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**SERVICE INFORMATION LETTER No. 106**

**Active Noise & Vibration System Best Practises**

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**1. Introduction**

In response to feedback regarding issues being experienced by Bombardier Q series operators with the Active Noise and Vibration System (ANVS) Ultra Electronics, Precision Control Systems (PCS) have produced this best practises document to help reduce the number of unnecessary removals and improve system performance.

**2. Recommendations**

- A. Ultra Electronics (PCS) would like to remind all Q series operators that ANVS & Propeller Balancing and Monitoring System (PBMS) training is available free of charge on request.
- B. Removal of faulty NVS hardware
  - (1) If any faulty component is removed from an Aircraft ensure that the return documentation is clearly marked with the removal reason and position it was removed from. Please refer to Service Information Letter (SIL) 109 for more information and examples.
  - (2) If a part number 8-83X controller is fitted before a controller is removed download an event log and email to the address above. During a normal installation of the MT830 software a shortcut for the store event log tool will be available on the desktop; otherwise it can be found in C:\MT830\Tools\storeeventlog.exe
  - (3) If a controller part number 8-81X is fitted copy the maintenance log and email to the address above. The maintenance log can be found in C:\MT830\serial number of the aircraft.

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### C. General Maintenance

- (1) Flight crews should be encouraged to report cabin vibrations – detailing locations by seat row and on which side of the aircraft.
- (2) If the flight crew report noise in a specific area but the system tests serviceable a leak check of the microphones in the general area should be carried out to ensure microphone seals are intact.
- (3) If high levels of distortion are reported on a particular channel after an Automatic Actuator and Sensor test then perform a manual Actuator test on that channel and isolate any loose or vibrating interior components and secure as necessary.
- (4) Carry out regular manual actuator tests on each actuator and listen for loose or vibrating interior components. Locate and secure all vibrating interior components.
- (5) Make sure that arm rests, ash trays and seat back tray hardware is secure and in good order.
- (6) Make sure that all microphone holes located throughout the cabin are clear of debris.
- (7) Flight crews should be discouraged from leaving loose (particularly metallic) articles in overhead bins. The vibrating article can interfere with the ANVS ability to attenuate noise.
- (8) If an Active Tuned Vibration Attenuator (ATVA) is removed for troubleshooting ensure a new gasket is fitted when refitting it to the aircraft.

### D. Bombardier Aircraft Recommendations

**NOTE: The following recommendations are aircraft related and as such Bombardier help desk should be contacted with any questions**

- (1) Carry out regular inspection of the Engine Vibration Isolation System.
- (2) Carry out regular checks of overhead bins for missing Bumpons and replace as necessary.
- (3) The liberal use of 3M glue, Velcro strips and Bumpons is recommended to secure internal panels from vibrating.
- (4) During a C-check or when access is otherwise gained to an ATVA check and observe if the ATVA bracket is touching the aircraft rib. If so, contact Bombardier help desk with condition details to obtain corrective engineering.

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### E. Switching off the ANVS System

- (1) Unnecessarily switching off of the ANVS for Degrade or Fail lights and then leaving the system on MEL for extended periods has been found to have a detrimental effect on the long term reliability of the ATVA's.
- (2) With the ANVS system switched off the ATVA's are free to vibrate at a frequency and amplitude induced by airframe vibration and could potentially cause internal damage over time. It should also be noted that PBMS vibration data will NOT be collected if the system is switched off at the Flight Attendants Panel.
- (3) Operators are advised that if the NVS INOP light is present and providing that no ATVA is making excessive noise to leave the system switched on and manually paused. This will allow the internal components of the ATVA to be electrically held in a central position.
- (4) It is recommended that to improve the MTBF of the ANVS system, operators consider repairing the system at the first practical opportunity. This will limit the time ATVA's are subjected to uncontrolled external vibration influences if not paused.

### F. Excessive Noise

- (1) In the event that an ATVA is making excessive noise (hammering) the first action should be to attempt to relieve the symptoms by "Pausing" the system from the button on the Flight Attendants Panel. The ANVS system should only be switched OFF if the symptoms persist.

