

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

October 18, 2021

Electronic Flight Information System (EFIS) Data Cards

Specialist's Factual Report
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1. EVENT SUMMARY

Location: Corfu, New York
Date: October 2, 2020
Aircraft: Socata TBM 700
Registration: N965DM
Operator: Private
NTSB Number: ERA21LA003

2. RECORDED FLIGHT DATA GROUP

A recorded flight data group was not convened.

3. DETAILS OF INVESTIGATION

On October 23, 2020, the National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following EFIS SD¹ data cards:

Data Card #1:	Garmin SVS Unlock
Data Card #2:	Garmin TAWS Unlock
Data Card #3:	Garmin Chart Unlock
Data Card #4:	Garmin Socata TBM 850 Loader
Data Card #5:	Garmin GIFD Supplemental
Data Card #6:	Unknown SD card

3.1. Data Recovery

Figure 1 shows the condition of the six SD cards as received. Five of the SD cards were identified after being cleaned, and one was unknown, as shown in Figure 2. The identified SD cards did not store any flight data; they were Garmin system cards which only stored firmware for the EFIS operations. The unknown SD card was identified as the one possibly storing the flight data. Figure 3 shows an enlarged view of the unknown SD card, and a crack was found on the card. An attempt to read the card with a forensic SD card reader and imaging software did not yield any data. An inquiry was then sent to a commercial data

¹ SD – Secure Digital, a proprietary non-volatile memory

recovery facility, and they responded that data were unrecoverable after evaluating the condition of the SD card. A last attempt was made by using a visual NAND chip data reconstruction tool and no data were recovered. Figure 4 is an X-ray image of the SD card with comments from the technical support staff of the visual NAND chip data reconstruction tool company.

3.2. Discussion

In a discussion with a representative of the manufacturer of the accident aircraft, Daher-Socata, the representative stated that the Garmin EFIS in this aircraft contained software “GDU v15.XX” which means that the system would have recorded maintenance logs (exceedances, engine trends, engine cycles and aircraft cycles) on the “MFD² Databases” card. This card would have been installed in the “lower slot” of the Garmin MFD unit of the EFIS. These files are recorded in a format that can only be decoded by Garmin. This card would have been labeled “2” with pen ink on the card’s label. A SD card labeled “2” was not found in the aircraft wreckage.

Additionally, the aircraft was reported to have left the factory with blank memory card in the MFD “top slot”. This slot would have enabled 1Hz data-logging from the Garmin EFIS. The card can be optionally removed by the user of the aircraft, and the EFIS does not require this card to operate properly. The unidentified card was determined to be one of the following:

- The “top slot” MFD 1 Hz data log card
- A Garmin unlock option card
- A personal SD card of the owner

The representative from Daher-Socata stated that all aircraft contain an SD card in the “top slot” of the Garmin MFD unit when they leave the factory.

² MFD – Multifunction Display



Figure 1: EFIS SD cards as received.

