

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



WPR24LA109

COCKPIT VOICE RECORDER

Group Chair's Factual Report

October 9, 2025

WARNING

The reader of this report is cautioned that the summary of a cockpit voice recorder audio recording is not a precise science but is the best product possible from a National Transportation Safety Board investigative effort. The summary or parts thereof, if taken out of context, could be misleading. The summary should be viewed as an accident investigation tool to be used in conjunction with other evidence gathered during the investigation. Conclusions or interpretations should not be made using the summary as the sole source of information.

TABLE OF CONTENTS

A. ACCIDENT.....	3
B. COCKPIT VOICE RECORDER SPECIALIST	3
C. FEDERAL CARRIAGE REQUIREMENTS.....	3
D. DETAILS OF THE INVESTIGATION	3
1.0 RECORDER DESCRIPTION.....	3
1.1 Recorder Damage	3
1.2 Audio Recording Description.....	4
1.3 Timing and Correlation	4
1.4 Description of Audio Events.....	4
APPENDIX A. CVR QUALITY RATING SCALE.....	7

A. ACCIDENT

Location: Billings, Montana
Date: March 12, 2024
Time: 0805 mountain daylight time (MDT)
1405 coordinated universal time (UTC)
Airplane: Raytheon Aircraft Company B200, Teton Leasing Llc, N299AV

B. COCKPIT VOICE RECORDER SPECIALIST

Specialist Michael Portman
Senior Aerospace Engineer – Recorder Specialist
National Transportation Safety Board (NTSB)

C. FEDERAL CARRIAGE REQUIREMENTS

The event aircraft, N299AV, was operating as Title 14 *Code of Federal Regulations* (CFR) Part 91 and was operating such that it was not required to be equipped with a cockpit voice recorder (CVR).

D. DETAILS OF THE INVESTIGATION

A CVR group was not convened. The NTSB Vehicle Recorder Division received the following CVR:

Recorder Manufacturer/Model:	Fairchild A-100S
Part Number:	S100-0080-00
Recorder Serial Number:	02602

1.0 Recorder Description

This model CVR, the Fairchild A-100S, is a solid state CVR that records 30 minutes of digital audio in a four-channel format: one channel for each flight crew, one channel for a cockpit observer, and one channel for the cockpit area microphone (CAM).

1.1 Recorder Damage

Upon arrival at the laboratory, it was evident that the CVR had not sustained any heat or structural damage, and the audio information was extracted from the recorder normally, without difficulty.

1.2 Audio Recording Description

Each channel's audio quality is indicated in Table 1.¹ Channel number four did not contain any audio information (nor was it required by federal regulations).

Table 1. Audio Quality.

Channel Number	Content/Source	Quality	Duration (mm:ss)
1	Pilot	Good	30:16
2	Co-pilot	Good	30:16
3	CAM	Good	30:16
4	Unused	N/A	N/A

1.3 Timing and Correlation

As no external sources were available to correlate the recorder to real world time, events noted in the CVR summary are in elapsed time from the beginning of recording.

1.4 Description of Audio Events

In agreement with the Investigator-In-Charge, a CVR group did not convene. A summary of events from the CVR follows.

Table 2. Summary of CVR events.

Time (mm:ss)	Observation
06:27.9	The accident flight recording began.
08:29.9	The crew obtained their clearance.
09:37.4	The crew obtained the ATIS information Echo at 1253 Zulu, winds 220 degrees at 9 knots, visibility 10 miles, clouds 10,000 feet overcast, temperature 6 degrees Celsius, dewpoint -5 degrees Celsius, altimeter 29.76 inches of mercury.
13:56.1	A power cycle was noted.
13:56.1	An electronic clicking sound, 4 seconds in duration, was noted. The crew discussed the Billings Five departure.
14:37.5	An electronic clicking sound, 28 seconds in duration, was noted.
15:13.3	The co-pilot ran the operator's before-start checklist. It was completed slowly, with the pilot coaching the co-pilot through various items.

¹ Appendix A comprises the CVR Quality Rating Scale.

