RibEye Simulator
Version 2
September 4, 2019

Introduction:
The RibEye Simulator is a PC based program that simulates the Ethernet communication protocol of the RibEye measurement system. For more information on the RibEye communication protocol download the latest version from the RibEye tab of the Boxboro Systems website (www.boxborosystems.com)

The simulator program supports all current RibEye models. The program can run on Windows 7 and Windows 10. The program is written in National Instruments Labwindows CVI 2017, and the installer will install the Labwindows run-time engine on the target PC.

Installation:
Download the installation program from the RibEye tab of the Boxboro Systems website and unzip it to a new folder. Run setup.exe and follow the instructions on the screen.

Operation:
When you start the program, Resim.exe, you will see the following screen (Figure 1):

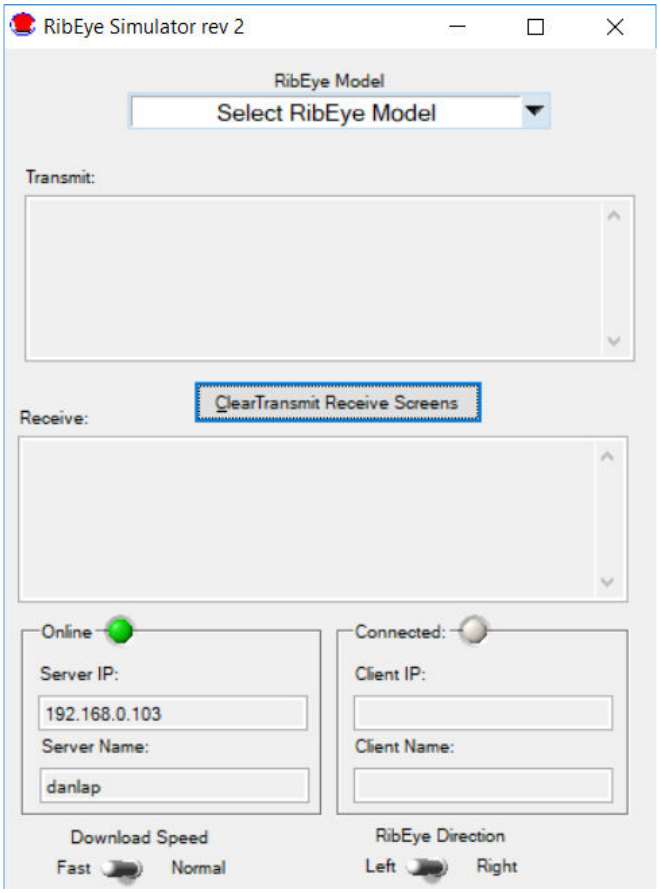

Figure 1. Simulator program at startup

The program will automatically set up a TCP server, and show the IP address of the PC. To start the simulator, select a RibEye model from the drop-down box at the top. When your application program connects to the simulator, the connected light will turn green, and the IP address of your computer will be shown as the client. Note that you can run your application on the same PC as the server, as shown in the screen below. You can also run your program from another computer on the same LAN.

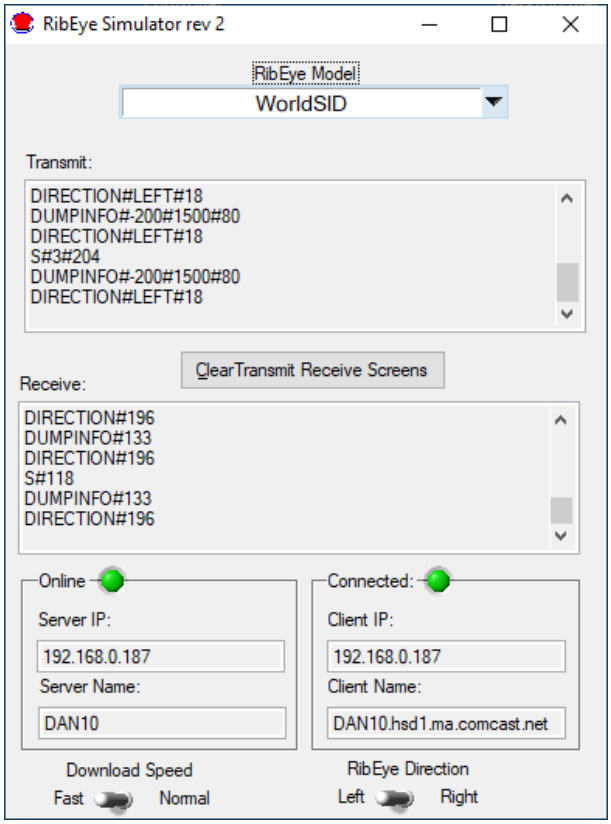

Figure 2. Simulator screen after conection

Commands that you send will be shown in the Receive box. RibEye responses are shown in the Transmit box.

Table 1 shows the data the Simulator will generate for the RibEye commands for all of the models.

