

ISIS On board computer

Flight heritage since 2012



FreeRTOS

Fail Safe
Mass Data
Storage



www.isispace.nl

DESCRIPTION

The ISIS on-board computer (iOBC) is a flight proven, high performance processing unit based around an ARM9 processor with a clock speed of 400 MHz and offers a multitude of standardized interfaces. Combined with its daughterboard architecture, allowing for easy addition of mission specific electronics or interfaces, this makes the iOBC the ideal candidate for your main mission computer or payload processing unit.

FEATURES

- 400 MHz, power efficient ARM9 processor
- Multiple OS options available:
 - FreeRTOS operating system for simple and lightweight cooperative multitasking
 - KubOS Linux
- On-board telemetry: voltages, currents, and temperature
- External on-board watchdog, power-controller, and real time clock
- High reliability data storage and fail safe filesystem
- Flexible daughterboard architecture
- Robust design

PERFORMANCE

- Processor: 400MHz 32-bit ARM9 processor
- Volatile Memory: 64MB SDRAM
- Code Storage: 1MB NOR Flash
- Critical Data Storage: 256kB FRAM
- Mass Data Storage: 2 x 2 GB high reliability SD cards for fail safe data storage (up to 32 GB on request) or 2x any size standard SD cards



SD card slots

INTERFACES

- I²C master or slave mode
- SPI master mode (up to 8 slaves)
- 2x UART (RS232 + RS232 / RS485 / RS422)
- General Purpose Input / Output pins (GPIO)
- ADC (10-bit, 8 channels)
- Pulse Width Modulation (PWM)
- JTAG for programming and debugging
- Dedicated debug LEDs and UART
- USB host and device
- Image Sensor Interface



SD card slots

PRODUCT PROPERTIES

- Operating Temperature: -25 °C to +65 °C
- Power Supply: 3.3V
- Dimensions: 96 x 90 x 12.4mm (incl. FM daughter board)
- Mass: 76g mainboard only, 100g with EM daughter board
- Power Consumption: 400mW average



EM Daughter Board

DAUGHTERBOARD ARCHITECTURE

- The pluggable daughterboard offers flexibility and customizability by providing a wide range of interfaces for payloads, sensors, actuators in a compact form factor
- EM daughterboard: all interfaces for development and debugging
- FM daughterboard: all interfaces in compact form factor using high reliability connectors
- Custom daughterboard: design your own daughterboard with additional interfacing and electronics based on mission requirements

AVAILABLE SOFTWARE LIBRARIES

iOBC Hardware Abstraction Layer library (included)

- Library that supports all iOBC hardware peripherals and includes FreeRTOS and the fail-safe FAT32 filesystem

Subsystems interface library (optional)

- Library for interfacing the iOBC with the most commonly used satellite subsystems over the I²C databus

Mission Support library (optional)

- Library providing high level mission software functionality, includes flight parameter storage and logging modules

Custom solutions on request

PRODUCT CONTENTS AND ACCESSORIES

- iOBC main board
- JTAG programmer / debugger + USB cable
- Adapter board (including debug UART to USB conversion) + USB cable
- 2 x 2 GB high reliability SD cards
- Power break-out board for easy connection to power supply
- USB drive containing manuals, iOBC SDK installer, and applicable software libraries

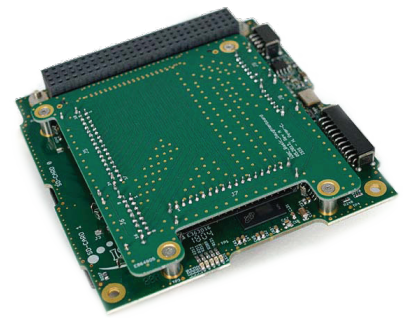


iOBC product contents

DAUGHTER BOARDS

ISIS CORE DAUGHTER BOARD

- compatible with ISIS bus
- supported in ISIS Subsystems Library
- provides interfaces to ISIS solar panels (photodiode and temperature sensors)
- provides data interfaces (RS-422 or RS-232)
- provides power interfaces (switchable 3V3 and 5V lines)



FM Daughter Board

GYROSCOPE DAUGHTER BOARD

- includes all ISIS Core daughter board functionalities and interfaces
- includes low-power MEMS gyro

MAGNETIC CONTROL DAUGHTER BOARD

- includes all ISIS Core daughter board functionalities and interfaces
- includes 3-axis magnetometer
- includes 6 PWM and H-bridges to control magnetorquers

EXAMPLE USE CASES



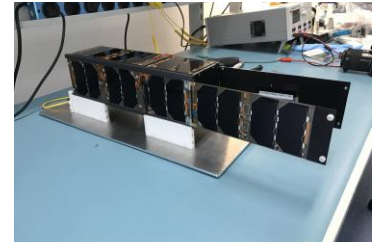
PEASSS

- provides various payload control signals and interfaces while performing simultaneous data acquisition for several payloads



NCLE

- provides hot redundant CAN interface and solid state recorder data output to Chang'e-4 relay satellite currently at the Earth-Moon L2 point



PicSat:

- provides power and data interfaces to the payload and ADCS subsystems

