neoRADI/O Connection, Setup, and Troubleshooting Guide

Quick Start!

Section A – CAN Baud Rate and Message ID's

Before the neoRADI/O can be used, the CAN baud rate and CAN ID need to be configured. This configuration is done via switches inside the box. Figure 1 shows a picture of the switches inside the unit. The default baud rate is 500kbits and the default CAN IDs are 0x600 and 0x640.

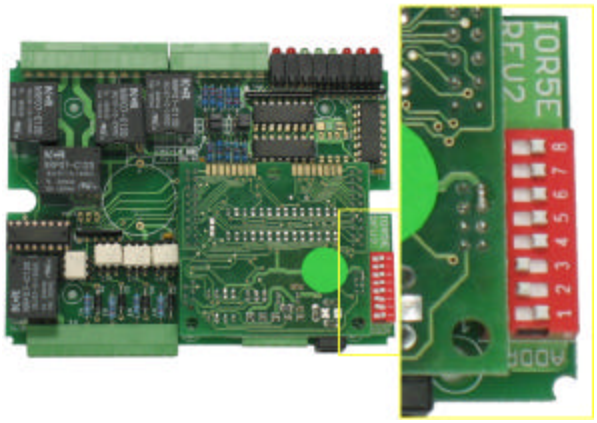

Figure 1: Configuration Switches

Switches 1 and 2 control the baud rate the neoRADI/O communicates on. Table 1 shows the proper settings for the available baud rates.

Switch 1	Switch 2	Baud Rate
Off	Off	125 kbit/s
On	Off	250 kbit/s
Off	On	500 kbit/s
On	On	1000 kbit/s

Table 1: Baud Rate settings

Switches 8 through 3 control the CAN IDs used by the device by adding an offset to the base CAN ID. neoRADI/O uses two addresses, one to send commands (0x600 + offset) and the other for receiving responses (0x640 + offset). The value of the binary pattern of the 6 switches is added as an offset to the base CAN ID. Table 2 shows the switch positions and the resulting offset.

Switch Number						
8	7	6	5	4	3	ID
0	0	0	0	0	0	0x00
0	0	0	0	0	1	0x01
0	0	0	0	1	0	0x02
0	0	0	0	1	1	0x03
0	0	0	1	0	0	0x04
0	0	0	1	0	1	0x05
0	0	0	1	1	0	0x06
0	0	0	1	1	1	0x07
0	0	1	0	0	0	0x08
0	0	1	0	0	1	0x09
0	0	1	0	1	0	0x0A
0	0	1	0	1	1	0x0B
0	0	1	1	0	0	0x0C
0	0	1	1	0	1	0x0D
0	0	1	1	1	0	0x0E
0	0	1	1	1	1	0x0F

Switch Number						
8	7	6	5	4	3	ID
0	1	0	0	0	0	0x10
0	1	0	0	0	1	0x11
0	1	0	0	1	0	0x12
0	1	0	0	1	1	0x13
0	1	0	1	0	0	0x14
0	1	0	1	0	1	0x15
0	1	0	1	1	0	0x16
0	1	0	1	1	1	0x17
0	1	1	0	0	0	0x18
0	1	1	0	0	1	0x19
0	1	1	0	1	0	0x1A
0	1	1	0	1	1	0x1B
0	1	1	1	0	0	0x1C
0	1	1	1	0	1	0x1D
0	1	1	1	1	0	0x1E
0	1	1	1	1	1	0x1F

Switch Number						
8	7	6	5	4	3	ID
1	0	0	0	0	0	0x20
1	0	0	0	0	1	0x21
1	0	0	0	1	0	0x22
1	0	0	0	1	1	0x23
1	0	0	1	0	0	0x24
1	0	0	1	0	1	0x25
1	0	0	1	1	0	0x26
1	0	0	1	1	1	0x27
1	0	1	0	0	0	0x28
1	0	1	0	0	1	0x29
1	0	1	0	1	0	0x2A
1	0	1	0	1	1	0x2B
1	0	1	1	0	0	0x2C
1	0	1	1	0	1	0x2D
1	0	1	1	1	0	0x2E
1	0	1	1	1	1	0x2F

