



Event Recorder User Manual

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1. Introduction

The Event Recorder is for recording of pre-defined data to detect and trouble shoot the dynamic behavior or failure of train control. Retained memory is used for keeping data in case train and / or ICP boards are switched off.

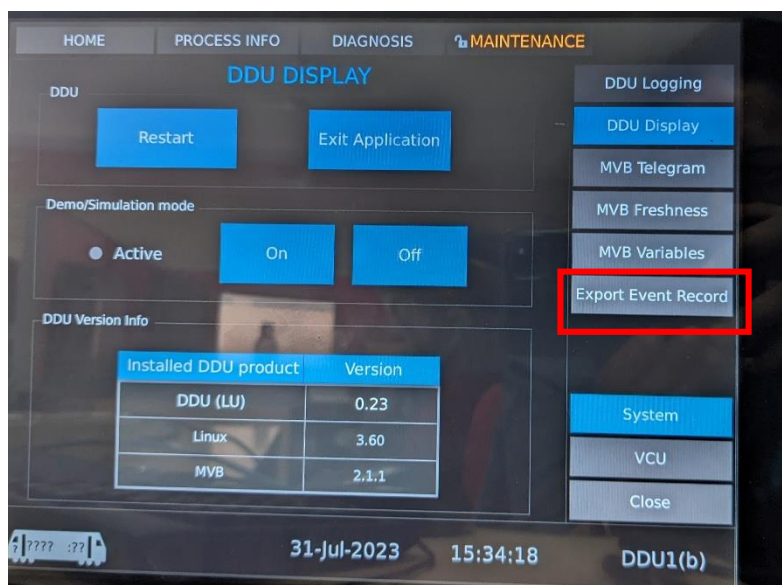
The event recorder functionality of BHEL is built in to the ARC make DDU. The event recorder is storing pre-defined data, selected from the data available of the TCMS system.

Event Recorder shall do the logging 43 signals in every 1 second, and 30 days' records shall be stored. The log files can be downloaded from the DDU and decoded using the Event Record Monitoring System

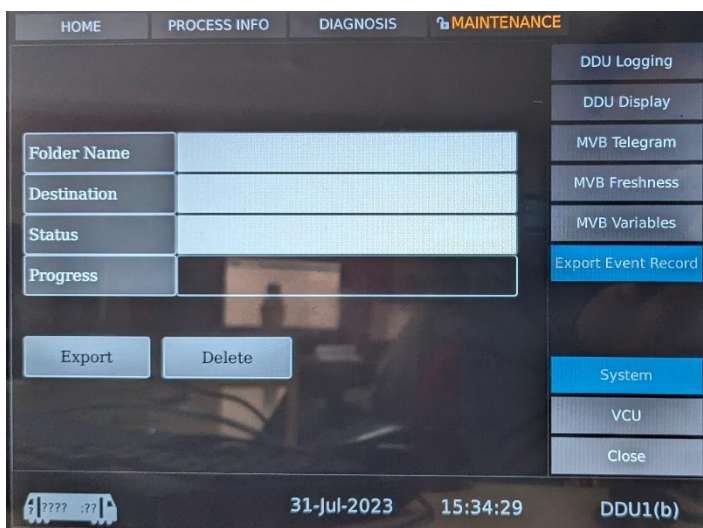
2. Downloading the Event Records

The software of the ARC make DDU in BHEL shall be updated with Event Record functionality. After the update the following steps may be performed to download the data in the USB drive.

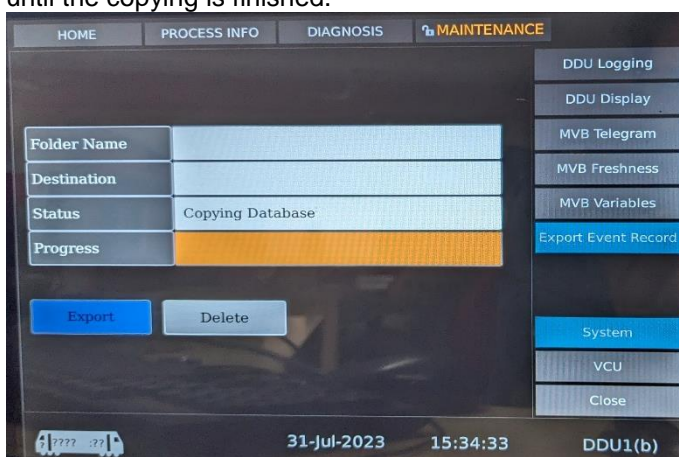
1. On the Home Screen, click on Maintenance Tab. Enter the password to login to Maintenance Page
2. Click on Export Event Record on the right hand side



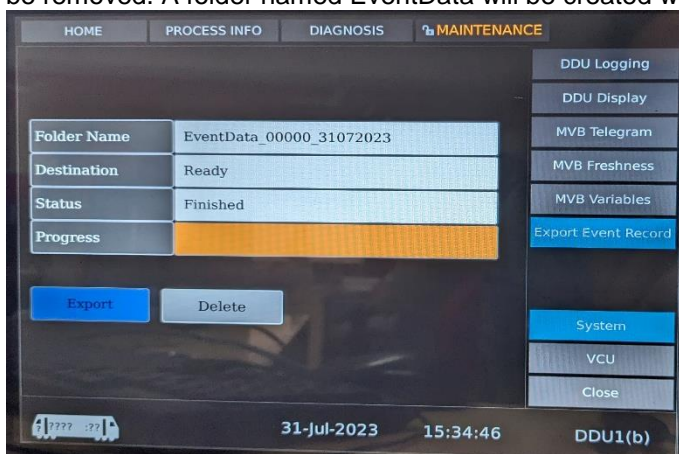
3. Ensure that USB drive is inserted in the DDU. Click on "Export" button. Before clicking "Export" button, ensure that there is no folder named EventData existing in the USB drive. In case it exists, please delete it.



4. After clicking the “Export” button, the following screen will appear. Please wait for some time until the copying is finished.



5. Once the copying is finished, the following screen will be displayed. Now the USB drive can be removed. A folder named EventData will be created with date-wise log files.



6. One by one, the files can be decoded using the Event Record Monitoring System

3. Event Record Monitoring System User Guide

The following sections describe how to use the Event Record Monitoring System(Interface Tool) to decode the Event Record log files.

3.1 Login Screen

The Login screen once the software is opened is depicted in the Figure 1.



Figure 1: Main Screen

Enter User Name and Password, and click on LOGIN to move to next screen.

Presently, the following credentials are used:

User Name: bhel

Password: bhel@123

If wrong credentials are entered, the following message as shown in Figure 2 will be displayed.

If you wish to close the application, click on EXIT.

