CANcrusher Car Hack / Development Platform

Hardware/System Features:

- 3 independent CAN channels supporting DW-CAN, SW-CAN, and LSFT CAN based on the MCP2515 CAN controller.
- 1 LIN/KLINE channel
- Bluetooth radio (RN42) with built-in SPP (acts like a serial port)
- SIM808 GSM / GPS Radio
- USB

- SD Datalogging using Bill Greiman's SDfat library for up to 64GB cards
- Real time clock using the DS3231 high precision RTC
- Teensy 3.1 (ARM Cortex M4) running @ 96MHz
- 8 Multi-purpose Inputs and Outputs for directly interfacing with the vehicle (outputs are open collector negative outputs with optional pull-up resistors.)
- LED Indicators (4 LEDs)

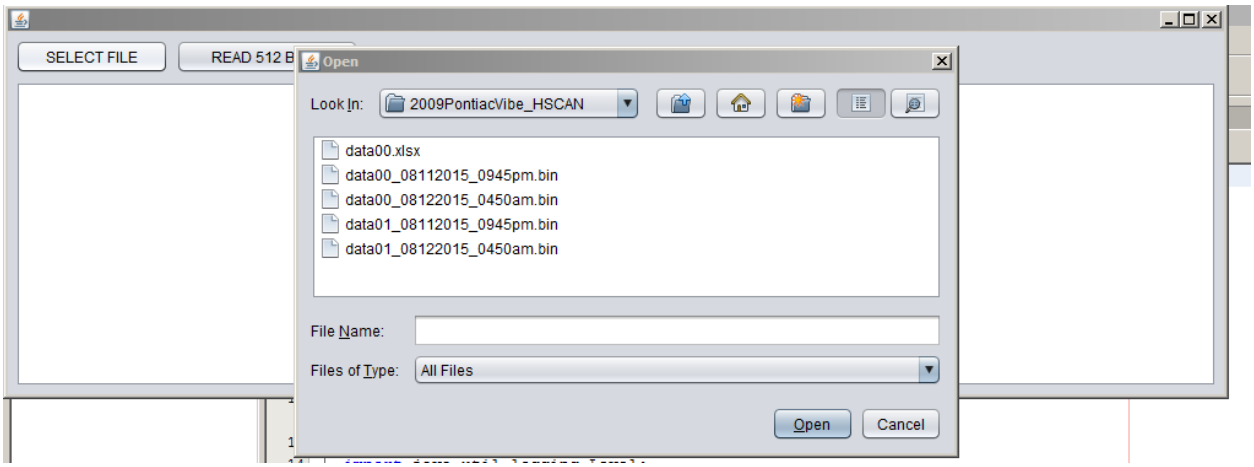
SOFTWARE:

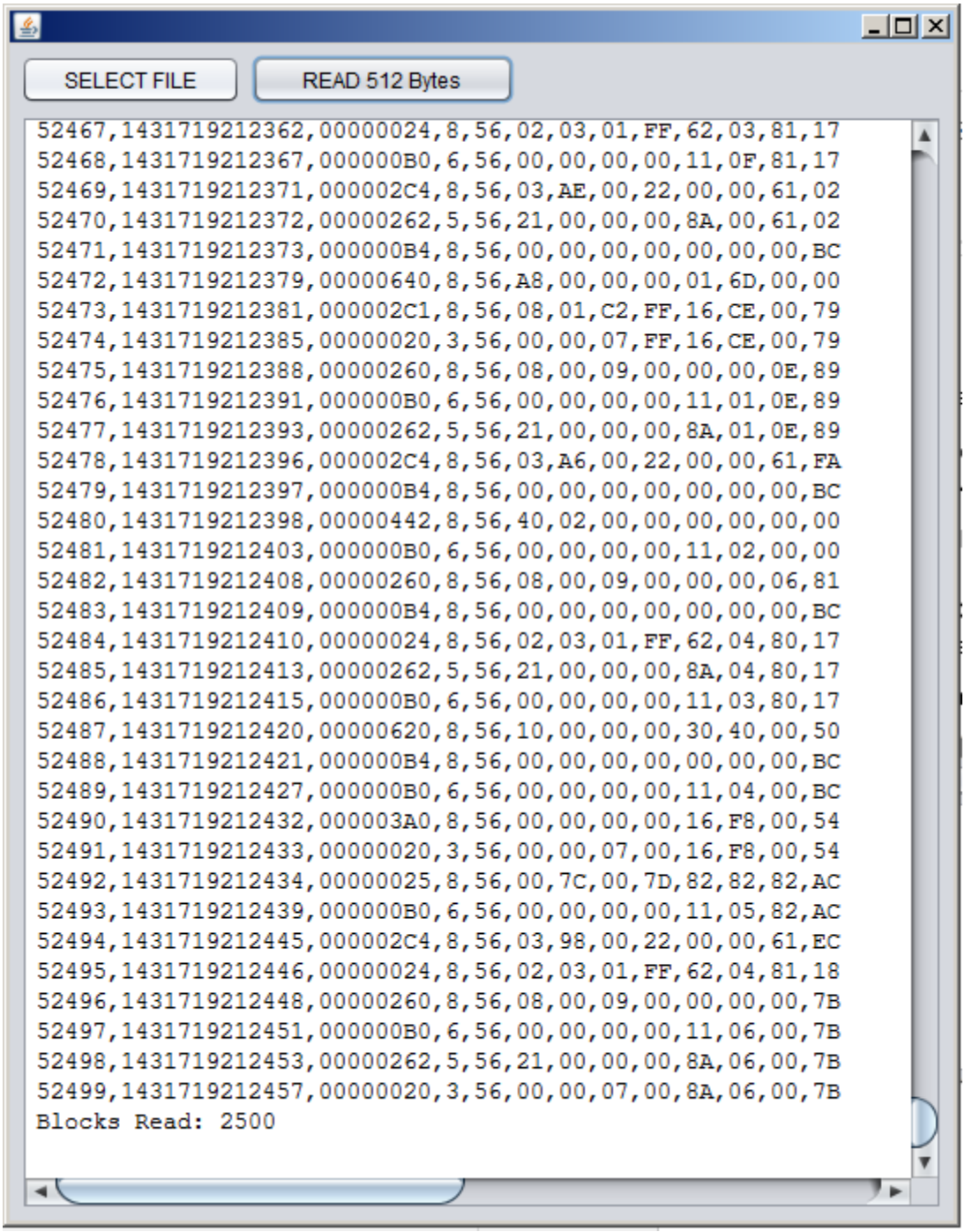
The firmware is Open Source (GNU General Public License), Arduino compatible and uses many of the libraries people know and love/hate.