Switch Number						
8	7	6	5	4	3	ID
1	1	0	0	0	0	0x30
1	1	0	0	0	1	0x31
1	1	0	0	1	0	0x32
1	1	0	0	1	1	0x33
1	1	0	1	0	0	0x34
1	1	0	1	0	1	0x35
1	1	0	1	1	0	0x36
1	1	0	1	1	1	0x37
1	1	1	0	0	0	0x38
1	1	1	0	0	1	0x39
1	1	1	0	1	0	0x3A
1	1	1	0	1	1	0x3B
1	1	1	1	0	0	0x3C
1	1	1	1	0	1	0x3D
1	1	1	1	1	0	0x3E
1	1	1	1	1	1	0x3F

Table 2: Switch Positions and offset

Section B - CAN Termination

The last setting that may need to be changed is the CAN termination of the neoRADI/O. By default a 120? termination resistor is added by the neoRADI/O. To remove the termination, remove the small daughter board, and then remove the “RT” jumper. This jumper is boxed in red in Figure 2.

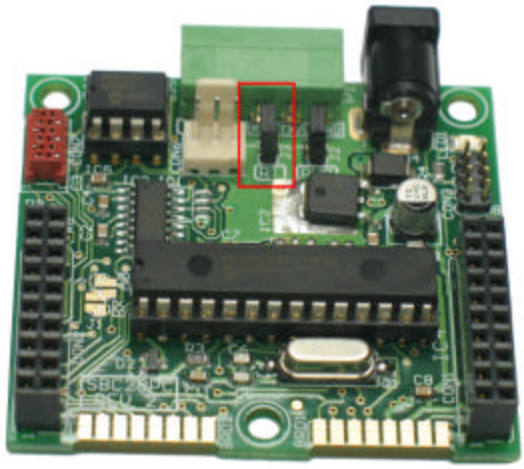

Figure 2: Termination Jumper marked in red.

Section C - CAN Connections and Power

Wiring the neoRADI/O box to the CAN bus is done through the use of a terminal block. Figure 3 shows CAN connections on the unit. Using the supplied terminal block, connect CAN High to the H connector, CAN Low to the L connector. Power and ground can be applied to the terminal block or to the 12 volt DC jack to the right of the terminal block. The supported voltage range is 8 to 20 Volts.

Figure 3: CAN Connections

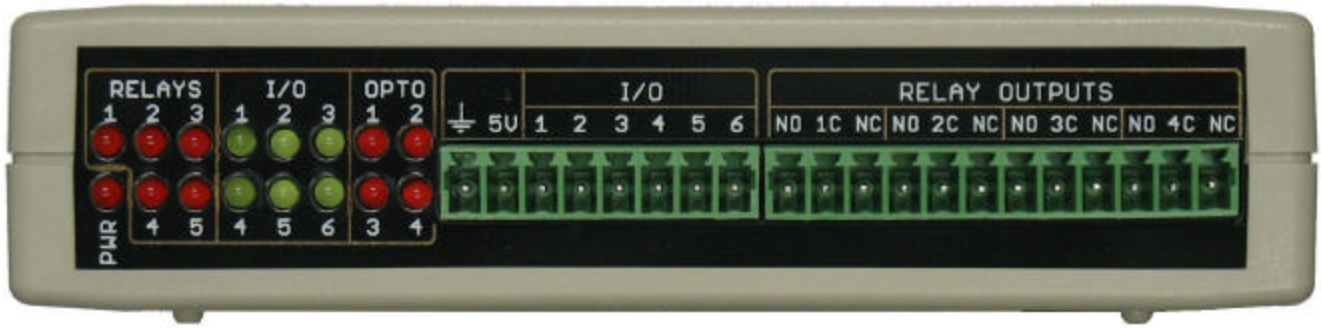

Figure 4: I/O connections

Section D – I/O Connections

I/O connections are made using terminal block connections on the front and back of the box. The I/O connections on the front of the unit (figure 4) are for the analog inputs. The analog inputs 1 to 4 (I/O pins 1 to 4) are 0 to 26 volts. Analog input number 5 (I/O pin 5) is 0 to 5 volts. The analog inputs are single ended measurements, so make sure that they all have a common ground.

The connections for the Digital optical inputs are made on the Opto Inputs terminal block (figure 3). The Opto inputs are differential so there is a positive and negative connection. The positive side for the input is connected to the "+" while the negative to the "-". The inputs allow for input voltages up to 30 volts.