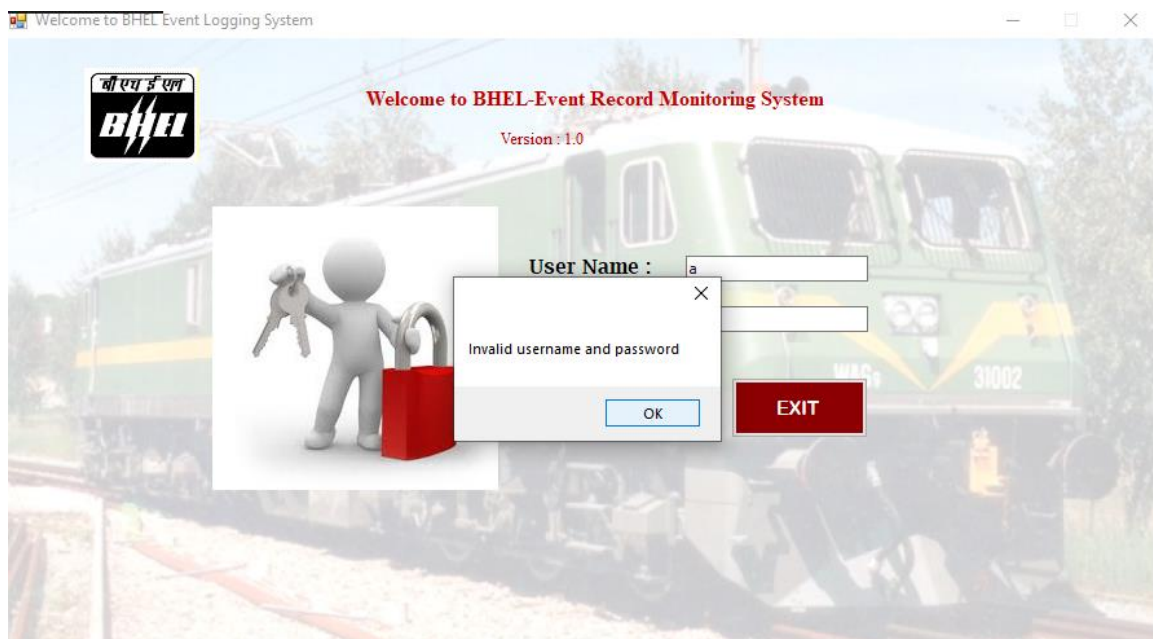


Figure 2: Error Message

3.2 Upload File Screen

Once the User has logged in with the correct credentials, the page shown in the Figure 3 gets loaded.



Figure 3: Upload File Screen

Click on the “Open” icon to select the file.

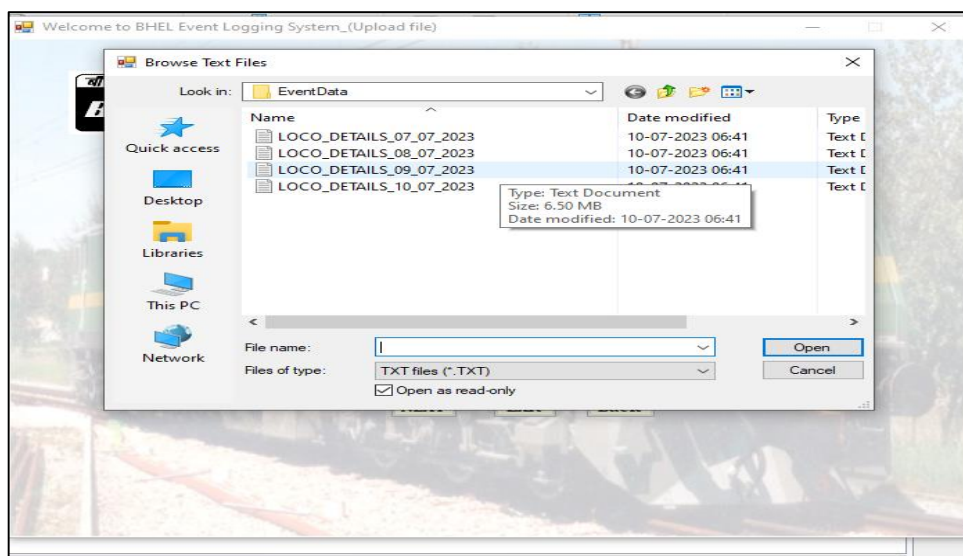


Figure 4: File Explorer

Click on the correct log file and press Open as shown in Figure 4.

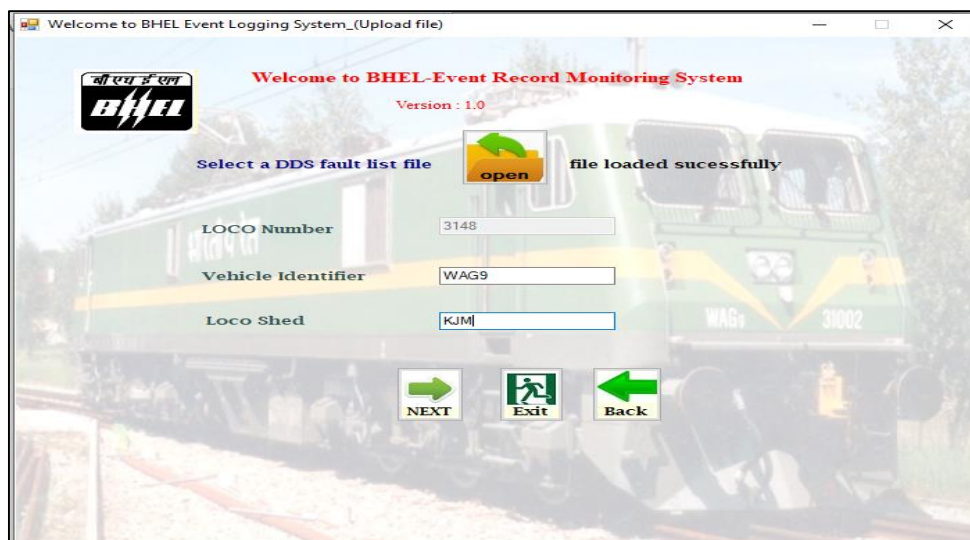


Figure 5: Upload File Screen after File Upload

Once the file has been loaded successfully, the message “file loaded successfully” will be displayed next to the open icon, as shown in Figure 5.

The Loco Number field will be read automatically from the log file.

The Vehicle Identifier field & Loco Shed field should be filled manually.

Please note that if Vehicle Identifier field or Loco Shed fields are left blank, it will show error message “Enter the data” when the user clicks on the Next button.

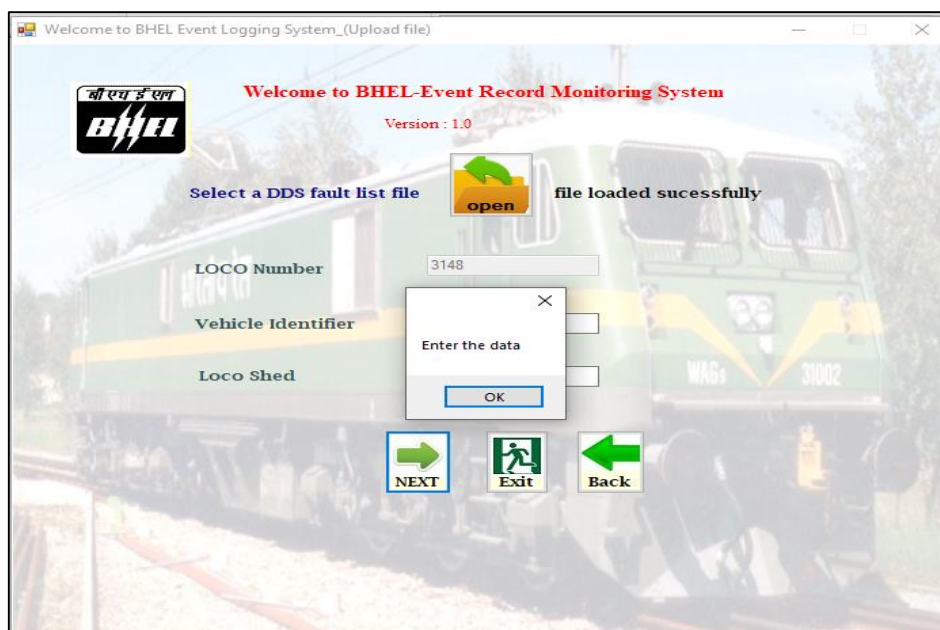


Figure 6: Error message due to blank Vehicle Identifier/Loco Shed Fields

After all fields are filled, click on Next. It will show the progress for loading of data and moving to the Next Screen. After some time, the next screen that is Confirmation Screen will be displayed.



