

Mixed-Signal Solutions for Space





Leading Space Innovation for Sixty Years

Extensive Space Heritage

Microchip has been developing space solutions for almost six decades and has played an important role in a wide variety of space programs globally. The company has a proven track record for innovation, quality, and reliability, and continues to build on that legacy with an impressive portfolio of industry-leading new products and technology innovations.

A Partner for the Long Run

Microchip's high-reliability products and solutions have been used in applications that require high levels of radiation-hardness for trips to the moon, Mars and beyond. Microchip has always responded to the specific needs of space applications and has a longstanding commitment to the space market.

Broad Solutions Portfolio

With one of the industry's most comprehensive space products portfolios, Microchip provides radiation-hardened and radiation-tolerant solutions including high-performance FPGAs, precise frequency and timing solutions with space-grade oscillators, mixed-signal ICs, isolated DC-DC converter modules, custom power supplies, hybrid solutions, MOSFETs, diodes, transistors, RF components and custom solutions. We are committed to supporting our products throughout the lifetime of our customer's programs.

Mixed-Signal Solutions for Space

Microchip has over 25 years of mixed-signal design development experience in the aerospace industry. We focus on radiation-hardened-by-design circuitry for space and aviation applications and our mixed-signal solutions have growing flight heritage with both custom and standard products. Our mixed-signal ICs for space are subjected to the radiation exposure that can occur in these unique missions. Our standard exposure tolerances are:

- Total Ionizing Dose (TID) to a minimum of 100 krad and in some cases up to 300 krad
- Enhanced Low Dose Rate Sensitivity (ELDRS) to a minimum of 50 krad
- Immunity to Single-Event Effects (SEEs) including Single-Event Latch-Up (SEL) and Single-Event Upsets (SEUs)

Continuous Innovation

We continue to innovate in areas such as semiconductor materials, advanced packaging technologies, and high-density integrated circuits. Our products are qualified to the highest government, DLA, NASA, and ESA standards, and their reliability has been independently verified by multiple agencies. As your supply partner for electronic systems in space, Microchip can solve problems at all stages of design and implementation, including power conversion and distribution, radio and radar signal processing, system telemetry and control, digital logic integration and semiconductor packaging. We invite you to explore Microchip's solutions and engage with us to help solve your most difficult space system design challenges.

Satellites

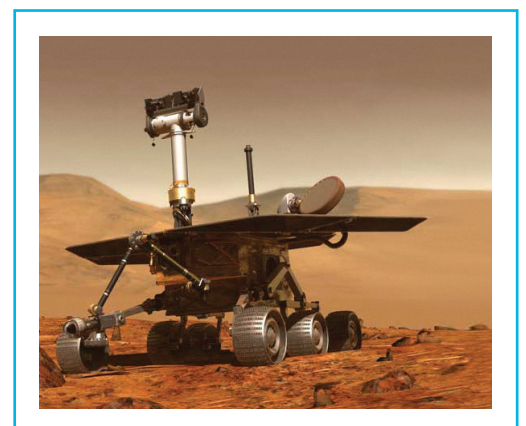
- Attitude and orbit control systems
- Electrical power systems
- TT&C/C&DH systems
- Communications payload
- Remote sensing payload
- Solar array and power conditioning
- Active and passive image payload
- Solid state recorders

