NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, DC 20594

February 14, 2012

Cockpit Voice Recorder

Specialist's Factual Report
By Bill Tuccio

1. EVENT

Location:	Camp Bastion, Afghanistan
Date:	January 16, 2012, Afghanistan Local Time (AFT)
Aircraft:	Bell 214, N5748M
Operator:	AAR Airlift Corp.
NTSB Number:	DCA12FA024

2. GROUP

A group was not convened.

3. SUMMARY

On January 16, 2012, at approximately 1045 Afghanistan Time (AFT), a Bell 214ST helicopter, registration N5748M, serial number 28102, crashed 7 miles south of Camp Bastion in the Helmand Province of Afghanistan. The aircraft was operated by AAR Airlift Group under the provisions of 14 CFR Part 135, under contract to the Department of Defense Air Mobility Command (AMC), under the U.S. Transportation Command (TRANSCOM). Visual meteorological conditions existed at the time of the accident. A solid-state cockpit voice recorder (CVR) was sent to the National Transportation Safety Board's Audio Laboratory for readout.

4. DETAILS OF INVESTIGATION

On February 1, 2012, the NTSB Vehicle Recorder Division's Audio Laboratory received the following CVR:

Recorder Manufacturer/Model:	**Allied Signal 980-6020-023**
Recorder Serial Number:	**2000**

4.1. Recorder Description

The accident aircraft had a CVR installed that records a minimum of the last 30 minutes of aircraft operation; this is accomplished by recording over the oldest audio data. When the CVR is deactivated or removed from the airplane, it retains only the most recent 30 minutes of CVR operation. This model CVR, the Allied Signal 980-6020-023, records 30 minutes of digital audio stored in solid-state memory modules. Four channels of audio information are retained: one channel for each flight crew and one channel for the cockpit area microphone (CAM).

4.2. Recorder Damage

Upon arrival at the audio laboratory, it was evident that the CVR had sustained substantial heat and structural damage (see figures 1 and 2). The crash protected memory unit (CSMU) was removed from the CVR housing; Figure 3 shows the CSMU on the left and CVR housing on the right. The CSMU insulation was removed revealing damage to the ribbon cable connecting the memory modules to the CVR housing (see figure 4).

The memory module was extracted from the CSMU and is shown in figure 5. Upon further inspection, it was evident that some of the control and memory chip connections to the memory board had been compromised, as shown in figure 6. Based upon this information, a chip level recovery was accomplished.

Figure 7 shows the memory board before flash memory chip recovery of the 14 memory chips on the board. Figure 8 shows the memory board during chip removal using precision heat application; 5 of the 14 chips have been removed in Figure 8. Figure 9 shows one of the flash memory chips in the chip reader socket.

The memory image on each of the 14 flash memory chips was read into a binary file format without difficulty. The 14 binary files were processed using software provided by the CVR manufacturer, again without difficulty. The resulting file was identical in format to that which would be created in an undamaged recovery. The recovered file was processed to create four, 30 minute digital audio files.

Figure 1. CVR upon arrival.

Figure 2. CVR before recovery process.

Figure 3. CSMU separated from CVR housing.

Figure 4. Memory ribbon cable.

Figure 5. Memory module.

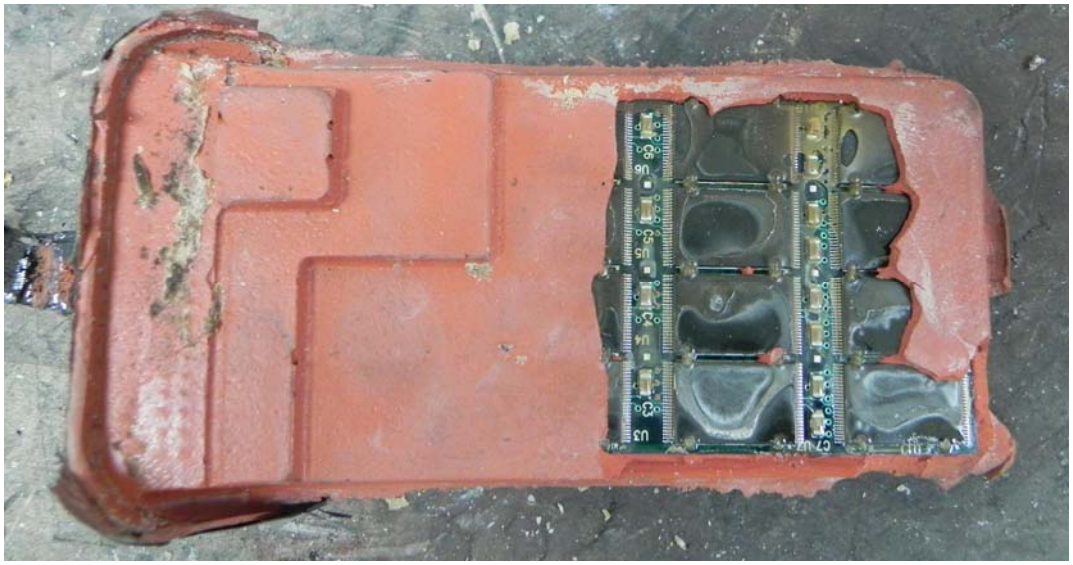


Figure 6. Damaged control chip connections to memory board.

