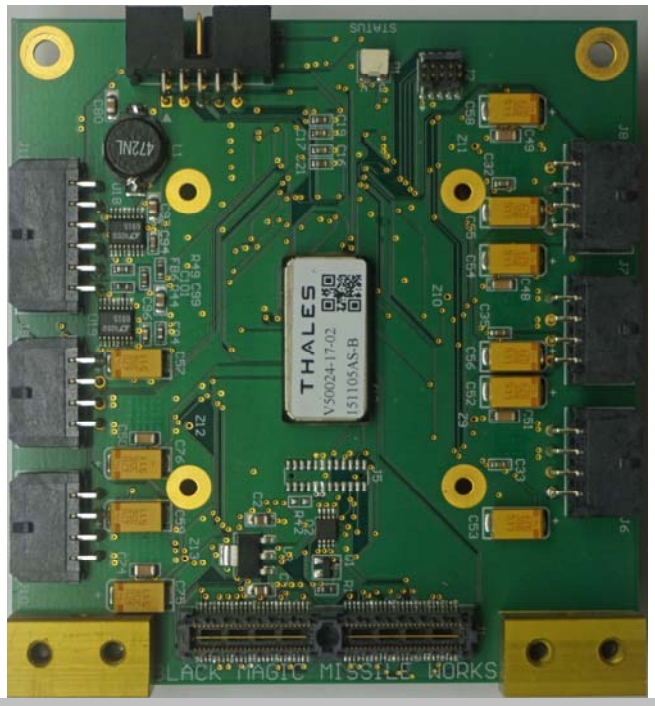
Black Magic Missile Works

FLIGHT MANAGEMENT SYSTEM



The first and only Flight Management System (FMS) for high power rocketry. UFC-3C Modular Flight Controller gives the user Flight Stabilization Control (stepper motor driven control surfaces) and Computer Controlled Hybrid or Mono-Propellant Liquid Motor Throttling using a compact Flow Control Valve (FCV). User programmable and customizable. High Power version (HPF) available as a two module set.

Pricing:

- **Thales NavChip IMU: $1,250.00 or**
- **Analog Devices ADIS16488 IMU: $2,400.00**
- **HPF Option: add $400.00**
- **FCV Documentation: $500.00 (custom parts available)**

Features

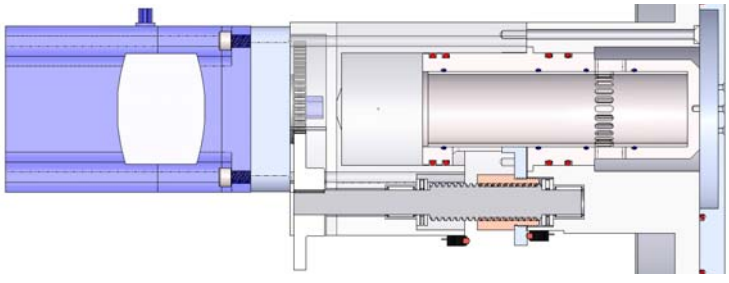
- Standard UFC Module form factor and electrical interface (Plug and Play)
- Communicates directly with UFC CPU
- User Programmable 32-bit 64/80MHz. ARM Cortex CPU
- 128MB Flight Log Memory
- High Performance Altimeter
- Five Intelligent Stepper Motor Controllers
- 1.5 Amp Drive (FMS) or 4.5 Amp Drive (HPF two module set)
- Three 16-bit ADC Channels for pressure/thrust sensors
- Additional NOS temperature and heater control on HPF
- Black Magic Support
- **Free d**evelopment tools by Cypress Semiconductor

Benefits

- Builds upon wide variety of established modules; CPU, Telemetry, GPS, ADC, Power Driver, Battery
- No need to develop/test common avionics functions
- All the processing power you need
- All sensors and drivers on board
- Supports NOS, Combustion Chamber and Thrust Load Cell sensors
- Well supported development tools including on-line technical support from Cypress
- We assist you in completing your project and packaging your design if desired
- HPF supports NOS tank pre-heater for maximum performance

Flow Control Valve:

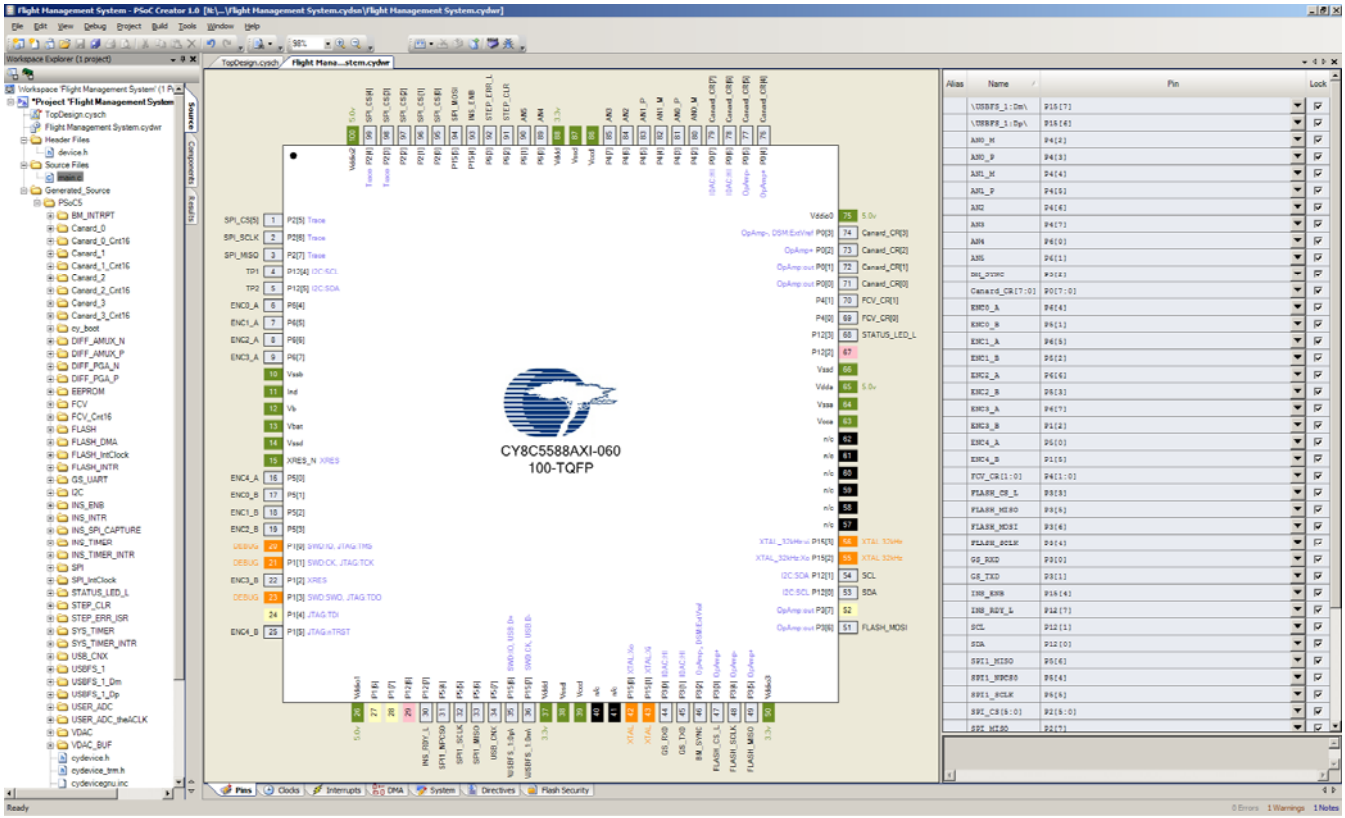
Designed for 6” diameter or larger motor casings this compact, high flow rate, low cost Flow Control Valve is suitable for metering Nitrous Oxide or NOFBX Monopropellants. Allows optimization of thrust curve for maximum altitude or most efficient motor operation over a wide range. Enhances safety by allowing the detection of faults such as over pressure and instant motor shutdown. Full documentation/drawings or custom parts available.



Contact Sales@BlackMagicMissileWorks.com

Flight Management System Module Resources

- Cypress PSoC 5 (CY8C55) Programmable System-on-Chip including:
  - 64/80 MHz ARM Cortex-M3 32-bit RISC processor
  - 256KB of Flash Memory
  - 64KB of SRAM
  - 2KB of EEPROM
  - I^2C Master
  - Four 16-bit timer/counter/PWM blocks
  - 24 programmable PLD based Universal Digital Blocks
    - May be programmed in Verilog
    - Schematic design entry
    - Configurable Macros from Libraries
    - User defined Library Macros (Component Author)
  - Library of standard digital peripherals
    - 8, 16, 24 and 32-bit timers/counters/PWMs
    - SPI
    - UART
    - I^2C
  - Library of advanced digital peripherals
    - Cyclic Redundancy Check (CRC)
    - Pseudo Random Sequence generator
    - LIN Bus 2.0
    - Quadrature decoder
  - Library of analog peripherals
    - 1.024V, ±0.1% reference
    - 12-20-bit Delta-Sigma ADC
    - Two 12-bit SAR ADC
    - 24-bit fixed point digital filter block (FIR/IRR filters)
    - Four 8-bit IDACs or VDACs
    - Four Comparators
    - Four Op Amps with 25 ma drive capability
    - Four multifunction analog blocks (PGA, TIA, Mixer, Sample and Hold, etc)
  - Complete Hardware/Software design and debugging tools
- Five AMIS30522 (FMS) or TMC262 (HPF) High Performance Stepper Motor Controllers and connectors
- 128MB NAND Flash for data logging
- High performance 100,000' Altimeter
- High performance 3-Axis Inertial Sensor; Tales NavChip 6 Degrees of Freedom, or Analog Devices ADIS16488 10 Degrees of Freedom (including magnetic compass)
- Three Differential Amplifiers for Combustion Chamber pressure, NOS pressure, Thrust Load Cell
- Additional Thermocouple ADC and heater control on HPF
- Complete schematics
- Source code for module initialization in the UFC-3C environment (communication with the Base Module)
- Synchronized with the Base Module ARM9 processor and able to exchange information, status and commands
  - Module Enumeration (User Configurable)
  - Power-up Initialization/Self Test Message
  - Status Reporting
  - Preflight Calibration/Check Functions
  - Flight Events
  - Flight Actions
  - Data Logging
  - Virtual Port Connect for any Special User Setup Commands



Cypress Semiconductor PSoC Creator Hardware/Software Development Platform