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Course Syllabus: 523-0779466

COURSE TITLE: Bombardier Challenger CL-604 Pro Line 4
Level I Operations & 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 line maintenance personnel with training to operate and perform flightline maintenance for the Pro Line 4 System. This course is designed to teach troubleshooting for replacement of line replacement units (LRUs) and does not include internal maintenance of any component.

The Pro Line 4 System consists of the LRUs identified in the section titled EQUIPMENT TYPE by nomenclature and part number, including associated peripheral equipment identified as deliverable hardware.

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

1. Provide an overall understanding of Pro Line 4 Avionics Principles and Operation.
2. Identify System Components and the Functional/Operational Characteristics of each LRU.
3. Identify Typical Aircraft System Interface/System Architecture.
4. Perform Fault Isolation to a faulty LRU using Built-In Maintenance Diagnostics.

COURSE LENGTH: 5 Days

TRAINING DEVICES:

1. Special Test Equipment
 - a. CL-604 Test Rig, Cedar Rapids (if available)

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TRAINING MATERIALS:

1. PowerPoint Presentation with LCD/Box Light projector
2. Student Guide – Flash drive (pdf) – Training Presentation
Information Sheets

REFERENCES:

- | | |
|---|-------------|
| 1. Bombardier Challenger 604 Avionics System Manual | 523-0777290 |
| 2. Bombardier Challenger 604 Avionics System Diagnostic Guide | 523-0777938 |
| 3. Cessna Citation XLS+ Operator's Guide | 523-0778673 |

COURSE OUTLINE

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0. Welcome & Introductions

- A. Course Overview
 - i. Welcome
 - ii. Student Registration
- B. Course Description and Objectives

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 (ICC)
- D. Lightning/HIRF Protection (LHP)
- E. Power Supply Module (PWR)
- F. IAPS Environmental Controller (IEC)
- G. Input/Output Concentrator (IOC)
- H. Maintenance Diagnostic Computer (MDC)
- I. Configuration Strapping Unit (CSU)
- J. Detailed Functional Theory
 - i. IAPS Power Distribution
 - ii. Temperature Monitoring
 - iii. Overheat Reporting
 - iv. Power Supply Inhibit
 - v. CSU Detailed Theory

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K. Maintenance and Troubleshooting

- i. PWR Fault Indications
- ii. IEC Fault Indications
- iii. Status Messages
- iv. Diagnostics

3. Maintenance Diagnostics

- A. Overview
- B. Maintenance Diagnostic Computer (MDC)

4. Electronic Flight Instrument System (EFIS)

- A. Overview
- B. Electronic Flight Display (EFD)
 - i. Primary Flight Display (PFD)
 - ii. Multifunction Display (MFD)
 - 1. MFD Formats
 - iii. EFD Detailed Theory of Operation
 - 1. Reversionary Mode Select
 - 2. Cooling Requirements
- C. Display Control Panel (DCP)
 - i. DCP Switch Description
 - ii. Detailed Theory of Operation

5. Engine Indicating Crew Alert System (EICAS)

- A. Overview
- B. Electronic Flight Display (EFD) / EICAS Display (ED)
 - i. Primary ED
 - ii. Secondary ED
- C. Secondary ED
 - i. Display Formats

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- D. EICAS Control Panel (ECP)
 - i. ECP Switch Description
 - ii. Detailed Theory of Operation
- E. Data Concentrator Unit (DCU)
 - i. Description
 - ii. Integration Theory
- F. EICAS Routing Unit (ERU)
- G. Lamp Driver Unit (LDU)
- H. Maintenance and Troubleshooting
 - i. Status Messages
 - ii. Diagnostics

6. Air Data System (ADS)

- A. Overview
- B. Air Data Computer (ADC)
- C. Air Reference Panel (ARP)
- D. Maintenance and Troubleshooting
 - i. Status Messages
 - ii. Diagnostics

7. Flight Control System (FCS)

- A. Overview
- B. Flight Control Computers (FCC)
- C. Servo Switching Modules (SSM)
- D. Flight Control Panel (FCP)
- E. Primary Servo (SVO)
- F. Servo Linear Actuator (SVL)
- G. Yaw Damper Engage Panel (YDEP)
- H. Autopilot and Yaw Damper Theory of Operation

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- I. Autopilot Diagnostics
 - i. Entering and Using Flight Guidance Diagnostics
 - 1. Input Mode
 - 2. Output Mode
 - 3. Report Mode
 - ii. Servo Spin Test
 - iii. Linear Actuator Test
- 8. Flight Management System (FMS)**
 - A. Overview
 - B. Flight Management Computer (FMC)
 - C. Control Display Unit (CDU)
 - D. Data Base Unit (DBU)
 - E. Flight Management Data Base Operations
 - i. 28 Day Database Load Procedure
 - ii. Fault History Download Procedure
- 9. Radio Sensor System (RSS)**
 - A. Overview
 - B. Radio Tuning Unit (RTU)
 - C. VHF Comm Receiver/Transmitter (VHF)
 - D. VOR/ILS/MB Receiver (NAV)
 - E. Distance Measuring Equipment (DME)
 - F. Automatic Direction Finder Receiver (ADF)
 - G. High Frequency Receiver/Transmitter (HF)
 - H. HF Antenna Coupler
 - I. Radio Altimeter (ALT) and Radio Altimeter Convertor (RAC)
 - J. Mode S Transponder (TDR-94D) with TCAS
 - i. Video - TCAS II Operations CHANGE 7.0

