

## *J1939 - SD Data Logging*

### NOTICE

This application note is provided for use as a general example and a guide. Divelbiss assumes no responsibility, liability or warranty regarding this application, its use, functionality or reliability to meet application needs. User assumes all responsibility to ensure all safety precautions are taken when using this application note. This application must not be used alone in applications which would be hazardous to personnel in the event of a failure. Precautions must be taken by the user to provide mechanical and/or electrical safeguards external to this application and controllers shown.

## Application Description

AN-121 demonstrates the reading of J1939 PGN/SPN data by the Divelbiss VB-2200 and writing this data to a SD card periodically and on event. The data is written in comma separated value (.csv) format to allow direct opening of file by spreadsheet programs such as Microsoft Excel. It is possible, however, to write the data in other formats, or binary form, due to the flexibility of the Structured Text programming language. For demonstration purposes, this example utilizes the standard J1939 database included with EZ Ladder Toolkit, however, should custom PGN/SPN data be required, a custom data base may be created from within EZ Ladder Toolkit consisting of broadcast, request, and even NMEA2000 messages. Since the data logging is controlled programmatically, log events may be triggered periodically, on event, or by other means.

## Equipment Used

VB-2200 Controller	
Controller Part #:	VB-2200
Programming Software:	EZ LADDER Toolkit, V1.2.0.1 or later
Other	J1939 Simulator
Application Filename:	AN121.dld
Programming Cable:	SI-PGM

Other controllers may be used providing that they support J1939 and SD Data Logging. Others would include HEC-P5000 Series, P-Series Bear Bones, P-Series PLC on a Chip and VB-2000 Series.

## Program Description

Rungs 1-3:

Power up timer – inhibits logging on power up to allow system to receive J1939 data, thus preventing logging of invalid values.

Rung 4:

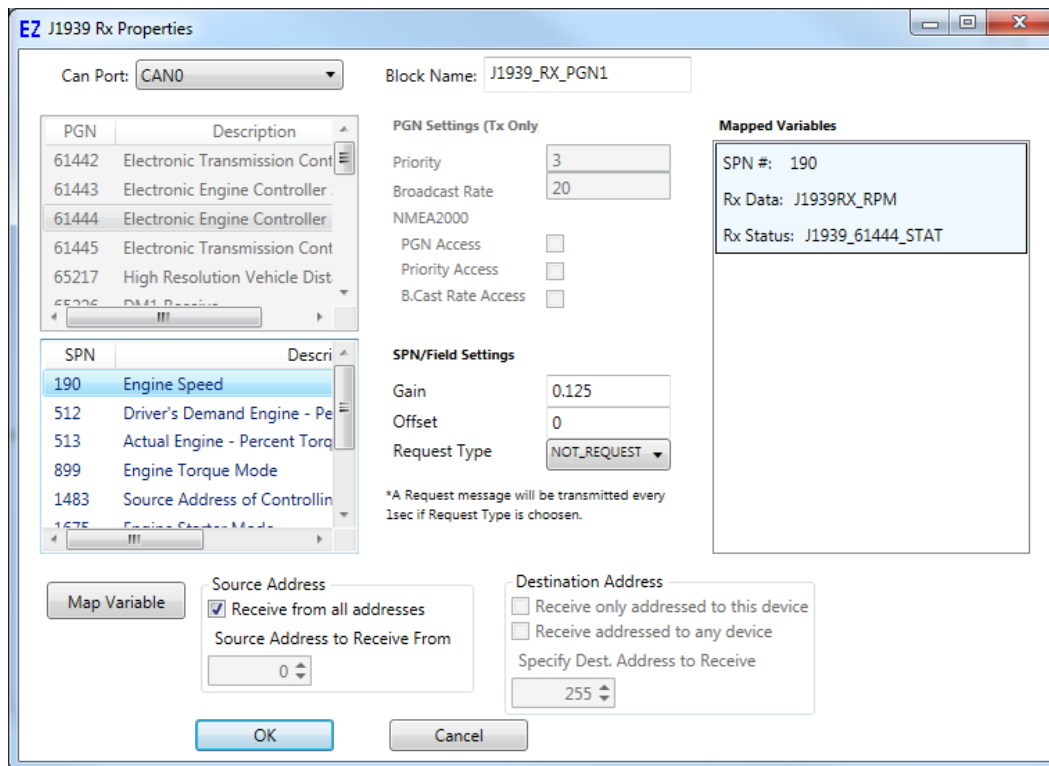
Enables power to CAN interface. In the VB-2x00 product line, CAN power may be disabled to reduce power consumption in low power applications.

Rungs 6-31:

Display of Received J1939 parameters used for this example and J1939 Receive function blocks. Each function block maps SPN values from a respective PGN to EZ Ladder variables.

Rungs 32-37:

Function blocks to read current date and time date from the PLC on a Chip Real Time Clock.



Rungs 38-50:  
SD Card data logging.

Rungs 39-42:  
Periodic logging trigger – logs data every time RTC\_SEC variable from real time clock = 3 (1 time per minute).

Rungs 43-46:  
On event logging trigger – logs data upon the occurrence of an event. In this example, whenever J1939 Oil Pressure drops below the trigger threshold, data is logged.

Rungs 47-50:  
Writes data to SD card when triggered. Note that the function block 'WR\_DATA\_LOG1' is triggered on rising edge signal from the various logging event triggers (including a manual trigger – rung 50). Upon completion of logging, the 'Q' output of the 'WR\_DATA\_LOG1' function block goes TRUE, triggering a pulse timer that turns on USER LED1 on the VB-2200 for 1 second to indicate that a data log was written successfully.

Rungs 51-56:  
Used to manually set the real time clock in this demo.

Structured Text function block 'WR\_DATA\_LOG'  
The structured text function block 'WR\_DATA\_LOG' handles all SD Card functionality. Upon detection of a rising edge on the 'Enable' input, the function block opens (or creates and opens) a file named 'datalog.csv' on the SD card. The size of the file is then read from the card, and the file pointer is set to read the LOG\_ID of the last record written. This LOG\_ID value is then incremented and new data is written to the file. The file is then closed.

Example Log Records:

```
156, 4- 2-2015, 13:49:40, 150.0, 195.0, 15.0, 500.0, 1500, 62
157, 4- 2-2015, 13:50:00, 150.0, 195.0, 15.0, 500.0, 1500, 62
```