

## Publications, Training and Logistic Services

Course Syllabus: 523-0823772

**COURSE TITLE:** Bombardier Challenger 605/650  
Pro Line 21 Advanced Avionics  
Flight Line Maintenance.

**PREREQUISITES:** Students should have basic knowledge of aircraft avionics systems and a working command of the English language (interpreters are available for special cases).

**PURPOSE:** This course provides flight-line maintenance personnel with training to operate and perform flight-line maintenance for the Pro Line 21 Advanced avionics system on the Bombardier Challenger 605 and 650 aircraft.

This course is designed to teach troubleshooting for replacement of line replaceable units (LRUs) and line replaceable modules (LRMs) and does not include internal maintenance of any component.

This course meets the requirements of ATA Spec 104 Level 3.

The Pro Line 21 Advanced System consists of the LRUs identified in the section titled EQUIPMENT TYPE by description and part number, including associated peripheral equipment identified as deliverable hardware.

**OBJECTIVES:** Upon completing this course, the student will be able to:

1. Have an overall understanding of the Pro Line 21 Advanced Avionics Principles and Operation.
2. Identify System Components and the Functional/Operational Characteristics of each Line Replaceable Unit (LRU) and Line Replaceable Module (LRM).
3. Perform Fault Isolation to a faulty LRU using Built-In Maintenance Diagnostics.
4. Identify typical aircraft system interface and system architecture.

**COURSE LENGTH:** 5 Days

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### **TRAINING DEVICES:**

1. Special Test Equipment
  - a. CL-605/650 Engineering Test Rig (if available)
  - b. CL-605/650 aircraft (if available)

### **TRAINING MATERIALS:**

1. Power Point Presentations with LCD Projector
2. Student Training Material.
3. Information Handouts.

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### REFERENCES:

Document Name	Part Number	Edition	Revision	Date
Bombardier Challenger 605/650 Pro Line 21 Advanced Avionics System Avionics System Manual (ASM)	523-0823150	2	0	17 Jan 2024
Bombardier Challenger 605/650 Pro Line 21 Advanced Avionics System Diagnostic Guide (DG)	523-0823152	3	0	13 May 2024
Bombardier Challenger 605/650 Pro Line 21 Advanced Avionics System Pilot Guide (PG)	523-0822376	4	0	17 May 2024
Bombardier Challenger 605/650 Pro Line 21 Advanced Flight Management System Pilot Guide (PG)	523-0822377	5	0	17 Feb 2023
Bombardier CL605/650 HGS-6605 Head-Up Display and Enhanced Vision System Pilot Guide (PG)	523-0816693	2	0	12 Jun 2023
Bombardier Challenger 605 HUD-6605 Head-Up Display System Maintenance Manual (SMM)	523-0816694	2	0	3 Dec 2021

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### **COURSE SYLLABUS**

#### **00. Course Introduction**

- A. Training Overview
  - i. Introduction
  - ii. Registration
  - iii. Course Description
  - iv. Course Objectives
  - v. Course Outline
  - vi. Course Evaluation
  - vii. Course Materials
  - viii. Publications & Service Links
  - ix. Summary

#### **01. Data Buses**

- A. Overview
- B. Data Buses
- C. ARINC Data Buses
  - i. ARINC 429
  - ii. ARINC 708 (formerly known as ARINC 453)

#### **02. Integrated Avionics Processing System (IAPS)**

- A. Overview
- B. Installed Components/System Overview
  - i. Integrated Card Cage (ICC)
  - ii. Lightning/HIRF Protector (LHP)

- iii. Power Supply (PWR-4000)
- iv. IAPS Environmental Controller (IEC-4000)
- v. Input/Output Concentrator (IOC-4000)
- vi. Configuration Strapping Unit (CSU-4100)
- vii. Maintenance Diagnostic Computer (MDC-3110)

### **03. Electronic Flight Instrument System (EFIS)**

- A. Overview
- B. Installed Components/Overview
  - i. Adaptive Flight Display (AFD)
  - ii. Display Control Panel (DCP)
  - iii. Cursor Control Panel (CCP)
  - iv. Reversion Switch Panel (RSP)
  - v. Standby Flight Instrument System (SFIS)
- C. Description
- D. Theory of Operation
- E. Maintenance and Troubleshooting

