

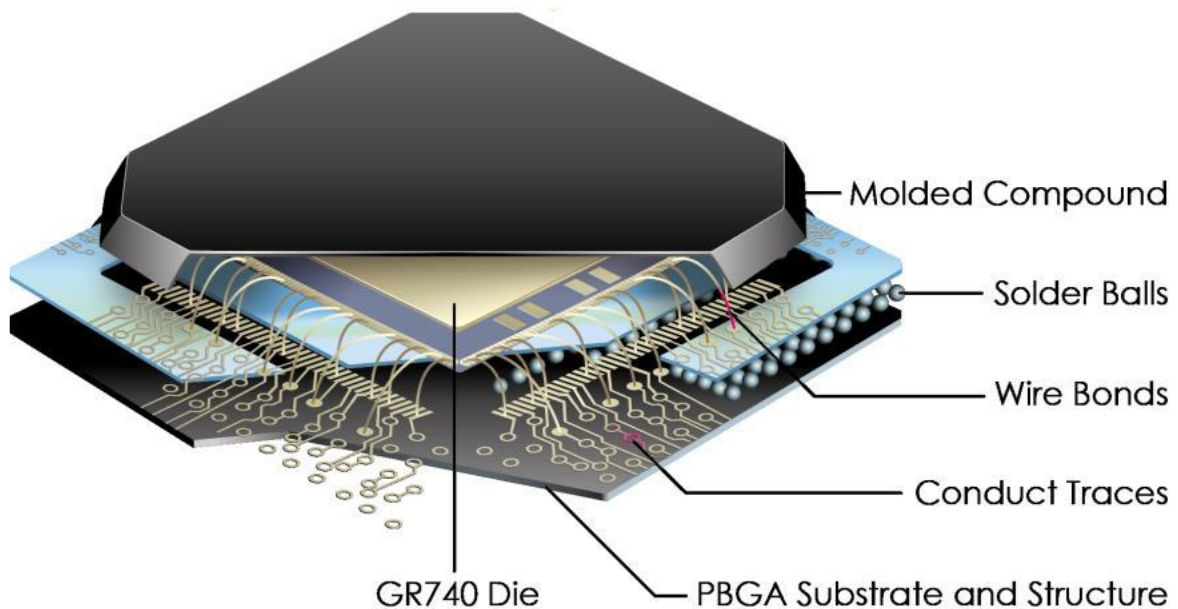
GR740 - Plastic BGA

Quad-Core Fault-Tolerant LEON4 SPARC V8 Processor
For High Volume and Constellation Space Applications

2020 Product Sheet

The most important thing we build is trust

COBHAM



Notional representation - Product in development

INTRODUCTION

The GR740-PBGA is a cost-efficient variant of the traditional top grade, hermetic ceramic GR740 space processor. Based on the same silicon material as the classic GR740, the Plastic Ball Grid Array (PBGA) device leverages a more industrialized package, as well as a reduced screening and qualification flow to achieve significant cost reductions. The combination of highest resilience to radiation effects and features targeted to space electronics, together with selective screening and a mass production approach is a mission enabler for constellation programs that must reduce part cost while maintaining high levels of reliability.

With its four LEON4FT SPARC V8 processor cores running at up to 250MHz, wide on-chip buses and memory interface, and 2MiB on-chip Level-2 cache, the GR740 is one of the most performant true space grade processors available to the industry. A variety of typical communication interfaces make it versatile to fit in a broad range of applications.

The GR740 was designed as the first rad-hard implementation of the European Space Agency's Next Generation Microprocessor (NGMP) system-on-chip architecture.

Online resources

Device: <http://gaisler.com/gr740>

Development board: <http://gaisler.com/gr-cpci-gr740>



*Hermetic Ceramic Variant
QML-V pending*

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Quality level

The 100% screening is based on ECSS-Q-ST-60-13C for class 2 components and includes:

- Temperature Cycling: 10 cycles
- Initial electrical test; +25°C
- Burn-in: 168 hours @ 125°C
- Final electrical test at high/low/room temperatures
- External visual inspection
- Traceability to wafer lot

Each assembly lot will be submitted to Lot Acceptance Testing based on ECSS-Q-ST-60-13C for class 2 components.

Applications

The GR740 device is targeted at high-performance general purpose processing. The architecture is suitable for both symmetric and asymmetric multiprocessing. Shared resources can be monitored to support mixed-criticality applications.

Specifications

- System frequency: 250 MHz
- Main memory interface: PC100 SDRAM
- SpaceWire links: up to 400 Mbit/s
- PCI 2.3 initiator/target interface
- Ethernet 10/100/1000 Mbit MACs
- PBGA package, 1mm pitch (GR740-CCGA compatible dimensions)

Software Support

Cobham Gaisler provides development tools such as the GRMON software debugger and various compilers and operating systems.

Development Board

The GR-CPCI-GR740 development board is designed to support the development and fast prototyping of systems based on the GR740.

Features

- Fault-tolerant quad-processor SPARC V8 integer unit with 7-stage pipeline, 8 register windows, 4x4 KiB instruction and 4x4 KiB data caches.
- Four double-precision IEEE-754 floating point units
- 2 MiB Fault-tolerant Level-2 cache
- 64-bit PC100 SDRAM memory interface with Reed-Solomon EDAC
- 8/16-bit PROM/IO interface with EDAC
- SpaceWire router with eight SpaceWire links
- 2x 10/100/1000 Mbit Ethernet interfaces
- PCI 2.3 Initiator/Target interface
- MIL-STD-1553B interface
- 2x CAN 2.0 controller interface
- 2x UART, SPI, Timers and watchdog, 16+22 pin GPIO
- CPU and I/O memory management units
- Multi-processor interrupt controller with support for asymmetric and symmetric multiprocessing
- SpaceWire TDP controller and support for time synchronisation