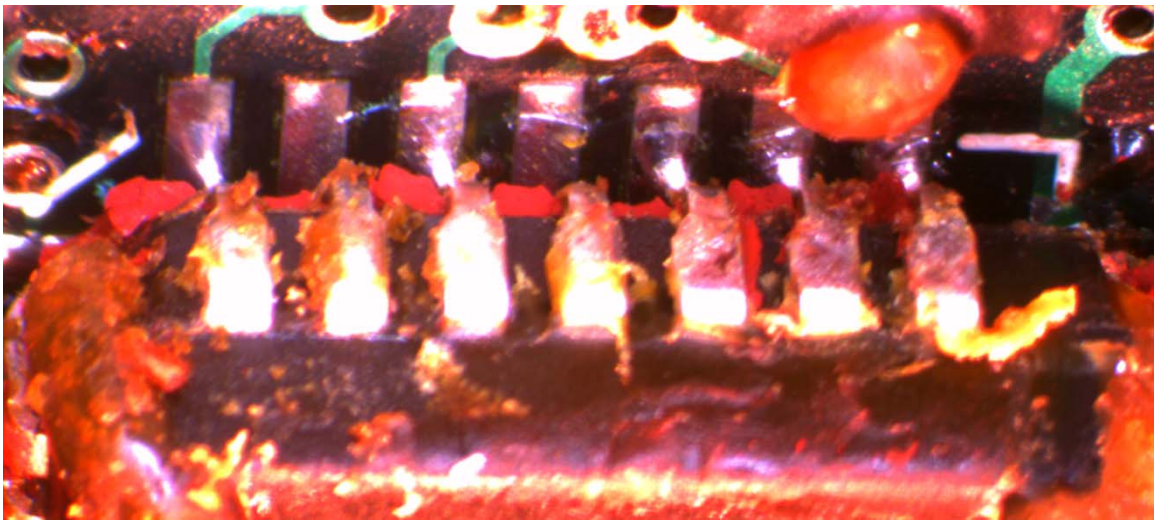


Figure 7. Memory board before flash memory chip removal.

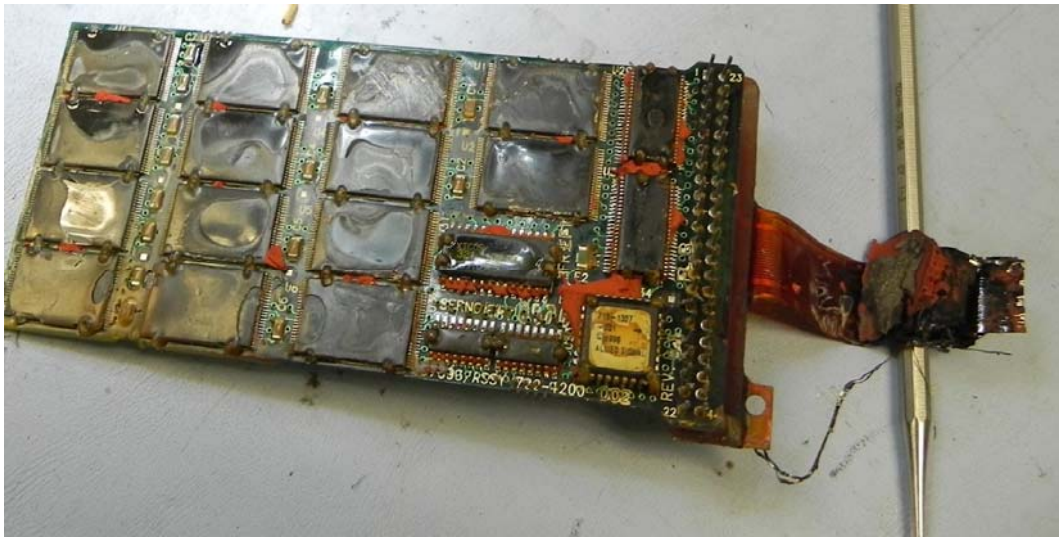


Figure 8. Memory board during flash memory chip removal.