Figure 7: Screen showing data getting loaded

Click on Exit to close the application. Click on Back to move to Login Page.

3.3 Confirmation Screen

The confirmation screen will be displayed on top of the File Upload screen to continue Data Loading. Click on Yes to move to next screen i.e. Overview Screen.

Click No to close the application.

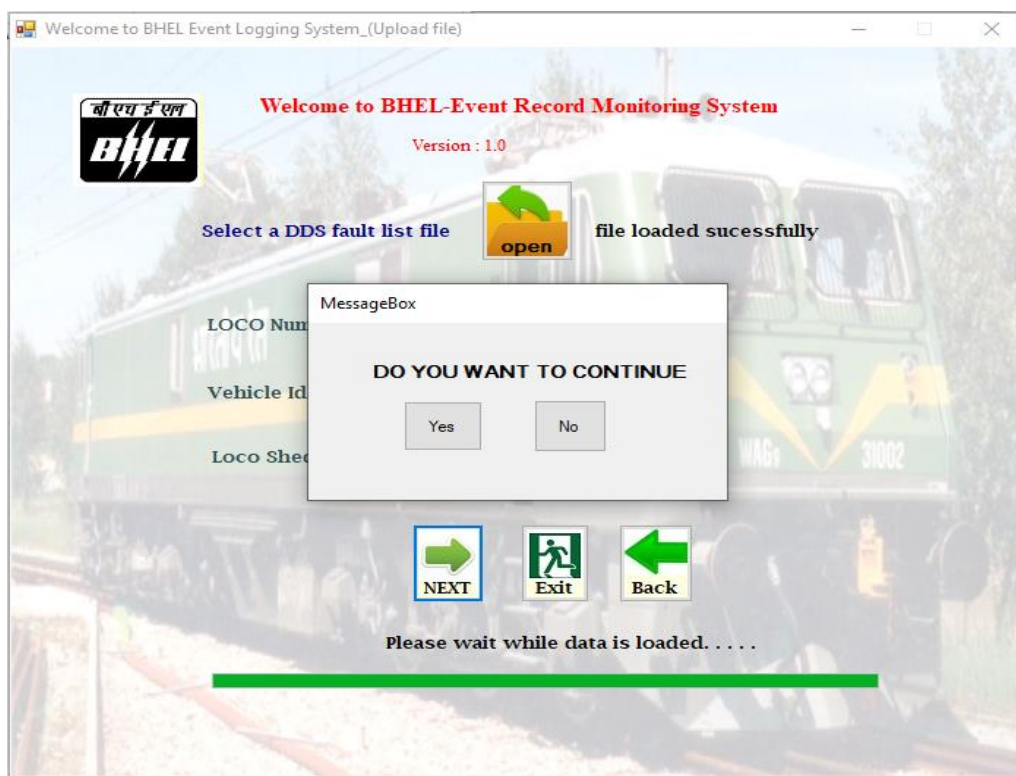


Figure 8: Confirmation Screen

3.4 Overview Screen

After clicking Yes on the confirmation screen, please wait for some time for the log file to get loaded. After that, the Overview Screen is displayed.

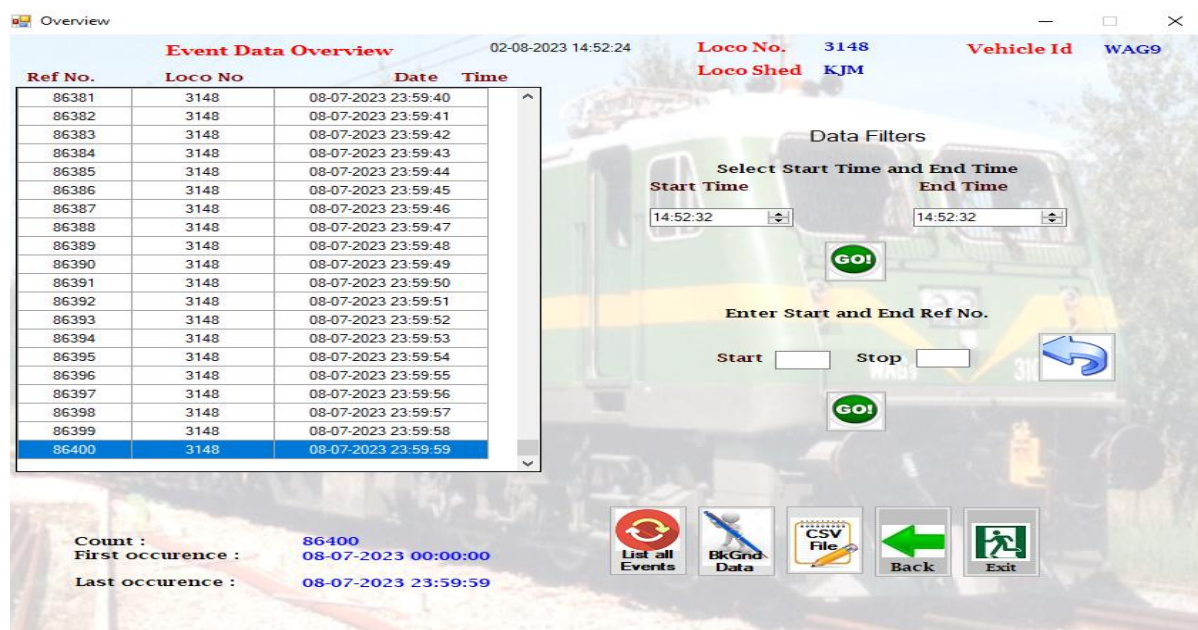


Figure 9: Overview Screen

The Overview Screen shows the data overview with Date/Time Stamps. At the bottom of the table, “Count” shows the total number of records in the log file. First Occurrence and Last Occurrence shows the Date/Time stamp of the first record and the last record in the file

Double click on any row to go to the Background Data Screen and see the status of all the signals at that particular Date/Time. The Background Data screen can also be loaded by clicking on the “Bk Gnd Data” icon on the overview screen. Background Data Screen is explained in the next section.

3.4.1. Overview Data Filters

There are 2 filters available for viewing a subset of the data

1. Time

Each Log file contains all the data for a particular date. However, if the user wishes to view the data for only a certain time interval, user can enter the start time and end time for the data, and click on the “Go” button below the Time filter



Figure10: Time Filter on Overview Screen

Once the filter is applied, the time entry fields are disabled, and the “Back Filter” button is enabled. On clicking the “Back Filter” button, the table will show the data corresponding to the previous filter applied. In case this is the first filter, all entries will be shown.

If all filters have been cleared, the “Back Filter” button is disabled and the “List all Events” button is disabled.

