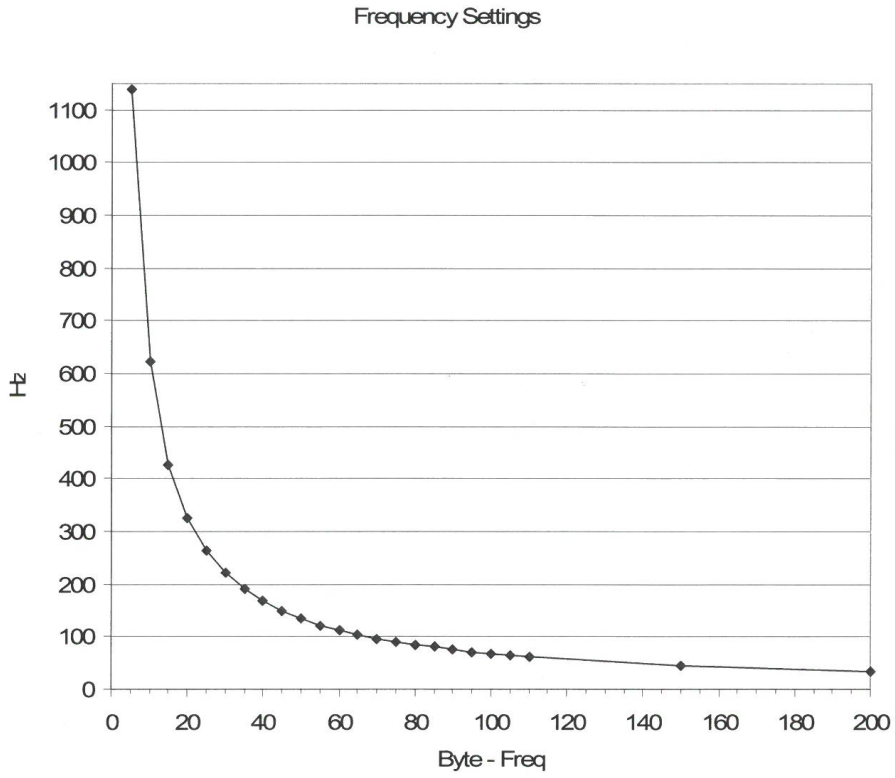
- Factory Default Config returns 1 in Status message 1-Status 1, this should not be on if the module has been configured.
- Default operation of the module is on/off digital control. PWM control messages are not needed.
- Default configuration does not require a Command 0x52 message to enable operation.

Command 0x52 (This message needs to be sent until the message confirmation bit is set true):

Value	Name	Data Type	Byte	Bits	Description
82 (0x52)	Command	Byte	1		Command for index pointer (which message your sending)
	Ctrl Mode Reset	2 bit	2	1,2	Enables Controller Mode Output Reset
	Enable Status 1 Msg			3,4	Enables the constant transmission of status message 1
	Enable Status 2 Msg			5,6	Enables the constant transmission of status message 2
	Enable Amp Msg			7,8	Enables the constant transmission of amperage messages
	Enable 24 vdc		3	1,2	Enables the low and over voltage fault limits for 24V DC system
	Save Configuration			3,4	Saves the configuration to the module (otherwise changes only valid until a power cycle occurs), set to 1 to write configuration to module
	Analog raw value			5,6	Sets all analog to be read in raw value as opposed to scaled (.005668/bit)
				7,8	
			4	1,2	
				3,4	
				5,6	
				7,8	
	FREQ1	Word	5		Sets the configuration of the frequency for all channels (30-1140 Hz)
			6		
	MODE1	4 Bit	7		Not used on this module
	MODE2	4 Bit			Sets the configuration of the inputs.(0=Mode 2 Not Used, 1=Digital Positive, 2=Digital Ground) No analog.
	ID1	Byte	8		User defined byte for configuration ID, this will be transimitted in the STAT message.

- Module configuration message, needed when not using module default configuration.
- All Status messages need to be turned on (set to value of 1) to be received by controllers at the intervals customer sets.
- Enable 24V DC: Enables the low and over voltage fault limits for 24V DC system, otherwise feeding 24V DC to 12V DC system would cause system over voltage error. This is also used for the output overcurrent and short circuit detection.
- FREQ1: There needs to be a value put in this parameter or the outputs won't work.

Frequency Pre-Scale to Hz							
Setting	**Hz**	**Setting**	**Hz**	**Setting**	**Hz**	**Setting**	**Hz**
5	1140	35	190	65	104	95	71
10	622	40	167	70	96	100	68
15	427	45	148	75	90	105	65
20	325	50	134	80	84	110	62
25	263	55	122	85	80	150	45
30	221	60	112	90	75	200	34



- Mode 2: Configure all the inputs at the same time, override Command 0x53 and 0x54.
- ID1: This is used to give a number to the node that will be transmitted back in Status Message 1-User ID. Default as 0, please note this User ID is not node ID (node address), please see "Configuring the Node ID" for setting node address.
- Save Configuration: Turn on the bits (value of 1) after configuring module, inputs and outputs, otherwise changes will only be saved until power cycle.

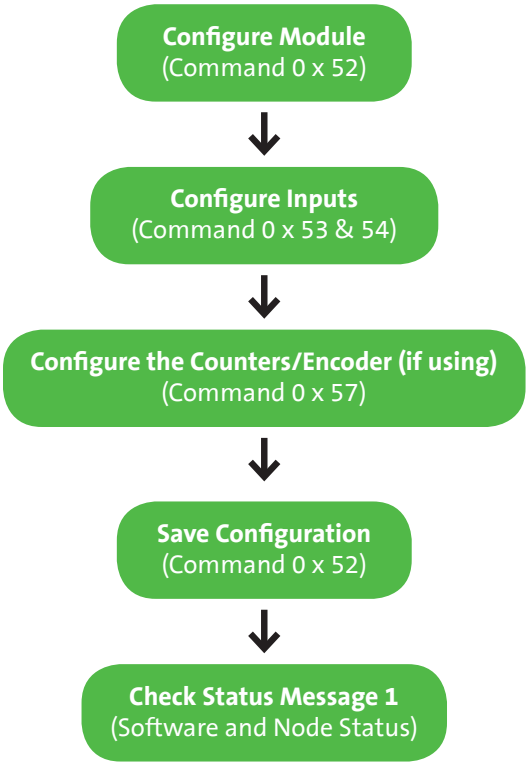
Command 0x53 & 54 (These messages only need to be sent one time):
- Configure individual input modes if they haven't been configured in Mode 2 in Command 0x52.

Command 0x57 (This message needs to be written all the time if a person is controlling the counter. A person needs to keep the counter on and needs to be able to reset the count):
- Configure the counters/encoder if using.

Status messages - Status message 1 PGN (EF(Controller Source Address)):

- Status 1 – Factory default configuration returns a value of 1, this should not be on if a module has been configured.
- Status 2 – Configuration Saved returns a value of 1 if the alternate configuration was on (value of 1) and saved the configuration using "Save Configuration" in Command 52.
- Status 3 – Alternate configuration, a new configuration was made to the module but hasn't been saved.
- Status 9-14 – Returns a value of 1 each time a Command message 52-57 is sent, to ensure each configuration has been sent. This is on for a brief moment and then resets.

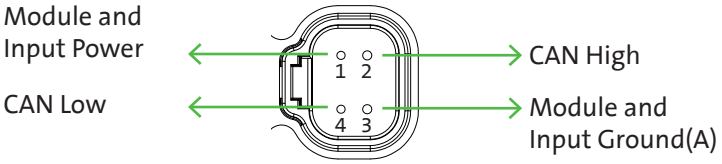
Configuration Sample Flowchart:



5.2 INPUT CONFIGURATION

5.2.1 POWERING THE INPUTS

CAN Ports 1 & 2 Non-Isolated



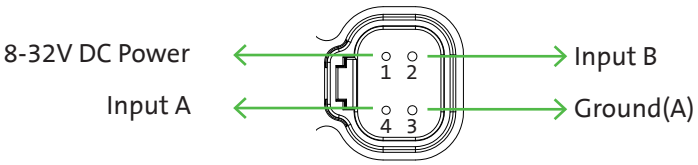
Power (Module and Input, 13A)
Pin 1 = 8-32V DC
Pin 3 = Ground (A)

Please note that module and input power is provided via the CAN port

All Ground (A) connections are internally connected and are isolated from Ground (B)!