Relay connections are found on both sides of the neoRADI/O. Each relay has 3 connections. The relays can be used as normally open (using the NO connection) or normally closed (using the NC connection). The "C" pin is the common connection. Figure 5 shows a simple diagram of the connections the relays make when activated nd deactivated.

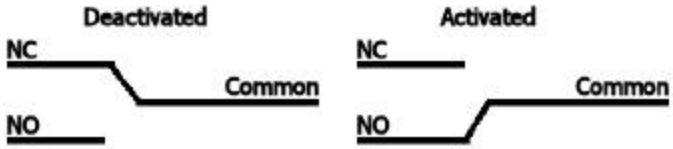

Figure 5: Relay Diagram

The LEDs on the front of the neoRADI/O give status information of the unit. Table 3 describes How each LED functions.

LED Name	Function
Power LED	Flashes when the unit is powered and running
LED I/O 1	Flashes when Control Messages are received
LED I/O 2	Flashes when Report messages are sent
LED I/O 3	Flashes when a Relay timeout is enabled
LED I/O 4	Turns solid when Timeout occurs
LED I/O 5	User controlled from Command Message
LED I/O 6	User controlled from Command Message
LED Opto 1-4	Shows states of Opto inputs
LED Relay 1-5	Shows activation states of Relays

Table 3: LED functions of the neoRADI/O

Section E – Message Setup

The last section to cover is the messaging convention used to communicate to the neoRADI/O. As mentioned before, only two arbitration IDs are used: one to send commands and one for reports. neoRADI/O ships with DBC and VS3 databases that can be used with almost any CAN tool on the market. The database files will decode the report messages and give the encoding for the command message. Table 4 and 5 describes the decoding for the two messages.

Control Message 0x600 + offset			Input range	Length	Signal Type	Decoding
Byte 1	Bit 0	Set Relay 1 Activation State	0/1	1 Bit	Digital	N/A
	Bit 1	Set Relay 2 Activation State	0/1	1 Bit	Digital	N/A
	Bit 2	Set Relay 3 Activation State	0/1	1 Bit	Digital	N/A
	Bit 3	Set Relay 4 Activation State	0/1	1 Bit	Digital	N/A
	Bit 4	Set Relay 5 Activation State	0/1	1 Bit	Digital	N/A
	Bit 5	Set LED IO 5 State	0/1	1 Bit	Digital	N/A
	Bit 6	Set LED IO 6 State	0/1	1 Bit	Digital	N/A
Byte 2		Input Report Rate MSB in milliseconds (set Byte 2 and Byte 3 to 0 to disable reporting)	0 to 255	1 Byte	Analog	
Byte 3		Input Report Rate LSB in milliseconds (set Byte 2 and Byte 3 to 0 to disable reporting)	0 to 255	1 Byte	Analog	
Byte 4		Set to 0 for Sending Report at rate set by Bytes 2 and 3 Set to 1 - 255 for sending Report on any input change. Value determines amount of change needed to report on analog channels	0 to 255	1 Byte	Analog	N/A
Byte 5		Set to 0 to disable relay time out Set between 1 - 255 sets Number of 100 ms clicks to wait till relay deactivate (Resend message to refresh)	0 to 25500ms	1 Byte	Analog	N*100

Table 4: Control Message

Report Message 0x640 + offset			Input range	Length	Signal Type	Decoding
Byte 1	Bit 0	Status of Digital Input Opto IO 1	0/1	1 Bit	Digital	N/A
	Bit 1	Status of Digital Input Opto IO 2	0/1	1 Bit	Digital	N/A
	Bit 2	Status of Digital Input Opto IO 3	0/1	1 Bit	Digital	N/A
	Bit 3	Status of Digital Input Opto IO 4	0/1	1 Bit	Digital	N/A
Byte 2		Analog input 1 Value	0 to 26 volt	1 Byte	Analog	N*(26/255)
Byte 3		Analog input 2 Value	0 to 26 volt	1 Byte	Analog	N*(26/255)
Byte 4		Analog input 3 Value	0 to 26 volt	1 Byte	Analog	N*(26/255)
Byte 5		Analog input 4 Value	0 to 26 volt	1 Byte	Analog	N*(26/255)
Byte 6		Analog input 5 Value	0 to 5 volt	1 Byte	Analog	N*(5/255)
Byte 7		Digital Input Status (all 4 in 1 byte)	0 to 15 count	4 bit	Analog	N

Table 5: Report Message