

NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, D.C. 20594

June 22, 2021

Engine Data Monitor (EDM)

Specialist's Factual Report
By Gerald Kawamoto

1. EVENT SUMMARY

Location: Jupiter, Florida
Date: February 28, 2021
Aircraft: Luscombe 8E
Registration: N2960K
Operator: Private
NTSB Number: ERA21FA142

2. ENGINE DATA MONITOR GROUP

An Engine Data Monitor group was not convened.

3. DETAILS OF INVESTIGATION

The National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following EDM:

Recorder Manufacturer/Model: **JPI EDM-830**
Recorder Serial Number: **43502**

3.1. JPI EDM-830 Description

The J. P. Instruments EDM-830 is a panel mounted LCD display that the operator can monitor and record up to 24 parameters related to engine operations. Depending on the installation, engine parameters monitored can include: Exhaust Gas Temperature (EGT), Cylinder Head Temperature (CHT), Oil Pressure and Temperature, Manifold Pressure, Outside Air Temperature, Turbine inlet Temperature, Engine Revolutions per Minute, Compressor Discharge Temperature, Fuel Flow, Carburetor Temperature, and Battery Voltage.

The unit can also calculate, in real-time, horsepower, fuel used, shock cooling rate and EGT differentials between the highest and lowest cylinder temperatures. The calculations are also based on the aircraft installation.

The unit contains non-volatile memory for data storage of the parameters recorded and calculated.¹ The rate at which the data is stored is selectable by the operator from 2 to 500 seconds per sample. The memory can store up to 20 hours of data at a 6 second sample

¹ Non-volatile memory (NVM) is semiconductor memory that does not require external power for data retention.

rate. For a non-damaged unit, the data can then be downloaded by the operator using a USB flash drive and following the instructions on the unit.

3.1.1. Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an external examination did not reveal any major signs of damage, as shown in Figure 1. The device powered on normally and data were extracted using laboratory tools.

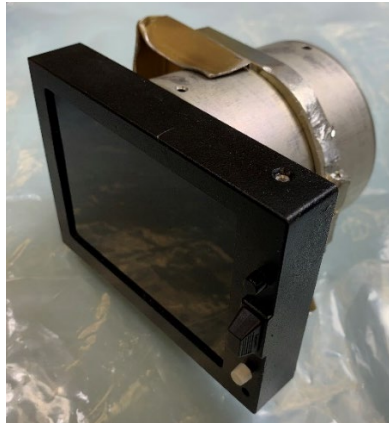


Figure 1. JPI EDM-830 as received.

3.1.2. Data Description

The EDM recording contained four sessions recorded from February 27, 2021, through February 28, 2021.² The data were sampled at a 6 second sample rate. Data from the two sessions recorded on February 28, 2021, are included in this report.

The engineering unit conversions used for the data contained in this report are based on documentation from the manufacturer of the EDM.

The EDM records time with the first data sample based on the unit's internal clock. This clock is set and updated by the operator. Upon powering on the device for the first time in the laboratory, the internal clock was offset approximately 5 minutes from UTC. At a later date, the device was powered on and the offset had increased. The exact correlation to UTC was unable to be determined and therefore time is referred to as JPI Time in this report.

Table 1 describes data parameters recorded by the device.

Table 1. JPI EDM-830 Data Parameters.

Parameter Name	Parameter Description
JPI Time	Time for recorded data point (HH:MM:SS)
EGT 1-4 (degF)	Exhaust Gas Temperature Cylinder # (degrees Fahrenheit)
CHT 1-4 (degF)	Cylinder Head Temperature Cylinder # (degrees Fahrenheit)
Fuel Flow (gph)	Fuel Flow (gallons per hour)
Fuel Used (gal)	Fuel Used (gallons)
Voltage (V)	Battery Voltage (Volts)

² Coordinated Universal Time (UTC).

3.2. Plots and Corresponding Tabular Data

Figure 2 is a plot of EDM data recorded on February 28, 2021. The first two data points (between 1714 and 1715) were recorded during the first session and the remaining data points were recorded during the second session. The time shown is 17:14:00 to 17:23:00 JPI Time.