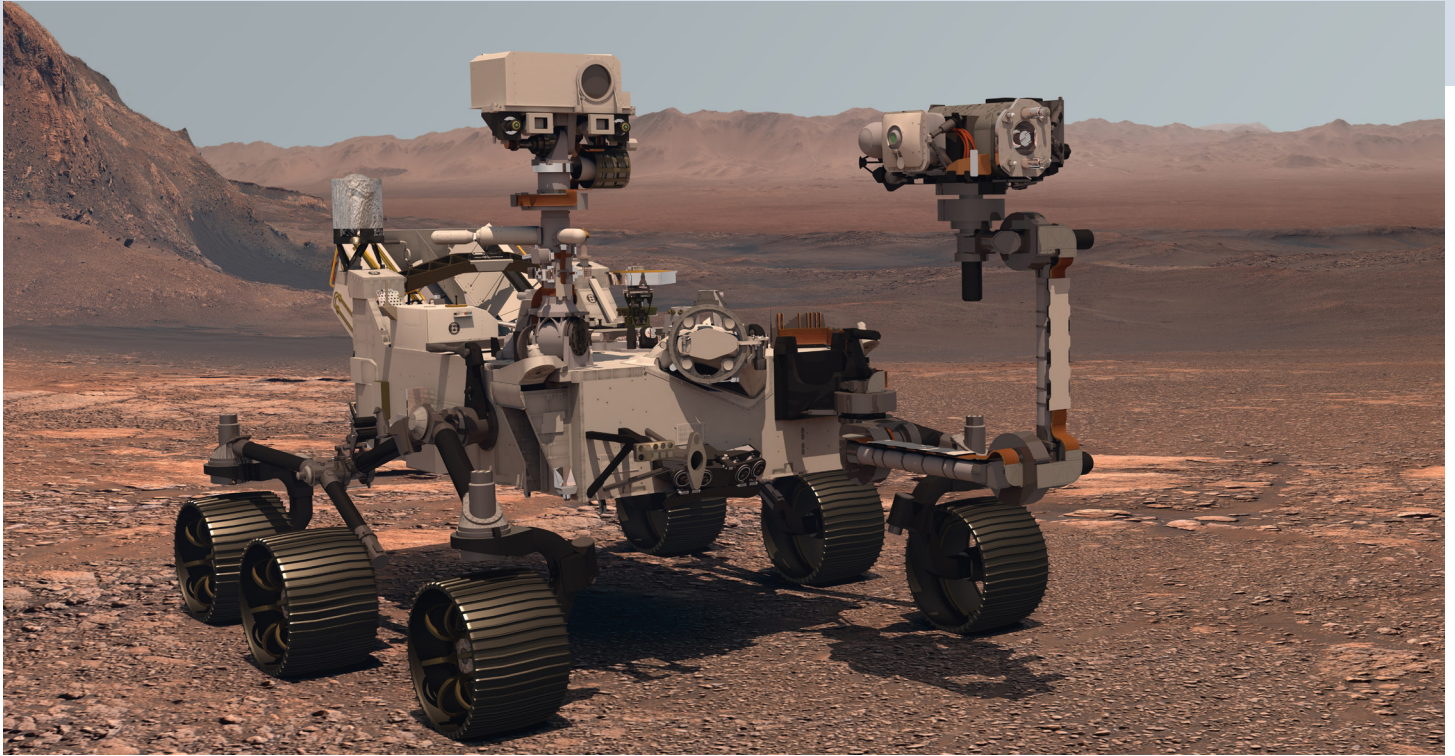
Launchers

- Navigation and guidance systems
- Electrical power systems
- TT&C/C&DH systems
- Propulsion control systems

Landers

- Navigation and guidance systems
- Electrical power systems
- TT&C/C&DH systems
- Science experiment payloads
- RF communications subsystems
- Cameras and imagers
- Motor control systems





Space System Manager ICs

Space System Manager Integrated Circuits

Microchip continues to build on expertise in space with breakthrough additions to our radiation-tolerant IC portfolio. Our new Space System Manager (SSM) family integrates commonly used mixed-signal satellite functions into a single space-saving IC. The SSM IC interfaces with a microcontroller or an FPGA to offer a complete application-specific solution that allows you to achieve aggressive weight and space requirements while increasing reliability.

LX7720: Radiation-Tolerant Position Sensing and Motor Controller

As the industry's first highly integrated radiation-tolerant position sensing and motor control integrated circuit, the LX7720 significantly reduces weight and board space relative to conventional discrete implementations, offering a unique solution for satellite manufacturers sensitive to area and weight challenges.

Features

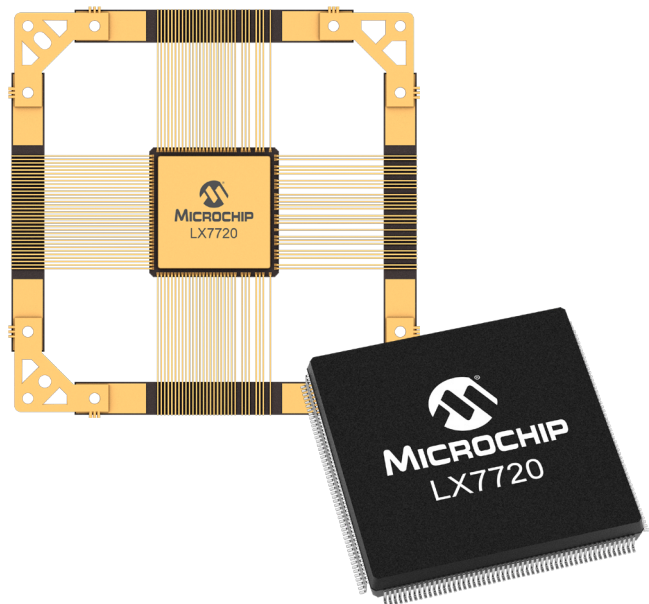
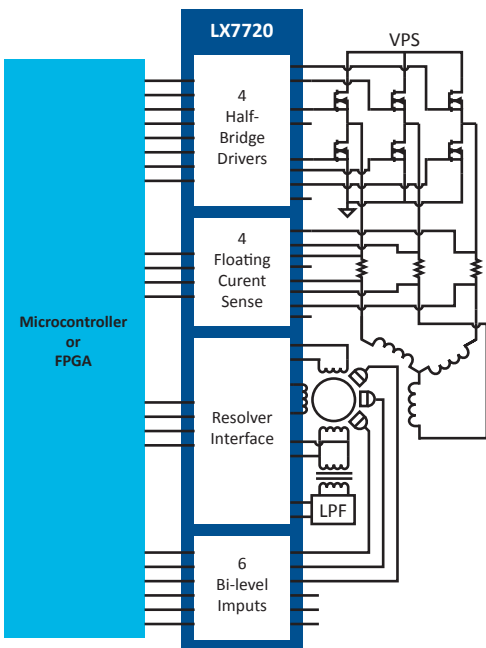
- Radiation tolerant by design
- Four half-bridge N-channel MOSFET drivers
- Four floating differential current sensors
- Pulse modulated resolver transformer driver
- Three differential resolver sense inputs
- Six bi-level logic inputs
- Fault detection
- 132 pin ceramic quad flatpack
- 160 pin plastic quad flatpack
- Radiation tolerant: 100 krad TID, 50 krad ELDRS, single event effects
- QML certified to Class Q and V flows

