

Publications and Training Solutions

Course Syllabus: 523-0823773

COURSE TITLE: Pro Line 21 Advanced Bombardier Challenger 300/350 Combo,
Level I Operations & Flightline 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 Line Maintenance Personnel with Training to Operate and Perform Flightline Maintenance for the Proline 21 System.

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

1. Provide an overall understanding of Proline 21 Avionics Principles and Operation.
2. Identify System Components and the Functional/Operational Characteristics of each Line Replaceable Unit (LRU).
3. Identify Typical Aircraft System Interface/System Architecture.
4. Perform Fault Isolation to a Faulty LRU using Built-In Test Diagnostics.

COURSE LENGTH: 5 Days

TRAINING DEVICES:

Challenger 300 M-184 Test Rig (If available)

TRAINING MATERIALS:

1. PowerPoint Presentation with LCD projector
2. Information Sheets
3. Student Material
4. Bombardier Challenger 300/350 Pro Line 21™ Advanced Avionics System Diagnostic Guide 523-0820895

REFERENCES:

1. Bombardier Challenger 300/350 Pro Line 21™ Advanced Avionics System Manual 523-0820908
2. Bombardier Challenger 300/350 Pro Line 21™ Advanced Avionics System Operator's Guide 523-0820887

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| 3. Bombardier Aerospace Challenger 300 with IFIS Avionics System Diagnostic Guide | 523-0807947 |
| 4. Bombardier Challenger 300/350 Pro Line 21™ Advanced Flight Management System Operator's Guide | 523-0820888 |

COURSE OUTLINE

0. Welcome & Introductions

- A. Course Overview
 - i. Welcome
 - ii. Student Registration

1. Data Bus

- A. Why We Use Data Buses
- B. ARINC Data Buses
 - i. ARINC 429
 - ii. ARINC 453

2. Integrated Avionics Processing System (IAPS)

- A. Overview
- B. System Architecture
- C. Integrated Card Cage
 - i. Description
 - ii. Theory of Operation
- D. Power Supply Module
 - i. Description
 - ii. Theory of Operation
- E. IAPS Environmental Controller (IEC)
 - i. Description
 - ii. Theory of Operation
- F. Input Output Concentrator (IOC)

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- i. Description
 - ii. Theory of Operation
- G. Maintenance Diagnostic Computer (MDC)
 - i. Description
 - ii. Theory of Operation
- H. Configuration Strapping Unit (CSU)
 - i. Description
 - ii. Theory of Operation
- I. Detailed Functional Theory
 - i. IAPS Power Distribution
 - ii. Temperature Monitoring
 - iii. Overheat Reporting
 - iv. Power Supply Inhibit
 - v. CSU Detailed Theory
- J. Maintenance and Troubleshooting
 - i. PWR Fault Indications
 - ii. IEC Fault Indications
 - iii. Status Messages
 - iv. Diagnostics

3. Electronic Flight Instrument System (EFIS)

- A. Overview
- B. Adaptive Flight Display (AFD)
 - i. Primary Flight Display (PFD)
 - 1. Description
 - 2. Theory of Operation
 - 3. Reversionary Mode Select
 - ii. Multifunction Display (MFD)
 - 1. Description

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- 2. Theory of Operation
- 3. Reversionary Mode Select
- C. Reversion Switch Panel (RSP)
 - i. RSP Switchology Description
 - ii. Operation
 - iii. Detailed Theory of Operation
- D. Cursor Control Panel (CCP)
 - i. CCP Switchology Description
 - ii. Operation
 - iii. Detailed Theory of Operation

4. Maintenance Diagnostics

- A. Overview
- B. Maintenance Diagnostic Computer (MDC)
 - i. Description
 - ii. Theory of Operation
 - iii. Operation

5. Synthetic Vision

- A. Description
- B. Theory of Operation

6. Engine Indicating and Crew Alerting System (EICAS)

- A. Overview
- B. MFD
 - i. Display Synoptics
- C. Cursor Control Panel (CCP)
 - i. CCP Switchology Description
 - ii. Operation
 - iii. Detailed Theory of Operation

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- D. Data Concentrator Unit (DCU)
 - i. Description
 - ii. Integration Theory
 - iii. Theory of Operation
- E. Remote Data Concentrator Unit (RDC)
 - i. Description
 - ii. Integration Theory
 - iii. Theory of Operation
- F. Lamp Driver Unit
 - i. Description
 - ii. Theory of Operation
- G. Maintenance and Troubleshooting
 - i. Status Messages
 - ii. Diagnostics

