# INSTRUCTIONS FOR MONITORING HEAD AMP DATA

## Setup

1. Remove the existing head amp data connections and connect the supplied cables as shown in Figure 1. Connect the USB connector from the EZ-Tap to a free USB port on the PC.

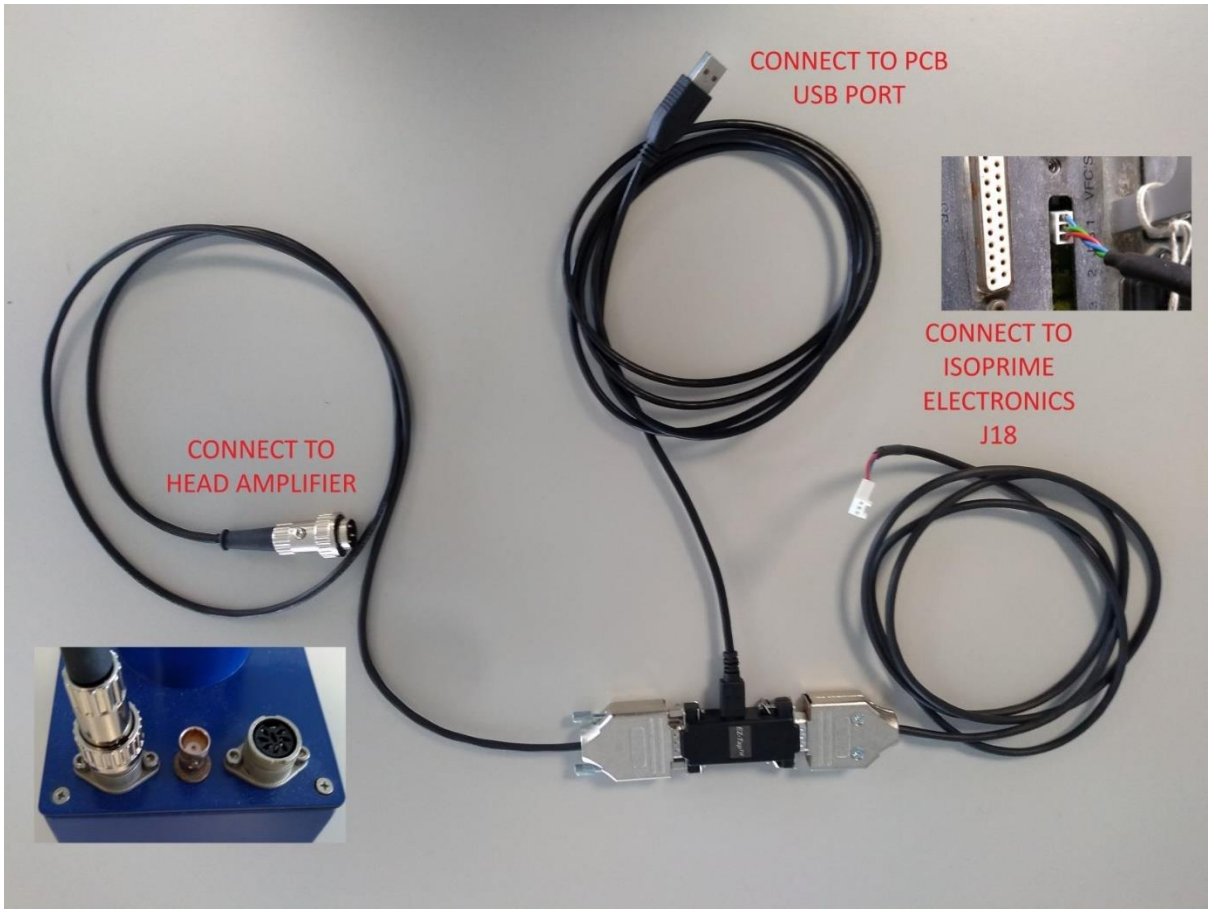


Figure 1: Cable Connections

2. Install the EZ-View software, *EZView_1_6_9.msi*, supplied on the USB stick or download from https://www.stratusengineering.com/downloads/

3. Start the EZ-View application and select *File->Load Settings* from the menu as shown in Figure 2. Browse to file *Head Amp.evs* supplied on the USB stick. This loads the settings for capturing head amp data. Then select *Settings->Display Mode->Line Mode* from the menu as shown in Figure 3.