Applications

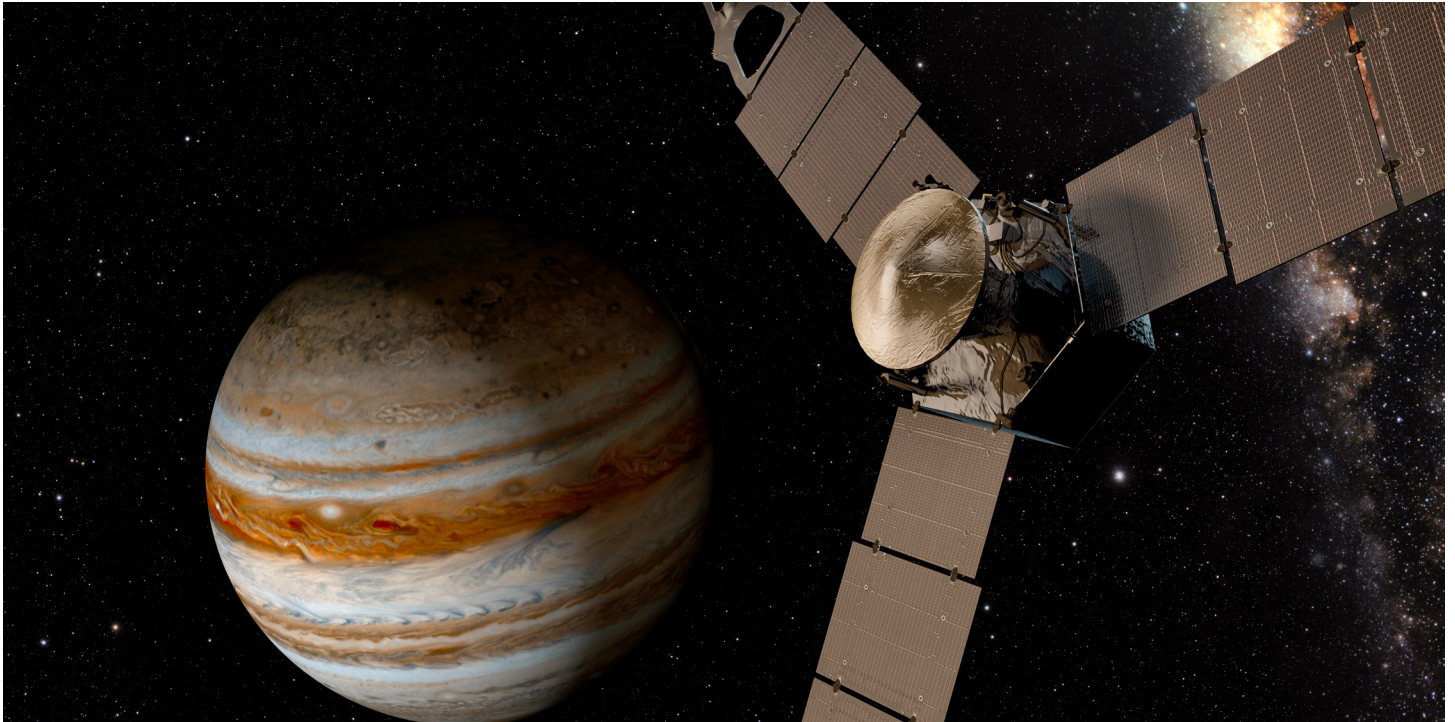
- Motor driver servo control
- Linear actuator servo control
- Stepper, BLDC, PMSM motor drivers



Part Number	Description
LX7720MFQ-ES	Engineering samples using production silicon
LX7720MFQ-Q 5962-2120201QXC	QML Class Q certified
LX7720MFQ-V 5962-2120201VX	QML Class V certified
LX7720-DB	Daughterboard available to work with Microchip FPGA and MCU development kits
LX7720MLF	Plastic package option with reduced screening



Space System Manager ICs

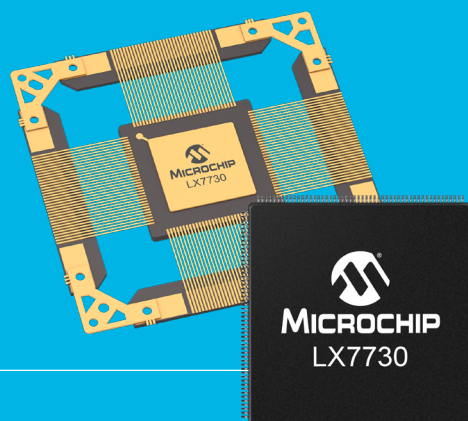


LX7730: Radiation-Tolerant Telemetry Controller IC

Microchip's LX7730 offers space system architects and designers the highest level of integration for telemetry applications available today to address their increasing needs and requirements. The LX7730 integrates the required functions in satellite telemetry systems such as sensor monitoring, attitude, and payload control, and interfaces with radiation-tolerant FPGAs such as those offered in Microchip's portfolio of FPGA solutions.

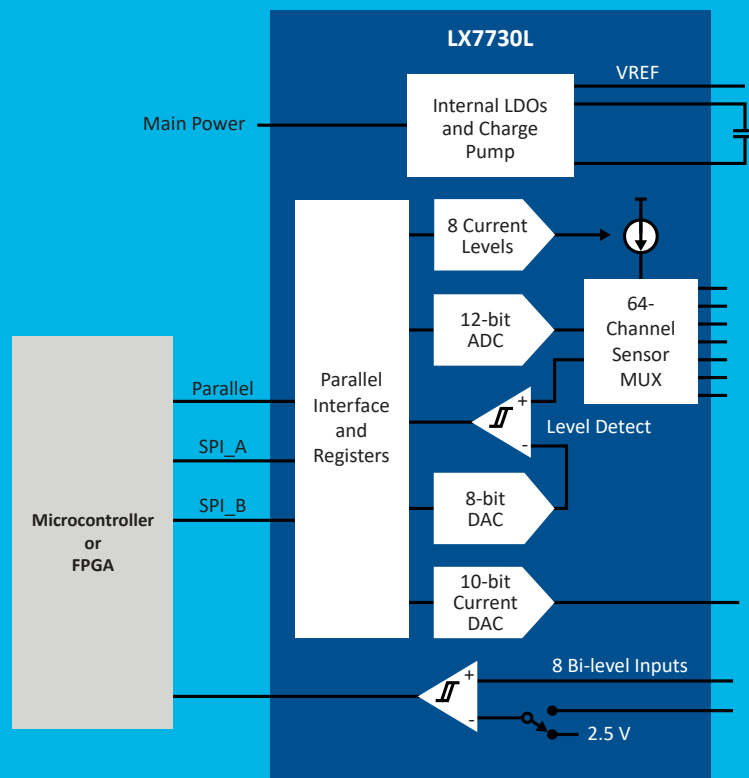
Features

- Radiation tolerant by design
- QML certified to Q and V flows
- 64-channel MUX
- Break-before-make switching
- 13 ksps 12-bit ADC
- 3% precision adjustable current source
- 1% precision 5.00 V source
- Threshold monitoring
- 8x bi-level logic
- 10-bit DAC
- Supports parallel or dual SPI interface
- 132 pin ceramic quad flatpack
- 160 pin plastic quad flatpack
- Radiation tolerant: 100 krad TID, 50 krad ELDRS, single event effects
- Applications
- Spacecraft health monitoring
- Attitude control
- Payload equipment
- QML certified to Class Q and V flows





