

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

February 5, 2013

## **17 – Electronic Devices Factual Report**

**Specialist's Factual Report**  
**by Bill Tuccio**

### **1. EVENT**

Location: Greensburg, Indiana  
Date: December 2, 2012  
Aircraft: Piper PA-46-350P  
Registration: N92315  
Operator: Private  
NTSB Number: CEN13FA085

On December 2, 2012, about 1819 eastern standard time, a Piper PA-46-350P, N92315, collided with the terrain while performing the RNAV (GPS) RWY 36 approach to the Greensburg Municipal Airport (I34), Greensburg, IN. The instrument rated private pilot and three passengers were fatally injured. The airplane was registered to an individual, and operated under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Instrument meteorological conditions (IMC) existed at the time of the accident, which was operated on an instrument flight rules flight plan. The flight originated at Destin-Fort Walton Beach Airport (KDTS), Destin, Florida, at 1416 central standard time.

### **2. DETAILS OF DEVICE INVESTIGATION**

The Safety Board's Vehicle Recorder Division received the following devices:

Device 1:	Shadin Fuel Flow Indicator
Device 1 Serial Number:	1021
Device 2:	Garmin GNS 530W
Device 2 Serial Number:	78401611
Device 3:	Garmin GMX-200
Device 3 Serial Number:	38400972
Device 4:	Bendix King KFC 150 Autopilot
Device 4 Serial Number:	Unknown

Device 5:	Bendix King KX-165 Nav/Com
Device 5 Serial Number:	17843
Device 6:	Bendix King KLN-90 GPS
Device 6 Serial Number:	Unknown
Device 7:	L-3 Skywatch TRC497
Device 7 Serial Number:	86003
Device 8:	Apple iPad
Device 8 Serial Number:	GB051H7SZ3A
Device 9:	Apple iPad
Device 9 Serial Number:	GB01832JETU
Device 10:	Apple iPad
Device 10 Serial Number:	GB105NMXZ38

## **2.1. Shadin Fuel Flow Indicator Device Description**

The Shadin Fuel Flow Indicator, part number 921081 GIF, is a digital fuel management system designed to provide fuel management information under real-time flight conditions to the flight crew. The unit is connected to engine fuel flow transducers. The unit is capable of transmitting fuel information to certain GPS receivers for additional calculations and display of fuel management data. The unit can display engine fuel flow, fuel used, fuel remaining, and endurance.

The unit does not interface with an aircraft's fuel quantity indicating system. The unit requires the flight crew to enter the initial fuel on board the aircraft. All calculations and data provided by the unit are based on fuel flow.

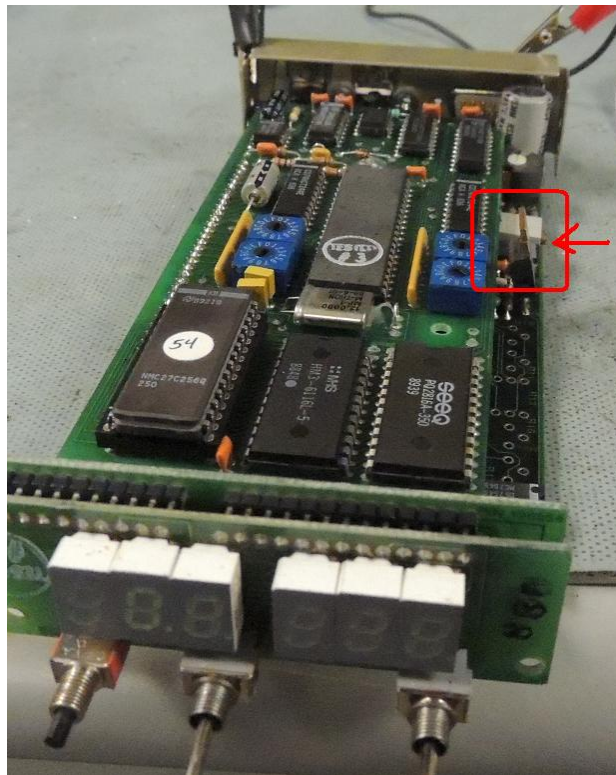
### **2.1.1. Shadin Fuel Flow Indicator Data Recovery**

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had sustained minor impact damage as shown in figure 1. Power was applied to the unit, however the LED digits were of insufficient intensity to discern displayed values. The unit was disassembled, and the internal intensity screw (figure 2) was used to increase the intensity of the LED display. The unit displays were documented.