4. Start capturing the data by clicking on the green play button in the tool bar. The head amp data should now appear in the window as shown in Figure 4.

5. Data can be captured to a file by selecting File->Save Data as Text or File->Save Data as Binary from the menu.

6. Refer to the following section for an explanation of the data structure.

7. Note that when plugged into the PC the EZ-Tap device creates 2 serial ports; this is so that it can monitor both transmitted and received data. The serial port numbers, e.g. COM4, COM5 are not explicitly referred to in the EZ-View software.

8. The user can then write their own software to capture the data on the appropriate port.

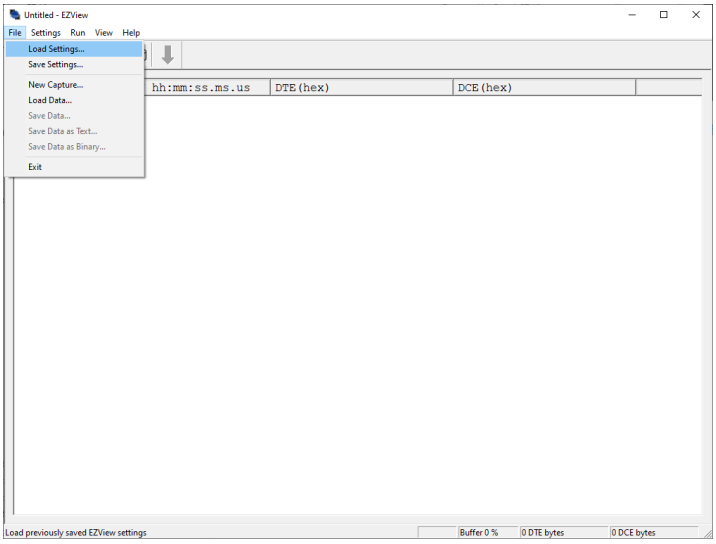


Figure 2: EZ-View Loading Settings

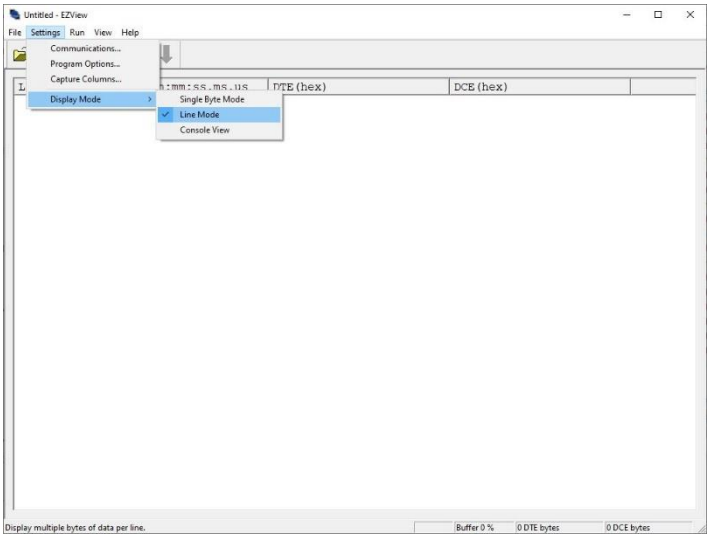


Figure 3: Display Mode

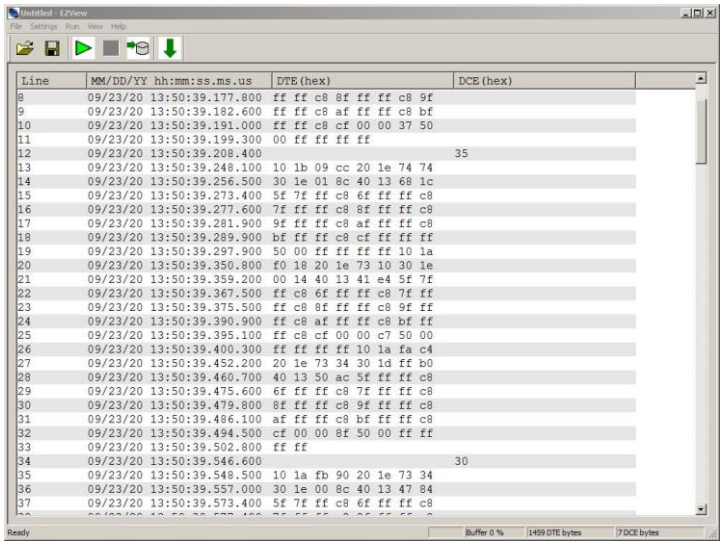


Figure 4: Head Amp Data

## Data Structure

1. An example of a data capture is shown in file *Head Amp Capture.txt* supplied on the USB stick.
2. Note that there are 2 groups of data, DTE and DCE. This corresponds to data transmitted from and data received by the head amplifier respectively. The DCE data can be ignored as it serves no purpose.
3. The data transmitted by the head amp consists of 54 bytes sent every 100ms. The data is structured as detailed in Table 1 and Table 2.