Part Number	Description
LX7720-ES	Engineering samples (using production silicon).
LX7730LMFQ-Q 5962-1721902QXC	QML-Q certified
LX7730LMFQ-V 5962-1721902VXC	QML-V certified
LX7730-EVB	Evaluation board: allows user to exercise LX7730 features when coupled with USB to serial interface. Application software provided. Includes cable assembly.
LX7730-DB	Daughterboard available to connect to Microchip FPGA and MCU development kits.
LX7730LMLF	Plastic option with reduced screening

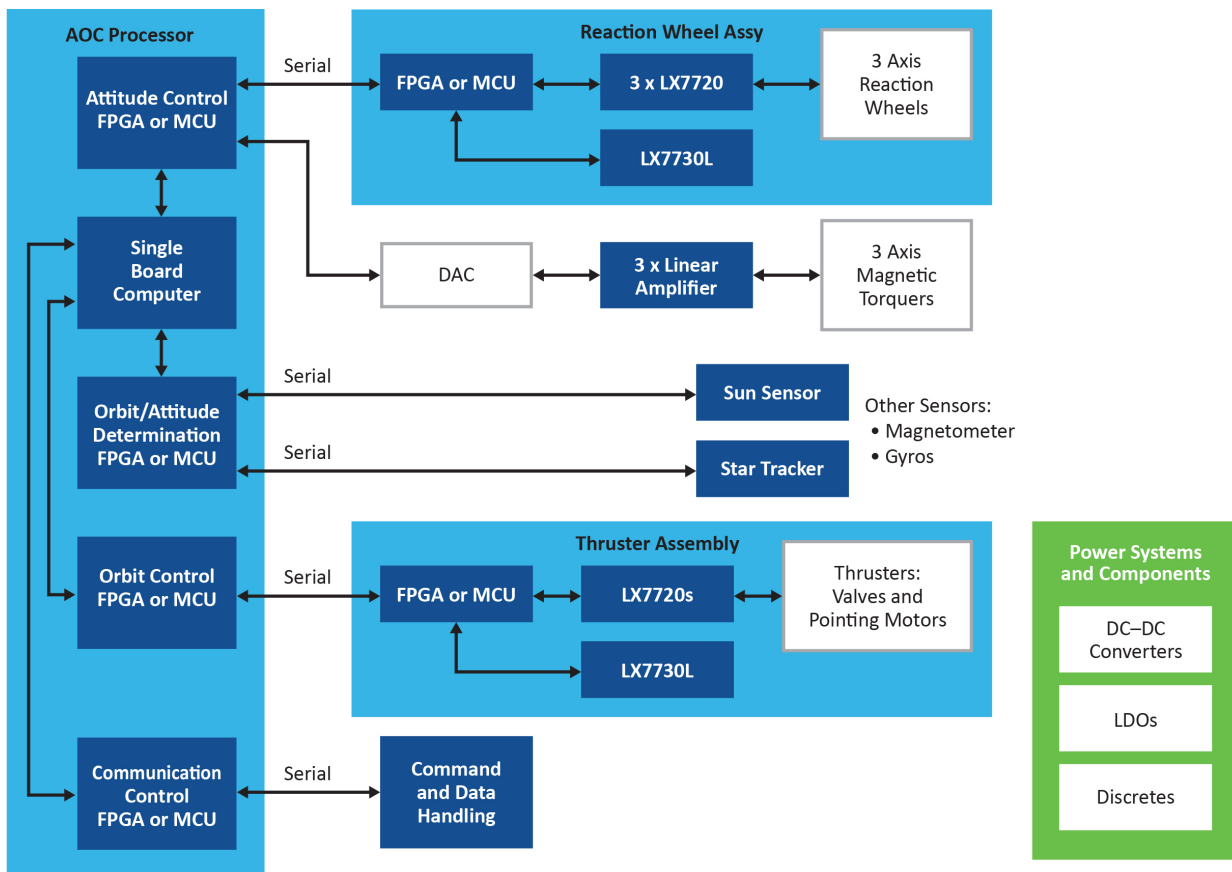




Space System Manager Applications

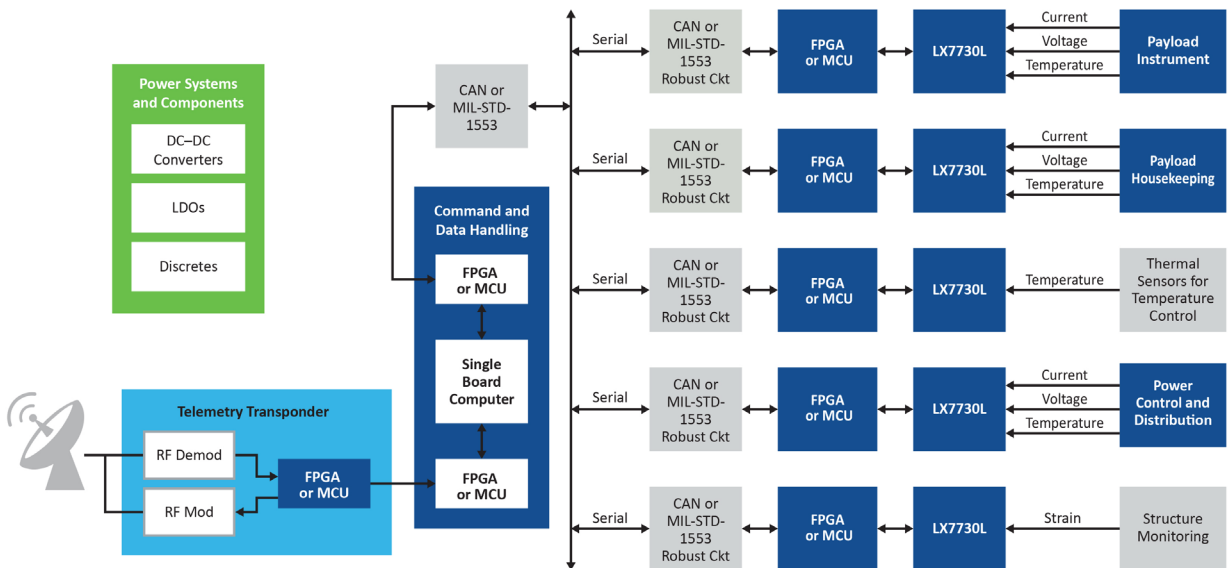
Our Space System Managers offer space-saving solutions in many satellite applications, including those shown.

Attitude and Orbit Control





Telemetry Tracking and Control



Development Tools

Space System Manager Development Tools

Various evaluation boards and daughterboards are available to support development using the space system manager products. Please refer to the product pages on our website for associated user guides and support material.