**Note: Pause is automatically set to OFF when the power is cycled. If the system is required to stay in pause reactivate on the Flight Attendants Panel 'before flight' if Modsum ISQ2300017 is not embodied and 'during flight' if Modsum ISQ2300017 is embodied.**

- (2) Maintenance crews are advised to identify the noisy ATVA at the first opportunity and using the MT830 Maintenance Terminal attempt to relieve the symptoms by "Disabling" the noisy ATVA. Only if the symptoms persist should the system be switched off.
- (3) On the Q400 Classic and Next Gen aircraft ATVA number 25 can appear loud during an Actuator/Sensor test, this is due to the ATVA being situated very close to the overhead bin crash-load rod which is rigidly mounted to the fuselage and hence a good transmitter of vibration into the overhead bin area.
- (4) When the bins around ATVA 25 are not tightened, ATVA 25 will show high distortion from an Auto I/O check. Loud ATVA noise levels from ATVA 25 should not be considered a reason for removal. If high distortion at ATVA 25 is observed then the security and rigging of the overhead bin installation should be carried out before any ATVA replacement is considered.

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- (5) The noise could sound worse depending on the rigging of the bin in the area (e.g. loose bin door).

G. Differences between the old and new Q400 Flight Attendants Panel

- (1) For more information please refer to Bombardier Service Letter DH8-400-SL-33-001. The effect on the control of the NVS system is tabulated below:

	<b>New FA Panel EMTEQ ECCX-1002</b>	<b>Old FA Panel WASP</b>
NVS On And Off	To turn the NVS 'ON', the button needs to be held for 4-5 seconds  To turn the NVS 'OFF', the button does not need to be held; the function is instantaneous.	No Difference  To Turn the NVS 'OFF', the button needs to be held for 4 seconds
NVS INOP	The NVS INOP indicator turns 'ON' if there is a fault or if the NVS is off	The NVS INOP indicator turns 'ON' only if there is a fault

H. Troubleshooting ATVAs and Power Amplifiers (PA)

- (1) Previous SIL 22 requested that operators replace ATVA's & PA's as a pair; however this was superseded by SIL 55. Some operators continue to change these components as a pair (possibly due to difficult access), thus incurring an unnecessary NFF charge for the serviceable component. ATVA's & PA's should only be returned as a pair if both items are confirmed by troubleshooting as being unserviceable.
- (2) The PA can be confirmed faulty in situ by performing the following simple voltage checks

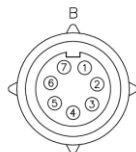
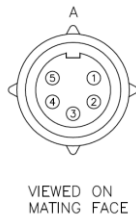
**Note: Use the manual actuator test to drive the failed channel**

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Check that the PA is getting a drive signal from the controller between the following contacts:



**Q400 PA Connector pin-outs**

### PA Voltage Checks for Q400:

Pin 1 and Pin 2 connector A:

- 0.7Vrms @ 85 Hz

Check Pin 5 and Pin 4 connector A

- 28V is being supplied to the PA

Check that the PA is supplying a drive signal to the ATVA

- 12-14Vrms from pin 5 to pin 1 connector B (Output high)
- 12-14Vrms from pin 6 to pin 1 connector B (Output low)

### PA Voltage Checks for Q100/200/300:

Pin 1 and Pin 2 connector A:

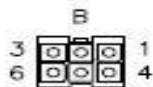
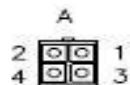
- 1.0 Vrms @ 73Hz (83x Controller)
- 0.5 Vrms @ 73Hz (81x Controller)

Check that 28V is being supplied to the PA:

- pin 4 to pin 3 connector A

Check that the PA is supplying a drive signal to the ATVA

- 12-14Vrms from pin 3 to pin 2 connector B (Output high)
- 12-14Vrms from pin 6 to pin 2 connector B (Output low)



**Q100/200/300 PA Connector pin-outs**

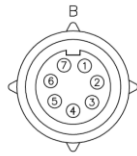
- (3) In most cases when ATVA's and PA's have been removed as a pair the PA is found not faulty. When returned PA's are confirmed as faulty the most common failure seen is a blown output stage. In cases where operators do replace ATVA's and PA's as a pair UEC recommends that the PA be subjected to the following bench check to confirm a blown output stage:

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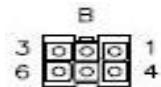
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MATING FACE



**Q400**



**Q100/200/300**

### PA Bench Check:

Measure the resistance between:

- Q400 Connector B Pin 5 and Connector B Pin 6.
- Q100/200/300 Connector B pin 3 and Connector B pin 6.