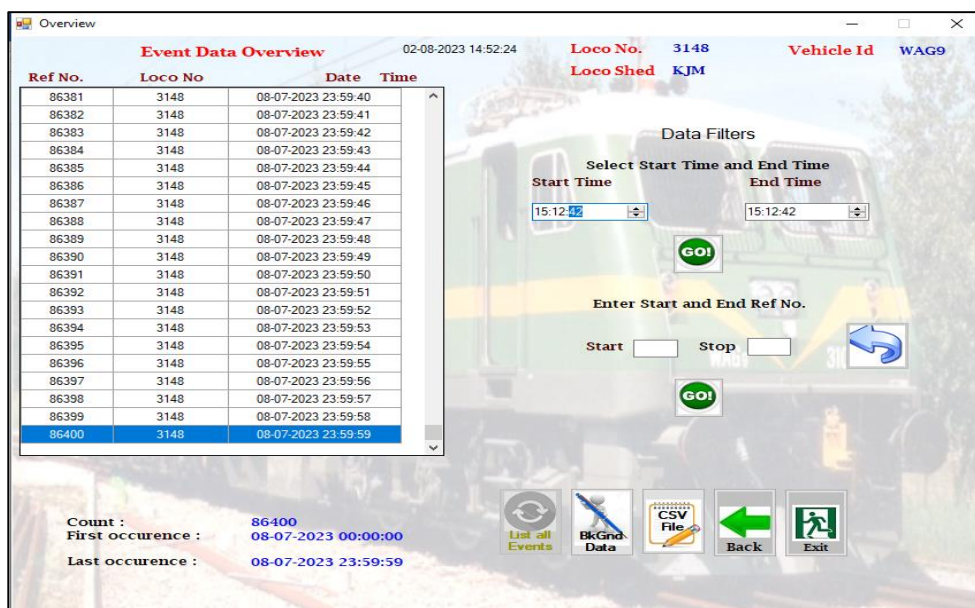


Figure 11: Time Filter Removed

2. Ref No.

The data can also be filtered using the Ref No. field. The start and stop reference number should be entered. Start Number should be less than Stop Number. Click on Go button below the filter field.

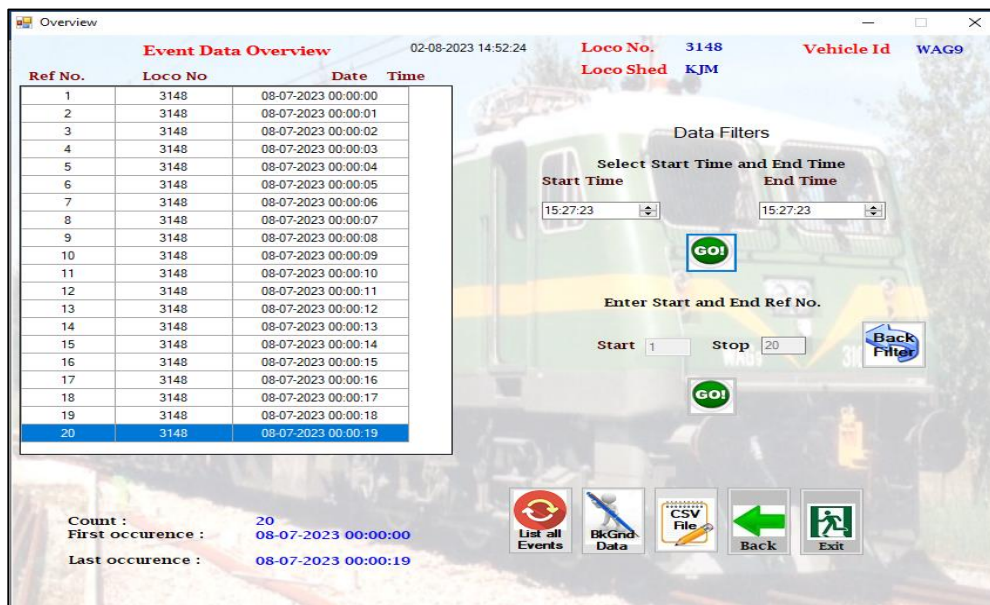


Figure 12: Ref No. Filter on Overview Screen

Once the filter is applied, the ref no. entry fields are disabled, and the "Back Filter" button is enabled. On clicking the "Back Filter" button, the table will show the data corresponding to the previous filter applied. In case this is the first filter, all entries will be shown.

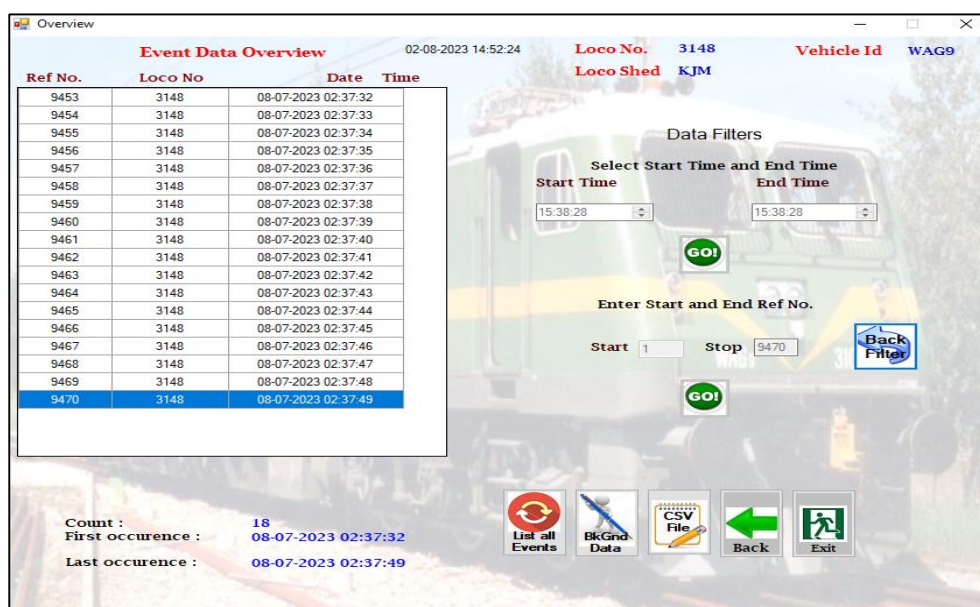
If all filters have been cleared, the "Back Filter" button is disabled and the "List all Events" button is disabled.

3. Nested Filters

If user wants to use multiple filters together, i.e. within a certain duration he/she wishes to view specific range of ref no. or vice versa, filters can be applied one after the other.

Figure 13 shows the result of 2 filters.

First Time Filter is applied. Then Ref No. Filter is applied. The data which is suitable after both filters are applied is displayed.