LX7730 Daughterboard

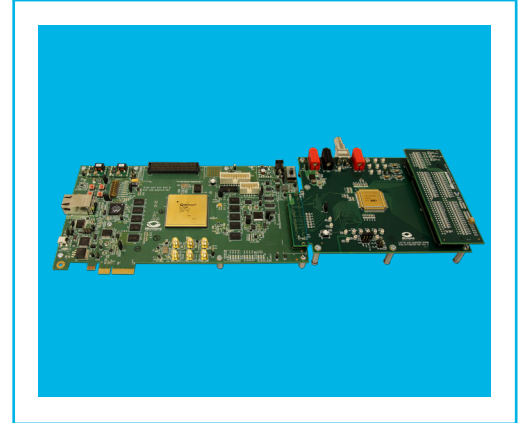
This daughterboard allows you to use Microchip FPGA development kits to evaluate the LX7730 directly via an FMC connector. You can also use the SAMRH71F20-EK evaluation kit with a supplied linker board. User guides, associated firmware and Libero® SoC Design Suite source code are available.

LX7730 Evaluation Board

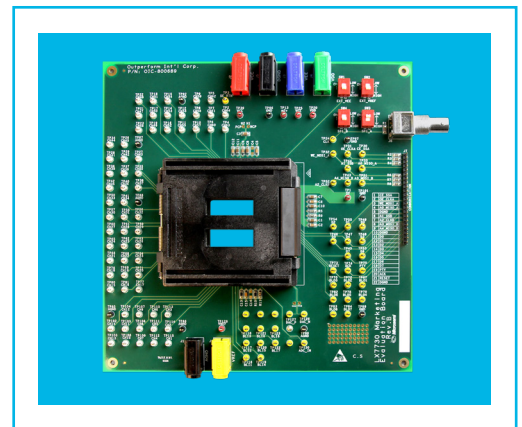
Allows you to exercise LX7730 features when coupled with a USB-to-serial interface. Application software is provided and includes cable assembly.

LX7720 Daughterboard

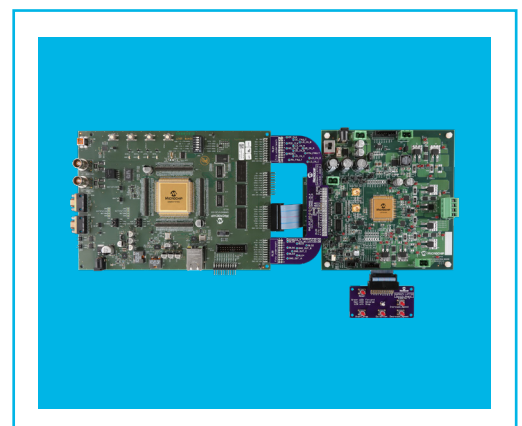
This daughterboard allows you to use Microchip FPGA development kits to evaluate the LX7720 directly via an FMC connector. You can also use the SAMRH71F20-EK evaluation kit with a supplied linker board. User guides, associated firmware and Libero SoC Design Suite source code are available.



