

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

Washington, D.C. 20594

March 8, 2017

Global Positioning System Device

Specialist's Factual Report

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1. EVENT SUMMARY

Location: Crescent City, Florida
Date: November 09, 2016
Aircraft: Quad City Challenger II
Registration: N327SH
Operator: Private
NTSB Number: ERA17FA038

On November 9, 2016, at 0913 eastern standard time, an experimental amateur-built Challenger-II, N327SH, was destroyed during an in-flight breakup in Crescent City, Florida. The flight instructor and student pilot/owner were fatally injured. Visual meteorological conditions prevailed, and no flight plan was filed for the local instructional flight, which departed Skinners Wholesale Nursery Airport (16FD), Crescent City, Florida, about 0815. The airplane was privately owned and operated, and the flight was conducted under the provisions of 14 Code of Federal Regulations Part 91.

2. GROUP

A group was not convened.

3. DETAILS OF INVESTIGATION

The National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following global positioning system (GPS) device:

Device Manufacturer/Model:	Garmin GPSMAP 196
Serial Number:	unknown

3.1. Device Description

The Garmin GPSMAP 196 is a portable GPS unit equipped with a detachable antenna, and a 320 x 240 12-level grayscale LCD display. The unit is equipped with a built in base map and internal Jeppesen aviation database. The unit employs a parallel 12 channel WAAS-capable receiver and can be operated using external power, or alternatively by four standard AA-size batteries. The GPSMAP 196 is capable of storing date, route of

flight, and flight time information for up to 50 individual flights in the form of a flight log. Flight logging begins when the GPS unit senses a speed increase to greater than 30 knots together with an altitude gain of greater than 500 feet. Recorded flight log data is saved when the speed is sensed to decrease to below 30 knots, and a new log is started if more than 10 minutes passes from this time. A detailed track log – including latitude, longitude, date, time, and GPS altitude information for an unspecified number of points – is stored within the unit whenever the receiver has a lock on the GPS navigation signal. Track log position is updated as a function of time or distance moved, depending on how the unit has been configured. Once the current track log memory becomes full, new information either overwrites the oldest information or recording stops, depending on how the unit is configured. The current track log can be saved to long-term memory and 15 saved track logs can be maintained in addition to the current track log. Track log storage may be activated or de-activated at user discretion. All recorded data is stored in non-volatile¹ memory. The unit contains hardware and software permitting the download of recorded waypoint, route, and track log information to a PC via a built-in serial port using the NMEA 0183 version 2.0 protocol. An internal button-battery is used to back-up power to the internal memory and real-time clock during those periods when main power is removed.

3.2. Data Recovery

The only part of the GPS that was recovered was the main circuit board of the unit. The memory device that contains the recorded track data was found partially dislodged from the circuit card. The 48 pin memory chip was missing all 24 of the external connection leads along one side of the device. The other side of the chip was missing 4 of the 24 connection leads. To download the memory device, temporary connections were made to replace the missing leads. Figure 1 is a picture of the repairs that were made to the damaged device.

¹ Solid-state memory that retains the stored data after electrical power is removed from the device.