Event Data Overview 02-08-2023 14:52:24 Loco No. 3148 Vehicle Id WAG9
Loco Shed KJM

Ref No.	Loco No	Date Time
9453	3148	08-07-2023 02:37:32
9454	3148	08-07-2023 02:37:33
9455	3148	08-07-2023 02:37:34
9456	3148	08-07-2023 02:37:35
9457	3148	08-07-2023 02:37:36
9458	3148	08-07-2023 02:37:37
9459	3148	08-07-2023 02:37:38
9460	3148	08-07-2023 02:37:39
9461	3148	08-07-2023 02:37:40
9462	3148	08-07-2023 02:37:41
9463	3148	08-07-2023 02:37:42
9464	3148	08-07-2023 02:37:43
9465	3148	08-07-2023 02:37:44
9466	3148	08-07-2023 02:37:45
9467	3148	08-07-2023 02:37:46
9468	3148	08-07-2023 02:37:47
9469	3148	08-07-2023 02:37:48
9470	3148	08-07-2023 02:37:49

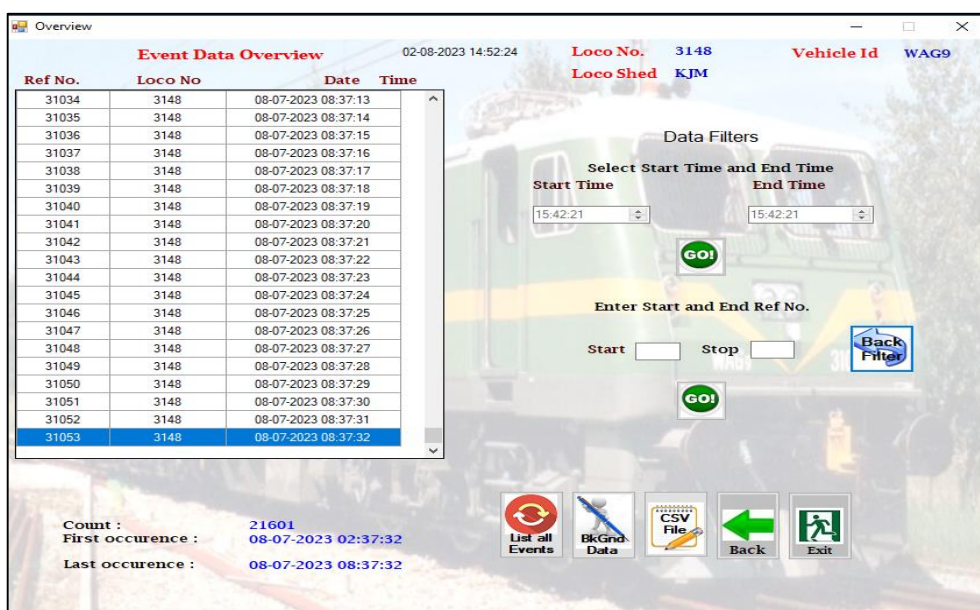
Count : 18
First occurrence : 08-07-2023 02:37:32
Last occurrence : 08-07-2023 02:37:49

Data Filters
Select Start Time and End Time
Start Time 15:38:28 End Time 15:38:28
GO!
Enter Start and End Ref No.
Start 1 Stop 9470
GO!
Back Filter

List all Events BkGnd Data CSV File Back Exit

Figure13: Nested Filter on Overview Screen

Clicking on the Back Filter button will take the user back to the results of the Date Filter



Event Data Overview 02-08-2023 14:52:24 Loco No. 3148 Vehicle Id WAG9
Loco Shed KJM

Ref No.	Loco No	Date Time
31034	3148	08-07-2023 08:37:13
31035	3148	08-07-2023 08:37:14
31036	3148	08-07-2023 08:37:15
31037	3148	08-07-2023 08:37:16
31038	3148	08-07-2023 08:37:17
31039	3148	08-07-2023 08:37:18
31040	3148	08-07-2023 08:37:19
31041	3148	08-07-2023 08:37:20
31042	3148	08-07-2023 08:37:21
31043	3148	08-07-2023 08:37:22
31044	3148	08-07-2023 08:37:23
31045	3148	08-07-2023 08:37:24
31046	3148	08-07-2023 08:37:25
31047	3148	08-07-2023 08:37:26
31048	3148	08-07-2023 08:37:27
31049	3148	08-07-2023 08:37:28
31050	3148	08-07-2023 08:37:29
31051	3148	08-07-2023 08:37:30
31052	3148	08-07-2023 08:37:31
31053	3148	08-07-2023 08:37:32

Count : 21601
First occurrence : 08-07-2023 02:37:32
Last occurrence : 08-07-2023 08:37:32

Data Filters
Select Start Time and End Time
Start Time 15:42:21 End Time 15:42:21
GO!
Enter Start and End Ref No.
Start Stop
GO!
Back Filter

List all Events BkGnd Data CSV File Back Exit

Figure14: Back Filter button to move to previous filter

Back Filter button is still enabled because all filters are not cleared. Clicking on this button one more time will clear the time filter as well, and the Back Filter button as well as the List All Events button.

4. Clear All Filters

When multiple filters are used, and the user wants to clear all filters at the same time, or even a single filter, the “List All Events” is used. Clicking on this button will list all entries in the log file.



Figure15: Nested Filter on Overview Screen

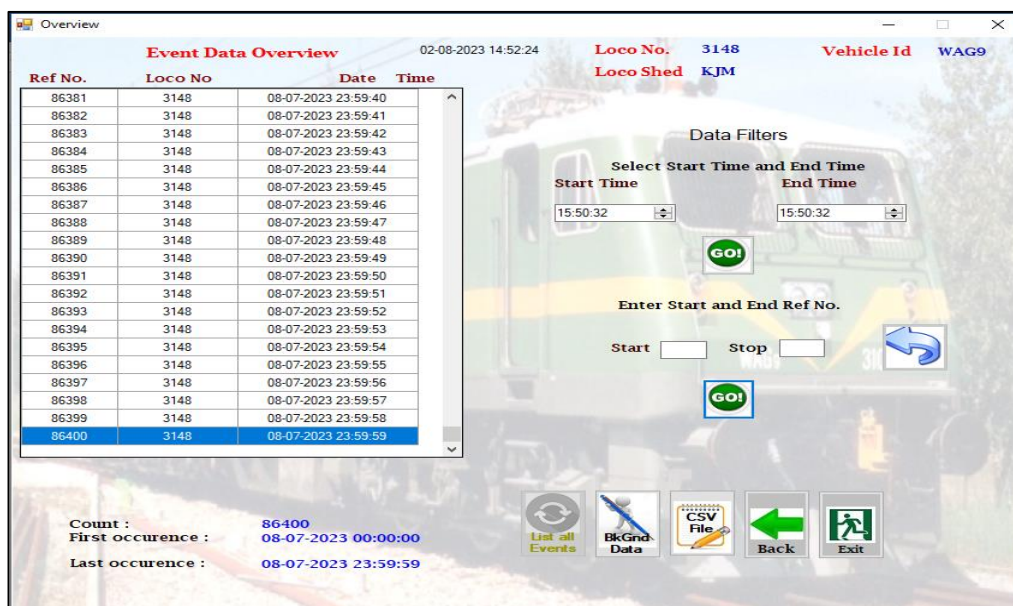


Figure16: Results of Clicking List All Events button

3.4.2. Save Data to CSV File

The button “CSV File” at the bottom of the screen is used to save all the data from the log file to a CSV file which can then be opened in excel.

When the “CSV File” button is clicked, the file explorer opens with the filename of the current log file as the default filename. Choose the location where you want to save the file, change the filename (if required) and click on “Save”. Wait for a few seconds while the file is saved at the chosen location.