7. Integrated Flight Information System (IFIS)

- A. Overview
 - i. System Description
- B. File Server Unit (FSU)
 - i. Description
 - ii. Theory of Operation
 - iii. Operation
 - 1. Enhanced Map Functions
 - 2. Electronic Charts
 - 3. Graphical Weather
- C. External Compensation Unit (ECU)
 - i. Description
 - ii. Theory of Operation
- D. File Server Application Software (FSA)

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- i. Description of Applications
 - ii. Theory of Operation
 - E. Encrypted Application Key (EAK)
 - i. Programming EAKs
 - F. Electronic Charts Region Access Keys
 - i. Programming Region Access Keys
 - G. Maintenance and Troubleshooting
 - i. Database Effective Dates
- 8. Air Data/Attitude Heading System (ADS/AHRS)**
 - A. Overview
 - B. Air Data Computer (ADC)
 - i. Description
 - ii. Theory of Operation
 - C. Maintenance and troubleshooting
 - i. Status Message
 - ii. Diagnostics
 - D. Attitude Heading Components and Function
 - E. Controls and Indicators
- 9. Flight Guidance System (FGS)**
 - A. Overview
 - B. Flight Control Computers (FCC)
 - i. Description
 - ii. Theory of Operation
 - C. Flight Control Panel (FCP)
 - i. Description
 - ii. FCP Switchology Description

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- iii. Operation
- iv. Theory of Operation
- D. Primary Servos (SVO)
 - i. Description
 - ii. Theory of Operation
- E. Servo Linear Actuator
 - i. Description
 - ii. Theory of Operation
- F. Autopilot and Yaw Damp Detailed Theory of Operation
 - i. Description of Fail Passive System
 - ii. Description of Null Seeking Servo Loops
 - iii. Description of Yaw Damp System
- G. Autopilot Diagnostics
 - i. Entering and Using Autopilot Diagnostics
 - 1. Input Mode
 - 2. Output Mode
 - 3. Report Mode
 - ii. Servo Spin Test
 - iii. Linear Actuator Test

10. Flight Management System (FMS)

- A. Overview
- B. Flight Management Computer (FMC)
 - i. Description
 - ii. Theory of Operation
- C. Control Display Unit (CDU)
 - i. Description
 - ii. Theory of Operation
- D. Data Base Unit (DBU)

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- i. Description
- ii. Theory of Operation
- E. Flight Management Data Base Operations
 - i. 28 day Database Load Procedure
 - ii. Fault History Download Procedure

11.Database Loading Operations

- A. Overview
 - i. Description
- B. Data Base Unit (DBU)
 - i. Description
 - ii. Theory of Operation
 - iii. Operation
 - 1. Uploading Databases
 - 2. Downloading Data

12.Radio Sensor System (RSS)

- A. Overview
- B. Radio Interface Unit (RIU)
 - i. Description
 - ii. Operation
 - iii. Theory of Operation
- C. Audio Control Panel (ACP) and Control Panel Electronics (CPE)
 - i. Description
 - ii. Operation
 - iii. Theory of Operation
- D. Radio Tuning Operations
 - i. Description
 - ii. Operations

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- iii. Theory of Operations
- E. VHF Comm Receiver/Transmitter (VHF)
 - i. Description
 - ii. Theory of Operation
 - iii. Datalink/CPDLC/Link 2000+
- F. VOR/ILS/MB/ADF Receiver (NAV)
 - i. Description
 - ii. Theory of Operation
- G. Distance Measuring Equipment (DME)
 - i. Description
 - ii. Theory of Operation
- H. High Frequency Receiver/Transmitter (HF)
 - i. Description
 - ii. Theory of Operation
- I. HF Antenna Coupler
 - i. Description
 - ii. Theory of Operation
- J. SATCOM
 - i. Description
 - ii. Theory of Operation
- K. Data Link (CPDLC)
 - i. Description
 - ii. General Component Description
 - iii. Theory of Operation
- L. Radio Altimeter (ALT)
 - i. Description

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- ii. Theory of Operation
- M. Mode S Transponder (TDR-94D) with Traffic Surveillance System (TSS)
 - i. Description
 - ii. Theory of Operation
- N. General Maintenance Procedures for Comm /Nav /Pulse Equipment
 - i. Flight Line Diagnostic Procedures
 - ii. Antenna Maintenance Considerations

