

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

February 7, 2020

Data Recorder

Specialist's Factual Report
By Gerald Kawamoto

1. EVENT SUMMARY

Location: Sedona, Arizona
Date: May 1, 2019
Aircraft: Beech S35
Registration: N6864Q
Operator: Private
NTSB Number: WPR19LA128

On May 1, 2019, about 0935 mountain standard time (MST), a Beech S35 airplane, N6864Q, was substantially damaged during departure from Sedona Airport (SEZ) Sedona, Arizona. The private pilot and flight instructor were not injured. The airplane was registered to and operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a personal flight. Visual meteorological conditions existed at SEZ about the time of the accident. The flight was originating from SEZ when the accident occurred.

2. DATA RECORDER GROUP

A group was not convened.

3. DETAILS OF INVESTIGATION

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

Recorder Manufacturer/Model: **Electronics International MUX-8A**
Recorder Serial Number: **079395**

3.1. Device Description

The MUX-8A is a data recorder designed to receive and record data from transducers produced by Electronics International, such as the UBG-16 engine bar-graph display. The MUX-8A is also capable of recording data from third-party instruments such as GPS receivers.

Data is recorded in non-volatile¹ serial FLASH memory. Recorded data for each flight is date and time stamped and subsequently stored in a comma-delimited format. The MUX-8A can be setup to record a new data point for each supported parameter every one, three, or six

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

minutes. It can also be set to record in a high data-rate “Burst Mode” (usually every five to six seconds). The unit can retain between 300 and 600 hours of data at 6 minute intervals depending on the number of parameters recorded. Data may be downloaded to a standard PC running Windows using a proprietary program called DRS-1 Download produced by the manufacturer.

According to the manufacturer, recorded data have these features: (a) each value is recorded as transmitted by the source device, dropping any decimal point; (b) in the case of the UBG-16 source device, the value transmitted is the value displayed on the device; and (c) no record descriptor (i.e. metadata) is recorded on the MUX-8A, as such, the record descriptor must be known from the installation configuration or inferred by reviewing the recorded values.

3.2. Data Recovery

The device arrived at the Vehicle Recorder Division in good condition and data was extracted normally using the manufacturer’s software.

3.3. Data Description

The data extracted included sessions from April 20, 2014, through May 1, 2019. The last session started at 9:14:04 and ended at 9:37:57 on May 1, 2019, and is included in this report. The data in the last session were sampled once every three minutes for a total of 9 data points.

3.4. Time Correlation

Data recorded by the MUX-8A is based on the unit’s internal timing device. The internal timing device records elapsed seconds relative to an arbitrary starting point. During the download process, the DRS-1 software used the downloading computer’s clock to offset the MUX-8A’s arbitrary elapsed seconds into local time, thereby assigning each record a date and time stamp. The date and time stamp for the MUX-8A data was extracted after verifying the downloading computer’s clock was accurately set to a reference atomic clock. Given uncertainties of the DRS-1 download software and the MUX-8A internal timing device, times are expressed as “Device Calculated MST.”

3.5. Parameters Provided

Table 1 describes data parameters downloaded from the MUX-8A. The verified values were date, time, cylinder head temperature (CHT), exhaust gas temperature (EGT), oil temperature, and oil pressure. An additional two unknown values were recorded (“CH-15” and “CH-16”). The manufacturer of the device was contacted and provided educated guesses on the unknown values:

- CH-15 - Fuel Pressure (x 0.1)
- CH-16 - Unknown (x unknown)

However, due to a lack of documentation regarding the installation and configuration, the meaning of the unknown values were not verified for this report. The values are included for their trend information.

Table 1 - Verified and provided parameters.

Parameter Name	Parameter Description
Date (MM/DD/YYYY)	Date for recorded data point
Time (HH:MM:SS)	Time (Device Calculated MST) for recorded data point
CHT # (degF)	Cylinder Head Temperature # (degrees Fahrenheit)
EGT # (degF)	Exhaust Gas Temperature # (degrees Fahrenheit)
Oil P (psi)	Oil Pressure (pounds per square inch)
Oil T (degF)	Oil Temperature (degrees Fahrenheit)
CH-15 & CH-16	Unknown value, units, and decimal point

3.6. OVERLAYS AND TABULAR DATA

Figure 1 is a plot of all parameters recorded on May 1, 2019. The time interval is 9:13:00 to 9:39:00 Device Calculated MST.

Tabular data used to generate figure 1 are included as Attachment 1. This attachment is provided in electronic comma separated value (.CSV) format.

Figure 1. Plot of parameters from MUX-8A.