For the CURRENT_POSITIONS command the simulator will generate data for the LED positions as follows:

LED Number. Axis where the axis is 1 for X, 2 for Y and 3 for Z

For example, for Led#1 X data will be 1.1, Y data is 1.2, and Z data will be 1.3

On startup, the program will simulate a RibEye powered up with test data in flash memory, with the data begin time of –500ms (-200ms for WorldSID) and a data end time of 1500 ms.

Data	WorldSID	50th	50th 3-axis	5th	SIDIIs	Polar	Ballistic	50th ADJ
Serial Number	0075							
Calibration Date	25 January 2010							
Calibration Location	Boxboro Systems, Boxboro MA							
Model	WorldSID	50th Male	50th 3D	5th Female	SIDIIs	POLAR	Ballistic	50th ADJ
Firmware	WSID6	50S0005	50_3D_01	5S0004	S2S_003	P0000	BS000	50S0005
# of LEDS	18	12	6	12	6	6	3	12
# of Axes	3	2	3	2	3	2	3	2
Sample Rate	10000	10000	1000	10000	10000	10000	20000	10000
# of Sectors to Erase	32	32	26	32	26	18	30	32
Test Comment	WorldSID 50th	HIII 50TH	HIII 50TH 3-AXIS	HIII 5TH FEMALE	SIDIIs	POLAR	3-rib Ballistic Test Stand	HIII 50TH
Data points per line in DUMPBINA	60	27	21	27	21	14	12	27
Data points per line in DUMPBIN	54	24	18	24	18	12	9	24

Table 1. Data reported by Simulator for each RibEye Model

If you erase the memory using the Erase command, and ARM and Trigger the RibEye, you can have up to 30 seconds of data (25 seconds for WorldSID), simulating the DRAM storage in the RibEye.

When you send an ARM command to the RibEye Simulator a Trigger button will appear on the screen. This button simulates a hardware trigger. Note that you can also generate a software trigger using the T# protocol command. The trigger button is shown on the screen below. (figure 3).

The Trigger button will also appear if you send an ARMTRIGGER command for a trigger check routine. If you click the trigger button after an ARMTRIGGER command, then when you send a TRIGGERCHECK command it will return a 1.

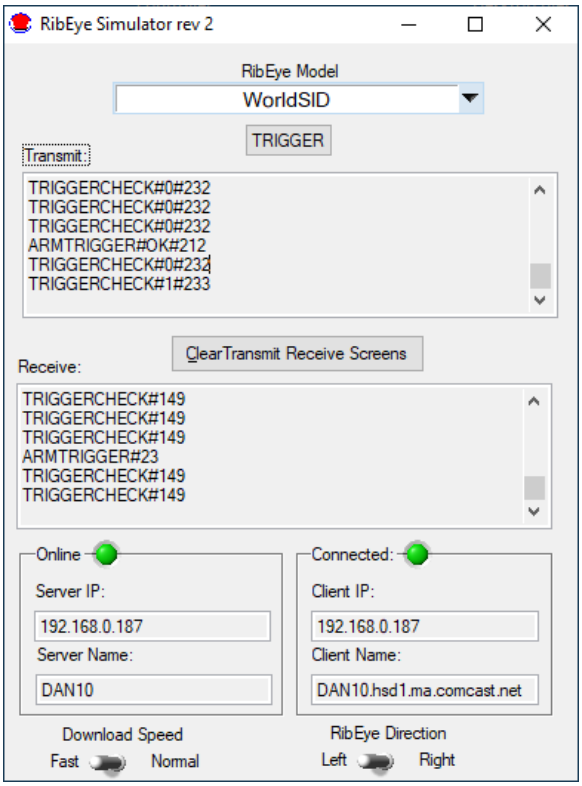

Figure 3. Simulator screen showing Trigger button

Note that there is a Download Speed toggle switch on the bottom of the screen. In the FAST position the simulator downloads data much faster than an actual RibEye can because the PC Ethernet communications are much faster than the RibEye. In the NORMAL position the simulator slows down communications to the typical RibEye speeds.

When downloading data from the RibEye using the DUMPBIN or DUMPBINA commands, pre-trigger data for each channel the data will be

led number *10 + axis number

post trigger data will be

led number *10 +10+axis number/10

Table 2 shows an example for the WorldSID simulated data.
Figure 4 shows a plot of the simulated data for a WorldSID, ribs 1-3, leds 1-9

led #	pre-T0 X	post-T0 X	pre-T0 Y	post-T0 Y	pre-T0 Z	post-T0 Z
1	11	20.1	12	20.2	13	20.3
2	21	30.1	22	30.2	23	30.3
3	31	40.1	32	40.2	33	40.3
4	41	50.1	42	50.2	43	50.3
5	51	60.1	52	60.2	53	60.3
6	61	70.1	62	70.2	63	70.3
7	71	80.1	72	80.2	73	80.3
8	81	90.1	82	90.2	83	90.3
9	91	100.1	92	100.2	93	100.3
10	101	110.1	102	110.2	103	110.3
11	111	120.1	112	120.2	113	120.3
12	121	130.1	122	130.2	123	130.3
13	131	140.1	132	140.2	133	140.3
14	141	150.1	142	150.2	143	150.3
15	151	160.1	152	160.2	153	160.3
16	161	170.1	162	170.2	163	170.3
17	171	180.1	172	180.2	173	180.3
18	181	190.1	182	190.2	183	190.3

Table 2. Pre and Post Trigger DUMPBIN data for a WorldSID

The DUMPBINA command appends the ambient light data for each sensor to the data stream. The ambient light data, in counts, will always be 1000 for sensor 1, 2000 for sensor2, 3000 for sensor 3 etc. Note that the WorldSID has 6 sensors.