LX7730-DB with RTG4 Dev Board



LX7730-EVB



LX7720-DB with SAMRH71F20-EK

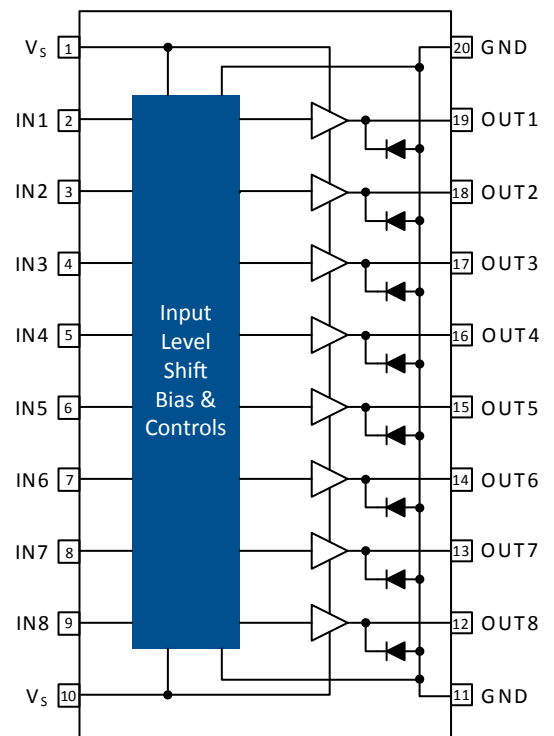


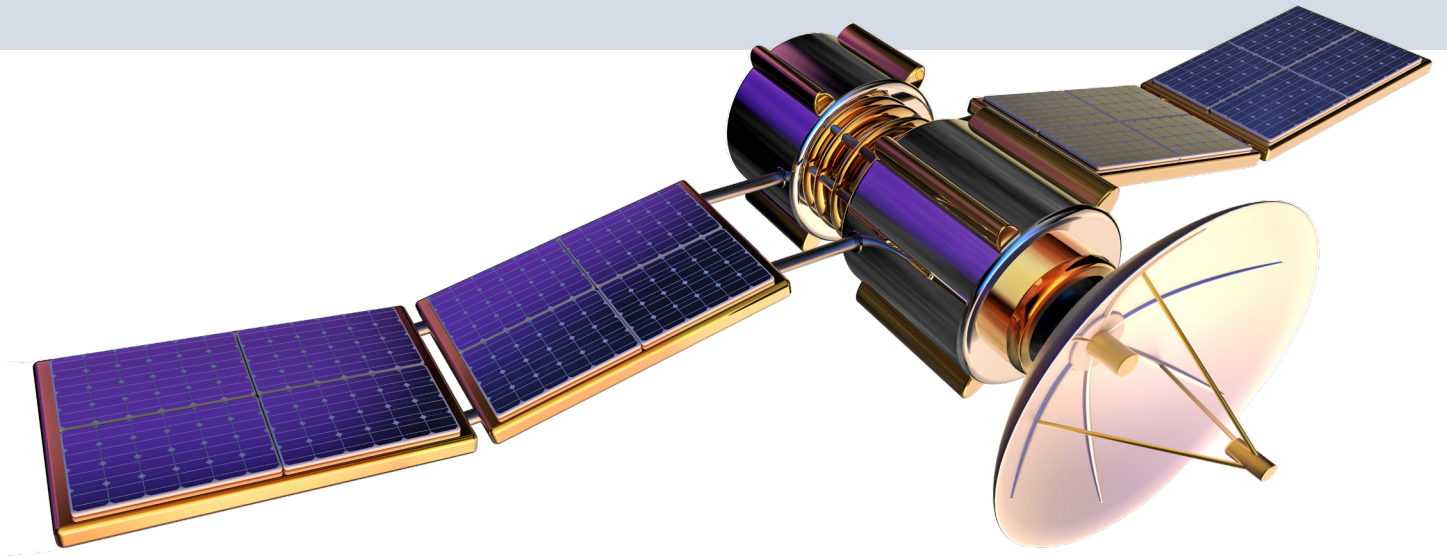
AAHS298B Radiation-Tolerant 8-Channel Source Driver

The AAHS298B source driver includes eight non-inverting channels and can be used to provide an interface from TTL level, 5 V, or 12V logic systems to relays, stepper and servo motors, solenoids, and other loads. Each output is capable of sourcing 700 milliamps (mA) with a withstand voltage of 50 V across the full military operating range, allowing manufacturers to develop more compact solutions. It includes an internal thermal shutdown feature to protect against over-current and soft-start occurrences.

Features

- Radiation tolerant by design
- 700mA output source current
- Zero quiescent off current
- Full channel isolation to prevent fault propagation
- Internal ground clamp diodes
- 75V output breakdown voltage
- TTL, 5V and 12V logic compatible
- Internal thermal shutdown
- Radiation tolerant to 100 krad(Si) total dose, 50 krad (Si) ELDRS
- -55°C to +125°C temperature range
- Available in 20-pin ceramic SOIC with formed and flat leads
- QML listed with SMD 5962-15231





Part Number	Description
AAHS298B-S-S20B-ENGR	Engineering samples using production silicon
AAHS298B-S-S20B-S SMD 5962-1523101VXC	20 pin CSOIC with formed leads, QML-V certified
AAHS298B-S-S20B-B SMD 5962-1523101QXC	20 pin CSOIC with formed leads QML-Q certified
AAHS298B-07-4020A-V SMD 5962-1523101VYC	20 pin CSOIC with flat leads QML-V certified
AAHS298B-06-4020A-Q SMD 5962-1523101QYC	20 pin CSOIC with flat leads QML-Q certified



Features

- Radiation tolerant by design
- 125V minimum breakdown voltage even if one diode in any string happens to fail (redundant)
- 700mA current capability per diode
- Low leakage current
- ESD protected
- Rad-tolerant to a minimum 100 krad(Si) TID and SEL immunity to a minimum of 87 MeV cm²/mg
- -55°C to +125°C temperature range
 - 20-pin ceramic SOIC with formed leads
 - QML listed with SMD 5962-1621001