5.2.2 INPUT LAYOUT

Inputs (Ports 5-8)



Power
Pin 1 = 8-32V DC
Pin 3 = Ground A

Configurations
Input A
1. Positive
2. Ground
3. Frequency/Counter/Encoder (7A & 8A)

Input B
1. Positive
2. Ground
3. 4-20mA
4. 0-5V DC
5. 0-10V DC
6. 0-32V DC
9. Ratiometric

Inputs
- Port 1, Pin 4: Input 1A
- Port 1, Pin 2: Input 1B

- Port 2, Pin 4: Input 2A
- Port 2, Pin 2: Input 2B

- Port 3, Pin 4: Input 3A
- Port 3, Pin 2: Input 3B

- Port 4, Pin 4: Input 4A
- Port 4, Pin 2: Input 4B

- Port 5, Pin 4: Input 5A
- Port 5, Pin 2: Input 5B

- Port 6, Pin 4: Input 6A
- Port 6, Pin 2: Input 6B

- Port 7, Pin 4: Input 7A
- Port 7, Pin 2: Input 7B

- Port 8, Pin 4: Input 8A
- Port 8, Pin 2: Input 8B

5.2.3 CONFIGURING INPUTS

Input Mode

There are two ways to configure the inputs. All configuration is done through the same PGN. PGN 61408 is used for multiple messages by use of a different value put into the "Command" byte of the PGN. This value is used as an index or pointer as to where the information goes in the module.

1. All Input Configuration

(Only used if you want all the inputs to be configured the same. Only works for digital configuration.)
Configuring all of the inputs is done through the "MODE2" byte in PGN 61408. The J1939 message structure,

PGN
61408 (0xEFE0) Node offset of 0
Source Address
(0x?? (CSA*))
PDU Format
239 (0xEF)
PDU Specific
224 (0xE0)
Built Message
(0x18EFE0??)

Transmit rate
50 ms
Msg timeout
200 ms
Priority
6
DP
0

Command Value
82 (0x52)

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message your sending)
Ctrl Mode Reset	2 bit	2	1,2	Enables Controller Mode Output Reset
Enable Status 1 Msg			3,4	Enables the constant transmission of status message 1
Enable Status 2 Msg			5,6	Enables the constant transmission of status message 2
Enable Amp Msg			7,8	Enables the constant transmission of amperage messages
Enable 24V DC		3	1,2	Enables the low and over voltage fault limits for 24V DC system
Save Configuration			3,4	Saves the configuration to the module (otherwise changes only valid until a power cycle occurs), set to 1 to write configuration to module
Analog raw value			5,6	Sets all analog to be read in raw value as opposed to scaled (.005668/bit)
			7,8	
		4	1,2	
			3,4	
			5,6	
			7,8	
FREQ1	Word	5		Sets the configuration of the frequency for all channels (**30-1140 Hz**)
		6		
MODE1	4 Bit	7		Not used in this module
MODE2	4 Bit	7		Sets the configuration of the inputs.(0=Mode 2 Not Used, 1=Digital Positive, 2=Digital Ground) **No analog**
ID1	Byte	8		User defined byte for configuration ID, this will be transimitted in the STAT message.

2. Individual Configuration

Individual output configuration is done through the “input mode” nibble in PGN 61408

PGN
61408 (0xEFE0) Node offset of 0
Source Address
(0x?? (CSA*))
PDU Format
239 (0xEF)
PDU Specific
224 (0xE0)
Built Message
(0x18EFE0??)

Transmit rate
50 ms
Msg timeout
200 ms
Priority
6
DP
0

Command Value
82 (0x52)

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message your sending)
INMODE1A	4 bit	2	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground
INMODE1B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)
INMODE2A		3	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground
INMODE2B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)
INMODE3A		4	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground
INMODE3B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)
INMODE4A		5	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground
INMODE4B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)
INMODE5A		6	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground
INMODE5B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)
INMODE6A		7	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground
INMODE6B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)
INMODE7A		8	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x7=Digital Positive Frequency, 0x8= Counter, 0xA=Encoder
INMODE7B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)

Command Value
84 (0x54)

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message you're sending)
INMODE8A	4 bit	2	1,2,3,4	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x7=Digital Positive Frequency, 0x8= Counter**
INMODE8B			5,6,7,8	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20ma (4000-20000), 0x4= 0-5V DC (0-5000), 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)**
	Byte	3		**Not Used on This Module**
		4		
		5		
		6		
		7		
		8		

3. Modes

Input A

Using a value of 0 - A will select the configuration of input A

[MODE#X]	Input Operation	Notes
0x0h	Disabled	This Mode Not Used
0x1h	Positive	ON/OFF
0x2h	Ground	ON/OFF
0x7h	Frequency	See Section on Frequency
0x8h	Counter	See Section on Counter
0xAh	Encoder	See Section on Encoder
0xFh	Not Used	Invalid Output Configuration

Input B

Using a value of 0 - 9 will select the configuration of input B

[MODE#X]	Input Operation	Notes
0x0h	Disabled	This Mode Not Used
0x1h	Positive	ON/OFF
0x2h	Ground	ON/OFF
0x3h	4-20mA	4-20mA = 16 bits 4,000-20,000
0x4h	0-5V DC	0-5V DC = 16 bits 0-5,000 mV
0x5h	0-10V DC	0-10V DC = 16 bits 0-10,000mV
0x6h	0-32V DC	0-32V DC = 16 bits 0-32,000mV
0x9h	Ratiometric	0-1000 = 0-100.0%
0xFh	Not Used	Invalid Output Configuration

| INPUT OPERATION

The input operation will be different depending on the configuration chosen for the input and the input pin being configured.
Input power for each port needs to be enabled to recevie 9-32V DC on pin1, See Control Message 1.

Input A

1. Disabled, MODE = 0

It is recommended to disable any inputs that aren't being used. Putting a "0" in the mode for an input disables the input.

2. Positive On/Off, MODE = 1

This puts the input into the standard discrete positive operation mode. When a positive voltage is present on the input pin, the low bit will turn on.

	High Bit	Low Bit
On	0	1
Off	0	0

3. Ground On/Off, MODE = 2

This puts the input into the standard discrete ground operation mode. When a ground is present on the input pin, the low bit will turn on.

	High Bit	Low Bit
On	0	1
Off	0	0

4. Frequency, MODE = 7

This puts the input into frequency operation mode. When a positive signal is present on the input pin, the frequency will be shown.

5. Counter, MODE = 8

This puts the input into counter operation mode. When a positive signal is present on the input pin, the count will increase.

6. Encoder, MODE = A

This puts the input 7A into Encoder operation mode. When a positive signal is present on the input pin the count will increase. Both input 7A and 8A are used for the encoder input, when changing input 7A to encoder mode it automatically sets up 8A to work with it.

Input B

1. Disabled, MODE = 0

It is recommended to disable any inputs that aren't being used. Putting a "0" in the mode for an input disables it.

2. Positive On/Off, MODE = 1

This puts the input into the standard discrete positive operation mode. When a positive voltage is present on the input pin, the low bit will turn on.

	High Bit	Low Bit
On	0	1
Off	0	0

3. Ground On/Off, MODE = 2

This puts the input into the standard discrete ground operation mode. When a ground is present on the input pin, the low bit will turn on.

	High Bit	Low Bit
On	0	1
Off	0	0

4. 4-20mA, MODE = 3

This puts the input into 4-20mA mode with a value of 4,000 - 20,000 = 4000 - 20,000 macro amps. A word is allocated for this input. The 1st byte is the low byte and the 2nd byte is the high byte.

Example	Second Byte (High Byte)								First Byte (Low Byte)							
4mA	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1
4000=	0	0	0	0	1	1	1	1	1	0	1	0	0	0	0	0

5. 0-5V DC, MODE = 4

This puts the input into 0-5V DC mode with a value of 0 - 5,000 = 0 - 5,000mV. A word is allocated for this input. The 1st byte is the low byte and the 2nd byte is the high byte.

Example	Second Byte (High Byte)								First Byte (Low Byte)							
4000mV	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1
4000=	0	0	0	0	1	1	1	1	1	0	1	0	0	0	0	0

6. 0-10V DC, MODE = 5

This puts the input into 0-10V DC mode with a value of 0 - 10,000 = 0 - 10,000mV. A word is allocated for this input. The 1st byte is the low byte and the 2nd byte is the high byte.

Example	Second Byte (High Byte)								First Byte (Low Byte)							
4000mV	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1
4000=	0	0	0	0	1	1	1	1	1	0	1	0	0	0	0	0

7. 0-32V DC, MODE = 6

This puts the input into 0-32V DC mode with a value of 0 - 32,000 = 0 - 32,000mV. A word is allocated for this input. The 1st byte is the low byte and the 2nd byte is the high byte.

