

High Performance Signal Processing with Embedded C

ACE Associated Compiler Experts bv
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Embedded C is an extension to the C programming language aimed at providing support for high level - high performance programming of DSP processors in C.

Embedded C is approved by ISO in the technical report "Extensions to support embedded processors" (<http://www.open-std.org/jtc1/sc22/wg14>).

The Language

```

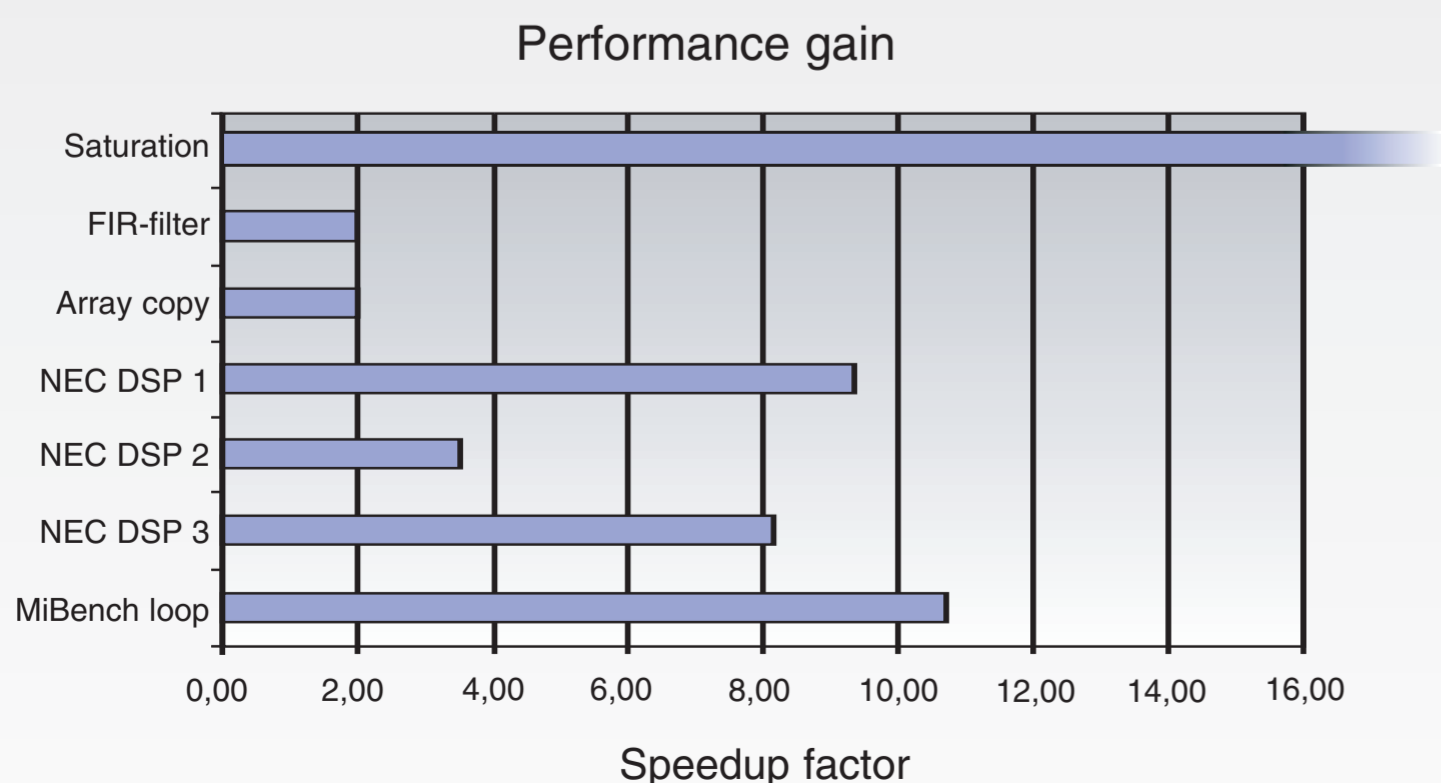
X fract coeff[N] = { 0.7r, ... } ;

fract fir( Y fract *inp ) {
    int i ;
    accum sum = 0.0k ;
    for( i = 0 ; i < N ; i++ ) {
        sum += coeff[i]* (accum)*inp++ ;
    }
    return (sat fract) sum ;
}
    
```

The Support

Embedded C is supported by CoSy, the compiler development system from ACE Associated Compiler Experts bv in the Netherlands. In close co-operation with the DSP semiconductor industry, ACE and CoSy initiated the *Embedded C* revolution by developing DSP-C, the predecessor of *Embedded C*, which has been a part of CoSy since 1997. See <http://www.embedded-c.org> for more information.

The Performance



Benchmark	ISO C	Embedded C
Saturation	10	0*
FIR-filter	2	1*
Array copy	2	1*

Benchmark	ISO C	Embedded C
NEC-DSP 1	5144	550
NEC-DSP 2	168543	48064
NEC-DSP 3	2822	349

Benchmark	ISO C	Embedded C
MiBench loop	32	3*

All values are in cycles. Lower is better.
Values marked with * are best possible.