On the computer-side, the initial software will be developed in Java with some of the following goals (some early versions of these features is done already):

- USB or Bluetooth communication with the CANcrusher
- CAN bus monitor allowing sending and receiving data, processing, reverse engineering, etc...
- Accepts CAN databases (*.dbc) format
- Imports and exports log files in Vector and Intrepid Controls Systems format

Early version of the binary file exporting tool:




SELECT FILE
READ 512 Bytes
52467,1431719212362,00000024,8,56,02,03,01,FF,62,03,81,17
52468,1431719212367,000000B0,6,56,00,00,00,00,11,0F,81,17
52469,1431719212371,000002C4,8,56,03,AE,00,22,00,00,61,02
52470,1431719212372,00000262,5,56,21,00,00,00,8A,00,61,02
52471,1431719212373,000000B4,8,56,00,00,00,00,00,00,00,BC
52472,1431719212379,00000640,8,56,A8,00,00,00,01,6D,00,00
52473,1431719212381,000002C1,8,56,08,01,C2,FF,16,CE,00,79
52474,1431719212385,00000020,3,56,00,00,07,FF,16,CE,00,79
52475,1431719212388,00000260,8,56,08,00,09,00,00,00,0E,89
52476,1431719212391,000000B0,6,56,00,00,00,00,11,01,0E,89
52477,1431719212393,00000262,5,56,21,00,00,00,8A,01,0E,89
52478,1431719212396,000002C4,8,56,03,A6,00,22,00,00,61,FA
52479,1431719212397,000000B4,8,56,00,00,00,00,00,00,00,BC
52480,1431719212398,00000442,8,56,40,02,00,00,00,00,00,00
52481,1431719212403,000000B0,6,56,00,00,00,00,11,02,00,00
52482,1431719212408,00000260,8,56,08,00,09,00,00,00,06,81
52483,1431719212409,000000B4,8,56,00,00,00,00,00,00,00,BC
52484,1431719212410,00000024,8,56,02,03,01,FF,62,04,80,17
52485,1431719212413,00000262,5,56,21,00,00,00,8A,04,80,17
52486,1431719212415,000000B0,6,56,00,00,00,00,11,03,80,17
52487,1431719212420,00000620,8,56,10,00,00,00,30,40,00,50
52488,1431719212421,000000B4,8,56,00,00,00,00,00,00,00,BC
52489,1431719212427,000000B0,6,56,00,00,00,00,11,04,00,BC
52490,1431719212432,000003A0,8,56,00,00,00,00,16,F8,00,54
52491,1431719212433,00000020,3,56,00,00,07,00,16,F8,00,54
52492,1431719212434,00000025,8,56,00,7C,00,7D,82,82,82,AC
52493,1431719212439,000000B0,6,56,00,00,00,00,11,05,82,AC
52494,1431719212445,000002C4,8,56,03,98,00,22,00,00,61,EC
52495,1431719212446,00000024,8,56,02,03,01,FF,62,04,81,18
52496,1431719212448,00000260,8,56,08,00,09,00,00,00,00,7B
52497,1431719212451,000000B0,6,56,00,00,00,00,11,06,00,7B
52498,1431719212453,00000262,5,56,21,00,00,00,8A,06,00,7B
52499,1431719212457,00000020,3,56,00,00,07,00,8A,06,00,7B
Blocks Read: 2500

COM Protocol for Bluetooth and USB interface:

The protocol is still in development, but here is an example of the data packets that will be exchanged between the CANcrusher and the computer when not in logging mode.

Protocol Byte	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	A5	5A	ID	DATA												
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	DATA															
	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
	DATA															
	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
	DATA															CRC

00	3	{4:11} 8-bytes	{12:15} 4-bytes	16	17	{18:25} 8-bytes
ID	DAT	EPOCH TIME	CAN_ID	DLC	STAT	Data Bytes[0-7]

	{26:33} 8-bytes	{34:37} 4-bytes	38	39	{40:47} 8-bytes
	EPOCH TIME	CAN_ID	DLC	STAT	Data Bytes[0-7]

48	49	50	{51:62}
IO_DIR	IO_VAL	bufSize	UNUSED

DAT	0: IO Only, 1: 1 CAN Msg, 2: 2 CAN Msgs, 3: 2 CAN + IO
bufSize	Remaining buffers of data in the CANcrusher with data

Early example of the CAN messages being sent to a Java GUI: