Integrated Flight Controller (IFC)

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Features

- Field Proven Hardware
- High performance PowerPC based single processor design
- Capable of processing up to 64 uplink discrete and 20 proportional commands
- Capable of providing up to 32 discrete & 32 proportional telemetry channels
- Communication with Control Datalink Transponder via RS-485
- RS-422 interface to APS, Umbilical, ECU, IFF, & ALE 47 Sequencers

Applications

- Vehicle Control System
- Autopilot
- Command and Telemetry
- Vehicle Payload Interface

Description

The Integrated Flight Controller (IFC)/Message Processor contains the datalink encode/decode and autopilot functions. These two functions are performed by a single high performance PowerPC processor. The IFC provides autonomous control functions to assure safe operation of the aircraft in the event of command datalink loss. This includes recovery to stable flight conditions while performing commanded maneuvers and control for escape maneuvers of individual drones under all flight conditions.

The IFC communicates with the Control Datalink Transponder via EIA RS-485 serial interfaces. The IFC receives uplink commands from the ground control station and outputs control signals the UAV . The IFC transmits downlink telemetry information (UAV performance information) to the ground control station.

The IFC/Message Processor communicates with the attitude sensor package (ASP) via EIA RS-485 at a 100 Hz rate. The IFC gathers Heading, Pitch Angle, Roll Angle, Pitch rate, Roll rate, and Yaw rate from the ASP. The IFC/Message Processor communicates to Ground Support Equipment (GSE) via an EIA RS-422 serial umbilical interface. This interface is used to load initialization parameters and flight information in to the IFC. This interface is also used to connect to the Target Test Set.

Characteristics

- **IFC Address:** Front panel programmable
- **Interrogation Rate:** 100 milliseconds (10 command/telemetry messages per second)
- **Discrete Commands:** 64, GND closure of up to 20, 12 bit channels
- **Proportional Commands:** Capability of up to 20, 12 bit channels
- **Discrete Telemetry:** 32, Open/GND/5 VDC
- **Proportional Telemetry:** Capability of up to 6 channels 16 bit and 16 channels 10 bit inputs
- **Command Interface:** EIA RS-485
- **APS Interface:** EIA RS-485 @ 100 Hz
- **GSE Interface:** EIA RS-422
- **Spare:** Discrete, Proportional, CANbus and serial interfaces for future expansion

Environmental

- **Temperature:** Operating: -40°C to +71°C Storage: -54°C to +125°C
- **Cooling:** Passive Conductive (no moving parts)
- **Vibration:** Operating, Random, 0.15g^2/Hz, 20Hz to 100Hz
  Operating, Random, 0.04g^2/Hz 100Hz to 2000 Hz for 5 minutes per orthogonal axis (8.8 G$_{rms}$)
- **Altitude:** Sea Level to 50,000 ft
- **Shock:** Half Sine, 20 G's peak, 11 ms, 3 axes
- **Humidity:** Up to 95% @ 40°C (all boards are conformal coated)
- **Acceleration:** 10 G's, 3 axes, tested at drone level

Power Requirements

- **DC Power:** 22 to 32VDC (28VDC Nominal)
- **Input Current:** 0.5 Amps maximum
- **Protection:** Reverse polarity protected

Physical

- **Size:** 9.30" W x 4.25" T x 2.51" D
- **Weight:** 4 pounds
- **Installation:** Flange Mount Base Plate

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