For both cases if the measurement is above 1.5 Mohm then the PA output stage is blown. If the PA output stage is not blown then it is recommend that the PA is re-installed onto an Aircraft and tested using the Automatic Actuator and Sensor Test.

- I. Connecting to the Active Noise Cancellation Unit (ANCU) with the MT830 terminal
- (1) If using a Windows XP/7 operating System and a USB to serial converter for connecting to a Controller please refer to SIL 084 for instructions.

**Note: The MT830 software is not compatible with Com ports higher than 9.**

- (2) If using a Windows 7 operating System and a USB to serial converter refer to SB 23-35-106 for your port allocation.
- (3) The type of serial cable needed to connect to the controller is a 'straight through cable'.
- (4) If you cannot connect to a Controller with a known working cable and computer try connecting to the Controller directly into J5 before replacing the Controller.

J. Calibration Issues

- (1) It is recommended to re-calibrate the NVS system annually if possible.
- (2) Calibration is highly recommended post C-check provided the following has been carried out:
  - A pre input serviceability check
  - Replacement of any failed components as required
  - Checks of the wiring and ATVA/PA installations
  - A post C-check serviceability check
  - All armrest ashtrays are firmly secured
- (3) Calibration is not required after an LRU change unless more than 50% of the ATVA's are changed at the same time.
- (4) All channels must be working before attempting a calibration.

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- (5) Always make sure that both the unpressurised and pressurised calibrations are carried out.
- (6) Make sure that the calibration files are kept in a place that is easily accessible by all maintenance crew in case there is a need to replace a controller.
- (7) Be aware that both calibration file attributes need to be 'read only' for the MT830 software to load them onto a Controller. The files are set to 'read only' as default however it is possible that they may be inadvertently deselected if being transferred between computers, network locations etc. If you cannot load calibration files onto a controller check that they are 'read only' in the file attributes by right clicking each calibration file, select properties, select 'General' tab and the Read-only tick box is at the bottom of the page. If there is not a tick in the Read-only box, click on the box until one appears then click on OK button.
- (8) Make sure that external noise is kept to a minimum before and during a calibration.
- (9) If the calibration continuously fails on a standard Q100/200/300 system but the Actuator/Sensor test passes you should suspect that one half of a double actuator shown failed during the calibration has failed and requires investigation.
- (10) If the calibration fails on a Q400 system but the Actuator/Sensor test passes you should suspect that the actuator shown failed during the calibration has failed and requires investigation.

### 3. Contact Details

- A. Please be aware that the ultracontrols.aero and the ultraquiet.com domains no longer exist.
- B. Current contact details are as follows:
  - Email: [support@ultra-pcs.com](mailto:support@ultra-pcs.com)
  - Phone: +44 (0) 2088134444
  - Fax: +44 (0) 2088134351
  - 24 Hour AOG: +44 (0) 2088134407
  - Address: Ultra Electronic (PCS),  
417 Bridport Road, Greenford,  
Middlesex, UB6 8UE  
England

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### C. Customer Feedback

To ensure continuous improvement in our service levels, Ultra Electronics (PCS) welcomes customer feedback. Correspondence on this subject should be sent to our formal customer feedback process via email at: [feedback@ultra-pcs.com](mailto:feedback@ultra-pcs.com).

### D. Acknowledgment Statement

Please complete the following acknowledgement statement. A copy of this statement should then be returned to Ultra Electronics at the address or fax number shown at the top of page 1.

(Name)..... of

(Company).....

Confirms receipt of SIL 106 Issue 4

If preferable, a statement confirming receipt of SIL 106 Issue 4 can be emailed to: [support@ultra-pcs.com](mailto:support@ultra-pcs.com)