Example	Second Byte (High Byte)								First Byte (Low Byte)							
4000mV	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1
4000=	0	0	0	0	1	1	1	1	1	0	1	0	0	0	0	0

8. Ratiometric, MODE = 9

This puts the input into Ratiometric mode with a value of 0 - 1,000 equaling 0 - 100.0%. This input will show the percentage of voltage being read compared to the source voltage The 1st byte is the low byte and the 2nd byte is the high byte.

Example	Second Byte (High Byte)								First Byte (Low Byte)							
10.0%	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1
100=	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0

5.3.4 FREQ./COUNTER/ENCODER OPERATION

5.3.4.1 FREQUENCY

1. The input must be put into Frequency MODE = 7 (Only valid on input 7A & 8A)

This puts the Input into frequency operation mode. When a positive signal is present on the input pin, the frequency will be shown.

Command Value
83 (0x53)

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message your sending)
INMODE1A	4 bit	2	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground
INMODE1B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)
INMODE2A		3	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground
INMODE2B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)
INMODE3A		4	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground
INMODE3B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)
INMODE4A		5	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground
INMODE4B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)
INMODE5A		6	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground
INMODE5B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)
INMODE6A		7	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground
INMODE6B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)
INMODE7A	4 bit	8	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, **0x7=Digital Positive Frequency**, 0x8= Counter, 0xA=Encoder
INMODE7B	4 bit	8	5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)

Value
84 (0x54)

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message your sending)
INMODE8A	4 bit	2	1,2,3,4	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x7=Digital Positive Frequency, 0x8= Counter**
INMODE8B	4 bit	2	5,6,7,8	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20ma (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC (0-32000), 0x9= Ratiometric (0-100.0% of source V DC)**
	Byte	3		**Not Used on This Module**
		4		
		5		
		6		
		7		
		8		

2. The Hertz and Duty Cycle are shown in the message below

PGN
65307 (0xFF1B)
Source Address
224 (0xE0)
PDU Format
255 (0xFF)
PDU Specific
27 (0x1B)
Built Message
(0x18FF1BE0)

Name	Data Type	Byte	Bits	Description
Hertz_Count Input 7A	Word	1	Low Byte	Input 7A, **Hertz** is used when the input is configured as a frequency input, **Count** is used when the input is configured as a high speed counter
		2	High Byte	
Duty Cycle_ SP Input 7A	Word	3	Low Byte	Input 7A, **Duty Cycle** is used when the input is configured as a frequency input, **Set Point** is used when the input is configured as a high speed counter
		4	High Byte	
Hertz_Count Input 8A	Word	5	Low Byte	Input 8A, **Hertz** is used when the input is configured as a frequency input, **Count** is used when the input is configured as a high speed counter
		6	High Byte	
Duty Cycle_SP Input 8A	Word	7	Low Byte	Input 8A, **Duty Cycle** is used when the input is configured as a frequency input, **Set Point** is used when the input is configured as a high speed counter
		8	High Byte	

5.3.4.2 COUNTER/ENCODER

1. The input must be put into Counter MODE = 8 (Only valid on input 7A & 8A)

This puts the Input into counter operation mode. When a positive signal is present on the input pin, the count will start to accrue.

Command Value
83 (0x53)

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message your sending)
INMODE1A	4 bit	2	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground
INMODE1B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)
INMODE2A		3	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground
INMODE2B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)
INMODE3A		4	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground
INMODE3B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)
INMODE4A		5	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground
INMODE4B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)
INMODE5A		6	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground
INMODE5B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)
INMODE6A		7	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground
INMODE6B			5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)
INMODE7A	4 bit	8	1,2,3,4	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x7=Digital Positive Frequency, **0x8= Counter**, 0xA=Encoder
INMODE7B	4 bit	8	5,6,7,8	Mode 0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)

Command Value
84 (0x54)

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message you're sending)
INMODE8A	4 bit	2	1,2,3,4	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x7=Digital Positive Frequency, 0x8= Counter**
INMODE8B			5,6,7,8	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20ma (4000-20000), 0x4= 0-5V DC (0-5000), 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)**
	Byte	3		**Not Used on This Module**
		4		
		5		
		6		
		7		
		8		

*****Encoder Mode: both 7A and 7B are used for the encoder input. When changing 7A to encoder it automatically sets up 8A to work with it.**

2. Configure the Counter in the message below

Value
87 (0x57)

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message you're sending)
Counter 7A On/Off	2 bit	2	1,2	Enable Counter 7A, 00 = Off, 01 = On (used in encoder mode)
Counter 7A Reset			3,4	Reset Counter 7A, 00 = Off, 01 = On (used in encoder mode)
Counter 7A Roll-Over Enabled			5,6	Enable Counter 7A Rollover, count continues after set point is achieved, 00 = Off, 01 = On (not used in encoder mode)
Counter 7A Enable Out 3A			7,8	Enable Output 3A when Counter 7A is enabled and set point hasn't been reached, 00 = Off, 01 = On (not used in encoder mode)
Counter 8A On/Off		3	1,2	Enable Counter 8A, 00 = Off, 01 = On (not used in encoder mode)
Counter 8A Reset			3,4	Reset Counter 8A, 00 = Off, 01 = On (not used in encoder mode)
Counter 8A Roll-Over Enabled			5,6	Enable Counter 8A Rollover, count continues after set point is achieved, 00 = Off, 01 = On (not used in encoder mode)
Counter 8A Enable Out 4A			7,8	Enable Output 4A when Counter 8A is enabled and set point hasn't been reached, 00 = Off, 01 = On (not used in encoder mode)
Spare		4	1,2	Not used on this module
			3,4	
			5,6	
			7,8	
Counter 7A Set Point	Word	5		Set point for totalalized count on Counter 7A
		6		
Counter 8A Set Point	Word	7		Set point for totalalized count on Counter 8A
		8		

Set a value of 1 to "Counter 7A Enable Out 3A" provides an Enable function for Output3A. Output3A is disabled when counter > = Set Point.
Set a value of 1 to "Counter 8A Enable Out 4A" provides and Enable function for Output4A. Output4A is disabled when counter > = Set Point.

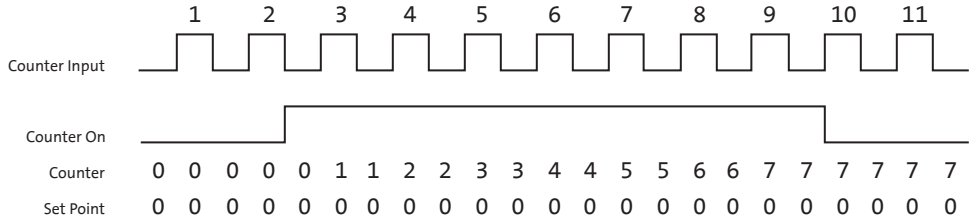
NOTES

1. Turning off the counter doesn't reset the accumulative value of the counter, a reset is required to reset the count.
2. If roll-over isn't selected the counter will only accrue up to the setpoint entered.
3. Designated outputs can be controlled by the counter to work asynchronous to the controller, when setpoint has been reached, the output will shut off if the enable bit is on. Please note the output must be turned on as it will not automatically turn on when the counter is on.
4. Turning the counter OFF will not clear the current count value or set point.
5. A counter reset does not clear the counter set point.
6. A counter reset will clear the current count and does not turn the counter OFF.
7. The Roll-Over signal will not change the Output3A and Output4A Enable function.

