

# Case Study: Verification of DSP Coprocessor

Using MicroTESK Technology



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## Overview

MicroTESK technology was applied to verification of a DSP coprocessor. The coprocessor implements 109 instructions. All instructions can be clustered into 8 groups:

- complex arithmetic (12 instructions)
- floating-point SIMD arithmetic (12)
- type conversion (11)
- integer arithmetic (21)
- comparison (4)
- move (6)
- memory (22)
- control operations (21)

## Specification and Test Development

We used triples of instructions as test cases. Test situations were directed to exceptions, boundary values, and hard-to-round cases.

The table below shows size of test descriptions in lines of code without comments (LOCWC).

| Type of description           | Volume, LOCWC | Volume, Percentage |
|-------------------------------|---------------|--------------------|
| Specification of subsystems   | 1650          | 8.5%               |
| Specification of instructions | 6250          | 32.5%              |
| Test situations               | 11400         | 59%                |
| <b>Total</b>                  | <b>19300</b>  | <b>100%</b>        |

## Detected Bugs

We have found about 5 errors in the RTL model of the DSP coprocessor and more than 10 errors in the coprocessor simulator (reference model).

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