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Flaps Electronic Control Unit (FECU)
DAL A Flaps Control Unit

- ■ Standalone Flaps Control Unit for Part-25 transport aircraft

- ■ DAL A certifiable development

- ■ Dissimilar COM/MON safety architecture

- ■ DO-160 G qualified (for typical avionics rack environment)

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Flaps Electronic Control Unit (FECU)
DAL A Flaps Control Unit

System Functions

The FECU is a typical standalone Flaps Control Unit for an electrically actuated High Lift System of a medium-sized turboprop Part-25 aircraft. It includes the following system functions:

- Flaps Control Lever Acquisition
- Flaps Position Control
- Wing Tip Brake Control
- Asymmetry Monitoring
- Jam Monitoring
- Overspeed Protection
- Mode Control
- Status to Indication and Flight Control System
- Fault Isolation and Reporting to Condition Monitoring System

Top Level Architecture

The FECU provides two functional lanes, the COMmand lane and the MONitor lane.

The COM lane acquires and validates the pilot commands (via Flaps Control Lever sensor), and controls the flaps to the commanded detent by controlling the speed of the electrical Flaps Power Drive Unit. The MON lane also acquires and validates the pilot command and compares the actual flaps position with the expected position. In case of mismatch, the MON stops the Flaps motion by activating the Power Off Brake of the drive channel.

The COM Lane consists of a microcontroller implementing the higher level functions, an FPGA implementing the I/O functions, signal conditioning and power conversion. The MON lane consists of an FPGA, signal conditioning, and power conversion. The FPGA is implementing I/O as well as the uncommanded motion monitoring functions.

The FPGAs COM and MON lanes as well as all other circuits which can lead to erroneous behavior are dissimilar.

Enclosure & Environmental Qualification

The FECU is built into a 3MCU ARINC 600 Housing. All sides of the housing are manufactured from milled aluminum sheet, optimized for low weight at sufficient stiffness. Environmental qualification is performed according to DO-160 G for a typical avionics rack environment.

Technical Data

Interfaces

- 2 x LVDT/Resolver
- 8 x Discrete Inputs
- 2 x Discrete Outputs
- 2 x Potentiometer
- 2 x ARINC 825/CAN 2.0B
- 2 x ARINC 429 RX
- 1 x ARINC 429 TX
- 1 x RS422
- High Power Discrete for Wingtip Brake Solenoids
- High Side/Low Side Switch for Power Drive Brakes

Power Input and Consumption

- Input power: 28 VDC
- Power consumption: ~10 W

Weight & Physical Dimensions

- 2.86 kg
- 319.5 mm x 194 mm x 90 mm

External Connectors

- ARINC 600 Size 2

Availability

- 60.000 FH

Customization

- FECU variants can be provided with higher/lower number of I/O interfaces within certain limits.

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