COUNTER OPERATION EXAMPLES

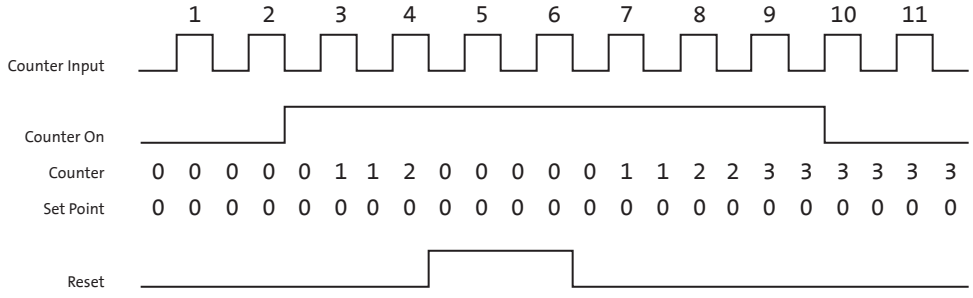
Counter Basic

Set Point zero, Reset off, Roll Over off



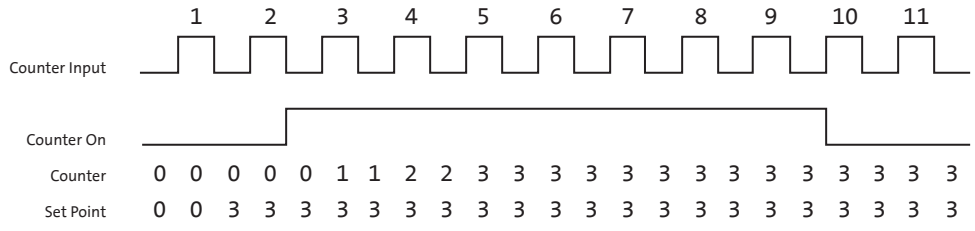
Counter - Using Reset

Set Point zero, Roll Over off

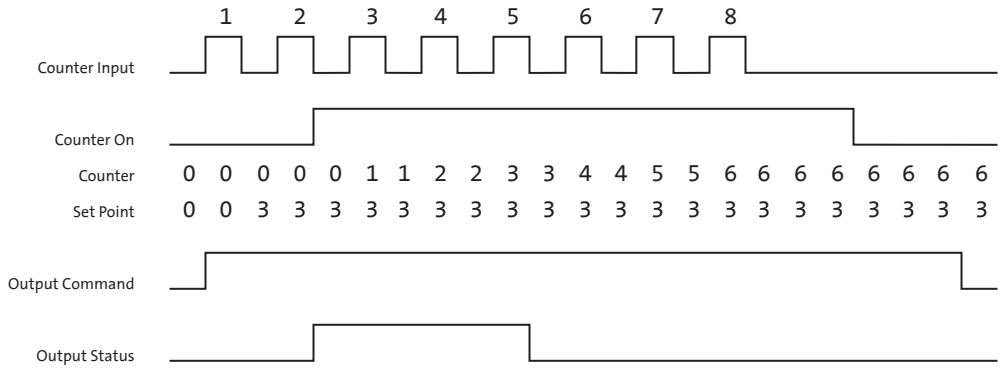


Counter - Using Set Point

Set Point set, Reset off, Roll Over off



Counter - Roll Over and Output Enable
Set Point set, Reset off, Roll Over on, Output Enable on



ENCODER OPERATION

- Input 7A & 8A are used for encoder mode. Channel A of the encoder is connected to Input 7A & Channel B is connected to Input 8A.
- When the encoder channels are correctly connected, as shown above, firmware takes care of incrementing or decrementing the count.
- The functions that work when using encoder mode are tied to counter 7A, the on/off & reset are the only commands that work at this time.

2. The Count and Counter Set Point are shown in the message below/Encoder

PGN
65307 (0xFF1B)
Source Address
224 (0xE0)
PDU Format
255 (0xFF)
PDU Specific
27 (0x1B)
Built Message
(0x18FF1BE0)

Name	Data Type	Byte	Bits	Description
Hertz_Count Input 7A	Word	1	Low Byte	Input 7A, **Hertz** is used when the input is configured as a frequency input, **Count** is used when the input is configured as a high speed counter
		2	High Byte	
Duty Cycle_ SP Input 7A	Word	3	Low Byte	Input 7A, **Duty Cycle** is used when the input is configured as a frequency input, **Set Point** is used when the input is configured as a high speed counter
		4	High Byte	
Hertz_Count Input 8A	Word	5	Low Byte	Input 8A, **Hertz** is used when the input is configured as a frequency input, **Count** is used when the input is configured as a high speed counter
		6	High Byte	
Duty Cycle_SP Input 8A	Word	7	Low Byte	Input 8A, **Duty Cycle** is used when the input is configured as a frequency input, **Set Point** is used when the input is configured as a high speed counter
		8	High Byte	

In Encoder mode, bytes 1 & 2 are the low word and bytes 3 & 4 are the high word to display a 32 bit value of the encoder count, 32 bit signed maximum positive count is 2,147,483,647.

5.2.4.3 INPUT STATUS

J1939 Digital Status					
PGN	**Name**	**Data Type**	**Byte**	**Bits**	**Description**
65301 (0xFF15) E0=SA	Input1A	2 bit	1	1,2	00 = Off, 01 = On, 10 = Fault
	Input1B			3,4	
	Input2A			5,6	
	Input2B			7,8	
	Input3A		2	1,2	
	Input3B			3,4	
	Input4A			5,6	
	Input4B			7,8	
	Input5A		3	1,2	
	Input5B			3,4	
	Input6A			5,6	
	Input6B			7,8	
	Input7A		4	1,2	
	Input7B			3,4	
	Input8A			5,6	
	Input8B			7,8	
	Not used	Byte	5		
			6		
			7		
			8		

J1939 Analog Status 1					
PGN	**Name**	**Data Type**	**Byte**	**Bits**	**Description**
65302 (0xFF16)	Analog Input 1A	Word	1	Low Byte	**Not Used on this module, discrete only**
			2	High Byte	
	Analog Input 1B	Word	3	Low Byte	Analog Input 1B, (4-20mA = 4,000 - 20,000) (0-5V DC = 0 - 5,000mV) (0-10V DC = 0-10,000mV) (0-32V DC = 0 - 32,000mV) (Ratiometric = 0 - 100.0% of source voltage)
			4	High Byte	
	Analog Input 2A	Word	5	Low Byte	**Not Used on this module, discrete only**
			6	High Byte	
	Analog Input 2B	Word	7	Low Byte	Analog Input 2B, (4-20mA = 4,000 - 20,000) (0-5V DC = 0 - 5,000mV) (0-10V DC = 0-10,000mV) (0-32V DC = 0 - 32,000mV) (Ratiometric = 0 - 100.0% of source voltage)
			8	High Byte	

J1939 Analog Status 2					
PGN	**Name**	**Data Type**	**Byte**	**Bits**	**Description**
65303 (0xFF17)	Analog Input 3A	Word	1	Low Byte	**Not Used on this module, discrete only**
			2	High Byte	
	Analog Input 3B	Word	3	Low Byte	Analog Input 3B, (4-20mA = 4,000 - 20,000) (0-5V DC = 0 - 5,000mV) (0-10V DC = 0-10,000mV) (0-32V DC = 0 - 32,000mV) (Ratiometric = 0 - 100.0% of source voltage)
			4	High Byte	
	Analog Input 4A	Word	5	Low Byte	**Not Used on this module, discrete only**
			6	High Byte	
	Analog Input 4B	Word	7	Low Byte	Analog Input 4B, (4-20mA = 4,000 - 20,000) (0-5V DC = 0 - 5,000mV) (0-10V DC = 0-10,000mV) (0-32V DC = 0 - 32,000mV) (Ratiometric = 0 - 100.0% of source voltage)
			8	High Byte	

J1939 Analog Status 3					
PGN	**Name**	**Data Type**	**Byte**	**Bits**	**Description**
65304 (0xFF18)	Analog Input 5A	Word	1	Low Byte	**Not Used on this module, discrete only**
			2	High Byte	
	Analog Input 5B	Word	3	Low Byte	Analog Input 3B, (4-20mA = 4,000 - 20,000) (0-5V DC = 0 - 5,000mV) (0-10V DC = 0-10,000mV) (0-32V DC = 0 - 32,000mV) (Ratiometric = 0 - 100.0% of source voltage)
			4	High Byte	
	Analog Input 6A	Word	5	Low Byte	**Not Used on this module, discrete only**
			6	High Byte	
	Analog Input 6B	Word	7	Low Byte	Analog Input 4B, (4-20mA = 4,000 - 20,000) (0-5V DC = 0 - 5,000mV) (0-10V DC = 0-10,000mV) (0-32V DC = 0 - 32,000mV) (Ratiometric = 0 - 100.0% of source voltage)
			8	High Byte	

J1939 Analog Status 4					
PGN	**Name**	**Data Type**	**Byte**	**Bits**	**Description**
65305 (0xFF19)	Analog Input 7A	Word	1	Low Byte	**Not Used on this module, discrete only**
			2	High Byte	
	Analog Input 7B	Word	3	Low Byte	Analog Input 7B, (4-20mA = 4,000 - 20,000) (0-5V DC = 0 - 5,000mV) (0-10V DC = 0-10,000mV) (0-32V DC = 0 - 32,000mV) (Ratiometric = 0 - 100.0% of source voltage)
			4	High Byte	
	Analog Input 8A	Word	5	Low Byte	**Not Used on this module, discrete only**
			6	High Byte	
	Analog Input 8B	Word	7	Low Byte	Analog Input 8B, (4-20mA = 4,000 - 20,000) (0-5V DC = 0 - 5,000mV) (0-10V DC = 0-10,000mV) (0-32V DC = 0 - 32,000mV) (Ratiometric = 0 - 100.0% of source voltage)
			8	High Byte	

J1939 Frequency Status

PGN
65307 (0xFF1B)
Source Address
224 (0xE0)
PDU Format
255 (0xFF)
PDU Specific
27 (0x1B)
Built Message
(0x18FF1BE0)