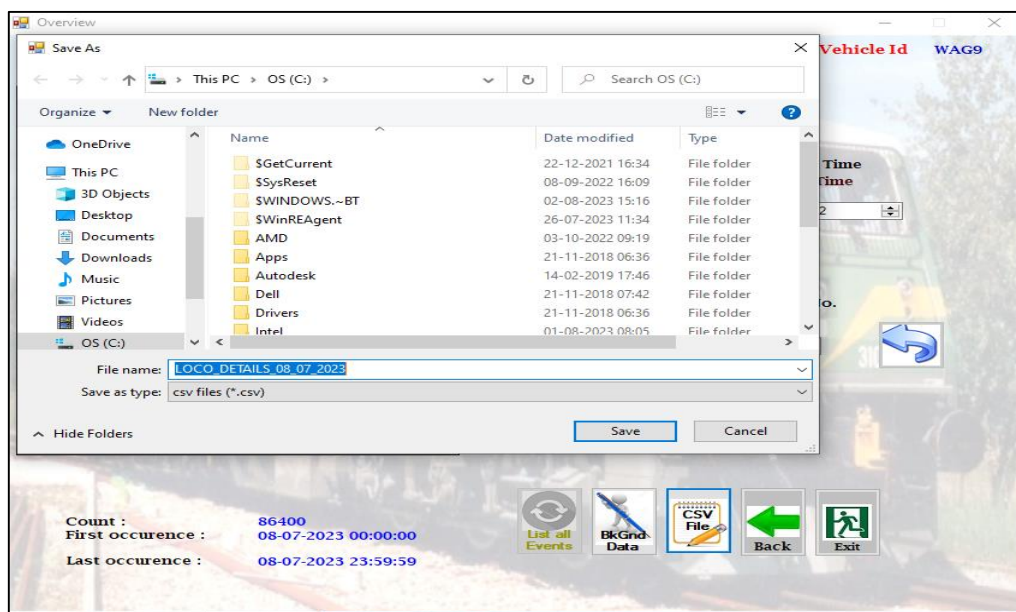
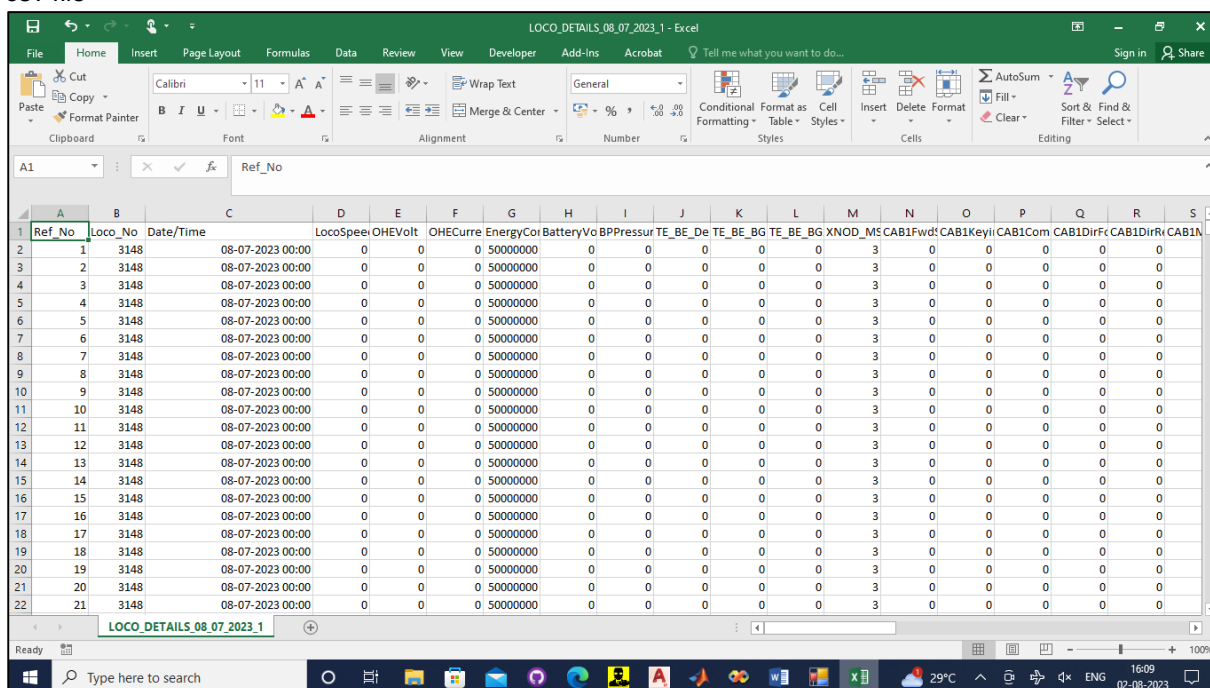


Figure17: Save CSV File

After the file is saved, the User can open the file and check the data. Given below is a snapshot of a csv file



Ref_No	Loco_No	Date/Time	LocoSpeed	OHEVolt	OHECurrent	EnergyConsumed	BatteryVoltage	BPPressure	TE_BE_De	TE_BE_Bg	TE_BE_Bg	XNOD_MS	CAB1Fwd	CAB1Key	CAB1Com	CAB1Dir	CAB1Dir	CAB1Dir
1	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
2	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
3	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
4	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
5	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
6	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
7	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
8	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
9	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
10	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
11	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
12	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
13	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
14	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
15	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
16	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
17	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
18	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
19	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
20	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
21	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0
22	3148	08-07-2023 00:00	0	0	0	50000000	0	0	0	0	0	3	0	0	0	0	0	0

Figure18: CSV File

Please note that the date/time stamp on the csv file shows only hours and minutes by default. To change this setting and view the seconds as well, please perform the following formatting on the csv file and save it in .xls/.xlsx format.:

1. Select the entire column and right click.

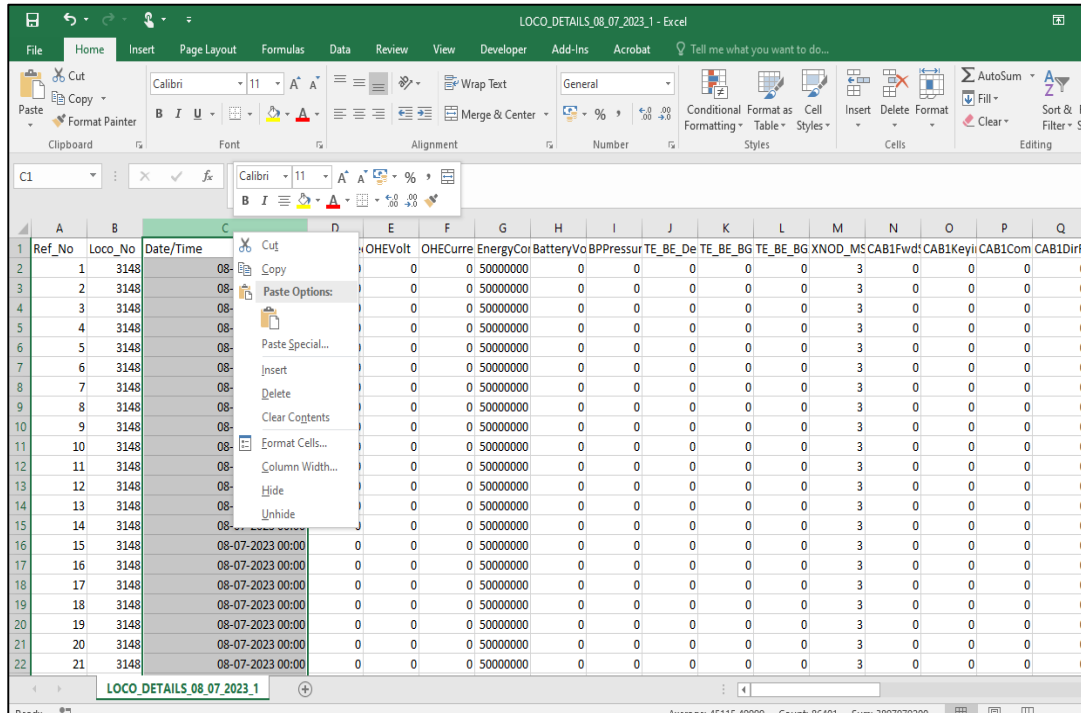


Figure19: Format Date/Time(1)