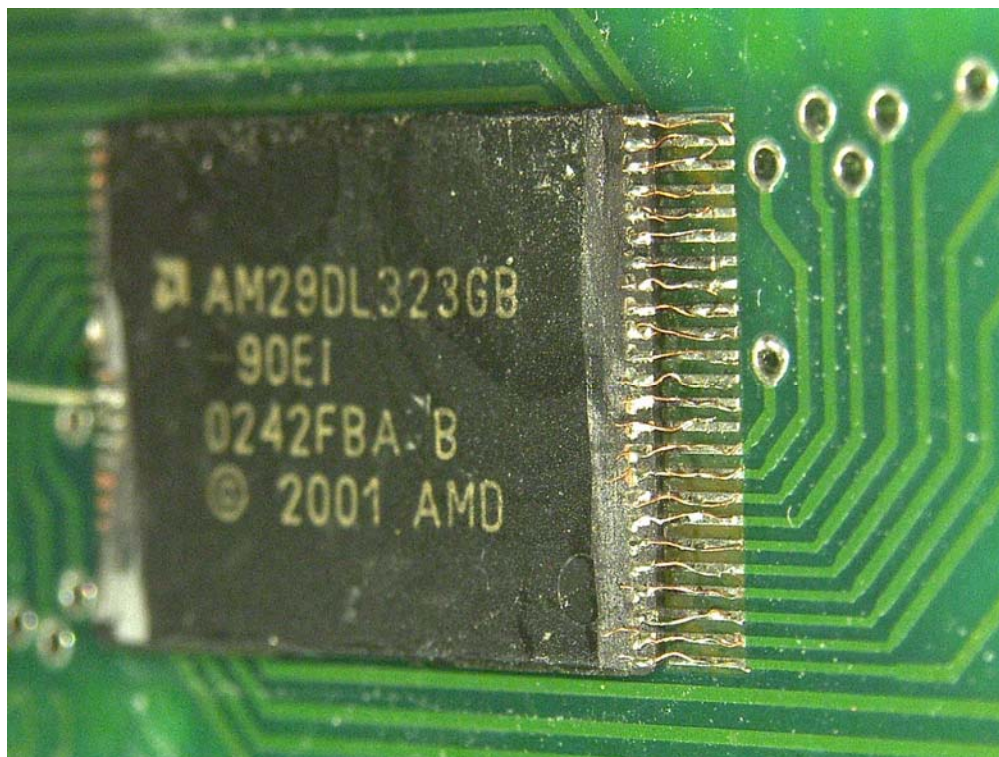


Figure 1. Photo of damaged memory device.

3.3. Data Description

Once the repairs were made, the chip was downloaded using the laboratory's chip reader. The download data file was decoded and the resulting data consisted of 35 track logs/sessions recorded from March 16, 2010 through October 20, 2016. Table 1 contains the listing of the decoded sessions that were recovered. The accident flight was flown on November 9, 2016 and was not found within the recorded data

TABLE 1 Decoded Sessions

SESSION INFORMATION FROM NTSB ACCIDENT ID: ERA17FA038

Session	Start Date	Time	End Date	Time	Session Length
0	3/16/2010	5:22:01 PM	3/16/2010	5:30:00 PM	0:7:59
1	4/29/2010	5:57:35 PM	4/29/2010	6:02:20 PM	0:4:45
2	4/29/2010	6:22:09 PM	4/29/2010	6:22:09 PM	0:0:0
3	4/29/2010	6:44:12 PM	4/29/2010	6:49:42 PM	0:5:30
4	5/29/2010	1:05:35 PM	5/29/2010	1:31:49 PM	0:26:14
5	9/9/2011	1:37:23 PM	9/9/2011	1:37:23 PM	0:0:0
6	3/16/2012	10:12:05 PM	3/16/2012	10:20:24 PM	0:8:19
7	3/19/2012	9:41:53 PM	3/19/2012	9:43:30 PM	0:1:37
8	3/23/2012	2:53:59 PM	3/23/2012	2:55:27 PM	0:1:28

9	4/27/2012	6:46:35 PM	4/27/2012	6:46:35 PM	0:0:0
10	4/27/2012	7:08:25 PM	4/27/2012	7:16:39 PM	0:8:14
11	5/10/2012	4:51:53 PM	5/10/2012	4:54:38 PM	0:2:45
12	5/12/2012	12:51:34 PM	5/12/2012	12:55:16 PM	0:3:42
13	5/12/2012	5:49:05 PM	5/12/2012	5:52:33 PM	0:3:28
14	5/12/2012	6:10:00 PM	5/12/2012	6:10:00 PM	0:0:0
15	5/22/2012	5:43:35 PM	5/22/2012	5:45:38 PM	0:2:3
16	6/26/2012	4:07:05 PM	6/26/2012	4:14:22 PM	0:7:17
17	7/2/2012	12:19:52 PM	7/2/2012	12:26:41 PM	0:6:49
18	7/15/2012	12:20:27 PM	7/15/2012	12:30:17 PM	0:9:50
19	7/15/2012	1:04:59 PM	7/15/2012	1:04:59 PM	0:0:0
20	7/16/2012	7:22:28 PM	7/16/2012	7:25:26 PM	0:2:58
21	8/17/2012	2:19:34 PM	8/17/2012	2:22:36 PM	0:3:2
22	8/18/2012	12:24:03 PM	8/18/2012	12:25:30 PM	0:1:27
23	8/20/2012	7:14:58 PM	8/20/2012	7:14:58 PM	0:0:0
24	8/5/2013	3:17:33 PM	8/5/2013	3:21:55 PM	0:4:22
25	6/21/2016	3:41:22 PM	6/21/2016	3:47:40 PM	0:6:18
26	6/21/2016	3:58:51 PM	6/21/2016	4:12:07 PM	0:13:16
27	6/21/2016	7:02:04 PM	6/21/2016	7:02:32 PM	0:0:28
28	6/21/2016	7:25:22 PM	6/21/2016	7:25:22 PM	0:0:0
29	6/21/2016	7:39:16 PM	6/21/2016	7:44:52 PM	0:5:36
30	6/21/2016	8:09:57 PM	6/21/2016	8:13:12 PM	0:3:15
31	6/21/2016	8:40:58 PM	6/21/2016	8:44:10 PM	0:3:12
32	6/21/2016	11:09:28 PM	6/21/2016	11:12:17 PM	0:2:49
33	6/22/2016	2:36:03 PM	6/22/2016	3:34:14 PM	0:58:11
34	6/22/2016	3:53:52 PM	6/22/2016	4:35:03 PM	0:41:11
35	10/20/2016	11:34:32 AM	10/20/2016	12:20:13 PM	0:45:41