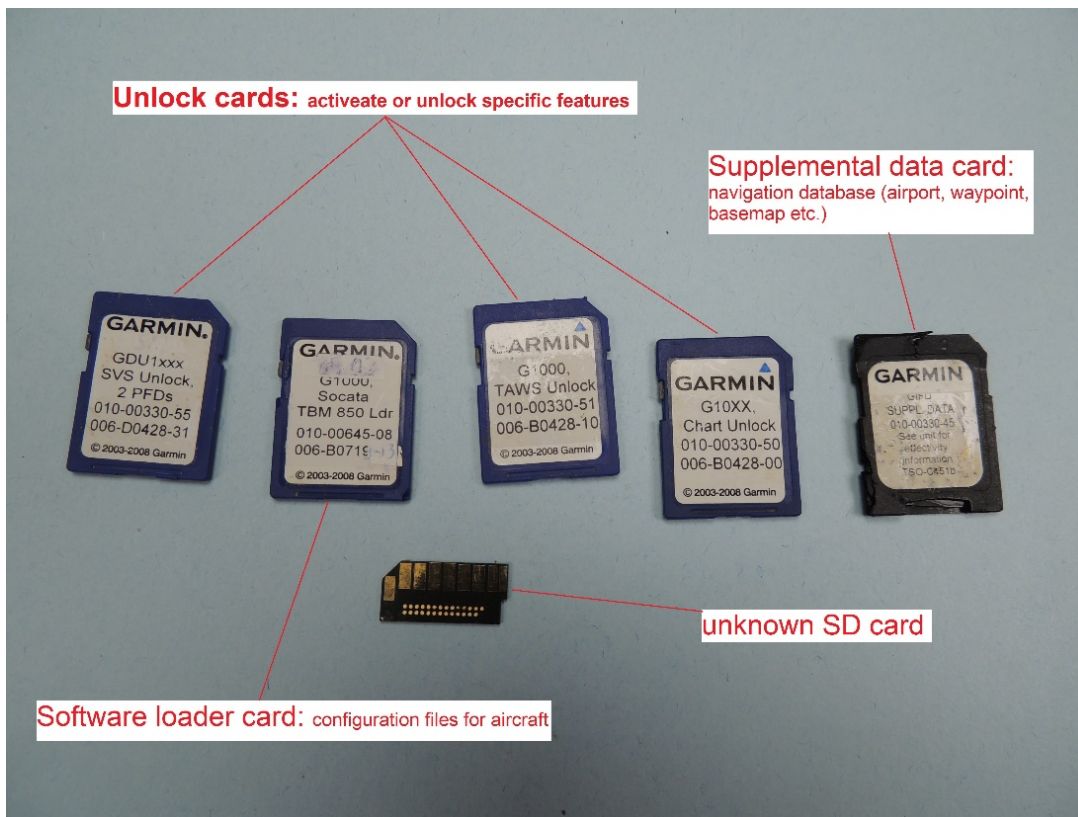


Figure 2: EFIS SD cards after being cleaned.

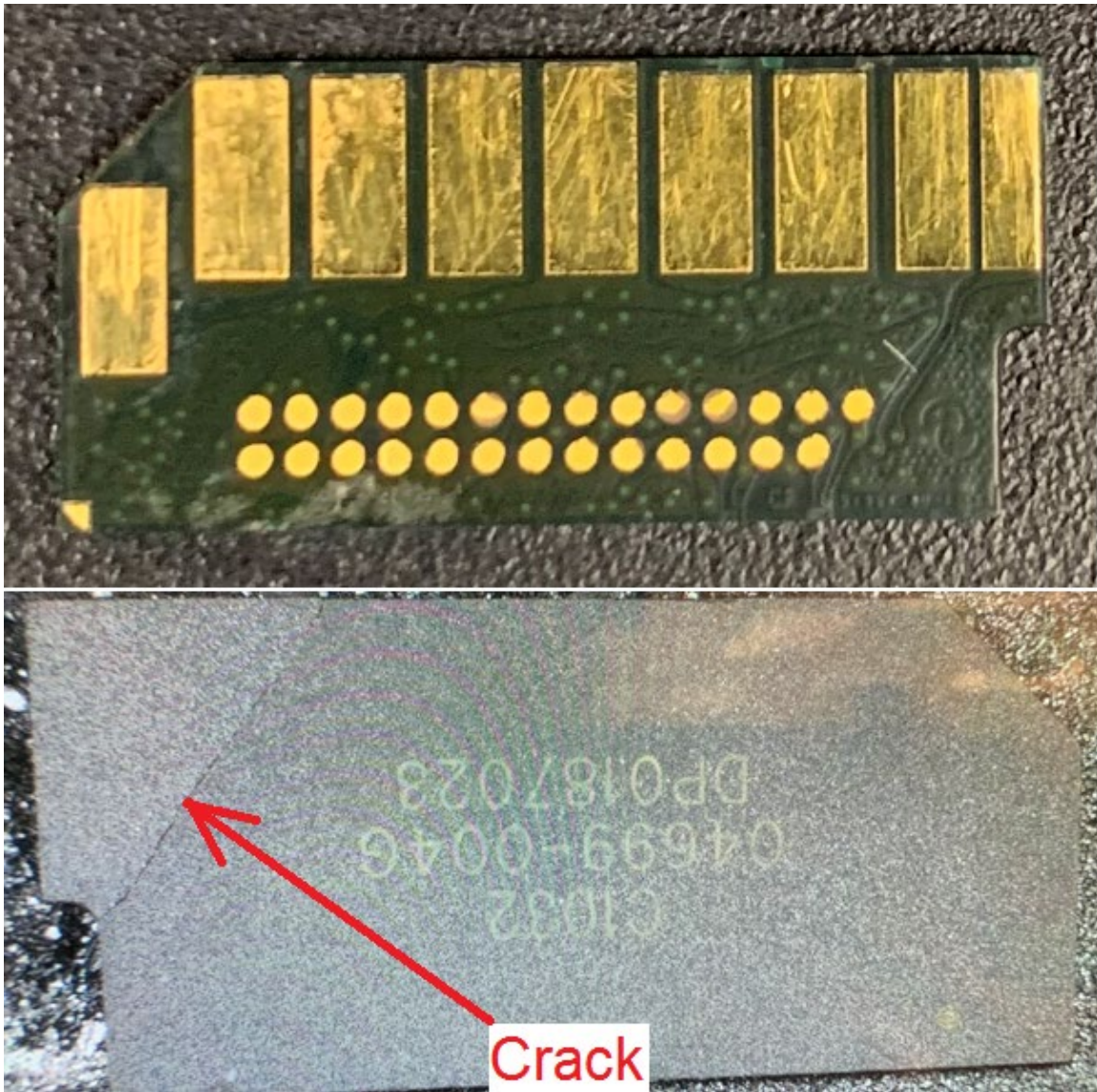


Figure 3: Front and back of the unknown SD card.

