Publications and Training Solutions
Course Syllabus: 523-0779483

COURSE TITLE: PROLINE 4 CRJ 700/900
Level I Operators & Flightline Maintenance

PREREQUISITES:

1. 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 4 system.

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

1. Provide an overall understanding of Proline 4 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: 4.5 Days

TRAINING DEVICES:

1. CRJ Test Rig (Cedar Rapids)
2. Customer aircraft if available.

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TRAINING MATERIALS:

1. PowerPoint Presentation with LCD projector
2. Information sheets
3. Video/CBT
4. Course Notebook
5. Canadair Regional Jet Avionics System Manual 523-0776286
6. Pro Line 4 Avionics System for the CRJ-700/900/1000 Operator's Guide 523-0778692
7. Canadair Regional Jet Avionics System Diagnostic Guide 523-0777349

REFERENCES:

1. Bombardier Regional Aircraft CRJ-700/900 Avionics System Manual 523-0778690

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COURSE OUTLINE

0. **Welcome & Introductions**
    - A. Training Overview (Customer Ambassador)
        - i. Welcome
        - ii. Student Registration
        - iii. Student Policies and Procedures
        - iv. Introduction to Materials and Handouts
        - v. System Manual Introduction and Use
        - vi. Test and Troubleshooting Guide Introduction
1. **Chapter 1 – Data Bus**
    - A. Why we use Data Buses
    - B. ARINC Data Buses
        - i. ARINC 429
        - ii. ARINC 453
2. **Chapter 2 – Integrated Avionics Processing System (IAPS)**
    - A. IAPS System Overview
    - B. System Architecture
    - C. IAPS Card Cage (ICC-4006)
        - i. Description
        - ii. Theory of Operation
        - iii. Fault Indications
    - D. Lightning HIRF Protection (LHP)
        - i. Description
        - ii. Theory of Operation
        - iii. Fault Indications
    - E. Power Supply Module (PWR)

i. Description

ii. Theory of Operation

iii. Fault Indications

F. Internal Environmental Controller (IEC)

i. Description

ii. Theory of Operation

iii. Fault Indications

G. Input Output Concentrator (IOC)

i. Description

ii. Theory of Operation

iii. Fault Indications

H. Maintenance Diagnostic Computer (MDC)

i. Description

ii. Theory of Operation

iii. Fault Indications

I. Configuration Strapping Unit (CSU)

i. Description

ii. Theory of Operation

J. Detailed Functional Theory

i. IAPS Power distribution

ii. Temperature Monitoring

iii. Overheat reporting

iv. Power Supply inhibit

3. Chapter 3 – 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. Detailed theory of operation

1. Reversionary modes

2. Cooling requirements

C. Display Control Panel (DCP)

i. DCP Switchology description

ii. Detailed Theory of Operation

4. Chapter 4 – Engine Indicating and Crew Alerting System

A. Overview

B. Electronic Flight Display (EFD)/EICAS Display (ED)

i. Primary ED

ii. Secondary ED

C. Secondary ED

i. Display formats

D. EICAS Control Panel (ECP)

i. Description

ii. ECP switchology description

iii. Detailed theory of operation

E. Data Concentrator Unit (DCU)

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

5. Chapter 5 – Maintenance Diagnostic Computer (MDC)

A. Overview

B. Maintenance Diagnostic Computer (MDC)

i. Description

ii. Theory of Operation

iii. Operation

6. Chapter 6 – Air Data System (ADS)

A. Overview

B. Air Data Computer

i. Description

ii. Theory of operation

C. Air Reference Panel (ARP)

i. Description

ii. ARP switchology description

iii. Theory of operation

D. Maintenance and troubleshooting

i. Status message

ii. Diagnostics

7. Chapter 7 – Attitude Heading System

A. Overview

B. Attitude Heading Computer (AHC)

i. Description

ii. Theory of Operation

C. Flux Detector Unit (FDU)

i. Description

ii. Theory of Operation

D. External Compensation Unit (ECU)

i. Description

ii. Theory of Operation

E. Maintenance and Troubleshooting

i. Diagnostics

ii. Post Installation Check

iii. Compass Compensation Procedure

iv. Automatic Leveling Procedure

8. Chapter 8 – Flight Control System (FCS)

A. Overview

B. Flight Control Computers (FCC)

i. Description

ii. Theory of operation

C. Flight Control Panel (FCP)

i. Description

ii. FCP switchology description

iii. Theory of operation

D. Primary Servo (SVO)

i. Description

ii. Theory of operation

E. Servo Linear Actuator

i. Description

ii. Theory of operation

F. Yaw Damper Engage Panel (YDEP)

i. Description

ii. Operation

iii. Theory of operation

G. 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

H. 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

9. Chapter 9 – 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)

i. Description

ii. Theory of operation

E. Flight Management Data Base operations

i. 28 day database load procedure

10. Chapter 10 – Radio Sensor System (RSS)

A. Overview

B. Radio Tuning Unit (RTU)

i. Description

ii. Operation

iii. Theory of operation

C. VHF Comm receiver/transmitter (VHF)

i. Description

ii. Theory of operation

D. VOR/ILS/MB Receiver (VIR)

i. Description

ii. Theory of operation

E. Distance Measuring Equipment (DME)

i. Description

ii. Theory of operation

F. Automatic Direction Finder receiver (ADF)

i. Description

ii. Theory of operation

G. High Frequency receiver/transmitter (HF)

i. Description

ii. Theory of operation

H. HF Antenna Coupler (HF)

i. Description

ii. Theory of operation

I. Radio Altimeter (ALT) and Radio Altimeter Converter (RAC)

i. Description

ii. Theory of operation

J. Mode S transponder (TDR-94D) with Traffic Alert and Collision Avoidance System (TCAS)

K. Description

i. Theory of operation

L. General Maintenance Procedures for Comm /Nav /Pulse Equipment

i. Flightline diagnostic procedures

ii. Antenna maintenance considerations

11. Chapter 11 – Weather Radar

A. Overview

B. Microwave Radiation Hazards

i. AC 20-68B

C. Weather radar theory

i. Mediums that reflect

ii. VIP or Z levels

D. Receiver Transmitter Assembly (RTA-8xx)

i. Description

ii. Theory of operation

E. Maintenance

i. Radome maintenance (AC 43-13)

