

OVERVIEW

Cobham Semiconductor Solutions (formerly Aeroflex) has over 35 years experience converting FPGA based designs and second sourcing of gate array or cell-based designs to Cobham radiation-hardened and commercial process technologies intended for HiRel and space applications. Cobham maintains and continually improves translation libraries and IP for FPGA and second source conversions

Examples of past FPGA conversions and capabilities include:

- Microsemi (formerly Actel): RH1020, RH1280, RT54SX or RTAX-S/SL FPGA designs
- Xilinx: XC2, XC3, XC4000S, XC8100, Virtex II, Virtex 4, Virtex 5, Virtex 5QV and Virtex 7 FPGA designs
- Altera: MAX 5000 and MAX 7000 FPGA designs
- Honeywell: HX2000, HX3000, and HX5000 gate array designs
- Legacy LSI: 5K, 10K, 20K gate array designs

ADVANTAGES

- Turnkey FPGA ASIC service
 - FPGA netlist or RTL to GDSII
 - Multiple supply voltage options, 1.0V to 5.0V core and IO
 - Form/fit/functional equivalent packaging options
 - Commercial QML Q, V and Y design, assembly, test and qualification flows
 - QML screened or qualified chip capacitors
 - Non-RadHard and Radiation hardness, TID > 100 krad(Si), SEL immune
- High fault coverage automatic test program generation
 - Stuck-at and transition delay fault test patterns
 - Input, output and bidirectional parametric test patterns
 - JTAG interface
 - Memory BIST
- Production burn-in
 - Dynamic test patterns, high toggle coverage
 - Demonstrated <1 FIT rates
- Mature design methodology
 - Netlist (FPGA, Verilog or VHDL RTL or structural netlist) hand-off
 - Customer provided STA constraints and functional stimuli
 - Cobham design-for-test serial scan, Memory BIST and JTAG insertion
 - Start to finish formal verification
 - Place and route with clock and reset tree synthesis insertion

- Mature digital ASIC technology offering, process technology and libraries
 - 0.6 μ (UT06_CRH)
 - 0.25 μ (UT025_HBD)
 - 130nm (UT130nHBD)
 - 90nm (UT90nHBD)
 - Robust compiled memory and IO offerings
 - HSSL (SerDes) IP available in advanced process nodes
 - Long term supply agreements available

PACKAGING OPTIONS:

- Microsemi and Xilinx compatible 84, 172, 208, 256 and 352 ceramic quad flat pack package (CQFP)
- Microsemi compatible 624 ceramic column grid array package (CCGA)
- Xilinx compatible 1752 ceramic land grid array (1752LGA)
- Chip capacitor attach optional
- Power and ground pin compatibility
- Numerous other standard and custom package options available

CUSTOMER DESIGN TOOLKIT

- Gate and cell-based standard cell, compiled memory, IO and analog IP for synthesis and simulation
- Logic rules checkers
- Tester rules checkers
- All design kits available via website download
- Design-for-test guidelines and requirements
- Design kit manuals

FPGA vs Industry Comparison (example)

| | Microsemi RTAX250- RTAX4000 | Cobham UT0.6µm (Gate Array) | Cobham UT0.25µm (Cell Based) | Cobham UT130nm (Cell Based) | Cobham UT90nm (Cell Based) |
|--|---|--|---|---|---|
| Usable Gates | 30K/500K | 500K | 3M | 15M | 50M |
| Feature Size | 0.15µm | 0.6µm | 0.25µm | 130nm | 90nm |
| Core Voltage | 3.3V, 2.5V, 1.8V | 5V, 3.3V | 2.5V, 3.3V | 1.5V | 1.0V |
| I/O Voltage | 1.5V | 5V or 3.3V | 2.5V or 3.3V | 1.8, 2.5V, 3.3V | 1.5V, 1.8V, 2.5V |
| Cold Sparing/5V Tolerant I/Os | Yes/Yes | Yes/Yes | Yes/Yes | No/No | No/No |
| I/O | Yes | CMOS, TTL, PCI | LVTTL, PCI I/O, LVCMOS, SSTL, PCI Core (Synopsys) | LVTTL, LVCMOS, PCI I/O, PCI Core (Synopsys) | LVTTL, LVCMOS, SSTL, 3.215Gbps SerDes |
| LVDS/PLL | No | No | Yes | Yes | Yes 3.125Ghz SerDes |
| Max Frequency | 500MHz | 215MHz/70MHz/ 30MHz | 1.3GHz | 1.5GHz | 3.125GHz |
| Package | 208CQFP, 352CQFP, 484CCGA, 624CCGA | 84 CQFP, 172 CQFP 208CQFP, 256CQFP 352 CQFP, 472 CCGA | 208CQFP, 256CQFP 352CQFP 484CCGA, 624CCGA | 624 CCGA or 1280 Flip Chip | 624 CCGA 729 CCGA 729 Flip Chip 1752 Flip Chip |
| TID krad(Si) | 200k | 100k Cond A | 100k to >1M Cond A | 100k to 330k Cond A | >100k Cond A |
| SEU tolerant IP | | Flip-flops, IO | Flip-flops, Memory, IO | Flip-flops, Memory, IO | Flip-flops, Memory, IO |
| SEL | >104MeV | >128MeV @125°C Guaranteed | >110MeV @125°C Guaranteed | >115MeV @125°C Guaranteed | >120MeV @125°C Guaranteed |
| QML Qualification - Class Q, V, Y | Class B | 1997 | 2004 | 2014 | 2015 |
| Demonstrated reliability (FIT rate) | 8 @55°C | 0.4 @55°C | 4.1 @55°C | <150 @55°C | <150 @55°C |

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