### **04. Maintenance Diagnostic Computer (MDC)**

- A. Overview
- B. Description
- C. Theory of Operation

### **05. Engine Indicating and Crew Alerting System (EICAS)**

- A. Overview
- B. Description
- C. Theory of Operation

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D. Maintenance and Troubleshooting

### **06. Integrated Flight Information System (IFIS)**

- A. Overview
- B. Description
- C. Theory of Operation
- D. Maintenance and Troubleshooting

### **07. Head-Up Display (HUD) and Enhanced Vision System (EVS)**

- A. Overview
- B. Description
- C. Theory of Operation
- D. Maintenance and Troubleshooting

### **08. Synthetic Vision System (SVS)**

- A. Overview
- B. Description
- C. Theory of Operation
- D. Maintenance and Troubleshooting

### **09. Air Data System (ADS) and Attitude Heading System (AHS)**

- A. Overview
- B. Description
- C. Theory of Operation
- D. Maintenance and Troubleshooting

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### **10. Flight Guidance System (FGS)**

- A. Overview
- B. Description
- C. Theory of Operation
- D. Maintenance and Troubleshooting

### **11. Flight Management System (FMS)**

- A. Overview
- B. Description
- C. Theory of Operation
- D. Maintenance and Troubleshooting

### **12. Radio Sensor System (RSS)**

- A. Overview
- B. Radio Tuning
  - i. Radio tuning using CDU
  - ii. Radio tuning using CCP/MFD
- C. Communication Navigation System (CNS)
  - i. Audio Control Panel (ACP)
  - ii. VHF-4000 VHF Radio
  - iii. Datalink
  - iv. HF-9000 System
  - v. NAV-4000 Navigation Receiver
  - vi. DME-4000 Distance Measuring Equipment

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- vii. GPS-4000S Global Positioning System
- viii. ALT-4000 Radio Altimeter
- ix. Terrain Awareness Warning System (TAWS)

### **D. Surveillance Systems**

- i. TDR-94D ATC/Mode S Transponder
- ii. TTR-4000 TCAS Computer
- iii. TSS-4100 Traffic Surveillance System

## **13. Data Loading**

- A. Overview
- B. DBU-5010E overview
- C. Non-enhanced data load procedures.
- D. Enhanced data load procedures

## **14. Weather Radar System (WXR)**

- A. Overview
- B. Description
- C. Theory of Operation
- D. Maintenance and Troubleshooting
- E. MultiScan Theory
- F. MultiScan Maintenance and Troubleshooting

## **15. Summary**



## **Publications, Training and Logistic Services**

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- A. Review
- B. Written Test (if applicable)
- C. Course Critique

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**EQUIPMENT TYPE:**

UNIT	DESCRIPTION	PART NUMBER
<b>Air Data System (ADS)</b>		
ADC-850E	Air Data Computer	822-0842-621
UMT-13	Mount, ½ ATR	622-5213-001
<b>Angle of Attack (AOA)</b>		
SLZ7960	Angle of Attack (AOA) Transmitter	856-0077-010
<b>Audio System</b>		
AIS-REU	Remote Electronics Unit	856-0073-010
AIS-REUMNT	REU Mounting Tray	856-0073-040
AIS-ACPDV	Avtech Audio Control Panel, Dual VHF	856-0073-050
<b>Automatic Flight Control System (AFCS)</b>		
FCC-4006	Flight Control Computer	822-0809-510 822-0809-810
FCP-4003	Flight Control Panel	822-0182-101
SMT-87A	Servo Mount	822-0259-001
SMT-87B	Servo Mount	822-0260-001
SVO-85A	Primary Servo	622-4404-101
SVO-85B	Primary Servo	622-5027-101
SSM-4000	Servo Switching Module	822-0782-001
SVL-4000	Servo Linear Actuator	622-9968-102
<b>Communication Navigation System (CNS)</b>		
ANT-462B	ADF Antenna (Dual)	622-7384-001
DME-4000	DME Transceiver	822-1466-001
GPS-4000S	GPS Receiver (SBAS)	822-2189-101
MCU-2	Equipment Tray, 2 MCU ARINC	270-2712-010

