



---

# **Bombardier Dash 8**

## **Transient Vibration Survey**

**Part Number: 11-200-0245**

**AppNote Number: A-BA-DASH8-4040-TVS (Rev. Original, Sept. 2007)**

This Application Note is provided for information only and does not supersede the requirements or guidelines set forth in the applicable engine or airframe maintenance manual. Technology for Energy Corporation assumes no obligation or liability, either expressed or implied, to the Purchaser arising out of the use of this procedure.

Copyright © 2007, TEC Aviation Division. All rights reserved. This document is to be printed and reproduced for personal use only.



<b>Application Note Number</b>	<b>A-BA-DASH8-4040-TVS</b>
<b>Revision</b>	<b>Original</b>
<b>Function</b>	<b>Transient Vibration Survey</b>
<b>Airframe</b>	<b>Bombardier</b>
<b>Engine</b>	<b>N/A</b>
<b>E-Setup Number</b>	<b>a-ba-dash8-4040-tvs.asf</b>
<b>ACES Systems Analyzer</b>	<b>Model 4040</b>
<b>Firmware Version</b>	<b>3.00 or Higher</b>
<b>Procedure</b>	<b>N/A</b>

## Introduction

This Application Note covers the required equipment, equipment installation, analyzer setup, data acquisition and solution process for using the ACES Systems Model 4040 with the Transient Vibration Survey Performance Option to perform a Transient Vibration Survey on the Bombardier Dash 8. General instructions for the use of the Model 4040 can be found in the Model 4040 User Manual #4040-OM-01 (P/N 75-900-4040). All procedures for Transient Vibration Survey and all adjustments should be made in accordance with the Aircraft Maintenance Manual.

## A. Required Equipment

The following ACES Systems equipment is required\*:

<b>Item</b>	<b>Quantity</b>	<b>Description</b>	<b>Part Number</b>
1.	1	Analyzer, Model 4040 Viper	10-100-4040
2.	1	Sensor, Vibe, Velocity, 991V	69-100-0064
3.	1	Cable, Interface, Dash 8 to 991V (On Engine)	10-320-0116
4.	1	Mount, 1/4X28 Sensor, Vibe ¼ hole	22-430-0056
5.	1	Cable, Interface Dash 8 Balance – 4040	10-320-0164

\*This listing shows the latest design parts. It is acceptable to perform this task using previous designs with the appropriate accessories. For compatibility issues, contact ACES Systems.

## Optional Equipment

Item	Quantity	Description	Part Number
6.	1	Communications Cable	10-320-0157
7.	1	Sensor, Vibe, Velocity, 991V	69-100-0064
8.	1	Cable, Interface, Dash 8 to 991V (On Engine)	10-320-0116

## Miscellaneous Equipment

Tape or tie wraps to secure cables to airframe.