4. Note that the terminator is 4 consecutive bytes of FF (hex). This can be used to align the data.
5. An extract from *Head Amp Capture.txt* is shown with the beam data highlighted in different colours. Beam 2 (Red), Beam 4 (Blue), Beam 1 (Green), Beam 3 (Orange)

| Byte Number | Parameter | Collector | Beam Number | Full Scale (nA) | Value |
|---|---|---|---|---|---|
| 0-3 | Channel 1 Current | B | 2 | 0.2 | See Table 2 |
| 4-7 | Channel 2 Current | D | 4 | 20 | |
| 8-11 | Channel 3 Current | A | 1 | 20 | |
| 12-15 | Channel 4 Current | C | 3 | 0.1 | |
| 16-19 | Channel 5 Current | E | 5 | Custom | |
| 20-23 | Channel 6 Current | F | 6 | | |
| 24-27 | Channel 7 Current | G | 7 | | |
| 28-31 | Channel 8 Current | H | 8 | | |
| 32-35 | Channel 9 Current | Not connected | | | |
| 36-39 | Channel 10 Current | Not connected | | | |
| 40-43 | Channel 11 Current | J | 9 | Custom | |
| 44-48 | Channel 12 Current | K | 10 | | |
| 49-50 | Gain Setting (Unused) | Not Applicable | | | Don't Care |
| 50-53 | Terminator | Not Applicable | | | FFFFFFFF(hex) |

Table 1: Head Amp Data Structure

| Byte Allocation (Big Endian Byte Order) | |
|---|---|
| **D31..D28** | **D27..D0** |
| Channel Number | Beam Current<br><br>Full Scale=DFFFFC8(hex), 234,880,968(decimal)<br>Overflow=FXXXXXX(hex)<br>D1..0 are always 0<br><br>Note: There is an electronic offset of 1% of full scale |