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MMT-125	Mount, Piggyback Installations	622-9670-001
MMT-125	Mount, Single Installation	622-9670-002
MMT-125	Mount	622-9670-005
MMT-125/125	MMT-125 over MMT-125 Piggyback Mount Kit	653-9078-102
MMT-125/UMT-13	Dual MMT-125 over UMT-13 Piggyback Mount Kit	653-9080-003
NAV-4000	VOR/ILS/MB/ADF Receiver	822-1465-001
VHF-4000	VHF Comms Transceiver 8.33 kHz	822-1468-110
<b>Electronic Flight Instrument System (EFIS)</b>		
AFD-5220E	Adaptive Flight Display	822-1917-207 822-1917-227 822-2917-228 822-2917-229 822-1917-230
CCP-5060	Cursor Control Panel	822-2164-002
DCP-5060	Display Control Panel	822-2165-002 822-2165-102
IMT-5220	Instrument Mounting Tray	822-1576-001
<b>Engine Indication and Crew Alert System (EICAS)</b>		
DCU-4002	Data Concentrator Unit	822-0179-205 822-0179-222
ERU-4000	EICAS Routing Unit	822-0845-001
LDU-4000	Lamp Driver Unit	622-9822-001
RDC-4002	Remote Data Concentrator	822-1533-202
UMT-18	Mount, $\frac{3}{4}$ ATR	622-9977-005
<b>Flight Management System (FMS) (Dual with V-speeds)</b>		
CDU-6200	Control Display Unit	822-1485-402

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DBU-5010E	Database Unit	822-3000-602
FMC-6200	Flight Management Computer	822-2488-110
Perf DB	Performance Database	815-9079-001
VDB	DOT V-speed Database	815-9174-001
VDB	FAA V-speed Database	815-9082-001
<b>HF Radio System (HF)</b>		
FL-9001	HF Feedline	685-0326-001
HF-9031A	HF Receiver/Transmitter	822-0101-002
HF-9041	HF Antenna Coupler	685-0350-002
MT-9030A	HF Radio Mount	622-8116-001
MT-9042A	HF Coupler Mount, Dual	622-8124-001
<b>Integrated Avionics Processing System (IAPS)</b>		
CSU-4100	Configuration Strapping Unit	822-1364-002
ICC-4007	Integrated Card Cage	822-0781-001
IEC-4000	IAPS Environmental Controller	822-0288-001
IOC-4100	Input/Output Concentrator	822-1362-088
LHP-4000	Lightning/HIRF Protection (Left)	822-0287-702
LHP-4001	Lightning/HIRF Protection (Right)	822-0332-702
OCM-4100	Options Control Module (EGPWS, LRC, FDR, Checklist, LPV)	822-1463-237
PWR-4000	Power Supply Module	622-9945-021
<b>Integrated Flight Information System (IFIS)</b>		
ECH-5000	Electronics Chart Key	810-0002-001
ECU-3000	External Compensation Unit - FSU	822-1200-998
FSA-5000	File Server Application v7.2 (Datalink GWX)	810-0001-222
FSU-5010	File Server Unit	822-1543-101

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		822-1543-201
MMT-5000	Equipment Mount	822-1811-003
OVL-5000	IFIS Enhanced Maps Overlay Key	810-0003-001
<b>Maintenance Diagnostic System (MDS)</b>		
MDC-3110	Maintenance Diagnostic Computer	822-1987-006
MDT-3110	Maintenance Diagnostic Tables	810-0042-087
<b>Radio Altitude System (RAS)</b>		
ALT-4000	Radio Altimeter	822-0615-206
UMT-12	Mount, 3/8 ATR	622-5212-004
<b>Synthetic Vision System (SVS)</b>		
SVC-3000	Synthetic Vision Computer	866-0232-010
SVC-3000 Mount	Synthetic Vision Computer Mount	866-0232-055
SVC-3000 VIU	Synthetic Vision Computer Video Interface Unit	866-0232-060
SVCM-3000	Synthetic Vision Configuration Module	822-3095-108 822-3095-109
<b>Transponder and TCAS (CL-605 Baseline)</b>		
MCU-4	Equipment Tray, 4 MCU ARINC	270-2682-020
MMT-150	Mount, 1/2 ATR Short, Dwarf	622-9672-001
TDR-94D	Dual Mode-S Transponder (ADS-B, EHS)	622-9210-409
TRE-920	TCAS II Directional Antenna	622-8973-001
TTR-4000	TCAS II Receiver/Transmitter	822-1294-002
<b>Traffic Surveillance System (TSS) (CL-650 Baseline)</b>		
ECU-3000	External Compensation Unit (TDR, TCAS, ADS-B Out)	822-1200-803
MMT-150	Mount, 1/2 ATR Short, Dwarf	622-9672-001
MMT-150/ATR	MMT-150 over 1/2 ATR Piggyback Mount Kit	634-1103-008