Transmit rate
50 ms
Msg timeout
n/a
Priority
24 (0x18)

Name	Data Type	Byte	Bits	Description
Hertz_Count Input 7A	Word	1	Low Byte	Input 7A, **Hertz** is used when the input is configured as a frequency input, **Count** is used when the input is configured as a high speed counter
		2	High Byte	
Duty Cycle_ SP Input 7A	Word	3	Low Byte	Input 7A, **Duty Cycle** is used when the input is configured as a frequency input, **Set Point** is used when the input is configured as a high speed counter
		4	High Byte	
Hertz_Count Input 8A	Word	5	Low Byte	Input 8A, **Hertz** is used when the input is configured as a frequency input, **Count** is used when the input is configured as a high speed counter
		6	High Byte	
Duty Cycle_SP Input 8A	Word	7	Low Byte	Input 8A, **Duty Cycle** is used when the input is configured as a frequency input, **Set Point** is used when the input is configured as a high speed counter
		8	High Byte	

******In encoder mode, bytes 1&2 are the low word and bytes 3&4 are the high word*******

5.3 STATUS MESSAGES

5.3.1 MODULE STATUS

Status Message 1 (Software and Node Status)					
PGN	**Name**	**Data Type**	**Byte**	**Bits**	**Description**
(0xEF(CSA))	Software Version	Byte	1		Version of the current software
	Software Revision		2		Revision of the current software
	Status 1	2 Bit	3	1,2	Factory Default Configuration
	Status 2			3,4	Configuration Saved (module is configured)
	Status 3			5,6	Alternate Configuration Received
	Status 4			7,8	Node Alive
	Status 5		4	1,2	Node Fault Present
	Status 6			3,4	Fault Count not Zero
	Status 7			5,6	Not used, will see (11b)
	Status 8			7,8	
	Fault Code	Byte	5		Active fault code
	User ID		6		The User ID of the module configured in CTRL1 message
	Status 9	2 Bit	7	1,2	True when Message Command = 0x52 received
	Status 10			3,4	True when Message Command = 0x53 received
	Status 11			5,6	True when Message Command = 0x54 received
	Status 12			7,8	True when Message Command = 0x55 received, **Not used**
	Status 13		8	1,2	True when Message Command = 0x56 received, **Not used**
	Status 14			3,4	True when Message Command = 0x57 received, **Not used**
	Hardware Version	4 Bit		5,6,7,8	Version of the current hardware

* (0xEF(Controller Source Address))
This is the only PGN that uses the controller source address as it is a reply to the controller.

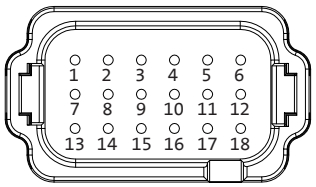
Status Message 2 (Configuration and Input Power)					
PGN	**Name**	**Data Type**	**Byte**	**Bits**	**Description**
65531 (0xFFFB)	Config Pair 1	2 Bit	1	1,2	Baud rate configuration jumper is applied
	Config Pair 2			3,4	Node ID 1's configuration jumper is applied
	Config Pair 3			5,6	Node ID 2's configuration jumper is applied
	Config Pair 4			7,8	Node ID 3's configuration jumper is applied
	Config Pair 5		2	1,2	Node ID 4's configuration jumper is applied
				3,4	Not used, will see (11b)
				5,6	
				7,8	
	Input Power Port 1		3	1,2	Status of output for Input Power on Port 1, (00 = off), (01 = on), (10 = fault)
				3,4	Not used, will see (11b)
	Input Power Port 2			5,6	Status of output for Input Power on Port 2, (00 = off), (01 = on), (10 = fault)
				7,8	Not used, will see (11b)
	Input Power Port 3		4	1,2	Status of output for Input Power on Port 3, (00 = off), (01 = on), (10 = fault)
				3,4	Not used, will see (11b)
	Input Power Port 4			5,6	Status of output for Input Power on Port 4, (00 = off), (01 = on), (10 = fault)
				7,8	Not used, will see (11b)
	Input Power Port 5		5	1,2	Status of output for Input Power on Port 5, (00 = off), (01 = on), (10 = fault)
				3,4	Not used, will see (11b)
	Input Power Port 6			5,6	Status of output for Input Power on Port 6, (00 = off), (01 = on), (10 = fault)
				7,8	Not used, will see (11b)
	Input Power Port 7		6	1,2	Status of output for Input Power on Port 7, (00 = off), (01 = on), (10 = fault)
				3,4	Not used, will see (11b)
	Input Power Port 8			5,6	Status of output for Input Power on Port 8, (00 = off), (01 = on), (10 = fault)
				7,8	Not used, will see (11b)
	Power Buss P1		7	1,2	
	Power Buss P2			3,4	
	Power Buss P3			5,6	
	Power Buss P4			7,8	
	Save Config Counter	Byte	8		Count of how many times the configuration has been saved to the module

Status Message 3 (Controller Information)					
PGN	**Name**	**Data Type**	**Byte**	**Bits**	**Description**
65532 (0xFFFC)	CNFG1	Byte	1	All	Hardware Configuration
	CNFG2		2		PCB Assembly Revision
	VBAT	10 Bit	3		Battery Voltage
			4	1, 2	
	TEMP	12 Bit	5	All	Module Temperature
			6	1, 2, 3, 3	
	CNFG3	Byte	7	All	Additional Configuration
			8		Not Used

5.4 DATA SHEET

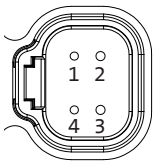
5.4.1 PORT CONFIGURATION

Configuration & Power Plug



See page 30 for pinout guide

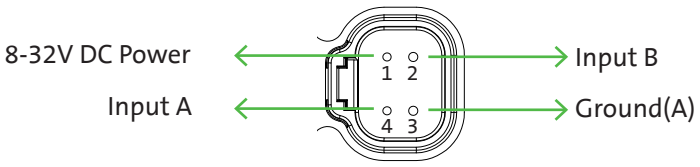
CAN Ports 1 & 2 Non-Isolated



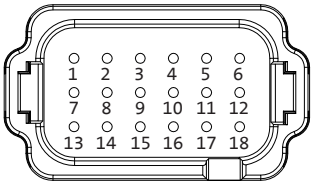
CAN
(J1939)
Pin 2 = CAN High
Pin 4 = CAN Low

Power
(Module & Input-13A)
Pin 1 = 8-32V DC
Pin 3 = Ground (A)

Inputs (Ports 1-8)



Configuration & Power Plug Pinouts



1. Baud1-A
2. Config 1-A
3. Config 2-A
4. Config 3-A
5. Config 4-A
6. N/C
7. Baud1-B
8. Config 1-B
9. Config 2-B
10. Config 3-B
11. Config 4-B
12. N/C
13. N/C
14. N/C
15. N/C
16. N/C
17. N/C
18. N/C

Baud Rate
No Jumper = 250kb
Baud1-A to Baud1-B = 500kb.

Node ID (0-15)
Config1-A to Config1-B = 1s
Config2-A to Config2-B = 2s
Config3-A to Config3-B = 4s
Config4-A to Config4-B = 8s

Power
Pin 1 = 8-32V DC
Pin 3 = Ground (A)

Configurations
Input A
1. Positive
2. Ground
3. Frequency/Counter/Encoder (7A & 8A)

Input B
1. Positive
2. Ground
3. 4-20mA
4. 0-5V DC
5. 0-10V DC
6. 0-32V DC
7. Ratiometric

Inputs
- Port 1, Pin 4: Input 1A
- Port 1, Pin 2: Input 1B

- Port 2, Pin 4: Input 2A
- Port 2, Pin 2: Input 2B

- Port 3, Pin 4: Input 3A
- Port 3, Pin 2: Input 3B

- Port 4, Pin 4: Input 4A
- Port 4, Pin 2: Input 4B

- Port 5, Pin 4: Input 5A
- Port 5, Pin 2: Input 5B

- Port 6, Pin 4: Input 6A
- Port 6, Pin 2: Input 6B

- Port 7, Pin 4: Input 7A
- Port 7, Pin 2: Input 7B

- Port 8, Pin 4: Input 8A
- Port 8, Pin 2: Input 8B

5.4.2 TECHNICAL DATA

Art. No. / Description	DP-34044-1 / Combo Block
Dimension	3.802" x 10.427"
Installation	(3) M5 x 1 screws
Communication	2 non-isolated J1939 ports (250kb & 500kb)
Voltage Range	8-32V DC
Operating Temp	(-40 to 85° C)
Storage Temp	(-45 to 85° C)
Protection	IP67
# of Ports	8
Total # of I/O	16
Total # of Inputs	16
# of Digital	up to 16*
# of configurable Inputs	16
Input A configurations	Digital postive, Digital ground, frequency/counter/encoder
Input B configurations	Digital postive, Digital ground, 4-20mA, 0-5V DC, 0-10V DC, 0-32V DC, Ratiometric
Analog resolution	12 bit, 1% Full scale accuracy
Input diagnostics	short circuit and high scale
Total # of Outputs	n/a
# of configurable Outputs	n/a
Output configurations	n/a
PWM frequency	n/a
Switching current	n/a
Total input current	13 amps
J1939 Port	1=+V DC (module pwr), 2=CAN L, 3=gnd(A), 4=CANH
Node ID Offset	0-15
Baud rate	250 Kbits/s, 500 Kbits/s
LED's	(4)blue (PWR), (2) red CAN, (16) yellow status
Ports 1-8	1=+vdc, 2=sig 2, 3=gnd(A), 4=sig 1