Table 2: Byte Allocation

| Line | MM/DD/YY hh:mm:ss.ms.us | DTE(hex) | DCE(hex) |
|---|---|---|---|
| 1 | 09/23/20 11:18:06.819.000 | ff ff c8 bf ff ff c8 cf | |
| 2 | 09/23/20 11:18:06.827.100 | 00 00 77 50 00 ff ff ff | |
| 3 | 09/23/20 11:18:06.835.300 | ff 10 1a ba 8c 20 1e 3e | |
| 4 | 09/23/20 11:18:06.886.900 | 9c 30 1d b5 74 40 14 bf | |
| 5 | 09/23/20 11:18:06.895.400 | 1c 5f 7f ff c8 6f ff ff | |
| 6 | 09/23/20 11:18:06.908.700 | c8 7f ff ff c8 8f ff ff | |
| 7 | 09/23/20 11:18:06.912.900 | c8 9f ff ff c8 af ff ff | |
| 8 | 09/23/20 11:18:06.920.500 | c8 bf ff ff c8 cf 00 00 | |
| 9 | 09/23/20 11:18:06.928.500 | 3f 50 00 ff ff ff ff 10 | |
| 10 | 09/23/20 11:18:06.981.600 | 1a a6 ec 20 1e 3f 20 30 | |
| 11 | 09/23/20 11:18:06.989.600 | 1d b5 d4 40 14 a1 2c 5f | |
| 12 | 09/23/20 11:18:06.998.600 | 7f ff c8 6f ff ff c8 7f | |
| 13 | 09/23/20 11:18:07.006.600 | ff ff c8 8f ff ff c8 9f | |
| 14 | 09/23/20 11:18:07.014.600 | ff ff c8 af ff ff c8 bf | |
| 15 | 09/23/20 11:18:07.027.800 | ff ff c8 cf 00 00 07 50 | |
| 16 | 09/23/20 11:18:07.031.600 | 00 ff ff ff ff 10 1a af | |
| 17 | 09/23/20 11:18:07.083.600 | 3c 20 1e 3e b8 30 1d b5 | |
| 18 | 09/23/20 11:18:07.091.600 | 7c 40 14 c7 34 5f 7f ff | |
| 19 | 09/23/20 11:18:07.099.800 | c8 6f ff ff c8 7f ff ff | |
| 20 | 09/23/20 11:18:07.108.300 | c8 8f ff ff c8 9f ff ff | |
| 21 | 09/23/20 11:18:07.116.800 | c8 af ff ff c8 bf ff ff | |
| 22 | 09/23/20 11:18:07.125.300 | c8 cf ff ff cf 50 00 ff | |
| 23 | 09/23/20 11:18:07.133.700 | ff ff ff | |
| 24 | 09/23/20 11:18:07.145.700 | | 0d |
| 25 | 09/23/20 11:18:07.179.800 | 10 1a a6 10 20 1e 3e ec | |
| 26 | 09/23/20 11:18:07.188.300 | 30 1d b6 78 40 14 ad c0 | |
| 27 | 09/23/20 11:18:07.205.300 | 5f ff ff c8 6f ff ff c8 | |
| 28 | 09/23/20 11:18:07.209.500 | 7f ff ff c8 8f ff ff c8 | |
| 29 | 09/23/20 11:18:07.213.800 | 9f ff ff c8 af ff ff c8 | |
| 30 | 09/23/20 11:18:07.221.800 | bf ff ff c8 cf 00 00 97 | |
| 31 | 09/23/20 11:18:07.229.800 | 50 00 ff ff ff ff 10 1a | |
| 32 | 09/23/20 11:18:07.283.000 | a7 8c 20 1e 3e b0 30 1d | |
| 33 | 09/23/20 11:18:07.291.400 | b5 88 40 14 b0 80 5f 7f | |
| 34 | 09/23/20 11:18:07.299.800 | ff c8 6f ff ff c8 7f ff | |
| 35 | 09/23/20 11:18:07.307.400 | ff c8 8f ff ff c8 9f ff | |
| 36 | 09/23/20 11:18:07.315.000 | ff c8 af ff ff c8 bf ff | |
| 37 | 09/23/20 11:18:07.328.800 | ff c8 cf 00 00 5f 50 00 | |
| 38 | 09/23/20 11:18:07.332.800 | ff ff ff ff 10 1a b2 1c | |
| 39 | 09/23/20 11:18:07.384.100 | 20 1e 3d f8 30 1d b6 60 | |
| 40 | 09/23/20 11:18:07.392.700 | 40 14 c1 e4 5f 7f ff c8 | |

Figure 5: Example Data

NSF 23/09/20