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TDR-94D	Diversity Mode-S Transponder (ADS-B Out)	622-9210-501
TSA-4100	Traffic Surveillance Antenna, Directional	866-0016-001
TSM-4100	Traffic Surveillance Mount	866-0128-020
TSS-4100	Traffic Surveillance System	822-2132-001
TSSA-4100	TSS Application (ADS-B Out/In)	810-0052-110
TSSE-4100	TSS Configuration Table (CL-605, Dual IRS)	810-0250-142
<b>Turbulence Weather Radar System (TWR) (CL-605 Baseline)</b>		
RTA-854	Receiver/Transmitter/Antenna Weather Radar, 14 inch	622-8440-004
<b>Weather Radar System (WXR) (CL-650 Baseline)</b>		
RTA-4114	Multiscan Weather Radar, 14 inch	822-2255-001

<b>OPTIONAL SYSTEMS</b>		
<b>Datalink</b>		
CMU-4000	Communications Management Unit	822-1739-601 822-1739-603
ECU-3000	External Compensation Unit	822-1200-996
MMT-125	Mount – Piggyback Installations	622-9670-001
MMT-125/130	MMT-125 over MMT-130 Piggyback Mount Kit	653-9078-106
MMT-130	Mount – Piggyback Installations	622-9671-001
<b>Data Link Option Keys</b>		
ATN-6200	ATN CPDLC Key (Link 2K+)	810-0187-100
DLC-6200	Dual ATC Data Link Key	810-0185-100
FAN-6200	FANS ATC Data Link Key (CPDLC)	810-0186-100

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FPLK-6200	702A AOC Key (Data Link)	810-0368-100
GWXK-6200	Graphical Weather Key (Data Link)	810-0369-100
<b>Dual Flight Management System (FMS) (with Search Pattern)</b>		
FMC-6200	Flight Management Computer	822-2488-111
<b>Enhanced Vision System (EVS)</b>		
CMA-2700	EVS Sensor	1500-3180-002
CMA-2700 AIT	EVS Aircraft Identification Tag	1500-3200-001
CMB-6600	HUD Combiner (Left)	1500-3110-003
EVS Window	EVS Window	1500-3190-001
HC-6605	HUD Computer	1500-3120-004
Installation Kit	HUD/EVS Install Kit	9672-1009-004
OHU-6600	HUD Overhead Unit	1500-3100-001
<b>Extended Range VHF Communications</b>		
VHF-4000E	VHF Comms Transceiver – Extended Range, 8.33 kHz	822-1872-110
<b>Flight Data Conversion Unit (FDCU)</b>		
FDCU-4000	Flight Data Conversion Unit	822-2877-001
<b>Head-Up Guidance System (HGS)</b>		
CMB-6600	HUD Combiner (Left)	1500-3110-003
CSV-6600	HUD Combiner Sun Visor	5000-8194-001
HC-6605	HGS Computer	1500-3120-003
HC Fan Tray	HUD Computer Fan Tray	1500-3310-001
Installation Kit	HUD/EVS Install Kit	9672-1009-003
OHU-6600	HUD Overhead Unit	1500-3100-001
<b>Lightning Detection System (LDS)</b>		
WX-1000	Lightning Detection System Antenna	270-2687-030