The corresponding tabular data used to create this plot are provided in electronic (*.csv³) format as Attachment 1 to this report.

³ Comma Separated Value format.

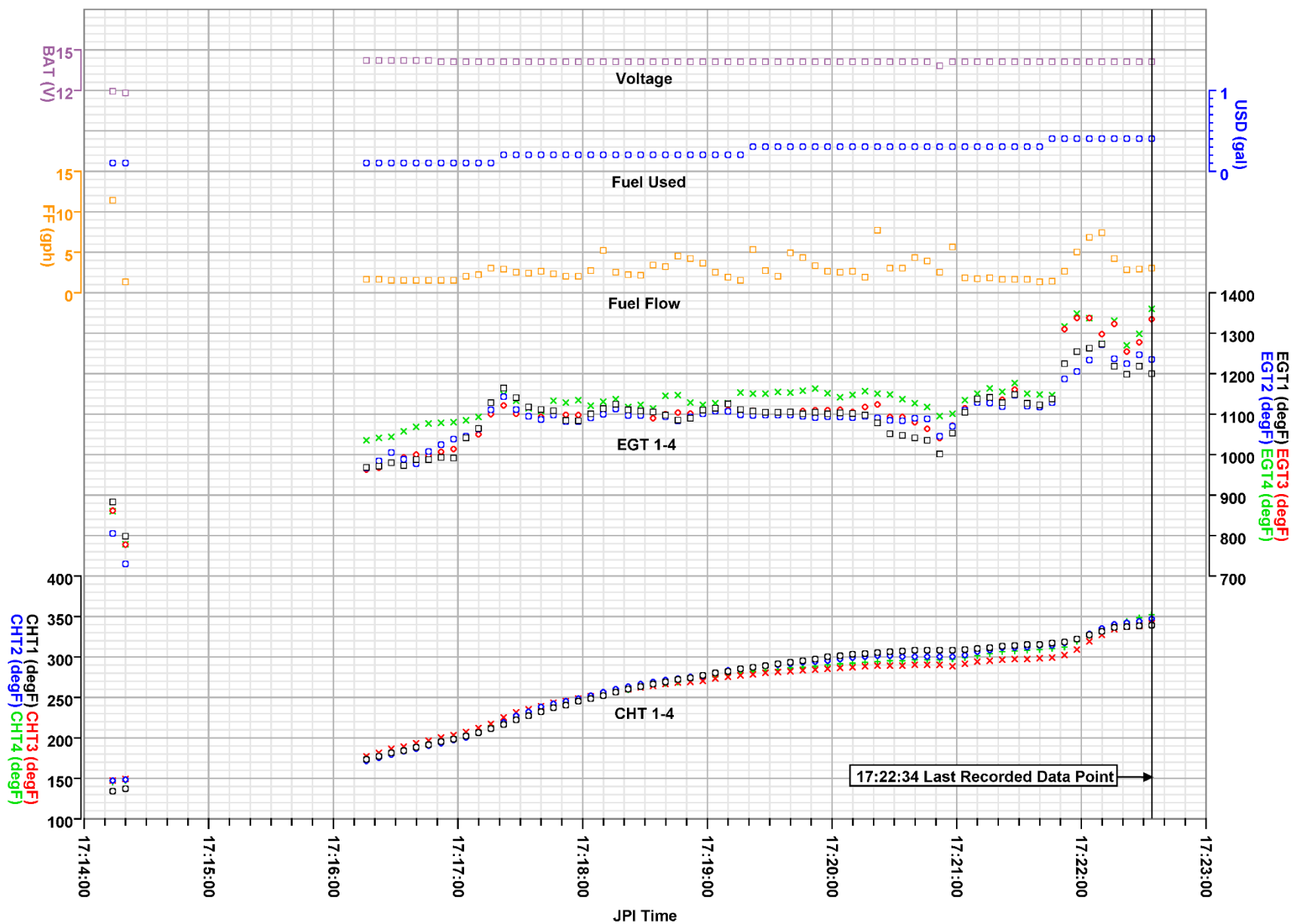


Figure 2. Plot of JPI parameters recorded on February 28, 2021.