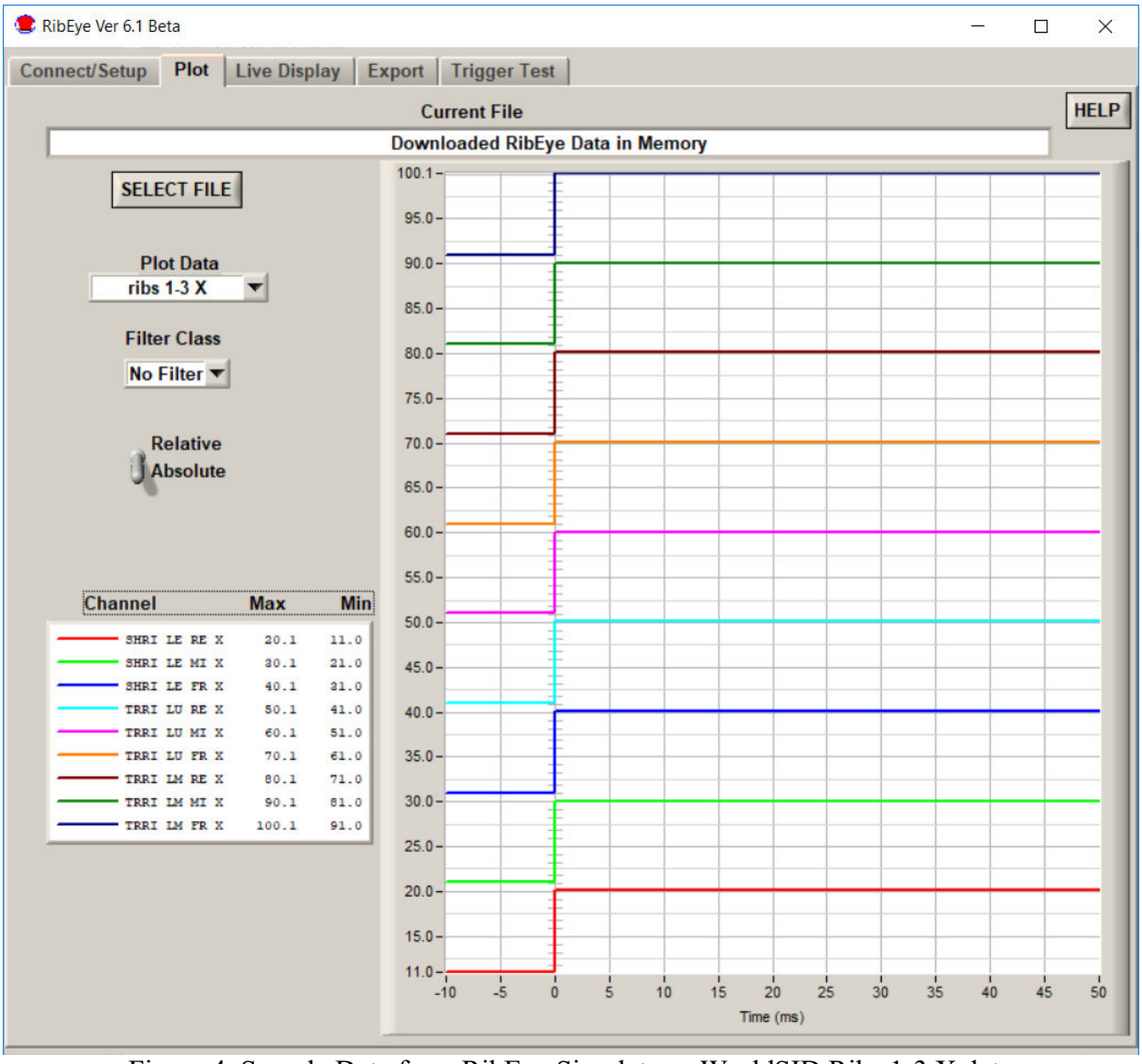

Figure 4. Sample Data from RibEye Simulator – WorldSID Ribs 1-3 X data

Direction Command and Toggle switch:
The simulator screens have a RibEye direction toggle switch in the lower right corner. For WorldSID, SIDIIs, and Polar RibEyes a Direction command will respond with the switch setting telling you which impact side the RibEye is monitoring, Left or Right. For all other models, the RibEye is always facing the center in the X direction, and the Direction command is not implemented and will return the ?2 bad command response.
Note that when the RibEye is installed in a dummy the appropriate calibration curve must be loaded into the RibEye. This will be done in the ATD lab using Boxboro Systems software.