

Brake Control Unit (BCU)

Dual Channel Brake Control Unit



- Standalone Brake by Wire Control Unit for Part-25 transport aircraft
- DAL A certifiable development process
- Two completely segregated channels in one enclosure
- Dissimilar COM/MON safety architecture
- DO-160 G qualified (for typical avionics rack environment)



Brake Control Unit (BCU) Dual Channel Brake Control Unit

System Functions

The BCU is a typical standalone Brake Control Unit for a two channel inboard/outboard hydraulic Brake-by-Wire System of a medium-sized turboprop Part-25 aircraft.

Control Functions

- Normal Brake Control
- Autobrake
- De-spin
- Antiskid Functions
 - Touch Down protection
 - Locked wheel protection
 - Skid control
- Ground spoiler deployment

Monitoring Functions

- Brake temperature monitoring
- Built-in Test
- Uncommanded brake monitoring

Top Level Architecture

The BCU consists of two completely independent and segregated channels controlling the inboard and outboard wheels respectively. The two channels are separated by a solid aluminum sheet to prevent propagation electrical faults.

Each channel provides two lanes, the COMmand lane and the MONitor lane. The COM lane acquires and validates the pilot commands (via pedals, autobrake selector, etc.), and controls the brakes via Brake Control Servo Valve. It performs autobrake, de-spin braking as well as antiskid functions.

The MON lane is protecting against uncommanding braking at high speed (the only catastrophic failure condition needing dissimilar monitoring).

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 consist of an FPGA, signal conditioning, and power conversion. The FPGA is implementing I/O as well as the uncommanded braking monitoring functions.

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

Environmental Qualification

The BCU 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.

The BCU is qualified according to RTCA/DO-160 G.

Technical Data

Interfaces

- 4 x LVDT Inputs for Brake Pedal Sensors
- 8 x Discrete Inputs for Autobrake Selector and Landing Gear
- 2 x Analog Outputs for Brake Control Servo Valve
- 2 x Solenoid Control Outputs for Shut Off Valve
- 2 x Pressure Sensor Acquisition
- 2 x Wheel Speed Sensor Acquisition
- 2 x Brake Temperature Acquisition
- 2 x ARINC 429 TX
- 2 x RS422

Power Input and Consumption

- Input power: 28 VDC
- Dual Power Supply for Inboard and Outboard channel
- Power consumption: < 10 W

Weight & Physical Dimensions

- 3.2 kg
- 319.5 mm x 194 mm x 90 mm

External Connectors

- ARINC 600 Size 2

Availability

- 26.000 FH

Customization

- BCU variants can be provided with different number / type of I/O interfaces within certain limits.