**Figure 1. Shadin fuel flow indicator.**



**Figure 2. Shadin LED intensity display screw.**



### **2.1.2. Shadin Fuel Flow Indicator Data Description**

The unit self-tested “-Good-”, indicating firmware version 60.01.54. The self-test then displayed “78.0 GAL”, followed by “FUL 120”. The fuel used value displayed 72.7 gallons, fuel remaining was 18.8 gallons.

## 2.2. Garmin GNS 530W Device Description

The Garmin Model GNS 530W is a panel-mounted WAAS GPS receiver featuring a 5-inch color liquid crystal (LCD) display and offering navigation and communication data, along with precision and non-precision approach certification in the IFR environment. The unit has a slot for a Jeppesen database (front-loading data card) containing all airports, VORs, NDBs, intersections, Approach, STAR/SIDs and SUA information. A flight plan composed of multiple waypoints, including user-defined waypoints, can be programmed in the unit. However, no provision has been made to record and store position information within the unit. Data related to last known frequency settings and last known GPS location is stored in volatile memory and may be read from the front panel display upon power-up. There are no provisions for downloading stored data to a PC. 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.

### 2.2.1. Garmin GNS 530W Data Recovery

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had sustained significant impact damage, as shown in figure 3. An internal inspection revealed internal cabling was disconnected. The cables were re-attached and the unit started normally. The screens were explored and documented.

Figure 3. Garmin 530W as received.



### 2.2.2. Garmin GNS 530W Data Description

The IFR database installed in the unit's front-loading data card expired December 13, 2012, the obstacle database expired July 31, 2008. The unit was configured for Terrain Awareness and Warning System (TAWS). The unit was also configured to interface with an external fuel flow system, XM weather, and traffic information. The active

communication frequency was 122.9 and the standby communication frequency was 124.950. The active VOR frequency was 117.9 and the standby VOR frequency was 110.8.

### **2.3. Garmin GMX-200 Device Description**

The Garmin GMX-200 is a panel-mounted multi-function display utilizing a 6-inch diagonal, 640x480 pixel, color display. This unit can display data stored on SD data-cards inserted in the front panel, and from other sources, including: custom maps, IFR charts, VFR charts, terrain, traffic information, lighting, weather radar, and Jeppesen Chartview products. According to the manufacturer, this unit only retains configuration data such as user settings, and does not retain ground track or the last displayed information such as radar or NEXRAD.

#### **2.3.1. Garmin GMX-200 Data Recovery**

Upon arrival at the Vehicle Recorder Laboratory, an exterior examination revealed the unit had sustained minor impact damage as shown in figure 4. Power was applied to the unit, but the screen would not start. The front-mounted SD card was removed and examined.

**Figure 4. Garmin GMX 200 as received.**



#### **2.3.2. Garmin GMX-200 Data Description**

The SD card indicated the approach charts on the device were from the August 17, 2012 cycle and had expired September 20, 2012. No further information was recovered from the SD card.

### **2.4. Remaining Devices**

It was determined the following devices did not contain sufficient non-volatile information to be pertinent to the investigation: Bendix King KFC 150 autopilot, Bendix King KLN-90 GPS, and the L-3 Skywatch TRC497.

The Bendix King KX-165 Nav/Com would not start when power was applied. No further efforts were made to repair the unit.

The three Apple iPads were extensively damaged. No efforts were made to recover information from the iPads.