

# Fast Reciprocal Square Root Approximation

This is a fast way to calculate reciprocal square roots with a reasonable precision. It can be implemented on both the EE and the VU. On the VU you can calculate 4 at a time!

The algorithm is from Matthew Jones (Infogrames).

## C Implementation:

```
float FastRSQRT(float val)
{
    const float magicValue = 1597358720.0f;
    float tmp = (float)*((uint*)&val);
    tmp = (tmp * -0.5f) + magicValue;
    uint tmp2 = (uint)tmp;
    return *(float*)&tmp2;
}
```

## VCL Implementation:

```
loi      1597358720.0      ; magic value
maxi     magic,vf00,i      ; magic value in xyzw

itof0    rval,val         ; 'val' contains your 4 inputs in xyzw
mula     acc,magic,vf00[w] ; put magic value in acc.xyzw
loi      -0.5
maddi    rval,rval,i
ftoi0    rval,rval        ; approx 1/sqrt(x)
```

Blue graph is original. Red line is the approximation. Input range: [0.01;400]. Error is within +-4%. The error is similar on other ranges as well.