2. Click on Format Cells in the Drop Down Menu which appears.

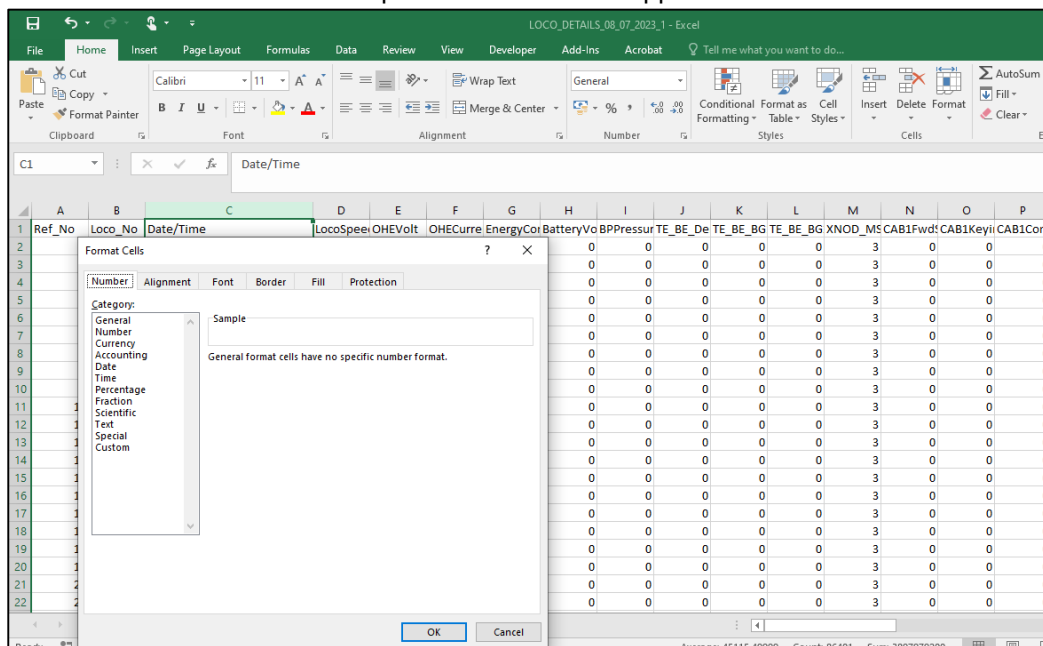


Figure 20: Format Date/Time(2)

3. Click on custom. In Type, scroll down and select dd-mm-yyyy hh:mm

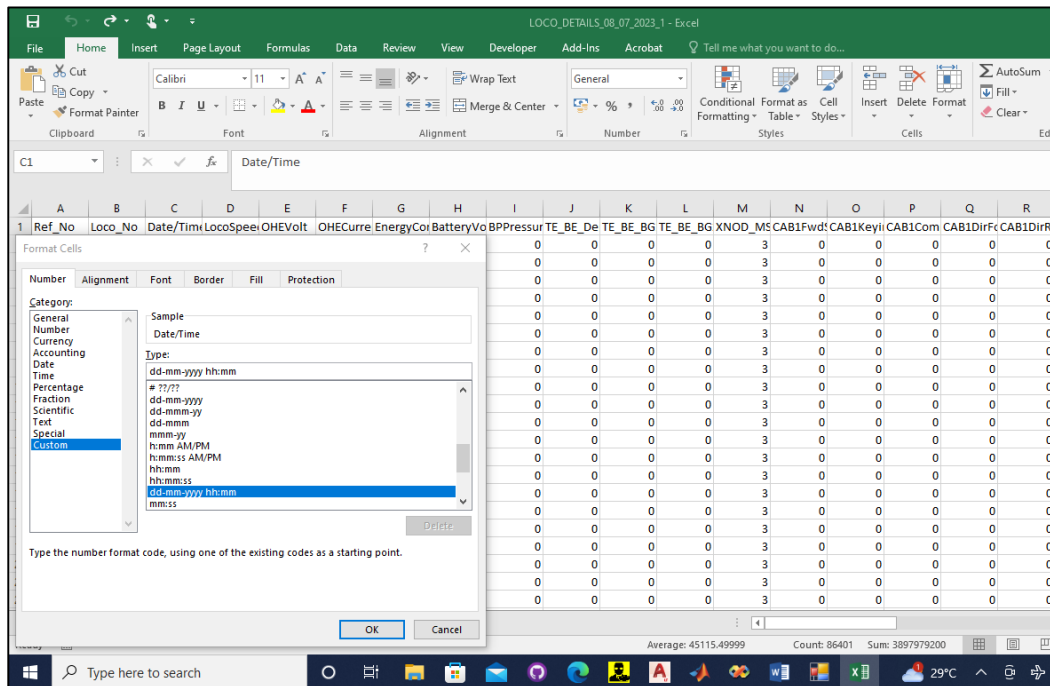


Figure 21: Format Date/Time(3)