Aircraft Maintenance Manual

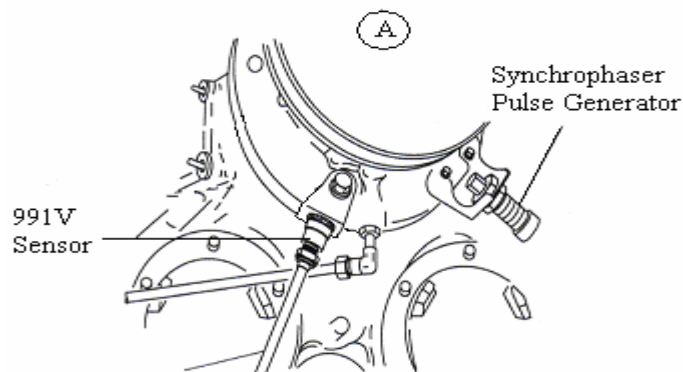
## B. Equipment Installation

### NOTE

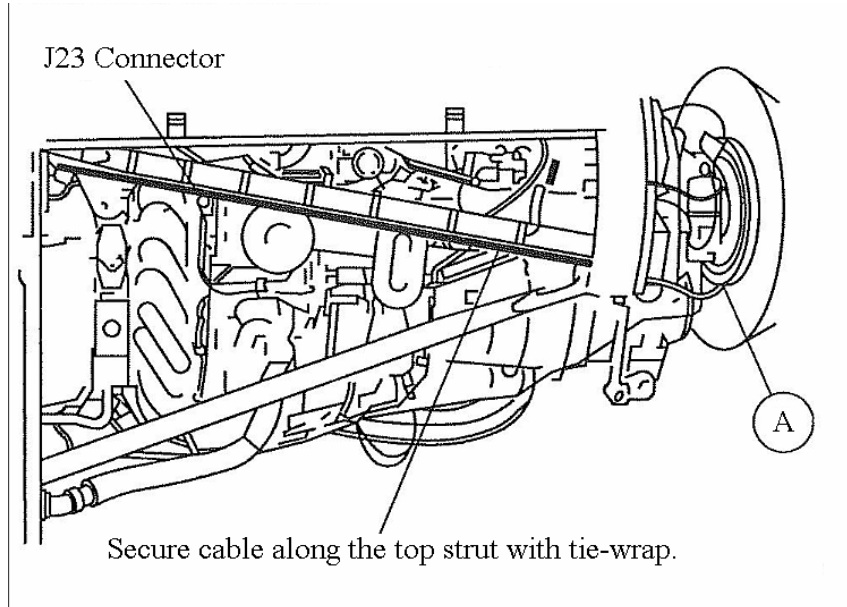
**For warnings, cautions, and notes regarding aircraft operations and tasks, see Aircraft Manufacturer's Maintenance Manual.**

1. Place analyzer (Item 1) in flight compartment.
2. Obtain access to the engine compartment.
3. Install a 991V Vibe Sensor (Item 2) into the Vibe Sensor Mount with ¼" Hole (Item 4). The vibration sensor should be installed and resemble Figure 1.
4. Connect a 991V Interface Cable (Item 3) to the sensor, route along upper strut, and secure using tie wrap or tape. Connect Cable to the 9811-J23 connector receptacle on the engine. (Figure 2)
5. Obtain access to the J24 maintenance connector located behind the cabin wardrobe adjacent to relay panel NO.1. Connect interface cable the J-24 then to the 4040 analyzer as labeled on the cables. (Figure 3)
6. Reinstall any previously removed engine cowlings.

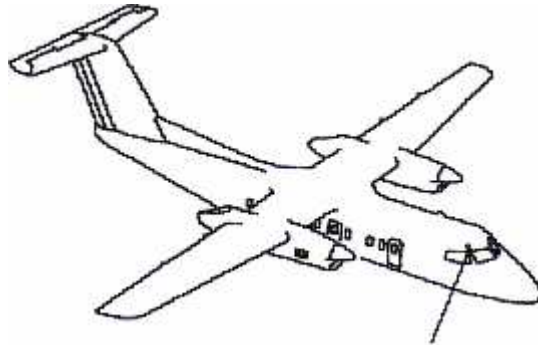
## Equipment Installation Diagram



**Figure 1**



**Figure 2**



J24 Connector behind wardrobe adjacent to relay panel No. 1

**Figure 3**

### **C. Analyzer Set Up**

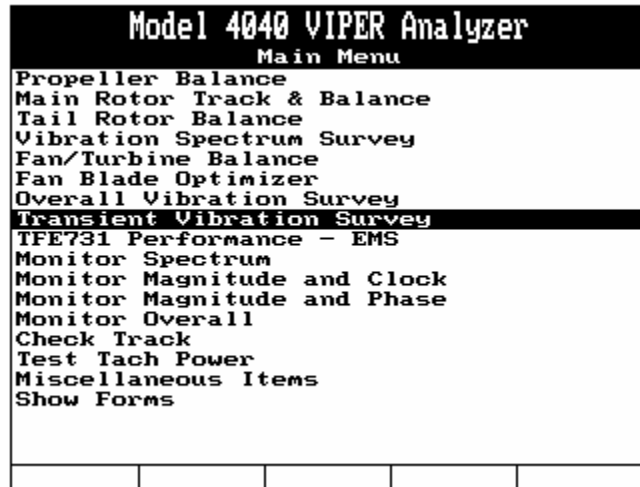
---

**NOTE**

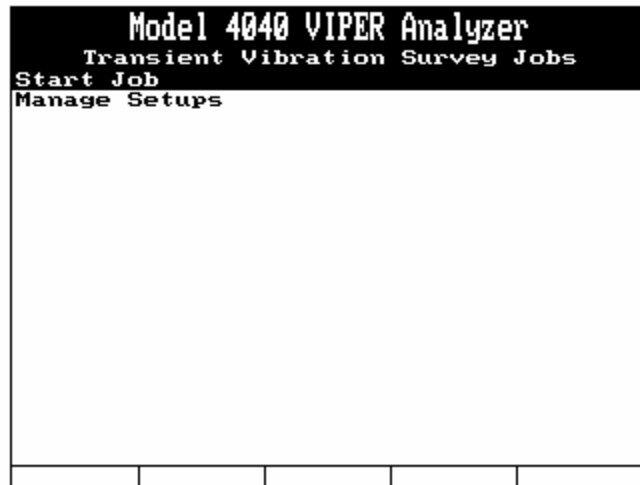
The user performing the Transient Vibration Survey should be familiar with the use of the analyzer key pad prior to the start of this task. For instructions on

using the analyzer keypad see the Model 4040 User Manual #4040-OM-01 (P/N 75-900-4040), Chapter 3.