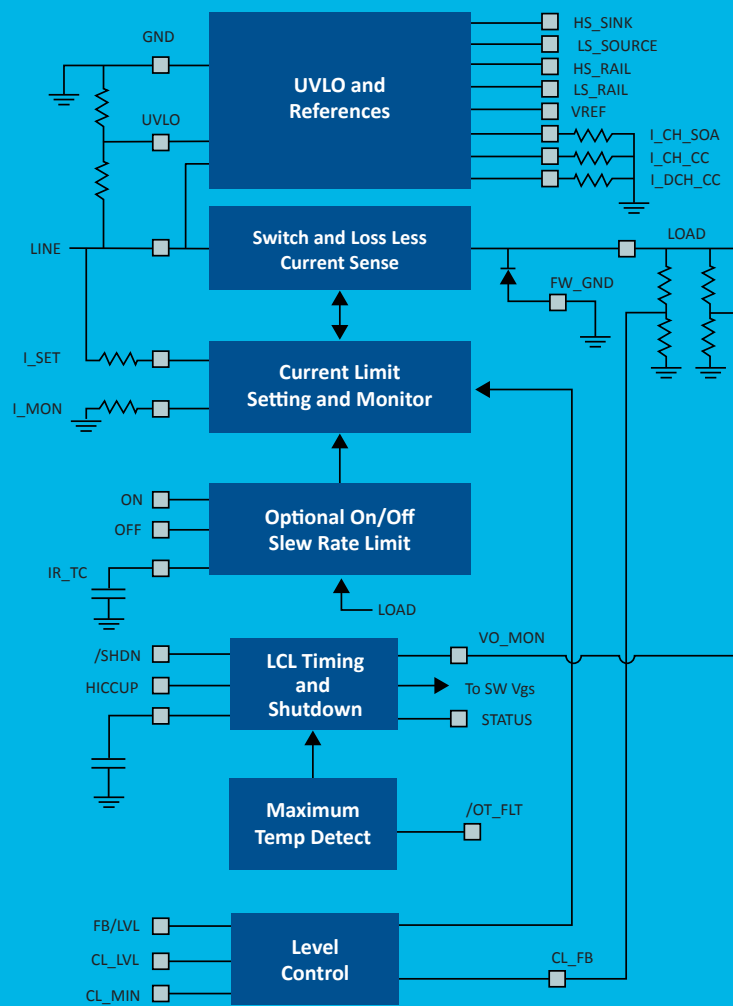
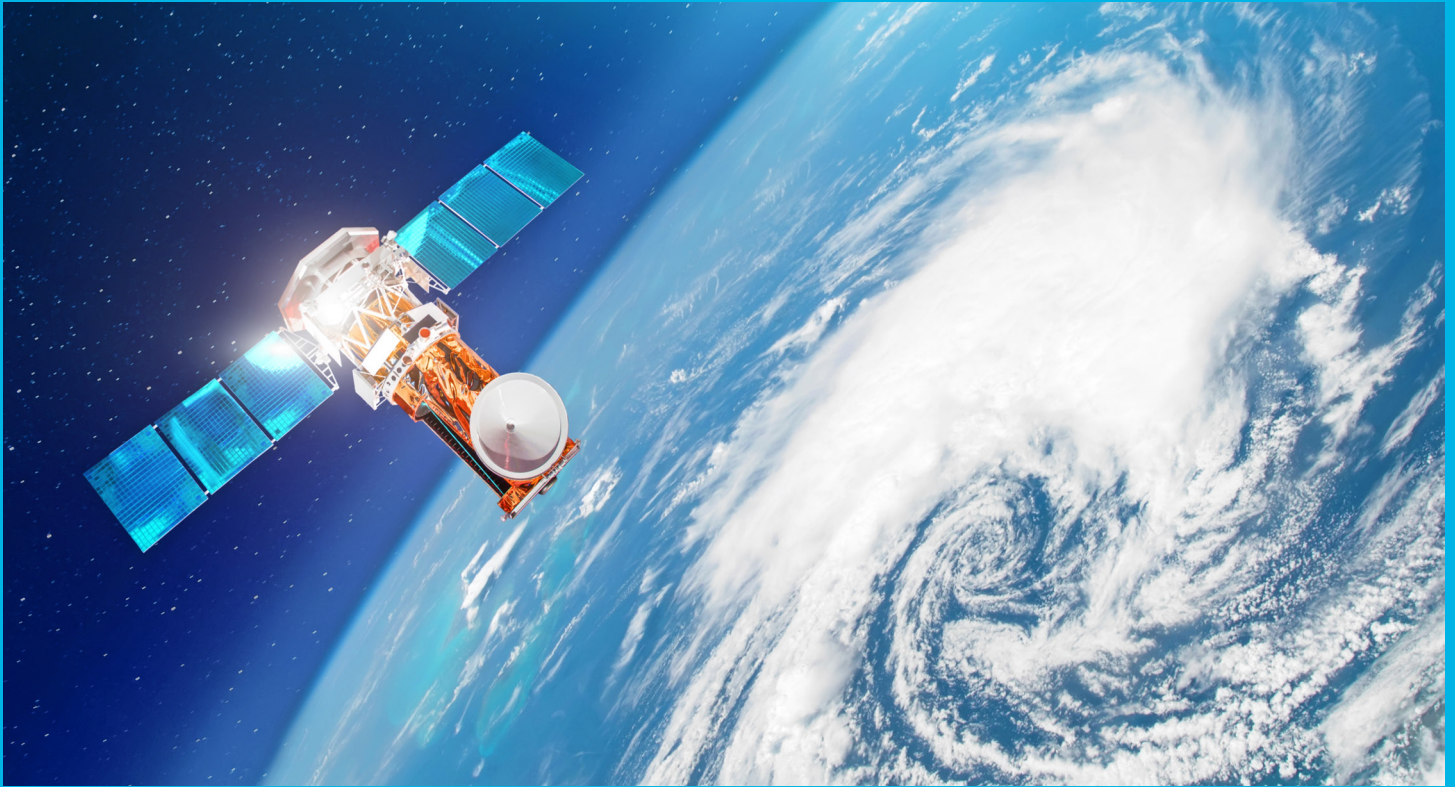
Part Number	Description
LX7710MDWC-ES	Engineering samples using production silicon
LX7710MDWC-Q SMD 5962-1621001QXC	QML-Q certified
LX7710MDWC-V SMD 5962-1621001VXC	QML-V certified