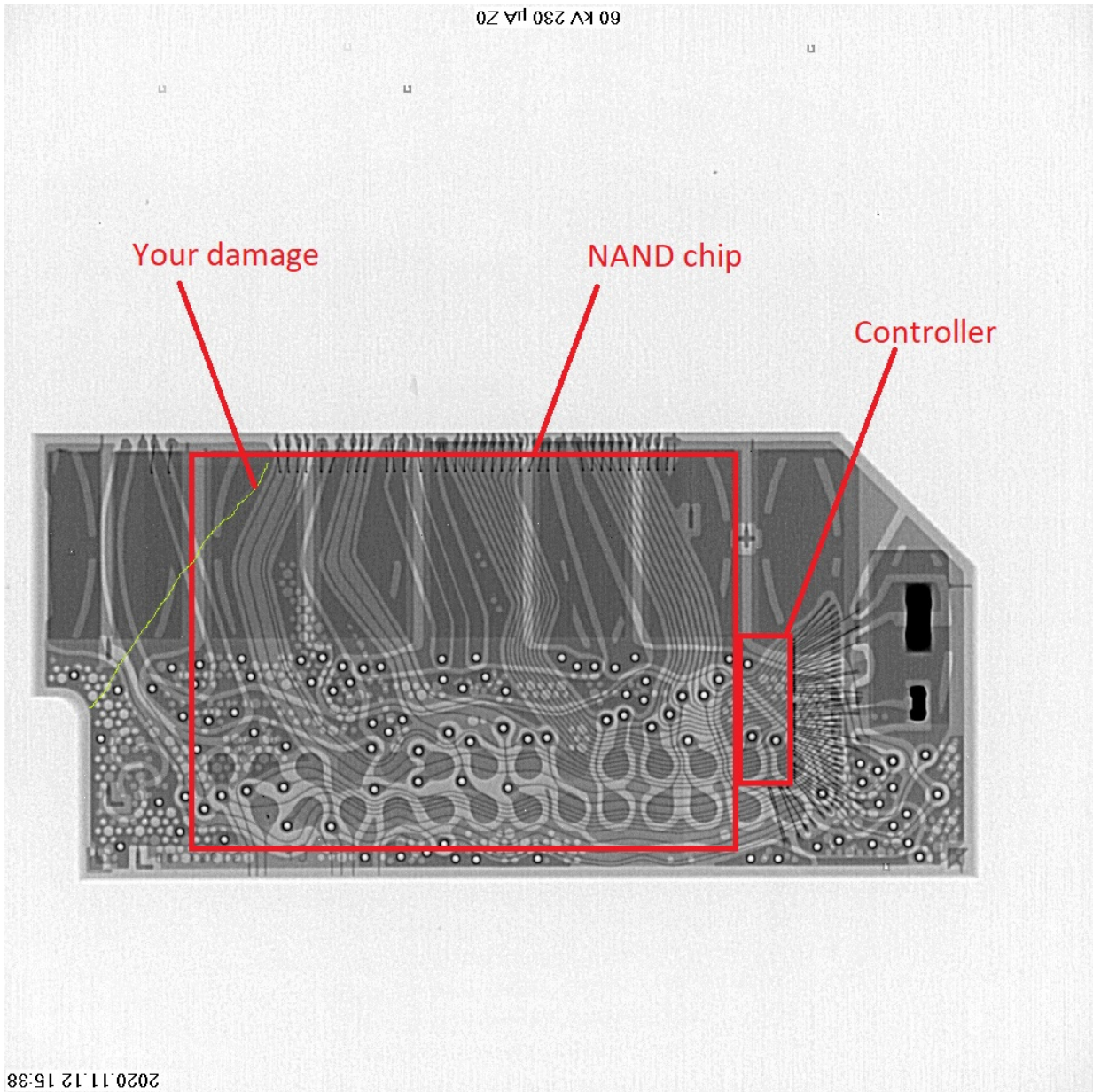


Figure 4: X-ray image of the unknown SD card.