18:17.7	The left engine was started.
18:47.0	An electronic clicking sound, 3.5 seconds in duration, was noted.
18:59.3	Unintelligible comments due to engine noise.
19:34.0	The co-pilot ran the "engine starting (battery)" checklist.
20:30.1	The crew were noted programming information into the flight computer.
21:08.8	The right engine was started.
22:07.4	The pilot mentioned "left gen is coming off...the right side picked it up...and I should have twenty-eight and a half so I got a good current limiter."
22:33.7	The co-pilot ran the before taxi checklist.
22:48.4	Tones, possibly related to the checklist item before "autopilot preflight test," were noted. A solid 350 hertz (Hz) tone followed by a solid 250 Hz tone was noted.
23:20.2	The co-pilot called the before taxi checklist complete.
23:37.4	The crew called ground control for taxi and received clearance to taxi to runway 28R.
24:05.2	The pilot called for the before takeoff checklist.
24:08.1	The co-pilot performed a flight control check, then proceeded with a taxi check, including mentioning that the generator load was "looking good."
25:12.4	The co-pilot called the taxi checklist complete. The pilot then called "above the line" and the co-pilot ran the "before takeoff (final items)" checklist above the line.
25:23.8	The pilot gave a takeoff brief, including the abort criteria being the "same as yesterday."
25:37.9	The pilot interrupted their own takeoff briefing to instruct the co-pilot to switch frequencies to tower.
25:44.4	The co-pilot mentioned he was not given a frequency for the tower. The pilot replied that the frequency is noted on the Billings Five departure plate.
26:24.6	The co-pilot called tower for takeoff, omitting the callsign, and ATC called back asking for the callsign.

26:36.5	The flight was cleared for takeoff on runway 28R. Winds were from 210 degrees at 7 knots, and the flight was instructed to fly a heading of 310 degrees after takeoff.
26:47.8	The co-pilot completed the "before takeoff (final items)" checklist, below the line. Some items were accomplished out of order. The "Ice Vanes" item was enunciated, but no response was received as the crew moved on to subsequent items.
27:20.8	An increase in power consistent with the takeoff roll beginning was noted.
27:28.0	The pilot was noted saying, "oh come on [unintelligible] don't do this."
27:51.3	The aircraft rotated.
27:57.9	The landing gear were raised.
28:07.5	The co-pilot asked if the pilot wanted yaw damp on, to which the pilot responded by confirming a heading of 310. The crew subsequently confirmed the yaw damp was activated 8 seconds later.
28:20.5	The flight was handed to departure. The crew checked in and were cleared up to 11,000 ft.
28:57.4	The flight was directed by ATC to turn right, direct to SHERY. The pilot then offered to help the co-pilot program the direction into the flight computers.
29:32.2	The pilot suggested to the co-pilot to warm up the cabin.
29:54.3	The pilot asked the co-pilot to send him direct to SHERY. The crew then discussed programming the flight computer for the remainder of the recording.
30:13.7	4 thumps of indeterminate origin were heard on CAM in the span of 1.3 seconds.
30:15.6	The recording ended.

Submitted by:

Michael Portman
Sr. Aerospace Engineer - Recorder Specialist

APPENDIX A. CVR QUALITY RATING SCALE

The levels of recording quality are characterized by the following traits of the cockpit voice recorder information:

Excellent Quality Virtually all of the crew conversations could be accurately and easily understood. The transcript that was developed may indicate only one or two words that were not intelligible. Any loss in the transcript is usually attributed to simultaneous cockpit/radio transmissions that obscure each other.

Good Quality Most of the crew conversations could be accurately and easily understood. The transcript that was developed may indicate several words or phrases that were not intelligible. Any loss in the transcript can be attributed to minor technical deficiencies or momentary dropouts in the recording system or to a large number of simultaneous cockpit/radio transmissions that obscure each other.

Fair Quality The majority of the crew conversations were intelligible. The transcript that was developed may indicate passages where conversations were unintelligible or fragmented. This type of recording is usually caused by cockpit noise that obscures portions of the voice signals or by a minor electrical or mechanical failure of the CVR system that distorts or obscures the audio information.

Poor Quality Extraordinary means had to be used to make some of the crew conversations intelligible. The transcript that was developed may indicate fragmented phrases and conversations and may indicate extensive passages where conversations were missing or unintelligible. This type of recording is usually caused by a combination of a high cockpit noise level with a low voice signal (poor signal-to-noise ratio) or by a mechanical or electrical failure of the CVR system that severely distorts or obscures the audio information.

Unusable Crew conversations may be discerned, but neither ordinary nor extraordinary means made it possible to develop a meaningful transcript of the conversations. This type of recording is usually caused by an almost total mechanical or electrical failure of the CVR system.