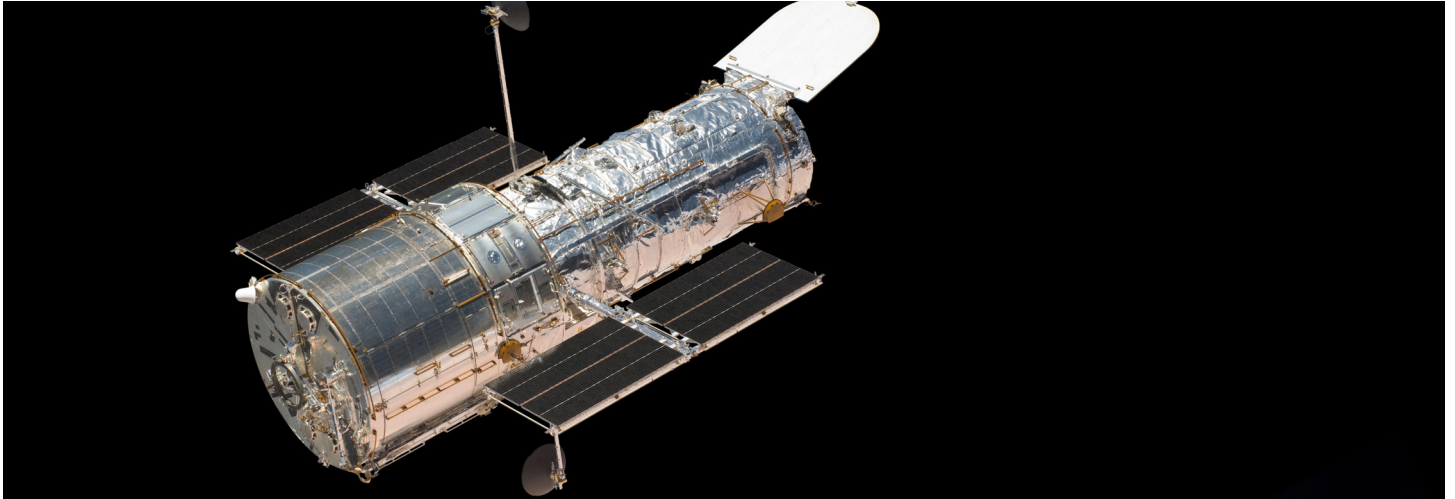


LX7712: Power Line Protection IC/Latchable Current Limiter

Features

- Radiation tolerant by design
- Internal 5A PMOS switch and diode
- 120V rated
- LCL or FCL configurable
- ON, OFF, and STATUS pins
- Programmable UVLO and STATUS
- Parallel-able for higher currents
- Current limit and monitor
- Current slew rate limit
- Chip temp monitor
- 132 pin ceramic quad flatpack
- 160 pin plastic quad flatpack
- Radiation tolerant: 100krad TID, 50 krad ELDRS, SEL free-87Mev-cm²/mg
- ESA Standards
 - ECSS-E-HB-20-20A
 - ECSS-E-ST-20-20C
- Sampling now



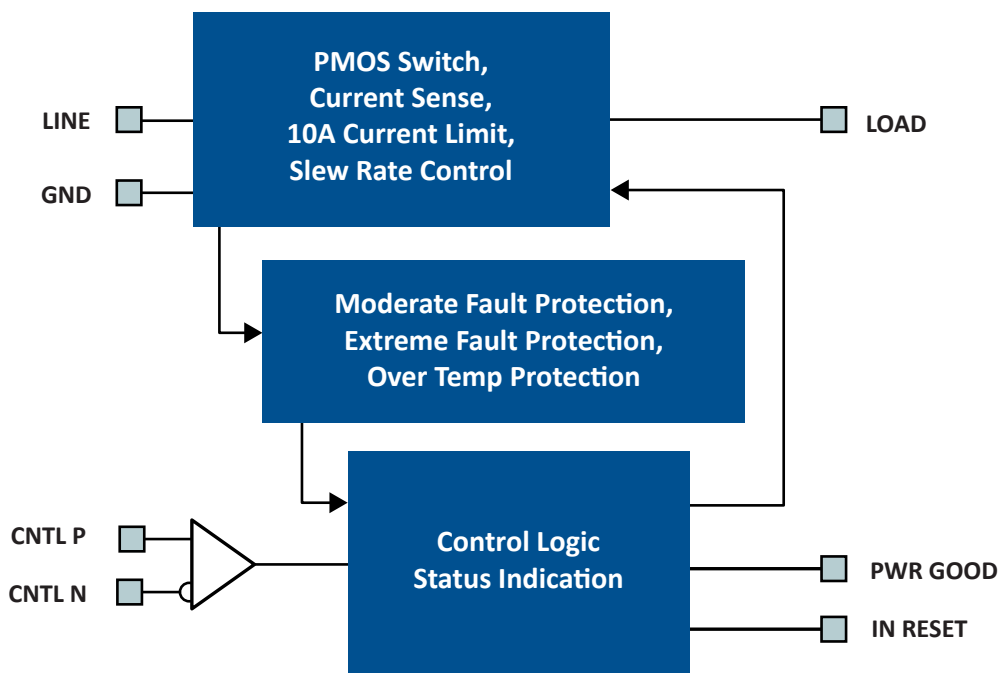


Radiation-Tolerant Power Line Protection

LX7714: RT Satellite Power Bus Controller/Quad Resettable Fuse and Relay Replacement

Features

- Radiation tolerant by design
- Internal 2.5A or 1.25A power switch
- Four resettable fuse + relay blocks/package
- Switches voltage up to 45 VDC
- Low switch voltage drop
- Self-resettable for protection from faults
- Hiccup mode to enable healing from shorts
- Efficient current sharing when paralleled
- Internal output voltage rise time control
- Differential TTL input On/Off control
- Power On, Off, and Hiccup Mode status
- Thermal shutdown for secondary protection
- Low resistance 28- pin ceramic flat package
- Radiation tolerant: 100 krad TID, 50 krad ELDRS, SEL free-87Mev-cm2/mg
- Sampling now







SMART | CONNECTED | SECURE

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