Port Deutsch Plugs Needed	
Power Port Connector	DT16-18SA-K004
CAN & I/O Port Connector	DT06-4S
Wedgelock DT Series 4-pin Socket	W4S
Size 16, Solid Socket, 16 - 20 AWG	0462-201-16141
Size 16, Solid Socket, 14 AWG	0462-209-16141
Size 16, Locking Sealing Plug	0413-217-1605

6. MESSAGE STRUCTURE

All addresses are shown as module configured with no jumpers (Offset = 0)

PGN
61408 (0xEFE0) ***Node offset of 0***
Source Address
(0x?? (CSA*))
PDU Format
239 (0xEF)
PDU Specific
224 (0xE0)
Built Message
(0x18EFE0??)

Transmit rate
50 ms
Msg timeout
200 ms
Priority
6
DP
0

Value
82 (0x52)

*CSA = Controller Source Address

J1939 Output Configuration 1

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message you're sending)
Ctrl Mode Reset	2 bit	2	1,2	Enables Controller Mode Output Reset
Enable Status 1 Msg			3,4	Enables the constant transmission of status message 1
Enable Status 2 Msg			5,6	Enables the constant transmission of status message 2
Enable Amp Msg			7,8	Enables the constant transmission of amperage messages
Enable 24V DC		3	1,2	Enables the low and over voltage fault limits for 24V DC system
Save Configuration			3,4	Saves the configuration to the module (otherwise changes only valid until a power cycle occurs), set to 1 to write configuration to module
Analog raw value			5,6	Sets all analog to be read in raw value as opposed to scaled (.005668/bit)
			7,8	
		4	1,2	
			3,4	
			5,6	
			7,8	
FREQ1	Word	5		Sets the configuration of the frequency for all channels (30-1140 Hz)
		6		
MODE1	4 Bit	7		**Not used on this module**
MODE2		7		Sets the configuration of the inputs (0=Mode 2 Not USed, 1=Digital Postive, 2=Digital Ground) No analog
ID1	Byte	8		User defined byte for configuration ID, this will be transimitted in the STAT message.

J1939 Output Control - Control Message 1 (Output Control)

Command Value
81 (0x51)

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message your sending)
Output1A	2 bit	2	1,2	Not used on this module
Output1B			3,4	
Output2A			5,6	
Output2B			7,8	
Output3A		3	1,2	
Output3B			3,4	
Output4A			5,6	
Output4B			7,8	
Output5A		4	1,2	
Output5B			3,4	
Output6A			5,6	
Output6B			7,8	
Output7A		5	1,2	
Output7B			3,4	
Output8A			5,6	
Output8B			7,8	
Input Power Port1		6	1,2	Enable for Port 1 Input Power, (00 = off), (01 = on)
Input Power Port2			3,4	Enable for Port 2 Input Power, (00 = off), (01 = on)
Input Power Port3			5,6	Enable for Port 3 Input Power, (00 = off), (01 = on)
Input Power Port4			7,8	Enable for Port 4 Input Power, (00 = off), (01 = on)
Input Power Port5		7	1,2	Enable for Port 5 Input Power, (00 = off), (01 = on)
Input Power Port6			3,4	Enable for Port 6 Input Power, (00 = off), (01 = on)
Input Power Port7			5,6	Enable for Port 7 Input Power, (00 = off), (01 = on)
Input Power Port8			7,8	Enable for Port 8 Input Power, (00 = off), (01 = on)
Not Used	Byte	8		

J1939 Output Configuration 2

Command Value
83 (0x53)

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message you're sending)
INMODE1A	4 bit	2	1,2,3,4	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground**
INMODE1B			5,6,7,8	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)**
INMODE2A		3	1,2,3,4	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground**
INMODE2B			5,6,7,8	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)**
INMODE3A		4	1,2,3,4	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground**
INMODE3B			5,6,7,8	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)**
INMODE4A		5	1,2,3,4	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground**
INMODE4B			5,6,7,8	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)**
INMODE5A		6	1,2,3,4	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground**
INMODE5B			5,6,7,8	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)**
INMODE6A		7	1,2,3,4	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground**
INMODE6B			5,6,7,8	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)**
INMODE7A		8	1,2,3,4	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x7=Digital Positive Frequency, 0x8= High Speed Counter, 0xA=Encoder**
INMODE7B			5,6,7,8	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20mA (4000-20000), 0x4= 0-5V DC (0-5000, 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)**

J1939 Output Configuration 3

Command Value
84 (0x54)

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message you're sending)
INMODE8A	4 bit	2	1,2,3,4	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x7=Digital Positive Frequency, 0x8= High Speed Counter**
INMODE8B			5,6,7,8	Mode **0x0=disabled, 0x1=Digital Positive, 0x2=Digital Ground, 0x3= 4-20ma (4000-20000), 0x4= 0-5V DC (0-5000), 0x5= 0-10V DC (0-10000), 0x6= 0-32V DC(0-32000), 0x9= Ratiometric (0-100.0% of source V DC)**
	Byte	3		**Not Used on This Module**
		4		
		5		
		6		
		7		
		8		

J1939 Counter Configuration Message

PGN
61408 (0xEFE0) Node offset of 0
Source Address
224 (0xE0)
PDU Format
239 (0xEF)
PDU Specific
224 (0xE0)
Built Message
0x18EFE0E0)

Transmit rate
50 ms
Msg timeout
n/a
Priority
24 (0x18)

Command Value
87 (0x57)

Name	Data Type	Byte	Bits	Description
Command	Byte	1		Command for index pointer (which message your sending)
Counter 7A On/Off	2 bit	2	1,2	Enable Counter 7A, 00 = Off, 01 = On Used in Encoder mode
Counter 7A Reset			3,4	Reset Counter 7A, 00 = Off, 01 = On Used in Encoder mode
Counter 7A Roll-Over Enabled			5,6	Enable Counter 7A Rollover, count continues after set point is achieved, 00 = Off, 01 = On Not Used in Encoder mode
Counter 7A Enable Out 3A			7,8	Enable Output 3A when Counter 7A is enabled and set point hasn't been reached, 00 = Off, 01 = On Not Used in Encoder mode
Counter 8A On/Off		3	1,2	Enable Counter 8A, 00 = Off, 01 = On Not Used in Encoder mode
Counter 8A Reset			3,4	Reset Counter 8A, 00 = Off, 01 = On Not Used in Encoder mode
Counter 8A Roll-Over Enabled			5,6	Enable Counter 8A Rollover, count continues after set point is achieved, 00 = Off, 01 = On Not Used in Encoder mode
Counter 8A Enable Out 4A			7,8	Enable Output 4A when Counter 8A is enabled and set point hasn't been reached, 00 = Off, 01 = On Not Used in Encoder mode
Spare		4	1,2	Not used on this module
			3,4	
			5,6	
			7,8	
Counter 7A Set Point	Word	5		Set point for totalalized count on Counter 7A
		6		
Counter 8A Set Point	Word	7		Set point for totalalized count on Counter 8A
		8		

J1939 Digital Status

PGN
65301 (0xFF15) EO=SA Node offset of 0
Source Address
224 (0xE0)
PDU Format
255 (0xFF)
PDU Specific
21 (0x15)
Built Message
(0x18FF15E0)

Transmit rate
50 ms
Msg timeout
200 ms
Priority
6
DP
0

Name	Data Type	Byte	Bits	Description
Input1A	2 bit	1	1,2	00 = Off, 01 = On, 10 = Fault
Input1B			3,4	
Input2A			5,6	
Input2B			7,8	
Input3A		2	1,2	
Input3B			3,4	
Input4A			5,6	
Input4B			7,8	
Input5A		3	1,2	
Input5B			3,4	
Input6A			5,6	
Input6B			7,8	
Input7A		4	1,2	
Input7B			3,4	
Input8A			5,6	
Input8B			7,8	
Not used	Byte	5		
		6		
		7		
		8		