ii. Flightline diagnostic procedures

12. Chapter 90 – Summary/Critique/ Review

A. Course Summary and Review

B. Course Test

C. Graduation

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EQUIPMENT TYPE:

EQUIPMENT	NOMENCLATURE	PART NUMBER
Air Data Computer	ADC-850A	822-0372-XXX
Automatic Direction Finder	ADF-462	622-7382-101
Attitude Heading Computer	AHC-85E	622-9336-400
Attitude Heading Computer	AHC-MT	866-0123-010
Radio Altimeter	ALT-1000	822-1939-005
Radio Altimeter	ALT-55B	622-2855-011
Antenna, ADF	ANT-462B	622-7384-001
Aircraft Personality Module	APM-900	822-1424-001
Air Data Reference Panel	ARP-4000	622-9819-106
Control Display Unit	CDU-4100	822-0021-XXX
Control Display Unit	CDU-4500	822-2101-102
Comm Management Unit	CMU-4000	822-1739-XXX
Comm Management Unit	CMU-900	822-1239-151
Configuration Strapping Unit	CSU-4100	822-1364-002
Control Tuning Unit	CTL-23	622-9851-001
Control Tuning Unit	CTL-23C	822-1121-001
Data Base Unit	DBU-4000	622-9865-002
Data Base Unit	DBU-4001	622-9679-001
Data Base Unit	DBU-5000	822-2215-102
Display Control Panel	DCP-4000	622-9812-XXX

Publications and Training Solutions
Course Syllabus: 523-0779483

EQUIPMENT	NOMENCLATURE	PART NUMBER
Data Concentrator Unit	DCU-4004	822-1310-XXX
Distance Measuring Equipment	DME-4000	822-1466-001
Distance Measuring Equipment	DME-442	622-7309-101
EICAS Control Panel	ECP-4000	622-9821-002
External Compensation Unit	ECU-3000	822-1200-XXX
Electronic Flight Display	EFD-4076	622-9810-XXX
EICAS Routing Unit	ERU-4000	822-0845-002
Flight Control Computer	FCC-4010	822-1308-XXX
Flight Control Panel	FCP-4002	822-0044-XXX
Flux Detector Unit	FDU-3000	822-1193-001
Flux Detector Unot	FDU-70	622-5812-006
Flight Management Computer	FMC-4200	822-0783-XXX
Global Positioning System	GPS-4000	822-0931-003
Global Positioning System	GPS-4000A	822-1377-001
Global Positioning System	GPS-4000S	822-2189-010
HF Radio	HF-9031A	822-0101-002
HF Antenna Coupler	HF-9041	685-0350-002
IAPS Card Cage	ICC-4006	822-0450-001
Internal Environmental Controller	IEC-4000	822-0288-001
Input Output Concentrator	IOC-4100	822-1362-XXX

Publications and Training Solutions
Course Syllabus: 523-0779483

EQUIPMENT	NOMENCLATURE	PART NUMBER
Input Output Concentrator	IOC-4110	822-2065-001
Lamp Driver Unit	LDU-4000	622-9822-001
Lightening HIRF Protector	LHP-4000	822-0287-201
Lightening HIRF Protector	LHP-4001	822-0332-201
Maintenance Diagnostic Computer	MDC-4100	822-1343-XXX
Maintenance Diagnostic Computer	MDC-4110	822-1988-XXX
Options Control Module	OCM-4100	822-1463-XXX
Power Supply	PWR-4000	622-9945-022
Rad Alt Converter	RAC-870	622-7209-XXX
Remote Compensation Panel	RCP-65	622-6174-001
Weather Radar	RTA-844	622-9302-004
Radio Tuning Unit	RTU-4000	622-9852-XXX
Radio Tuning Unit	RTU-4220	822-0730-466
Servo Mount	SMT-87A	822-0259-001
Servo Mount	SMT-87B	822-0260-001
Servo Linear Actuator	SVL-4000	622-9968-XXX
Servo	SVO-85A	622-4404-101
Servo	SVO-85B	622-5027-101
Transponder	TDR-94D	622-9210-XXX
TCAS Antenna	TRE-920	622-8973-001

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EQUIPMENT	NOMENCLATURE	PART NUMBER
Traffic Surveillance System	TSS-4100	822-2132-001
TCAS	TTR-920	622-8971-XXX
TCAS	TTR-921	822-1293-033
VHF Comm Radio	VHF-4000	822-1468-XXX
VHF Comm Radio	VHF-422A	622-7292-101
VHF Comm Radio	VHF-422C	822-1115-001
VHF NAV Receiver	VIR-432	622-7194-XXX
VHF NAV Receiver	VIR-433	822-0393-001
Weather Radar Control Panel	WXP-4120	622-9929-002