1. Turn the analyzer ON by pressing the [ON/OFF] key.
2. From the Main Menu, select “Transient Vibration Survey” and press the [ENTER] key.



3. From the “Transient Vibration Survey Jobs” menu, select “Start Job” and press the [ENTER] key.



4. If “a-ba-dash8-4040-tvs” is listed in the Setup List, select it using the [↓] key, press [ENTER] and go to section D, Step 1 below. If “a-ba-dash8-4040-tvs” is not in the Setup List, press the [F1], “New” key and go to Step 5 below.
5. Complete the Transient Vibration Survey Setup screen per the illustration screen below. (For detailed instructions regarding options in this screen [configurations, plots, limits, conditions, speeds, and parameters] see the Model 4040 User Manual #4040-OM-01 (P/N 75-900-4040), Chapter 11.).

**Model 4040 VIPER Analyzer**  
Transient Survey Setup

Name: a-ba-dash8-4040-tvs  
 (Hz): 100.00 to 600.00  
 Resolution: 400 lines  
 Display: Spectra Record Every 0 ms  
 Define related tachs? No

Channel	Units	Mod	Max
A:	<u>cm/sec</u>	<u>Peak</u>	<u>5.00</u>
B:	<u>None</u>		
C:	<u>None</u>		
D:	<u>None</u>		

Channel	Sensor	Desc
A:	<u>991V</u>	<u>Btm Lt</u>
B:		
C:		
D:		

Config			Plots	Limits
--------	--	--	-------	--------

- 5.1. In the "Name:" field, use the analyzer keypad to enter "a-ba-dash8-4040-tvs". Press the [↓] key to move to the next field.
- 5.2. In the "RPM:" field, press the [⇒] key to toggle to "Hz". Press [↓] to move to the next field.
- 5.3. In the unmarked fields adjacent to "Hz" enter the Minimum Frequency "100". Use the [↓] key to move to Maximum Frequency field. Use the keypad to enter "600". Press the [↓] key to move to the next field.
- 5.4. In the "Resolution:" field, press the [⇒] key until the field reads "400". Press the [↓] key to move to the next field.
- 5.5. In the "Display:" field use the [⇒] key to select "Spectra Record". Press the [↓] key to move to the next field.
- 5.6. In the "Every" field use the [⇒] key to select "0". Press the [↓] key to move to the next field.
- 5.7. In the "Define related tachs?:" field use the [⇒] key to select "No". Press the [↓] key to move to the next field.
- 5.8. Under the "Units:" field use the [⇒] key to select "cm/sec". You must enter a value in any channel where a sensor is present. (For more detailed information regarding engineering units used see the Viper 4040 Users Manual [#4040-OM-01, P/N 75-900-4040], Chapter 11 or contact ACES Systems.) Press the [↓] key to move to the next field.
- 5.9. In the "Mod:" field use the [⇒] key to select "Peak". Press the [↓] key to move to the next field.
- 5.10. In the "Max:" field use the [⇒] key to select "5.00". Press the [↓] key to move to the next field.
- 5.11. Repeat Steps 5.8 through 5.10 as needed for each "Channel". When all fields required are completed, press the [↓] key to move to the next field.
- 5.12. Under the "Sensor:" field use the [⇒] key to select "991V". Press the [↓] key to move to the next field.

- 5.13. In the "**Desc**" field use the key pad to enter "BTM LT" for bottom, left engine (enter "BTM RT" if sensor is on the right engine) or a location description of your choosing. Press the [↓] key to move to the next field.
- 5.14. Repeat Steps 5.12 and 5.13 as needed for each "**Channel**". Press the [↓] key to move to the next field.
6. Press [F1] to display the "Configuration" function key menu. Press [F1] to bring up the "Conditions" screen. Use the [↓] key to toggle to the "**Spectrum**" column. Then use the [⇒] key scroll until "**Waterfall**" appears. Pressing [ENTER] will take you back to the "**Transient Survey Setup**" screen.

Model 4040 VIPER Analyzer			
Conditions			
	Condition	Spectrum	Max. Time
1)	Test1	Waterfall	0
2)		None	0
3)		None	0
4)		None	0
5)		None	0
6)		None	0
7)		None	0
8)		None	0
9)		None	0
10)		None	0
11)		None	0
12)		None	0
13)		None	0
14)		None	0
15)		None	0

7. When all fields required are completed, press [ENTER].

## D. Data Acquisition

### Note

Steps 1 and 2 are optional. ACES Systems suggests these fields are completed to properly identify each job and assist in data acquisition at a later time, if desired.