13.Multiscan Weather Radar (WXR)

- A. Overview
- B. Microwave Radiation Hazards
 - i. AC 20-68B
- C. Receiver Transmitter Assembly (RTA-4114/4214)
 - i. Description
 - ii. Operation
 - iii. Theory of Operation
- D. Maintenance
 - i. Radome Maintenance (AC 43-13)
 - ii. Flight Line Diagnostic Procedures

14.Course Conclusion

- A. Review
- B. Course Critique

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EQUIPMENT TYPE:

EQUIPMENT	NOMENCLATURE	PART NUMBER
ICC-3111	IAPS Card Cage	822-1291-001
IEC-3000	IAPS Environmental Controller	822-1131-001
PWR-3000	IAPS Power Supply	822-1137-001
IOC-4110	I/O Concentrator	822-1362-150
OCM-3100	Options Control Module	822-1484-228
CSU-3100	Configuration Strapping Unit	822-1363-002
MDC-4110	Maintenance Diagnostic Computer	822-1988-104
IMT-5220	Instrument Mounting Tray	822-1576-001
AFD-5220E	Adaptive Flight Display (MFD)	822-1917-325
CCP-5220	Cursor Control Panel	822-2213-004
DCP-5020	Display Control Panel	822-1561-101
RSP-5020	Reversion Switch Panel	822-1569-003
DCU-5000	Data Concentrator Unit	822-1578-006
LDU-4000	Lamp Driver Unit	622-9822-001
RDC-5000	Remote Data Concentrator	822-1581-002
ADC-3000	Air Data Computer	822-1109-020
MMT-3000	ADC Mount	822-1227-001
ECU-3000	External Compensation Unit	822-1200-998
FGC-3002	Flight Guidance Computer	822-1592-526

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EQUIPMENT	NOMENCLATURE	PART NUMBER
FGP-5020	Flight Guidance Panel	822-1574-001
SVO-3000	Aileron Servo	822-1168-032
SVO-3000	Elevator Servo	822-1168-033
SMT-65	Servo Mount	622-5735-104
SVL-4000	Rudder Linear Actuator	622-9968-003
FMC-6200	Flight Management Computer	822-2488-100
CDU-5200	Control Display Unit	822-1560-106
DBU-5010E	Data Base Unit	822-3000-203
ACP-5200	Audio Control Panel	822-2171-020
ALT-4000	Radio Altimeter	822-0615-206
CPE-5200	Control Panel Electronics	822-2172-010
DME-4000	Distance Measuring Equipment	822-1466-001
GPS-4000S	Global Positioning System	822-2198-010
HF-9031A	HF Receiver-Transmitter	822-0101-002
HF-9041	HF Antenna Coupler	685-0350-002
NAV-4000	VHF Navigation Receiver	822-1465-001
NAV-4500	VHF Navigation Receiver	822-1579-001
RIU-4100	Radio Interface Unit	822-1590-102,152
TDR-94D	Transponder	622-9210-409
TSS-4100	Traffic Surveillance Transmitter Receiver	822-2132-001

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EQUIPMENT	NOMENCLATURE	PART NUMBER
VHF-4000	VHF Communication Transceiver	822-1468-110
RTA-4114	Receiver/Transmitter/Antenna (14 inch with turbulence detection)	822-2255-001
RTA-4114	Receiver/Transmitter/Antenna (14 inch)	822-2255-001
WX-1000E	Lightning Detection System Processor	270-2687-010
TAC-5000	TAWS configuration module	822-1791-001
TAS-5000	Terrain Awareness Warning System Computer	822-1575-001
FSU-5010	File Server Unit	822-1543-201
ECU-3000	External Compensation Unit	822-1200-998,803
SCM-2200	SDU Configuration Module	822-2558-001
FSA-5000	File Server Application -006: Universal Weather -106: XM Weather	810-0001-320
GWX-3000	Graphical Weather Software (XM Weather)	810-0007-001
GWX-5000	Graphical Weather Software (Universal Weather)	810-0004-001
XMWR-1000	XM Receiver	822-2031-002
XMA-1000	XM Antenna	822-2030-001
SVC-3000	Synthetic Vision Computer	866-0232-010
SVC-3000 VIU	SVC Video Interface Unit	866-0232-060
SVCM-3000	Synthetic Vision Configuration Module	822-3095-109