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WX-1000E	Lightning Detection System Processor	270-2687-010
WX-1000 Gasket	Lightning Detection System Antenna Gasket	270-2687-050
WX-1000MT	Lightning Detection System Processor Tray	270-2687-020
<b>OCM Options</b>		
OCM-4100	Option Control Module (EGPWS, FDR, Checklist, LPV)	822-1463-235
OCM-4100	Option Control Module (EGPWS, LRC, FDR, Checklist, LPV, SAR)	822-1463-236
OCM-4100	Option Control Module (EGPWS, FDR, Checklist, LRC, LPV)	822-1463-237
OCM-4100	Option Control Module (EGPWS, 3d Map, FDR, Checklist, LRC, LPV)	822-1463-239
OCM-4100	Option Control Module (EGPWS, FDR, CDU GWX, Checklist, LPV)	822-1463-240
OCM-4100	Option Control Module (EGPWS, FDR, CDU GWX, Checklist, LRC, LPV)	822-1463-255
OCM-4100	Option Control Module (EGPWS, FDR, CDU GWX, Checklist, LRC, LPV, SAR)	822-1463-256
OCM-4100	Option Control Module (EGPWS, FDR, Checklist, LPV, RNP AR)	822-1463-409
OCM-4100	Option Control Module (EGPWS, FDR, CDU GWX, Checklist, LPV, RNP AR)	822-1463-414
OCM-4100	Option Control Module (EGPWS, FDR, Checklist, LRC, LPV,	822-1463-429



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	RNP AR)	
OCM-4100	Option Control Module (EGPWS, FDR, Checklist, LRC, CDU GWX, LPV, RNP AR)	822-1463-430
OCM-4100	Option Control Module (EGPWS, FDR, Checklist, LRC, LPV, RNP AR, SAR)	822-1463-431
OCM-4100	Option Control Module (EGPWS, FDR, Checklist, LRC, CDU GWX, LPV, RNP AR, SAR)	822-1463-432
<b>Second Radio Altimeter</b>		
ALT-4000	Radio Altimeter	822-0615-202
UMT-12	Mount, 3/8 ATR	622-5212-004
UMT-12/12	UMT-12 over UMT-12 Piggyback Mount Kit	634-1103-003
<b>Single IFIS Datalink Graphical Weather (DLGWX)</b>		
GWX-5000	Datalink Weather Key	810-0004-001
<b>Single IFIS XM Graphical Weather</b>		
FSA-5000	File Server Application v 7.2 (XM GWX)	810-0001-322
GWX-3002	XM Weather Key	810-0142-001
XMA-1000	XM Weather Antenna	822-2030-001
XMWR-1000	XM Weather Receiver	822-2031-002 822-2031-003
<b>Single IFIS SXM Graphical Weather</b>		
FSA-5000	File Server Application (SXM GWX)	810-0001-330
GWX-3003	SXM Weather Key	810-0686-001
XMA-1000	XM Weather Antenna	822-2030-001
XMWR-1000S	SXM Weather Receiver	822-3365-001
<b>Third Flight Management System (FMS)</b>		

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CDU-6200	Control Display Unit	822-1485-402
FMC-6200	Flight Management Computer	822-2488-110
<b>Third VHF Communications Radio</b>		
AIS-ACP3V	Avtech Audio Control Panel, Triple VHF	856-0073-060
MMT-125	Mount – Piggyback Installations	622-9670-001
MMT-125/125	MMT-125 over MMT-125 Piggyback Mount Kit	653-9078-102
VHF-4000	VHF Comms Transceiver, 8.33 kHz	822-1468-110
<b>Third VHF with Extended Range</b>		
AIS-ACP3V	Avtech Audio Control Panel, Triple VHF	856-0073-060
MMT-125	Mount – Piggyback Installations	622-9670-001
MMT-125/125	MMT-125 over MMT-125 Piggyback Mount Kit	653-9078-102
VHF-4000E	VHF Comms Transceiver, Extender Range, 8.33 kHz	822-1872-110
<b>Third VHF for Datalink</b>		
AIS-ACP3V	Avtech Audio Control Panel, Triple VHF	856-0073-060
MMT-125	Mount – Piggyback Installations	622-9670-001
MMT-125/125	MMT-125 over MMT-125 Piggyback Mount Kit	653-9078-102
VHF-4000	VHF Comms Transceiver, 8.33 kHz, Data Link	822-1468-310 822-1468-390
<b>TSSE-4100 for Triple IRS Installation</b>		
TSSE-4100	TSS Configuration Table (CL-605, Triple IRS)	810-0250-147