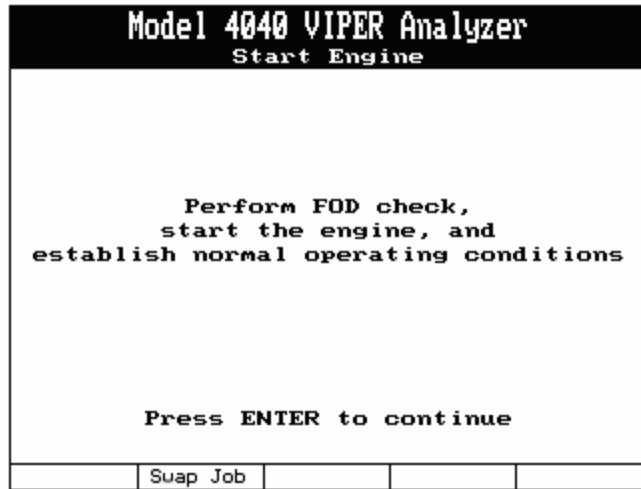
1. Job Identification Screen. The key pad will be used to enter all the information on this screen. In the "**Name:**" enter the name of the aircraft owner (i.e. John Doe). Use the [↓] key to select the next field. Under "**A/C Registration:**" enter the alphanumeric designation assigned to the aircraft. ). Use the [↓] key to select the next field. Under "**A/C Total Time:**" enter the aircrafts total time from its log books.

Model 4040 VIPER Analyzer				
Job Identification				
Name: JOHN DOE				
A/C Registration: N1234				
A/C Total Time: 123.4				
Press ENTER to continue				
Names				

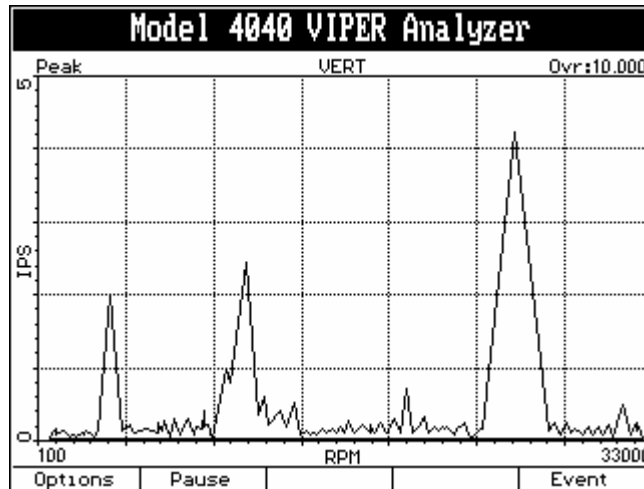
2. Engine Information. In the “**Position**” field, use the [⇒] key to select the position of the engine being surveyed (the position must correspond to how the cables for each engine are connected to the analyzer). Press the [↓] key to move through the fields. Under both “**Engine:**” and “**Propeller:**” use the key pad to enter information into the following fields; “**S/N**” (serial number, press [F1] to view and select from a list of previously used serial numbers), “**Type**” (engine/propeller type), “**TSO**” (time since overhaul), “**TSN**” (time since new). When all fields are completed as required, press [ENTER] to proceed.

Model 4040 VIPER Analyzer				
Engine Information				
Position:				
1				
Propeller:				
S/N 5678				
Type				
TSO 12				
TSN 34				
Engine:				
S/N 9012				
Type				
TSO 56				
TSN 78				
Serial Nos				

3. Start the engine. When the engine reaches normal operating conditions (speed, temp, etc.), press the [ENTER] key to begin acquiring data. You can press [F2] “Swap Job” to return directly to the Main Menu without rebooting the analyzer.



4. The “**Waterfall Plot**” screen will appear. When a suitable sample has been taken, press the [ENTER] key to continue.



5. The “**Store the Data?**” screen will display next, as shown below. If you do wish to save the data press [F1]. If you do not want to save the data press [F5] and you will be taken back to the “**Start Engine**” screen (Step 3) to restart the survey.

Model 4040 VIPER Analyzer				
Store the data?				
Yes				No

## E. Quit Job

---

1. After saving the run data you will be taken to the “Shut Down Engines” screen. Press [F2] to swap to another job, or [F5] to end the survey.

Model 4040 VIPER Analyzer				
Shut Down Engines				
Shut down engine(s) per manual instructions				
	Swap Job			Continue

2. To transfer the data from the analyzer to a computer see the Viper 4040 Users Manual (#4040-OM-01, P/N 75-900-4040), Chapter 17.