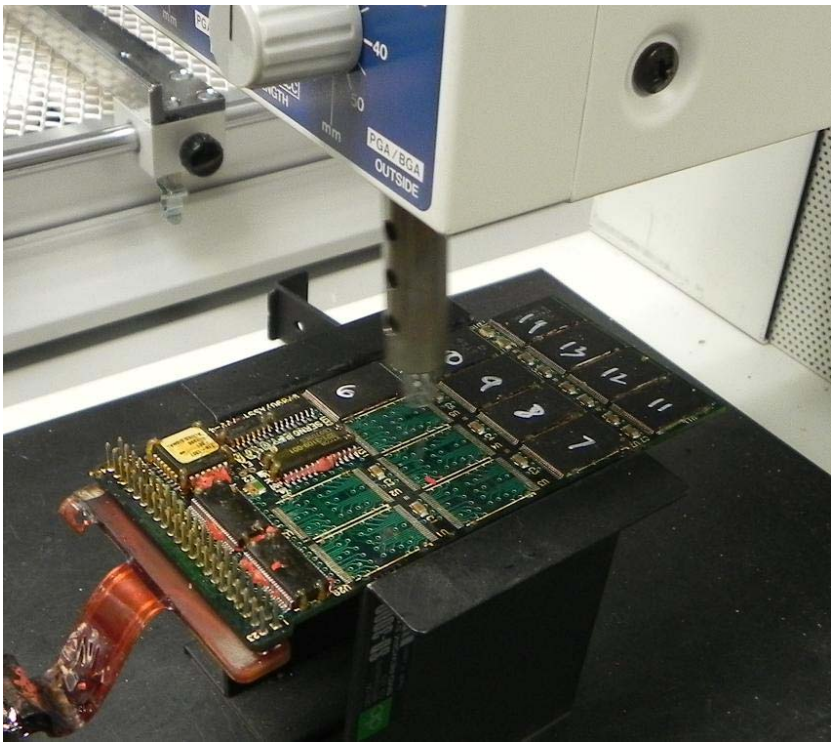
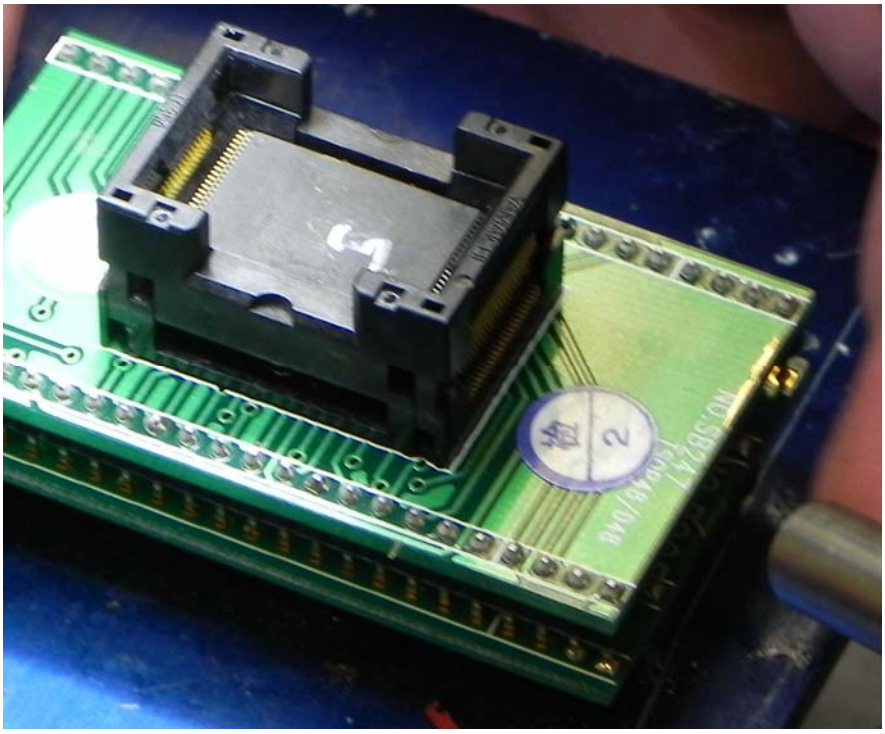


Figure 9. Flash memory chip in chip reader socket.



4.3. CVR Channels

The recording consisted of four channels of audio information. The audio on all the channels contained audio that was unusable. After examination of diagnostic information from the CVR manufacturer, it was determined the audio recovered from the chip level recovery represented the actual content of the CVR.

The audio was consistent with the CVR being inoperative or misconfigured at the time of the accident. All audio channels had no voice or background sounds.