4. Where Type is displayed, place the cursor next to mm and add “:ss” (Don’t put double quotes). Click on OK.

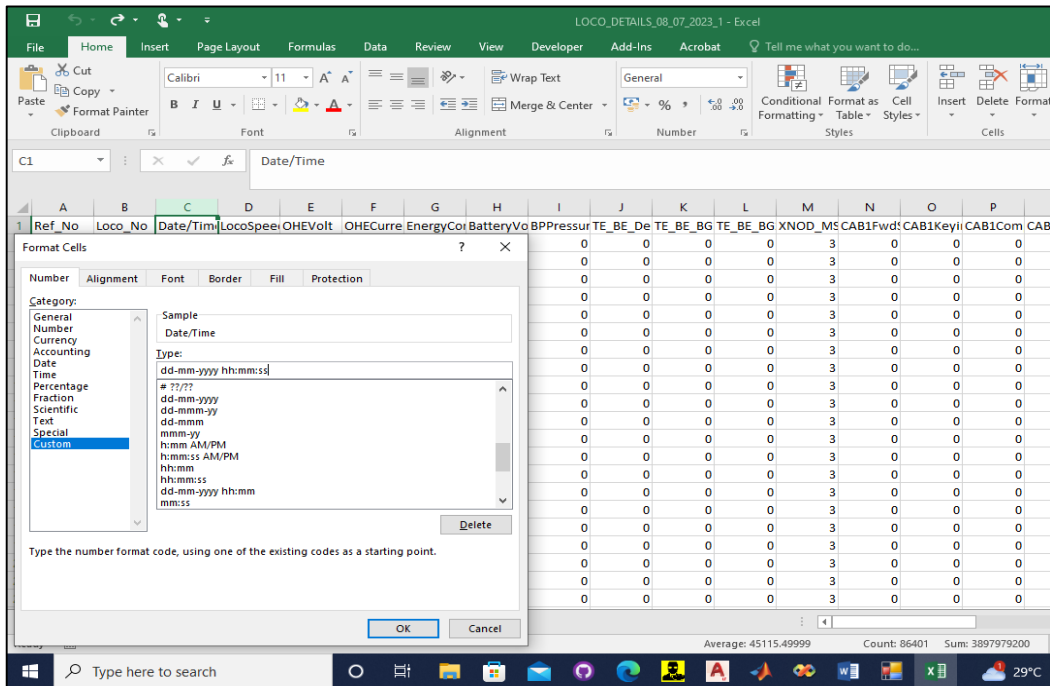


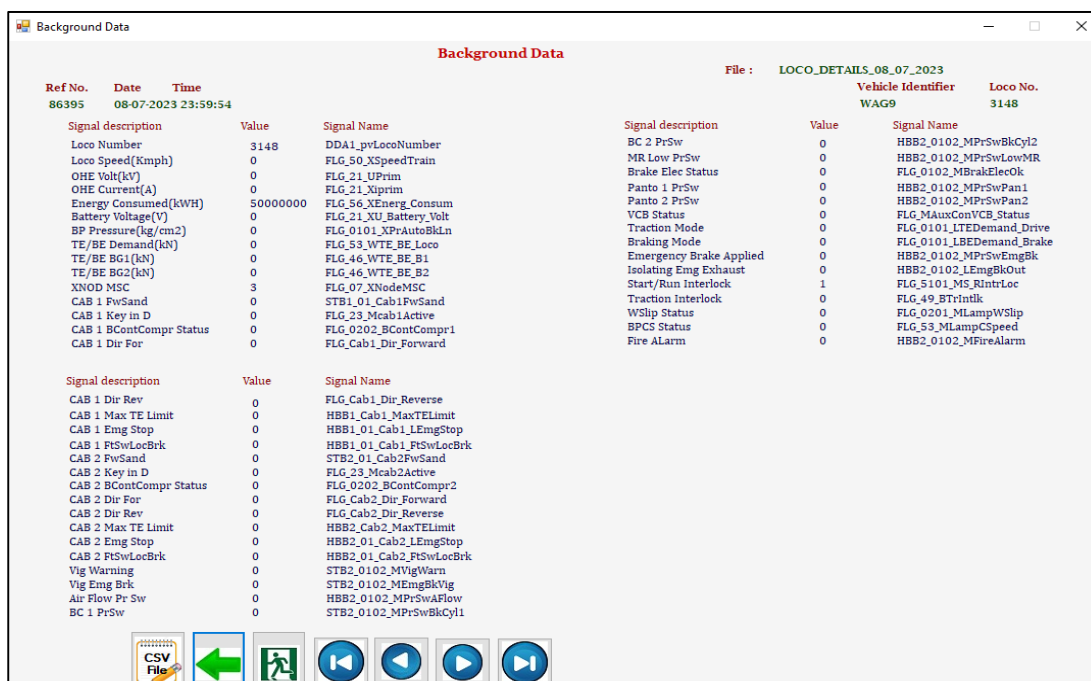
Figure 22: Format Date/Time(4)

5. The Date/Time Column is formatted to show seconds as well. Go to file->Save As and select .xls or .xlsx as file type to save the changes.

3.5 Background Data Screen

On the overview screen, double click on any record or clicking on the “Bk Gnd Data” button will show the Background Data screen for that particular data point.






In the Background Data screen, user can view the status of all the logged signals at that particular date and time, as shown in Figure 23.





Background Data			File : LOCO_DETAILS_08_07_2023		
Ref No.	Date	Time	Vehicle Identifier Loco No.		
86395	08-07-2023	23:59:54	WAG9 3148		
Signal description	Value	Signal Name	Signal description	Value	Signal Name
Loco Number	3148	DDA1_pvLocoNumber	BC 2 PrSw	0	HBB2_0102_MPrSwBkCyl2
Loco Speed(Kmph)	0	FLG_50_XSpeedTrain	MR Low PrSw	0	HBB2_0102_MPrSwLowMR
OHE Volt(kV)	0	FLG_21_UPrim	Brake Elec Status	0	FLG_0102_MBrakElecOk
OHE Current(A)	0	FLG_21_Xiprim	Panto 1 PrSw	0	HBB2_0102_MPrSwPan1
Energy Consumed(kWh)	50000000	FLG_56_XEnergy_Consum	Panto 2 PrSw	0	HBB2_0102_MPrSwPan2
Battery Voltage(V)	0	FLG_21_XU_Battery_Volt	VCB Status	0	FLG_MAuxConVCB_Status
BP Pressure(kg/cm2)	0	FLG_0101_XPrAutoBkLn	Traction Mode	0	FLG_0101_LTEDemand_Drive
TE/BE Demand(kN)	0	FLG_53_WTE_BE_Loco	Braking Mode	0	FLG_0101_LBEDemand_Brake
TE/BE BG1(kN)	0	FLG_46_WTE_BE_B1	Emergency Brake Applied	0	HBB2_0102_MPrSwEmgBk
TE/BE BG2(kN)	0	FLG_46_WTE_BE_B2	Isolating Emg Exhaust	0	HBB2_0102_LEmgBkOut
XNOD MSC	3	FLG_07_XNodeMSC	Start/Run Interlock	1	FLG_5101_MS_RintrLoc
CAB 1 FwSand	0	STB1_01_Cab1FwSand	Traction Interlock	0	FLG_49_BTIntlk
CAB 1 Key in D	0	FLG_23_Mcab1Active	WSlip Status	0	FLG_0201_MLampWSlip
CAB 1 BContCompr Status	0	FLG_0202_BContCompr1	BPCS Status	0	FLG_53_MLampCSpeed
CAB 1 Dir For	0	FLG_Cab1_Dir_Forward	Fire ALarm	0	HBB2_0102_MFireAlarm
CAB 1 Dir Rev	0	FLG_Cab1_Dir_Reverse			
CAB 1 Max TE Limit	0	HBB1_Cab1_MaxTELimit			
CAB 1 Emg Stop	0	HBB1_01_Cab1_LEmgStop			
CAB 1 FtSwLocBrk	0	HBB1_01_Cab1_FtSwLocBrk			
CAB 2 FwSand	0	STB2_01_Cab2FwSand			
CAB 2 Key in D	0	FLG_23_Mcab2Active			
CAB 2 BContCompr Status	0	FLG_0202_BContCompr2			
CAB 2 Dir For	0	FLG_Cab2_Dir_Forward			
CAB 2 Dir Rev	0	FLG_Cab2_Dir_Reverse			
CAB 2 Max TE Limit	0	HBB2_Cab2_MaxTELimit			
CAB 2 Emg Stop	0	HBB2_01_Cab2_LEmgStop			
CAB 2 FtSwLocBrk	0	HBB2_01_Cab2_FtSwLocBrk			
Vig Warning	0	STB2_0102_MVigWarn			
Vig Emg Brk	0	STB2_0102_MEmgBkVig			
Air Flow Pr Sw	0	HBB2_0102_MPrSwAFlow			
BC 1 PrSw	0	STB2_0102_MPrSwBkCyl1			

Figure 23: Background Data Screen

The user can use the arrow buttons to navigate through the records. The meaning of the buttons is explained below:

	Back to Overview Screen
	Navigate to Background data of first record
	Navigate to Background data of last record
	Navigate to Previous Record
	Navigate to Next Record



	Write the Background Data to CSV File
	Exit the Application