J1939 Analog Status 1

PGN
65302 (0xFF16)
Source Address
224 (0xE0)
PDU Format
255 (0xFF)
PDU Specific
22 (0x16)
Built Message
(0x18FF16E0)

Transmit rate
50 ms
Msg timeout
200 ms
Priority
6
DP
0

Name	Data Type	Byte	Bits	Description
Analog Input 1A	Word	1	Low Byte	**Not Used on this module, discrete only**
		2	High Byte	
Analog Input 1B	Word	3	Low Byte	Analog Input 1B, (4-20ma = 4,000 - 20,000) (0-5V DC = 0 - 5,000mv) (0-10V DC = 0-10,000mv) (0-32V DC = 0 - 32,000mv) (Ratiometric = 0 - 100.0% of source voltage)
		4	High Byte	
Analog Input 2A	Word	5	Low Byte	**Not Used on this module, discrete only**
		6	High Byte	
Analog Input 2B	Word	7	Low Byte	Analog Input 2B, (4-20ma = 4,000 - 20,000) (0-5V DC = 0 - 5,000mv) (0-10V DC = 0-10,000mv) (0-32V DC = 0 - 32,000mv) (Ratiometric = 0 - 100.0% of source voltage)
		8	High Byte	

J1939 Analog Status 2

PGN
65303 (0xFF17)
Source Address
224 (0xE0)
PDU Format
255 (0xFF)
PDU Specific
23 (0x17)
Built Message
(0x18FF17E0)

Transmit rate
50 ms
Msg timeout
200 ms
Priority
6
DP
0

Name	Data Type	Byte	Bits	Description
Analog Input 3A	Word	1	Low Byte	**Not Used on this module, discrete only**
		2	High Byte	
Analog Input 3B	Word	3	Low Byte	Analog Input 3B, (4-20ma = 4,000 - 20,000) (0-5V DC = 0 - 5,000mv) (0-10V DC = 0-10,000mv) (0-32V DC = 0 - 32,000mv) (Ratiometric = 0 - 100.0% of source voltage)
		4	High Byte	
Analog Input 4A	Word	5	Low Byte	**Not Used on this module, discrete only**
		6	High Byte	
Analog Input 4B	Word	7	Low Byte	Analog Input 4B, (4-20ma = 4,000 - 20,000) (0-5V DC = 0 - 5,000mv) (0-10V DC = 0-10,000mv) (0-32V DC = 0 - 32,000mv) (Ratiometric = 0 - 100.0% of source voltage)
		8	High Byte	

J1939 Analog Status 3

PGN
65304 (0xFF18)
Source Address
224 (0xE0)
PDU Format
255 (0xFF)
PDU Specific
24 (0x18)
Built Message
(0x18FF18E0)

Transmit rate
50 ms
Msg timeout
200 ms
Priority
6
DP
0

Name	Data Type	Byte	Bits	Description
Analog Input 5A	Word	1	Low Byte	**Not Used on this module, discrete only**
		2	High Byte	
Analog Input 5B	Word	3	Low Byte	Analog Input 5B, (4-20ma = 4,000 - 20,000) (0-5V DC = 0 - 5,000mv) (0-10V DC = 0-10,000mv) (0-32V DC = 0 - 32,000mv) (Ratiometric = 0 - 100.0% of source voltage)
		4	High Byte	
Analog Input 6A	Word	5	Low Byte	**Not Used on this module, discrete only**
		6	High Byte	
Analog Input 6B	Word	7	Low Byte	Analog Input 6B, (4-20ma = 4,000 - 20,000) (0-5V DC = 0 - 5,000mv) (0-10V DC = 0-10,000mv) (0-32V DC = 0 - 32,000mv) (Ratiometric = 0 - 100.0% of source voltage)
		8	High Byte	

J1939 Analog Status 4

PGN
65305 (0xFF19)
Source Address
224 (0xE0)
PDU Format
255 (0xFF)
PDU Specific
25 (0x19)
Built Message
(0x18FF19E0)

Transmit rate
50 ms
Msg timeout
200 ms
Priority
6
DP
0

Name	Data Type	Byte	Bits	Description
Analog Input 7A	Word	1	Low Byte	**Not Used on this module, discrete only**
		2	High Byte	
Analog Input 7B	Word	3	Low Byte	Analog Input 7B, (4-20ma = 4,000 - 20,000) (0-5V DC = 0 - 5,000mv) (0-10V DC = 0-10,000mv) (0-32V DC = 0 - 32,000mv) (Ratiometric = 0 - 100.0% of source voltage)
		4	High Byte	
Analog Input 8A	Word	5	Low Byte	**Not Used on this module, discrete only**
		6	High Byte	
Analog Input 8B	Word	7	Low Byte	Analog Input 8B, (4-20ma = 4,000 - 20,000) (0-5V DC = 0 - 5,000mv) (0-10V DC = 0-10,000mv) (0-32V DC = 0 - 32,000mv) (Ratiometric = 0 - 100.0% of source voltage)
		8	High Byte	

J1939 Frequency Status

PGN
65307 (0xFF1B)
Source Address
224 (0xE0)
PDU Format
255 (0xFF)
PDU Specific
27 (0x1B)
Built Message
(0x18FF1BE0)

Transmit rate
50 ms
Msg timeout
200 ms
Priority
6
DP
0

Name	Data Type	Byte	Bits	Description
Hertz_Count Input 7A	Word	1	Low Byte	Input 7A, **Hertz** is used when the input is configured as a frequency input, **Count** is used when the input is configured as a high speed counter
		2	High Byte	
Duty Cycle_ SP Input 7A	Word	3	Low Byte	Input 7A, **Duty Cycle** is used when the input is configured as a frequency input, **Set Point** is used when the input is configured as a high speed counter
		4	High Byte	
Hertz_Count Input 8A	Word	5	Low Byte	Input 8A, **Hertz** is used when the input is configured as a frequency input, **Count** is used when the input is configured as a high speed counter
		6	High Byte	
Duty Cycle_SP Input 8A	Word	7	Low Byte	Input 8A, **Duty Cycle** is used when the input is configured as a frequency input, **Set Point** is used when the input is configured as a high speed counter
		8	High Byte	

* In encoder mode, bytes 1 & 2 are the low word. Bytes 3 & 4 are the high word.

STATUS MESSAGES

Status Message 1 (Software and Node Status)

PGN
(0xEF(CSA))
Source Address
224 (0xE0)
PDU Format
239 (0xEF)
PDU Specific
(0x?(CSA))
Built Message
(0x18EF??E0)

Transmit rate
50 ms
Msg timeout
200 ms
Priority
6
DP
0

Name	Data Type	Byte	Bits	Description
Software Version	Byte	1		Version of the current software
Software Revision		2		Revision of the current software
Status 1	2 Bit	3	1,2	Factory Default Configuration
Status 2			3,4	Configuration Saved (module is configured)
Status 3			5,6	Alternate Configuration Received
Status 4			7,8	Node Alive
Status 5		4	1,2	Node Fault Present
Status 6			3,4	Fault Count not Zero
Status 7			5,6	Not used, will see (11b)
Status 8			7,8	
Fault Code	Byte	5		Active fault code
User ID		6		The User ID of the module configured in CTRL1 message
Status 9	2 Bit	7	1,2	True when Message Command = 0x52 received
Status 10			3,4	True when Message Command = 0x53 received
Status 11			5,6	True when Message Command = 0x54 received
Status 12			7,8	True when Message Command = 0x55 received, Not used
Status 13		8	1,2	True when Message Command = 0x56 received, Not used
Status 14			3,4	True when Message Command = 0x57 received, Not used
Hardware Version	4 Bit		5,6,7,8	Version of the current hardware

CSA = Controller Source Address

Status Message 2 (Configuration and Input Power)

PGN
65531 (0xFFFB)
Source Address
224 (0xE0)
PDU Format
255 (0xFF)
PDU Specific
251 (0xFB)
Built Message
(0x18FFFBE0)