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- K. Maintenance and Troubleshooting
 - i. Flight Line Diagnostic Procedures
 - ii. Antenna Maintenance Considerations

10. Weather Radar (WXR)

- A. Overview
- B. Microwave Radiation Hazards
 - i. AC 20-68B
- C. Weather Radar Theory
 - i. Mediums that Reflect
 - ii. Turbulence Detection and Ground Clutter Suppression
- D. Receiver/Transmitter Assembly (RTA-8xx)
- E. Maintenance and Troubleshooting
 - i. Radome Maintenance (AC 43-14)
 - ii. Flight Line Diagnostic Procedures

11. Head Up Guidance System (HGS)

- A. Overview
- B. Combiner Element
- C. HGS Computer (HC)
- D. HGS Drive Electronics Unit (DEU)
- E. HGS Control Panel (HCP)
- F. HGS Diagnostics
 - i. HCP Test Menu
 - ii. Fault Code Interpretation

12. Satellite Communication System (SATCOM)

- A. Overview
- B. Video – What is SATCOM?
- C. SAT-906 System

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D. SAT-5000 System

E. SAT-6000 System

13. Data Loading

A. Data Loading Procedures

i. PCD-3000

ii. DBU-5000

14. Summary – Review - Critique

A. Test

B. Critiques

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EQUIPMENT TYPE:

EQUIPMENT	NOMENCLATURE	PART NUMBER
IAPS Card Cage	ICC-4007	822-0781-001
IAPS Environmental Controller	IEC-4000	822-0288-001
IAPS I/O Concentrator	IOC-4000	622-9814-701, -702, -703, -704, -705
IAPS Power Supply	PWR-4000	622-9945-021
Configuration Strapping Unit	CSU-4100	822-1364-002
Configuration Strapping Unit	CSU-4000	822-0049-002
Options Control Module	OCM-4100	822-1463-210, -212, -214, -216
Lightning/HIRF Protection (Left)	LHP-4000	822-0287-701, -702
Lightning/HIRF Protection (Right)	LHP-4001	822-0332-701, -702
Maintenance Diagnostic Computer	MDC-4000	622-9818-401, -402, -403, -404, -405
Display Control Panel	DCP-4000	622-9812-202, -104, -106, -204, -206
Electronic Flight Display (PFD, MFD)	EFD-4077	822-9978-302, -304, -306, -308, -310, -312
Cursor Control Panel	CCP-3310	822-2389-001
EICAS Data Concentration Unit	DCU-4002	822-0179-001, -002, -003, -013
EICAS Control Panel	ECP-4003	822-0180-002, -102
EICAS Routing Unit	ERU-4000	822-0845-001
Lamp Driver Unit	LDU-4000	622-9822-001
Air Data Computer	ADC-850E	822-0842-119, -142, -421
Air Data Reference Panel	ARP-4000	622-9819-004, -006, -104, -106

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EQUIPMENT	NOMENCLATURE	PART NUMBER
Control Display Unit	CDU-6000	822-0867-002, -004, -006, -008
Flight Management Computer (in IAPS)	FMC-6000	822-0868-001, -004, -010, -029
Data Base Unit (DSDD Disk Drive)	DBU-4100	*822-0014-002, -004, -006, -008
Flight Control Computer (in IAPS)	FCC-4006	822-0809-010, -110, -210, -310
Flight Control Panel	FCP-4003	822-0182-001
Primary Servo (aileron)	SVO-85A	622-4404-001, -101
Primary Servo (elevator)	SVO-85B	622-5027-001, -101
Linear Actuator (rudder)	SVL-4000	622-9968-002
Servo Switching Module	SSM-4000	822-0782-001
Radio Tune Unit	RTU-4000	622-9852-022, -122, -124
VHF Comm Transceiver	VHF-422B	622-7293-101, -121
VHF Comm Transceiver	VHF-422C	822-1115-001
VHF Navigation Receiver	VIR-432	622-7194-201
DME Transceiver	DME-442	622-7309-101
Radio Altimeter	ALT-55B	622-2855-011
Radio Altitude Converter	RAC-870	622-7209-002
Mode S Transponder	TDR-94D	622-9210-003, -004
TCAS II Receiver Transmitter	TTR-920	622-8971-020
TCAS II Receiver Transmitter	TTR-921	822-1293-001
TCAS II Antenna	TRE-920	622-8973-001
HF Receiver/Transmitter	HF-9031A	822-0101-002

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EQUIPMENT	NOMENCLATURE	PART NUMBER
HF Antenna Coupler	HF-9041	685-0350-002
Audio Control Panel	ACP	856-0073-020, -030
Remote Electronics Unit	REU	856-0073-010
GPS Navigation Receiver	GPS-4000	822-0931-001, -002
Receiver/Transmitter/Antenna (14 inch)	RTA-854	622-8440-003
Weather Radar Control Panel	WXP-4220	622-9932-002
HGS Combiner	Combiner	1500-1760-001
HGS Control Panel	HCP	1500-1650-001
HGS Computer	HC	1500-2090-001
HGS Drive Electronics Unit	DEU	1500-1100-500
HGS Over Head Unit	OHU	1500-1080-501
Satellite Data Unit	SDU-906-4, -6	822-0312-101, -0314-101
Radio Frequency Unit	RFU-900	622-8849-100
High Power Amplifier	HPA-901A	822-0953-001
SATCOM Receiver/Transmitter	SRT-2000-4, -6	822-1348-001, -1349-001
Intermediate Gain Antenna	IGA-2000	822-1369-001
Lightning Detection System	WX-1000E	856-0072-010, 020