Transmit rate
50 ms
Msg timeout
200 ms
Priority
6
DP
0

Name	Data Type	Byte	Bits	Description
Config Pair 1	2 Bit	1	1,2	Baud rate configuration jumper is applied
Config Pair 2			3,4	Node ID 1's configuration jumper is applied
Config Pair 3			5,6	Node ID 2's configuration jumper is applied
Config Pair 4			7,8	Node ID 3's configuration jumper is applied
Config Pair 5		2	1,2	Node ID 4's configuration jumper is applied
			3,4	Not used, will see (11b)
			5,6	
			7,8	
Input Power Port 1		3	1,2	Status of output for Input Power on Port 1, (00 = off), (01 = on), (10 = fault)
			3,4	Not used, will see (11b)
Input Power Port 2			5,6	Status of output for Input Power on Port 2, (00 = off), (01 = on), (10 = fault)
			7,8	Not used, will see (11b)
Input Power Port 3		4	1,2	Status of output for Input Power on Port 3, (00 = off), (01 = on), (10 = fault)
			3,4	Not used, will see (11b)
Input Power Port 4			5,6	Status of output for Input Power on Port 4, (00 = off), (01 = on), (10 = fault)
			7,8	Not used, will see (11b)
Input Power Port 5		5	1,2	Status of output for Input Power on Port 5, (00 = off), (01 = on), (10 = fault)
			3,4	Not used, will see (11b)
Input Power Port 6			5,6	Status of output for Input Power on Port 6, (00 = off), (01 = on), (10 = fault)
			7,8	Not used, will see (11b)
Input Power Port 7		6	1,2	Status of output for Input Power on Port 7, (00 = off), (01 = on), (10 = fault)
			3,4	Not used, will see (11b)
Input Power Port 8			5,6	Status of output for Input Power on Port 8, (00 = off), (01 = on), (10 = fault)
			7,8	Not used, will see (11b)
Power Buss P1		7	1,2	
Power Buss P2			3,4	
Power Buss P3			5,6	
Power Buss P4			7,8	
Save Config Counter	Byte	8		Count of how many times the configuration has been saved to the module

Status Message 3 (Controller Information)

PGN
65532 (0xFFFC)
Source Address
224 (0xE0)
PDU Format
255 (0xFF)
PDU Specific
252 (0xFC)
Built Message
(0x18FFFCE0)

Transmit rate
50 ms
Msg timeout
200 ms
Priority
6
DP
0

Status Message 3 (Controller Information)				
Name	**Data Type**	**Byte**	**Bits**	**Description**
CNFG1	Byte	1	All	Hardware Configuration
CNFG2		2		PCB Assembly Revision
VBAT	10 Bit	3		Battery Voltage
		4	1, 2	
TEMP	12 Bit	5	All	Module Temperature
		6	1, 2, 3, 3	
CNFG3	Byte	7	All	Additional Configuration
		8		Not Used

7. PGNs USED

Depending on the Node ID selected for the module, the PGNs and source address will be different for the module. The section below shows which are used for each Node ID.

Module	Control	Module Status	Digital Input Status	Analog Inputs 1A-2B	Analog Inputs 3A-4B	Analog Inputs 5A-6B
0	EFE0	(EF(CSA)) (SA=E0)	FF15 (SA=E0)	FF16 (SA=E0)	FF17 (SA=E0)	FF18 (SA=E0)
1	EFE1	(EF(CSA)) (SA=E1)	FF15 (SA=E1)	FF16 (SA=E1)	FF17 (SA=E1)	FF18 (SA=E1)
2	EFE2	(EF(CSA)) (SA=E2)	FF15 (SA=E2)	FF16 (SA=E2)	FF17 (SA=E2)	FF18 (SA=E2)
3	EFE3	(EF(CSA)) (SA=E3)	FF15 (SA=E3)	FF16 (SA=E3)	FF17 (SA=E3)	FF18 (SA=E3)
4	EFE4	(EF(CSA)) (SA=E4)	FF15 (SA=E4)	FF16 (SA=E4)	FF17 (SA=E4)	FF18 (SA=E4)
5	EFE5	(EF(CSA)) (SA=E5)	FF15 (SA=E5)	FF16 (SA=E5)	FF17 (SA=E5)	FF18 (SA=E5)
6	EFE6	(EF(CSA)) (SA=E6)	FF15 (SA=E6)	FF16 (SA=E6)	FF17 (SA=E6)	FF18 (SA=E6)
7	EFE7	(EF(CSA)) (SA=E7)	FF15 (SA=E7)	FF16 (SA=E7)	FF17 (SA=E7)	FF18 (SA=E7)
8	EFE8	(EF(CSA)) (SA=E8)	FF15 (SA=E8)	FF16 (SA=E8)	FF17 (SA=E8)	FF18 (SA=E8)
9	EFE9	(EF(CSA)) (SA=E9)	FF15 (SA=E9)	FF16 (SA=E9)	FF17 (SA=E9)	FF18 (SA=E9)
10	EFEA	(EF(CSA)) (SA=EA)	FF15 (SA=EA)	FF16 (SA=EA)	FF17 (SA=EA)	FF18 (SA=EA)
11	EFEB	(EF(CSA)) (SA=EB)	FF15 (SA=EB)	FF16 (SA=EB)	FF17 (SA=EB)	FF18 (SA=EB)
12	EFEC	(EF(CSA)) (SA=EC)	FF15 (SA=EC)	FF16 (SA=EC)	FF17 (SA=EC)	FF18 (SA=EC)
13	EFED	(EF(CSA)) (SA=ED)	FF15 (SA=ED)	FF16 (SA=ED)	FF17 (SA=ED)	FF18 (SA=ED)
14	EFEE	(EF(CSA)) (SA=EE)	FF15 (SA=EE)	FF16 (SA=EE)	FF17 (SA=EE)	FF18 (SA=EE)
15	EFFF	(EF(CSA)) (SA=EF)	FF15 (SA=EF)	FF16 (SA=EF)	FF17 (SA=EF)	FF18 (SA=EF)

Module	Control	Analog Inputs 7A-8B	Freq Inputs 7A&8A	Input Power Status	Controller Info	Fault Count
0	EFE0	FF19 (SA=E0)	FF1B (SA=E0)	FFFB (SA=E0)	FFFC (SA=E0)	FFE6 (SA=E0)
1	EFE1	FF19 (SA=E1)	FF1B (SA=E1)	FFFB (SA=E1)	FFFC (SA=E1)	FFE6 (SA=E1)
2	EFE2	FF19 (SA=E2)	FF1B (SA=E2)	FFFB (SA=E2)	FFFC (SA=E2)	FFE6 (SA=E2)
3	EFE3	FF19 (SA=E3)	FF1B (SA=E3)	FFFB (SA=E3)	FFFC (SA=E3)	FFE6 (SA=E3)
4	EFE4	FF19 (SA=E4)	FF1B (SA=E4)	FFFB (SA=E4)	FFFC (SA=E4)	FFE6 (SA=E4)
5	EFE5	FF19 (SA=E5)	FF1B (SA=E5)	FFFB (SA=E5)	FFFC (SA=E5)	FFE6 (SA=E5)
6	EFE6	FF19 (SA=E6)	FF1B (SA=E6)	FFFB (SA=E6)	FFFC (SA=E6)	FFE6 (SA=E6)
7	EFE7	FF19 (SA=E7)	FF1B (SA=E7)	FFFB (SA=E7)	FFFC (SA=E7)	FFE6 (SA=E7)
8	EFE8	FF19 (SA=E8)	FF1B (SA=E8)	FFFB (SA=E8)	FFFC (SA=E8)	FFE6 (SA=E8)
9	EFE9	FF19 (SA=E9)	FF1B (SA=E9)	FFFB (SA=E9)	FFFC (SA=E9)	FFE6 (SA=E9)
10	EFEA	FF19 (SA=EA)	FF1B (SA=EA)	FFFB (SA=EA)	FFFC (SA=EA)	FFE6 (SA=EA)
11	EFEB	FF19 (SA=EB)	FF1B (SA=EB)	FFFB (SA=EB)	FFFC (SA=EB)	FFE6 (SA=EB)
12	EFEC	FF19 (SA=EC)	FF1B (SA=EC)	FFFB (SA=EC)	FFFC (SA=EC)	FFE6 (SA=EC)
13	EFED	FF19 (SA=ED)	FF1B (SA=ED)	FFFB (SA=ED)	FFFC (SA=ED)	FFE6 (SA=ED)
14	EFEE	FF19 (SA=EE)	FF1B (SA=EE)	FFFB (SA=EE)	FFFC (SA=EE)	FFE6 (SA=EE)
15	EFFF	FF19 (SA=EF)	FF1B (SA=EF)	FFFB (SA=EF)	FFFC (SA=EF)	FFE6 (SA=EF)

8. FIRMWARE UPDATES

All modules are capable of in the field firmware updates with the use of the xtreme DB Programming Kit (DP-34005-12). DP Loader is the software used to download the firmware to the xtreme DB blocks. Please reference the DP Loader User Manual for instructions.

MURR ELEKTRONIK

stay connected

1327 Northbrook Parkway, Suite 460 | Suwanee, GA 30024
P: 770-497-9292 | F: 770-497-9391 | murrinc.com

DP34044-4 | 7.17 | US-xtremedb34044-4-2016