

Extending VSIPPL to other Precisions Achieving improved performance with modern processors

Albert L Garrett

Tony Skjellum

110 Twelfth Street North, Suite D103

Birmingham, AL 39502

agarrett@verarisoft.com

**High Performance Embedded Computing (HPEC)
Workshop**

19-21 September 2006

Benefits of Extending VSIPL

- Significant improvements in operations per second can be achieved by use of integer precisions
 - Simple ADD/SUB instruction execute 2x operations compared to float
- COTS Software community benefits
 - VSIPL vendors cope with fixed-point issues
 - Dynamic range growth
 - Scaling issues
 - VSIPL users focus on system level issues
 - Floating-point versus fixed-point trades
 - parameters of SDR and OPS
- Integer operations of Signal Processing algorithms can readily be added to the VSIPL standard

Exploiting Benefits Requires Understanding Drawbacks

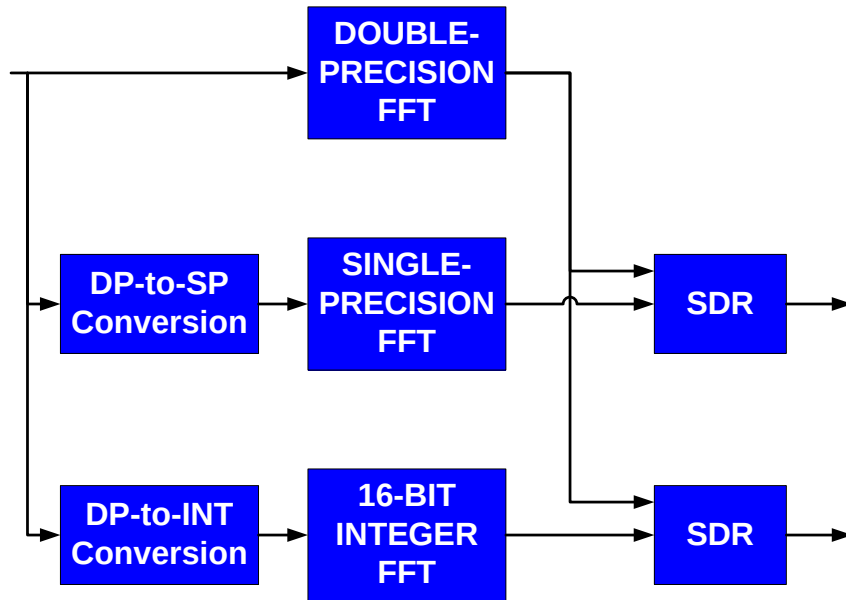
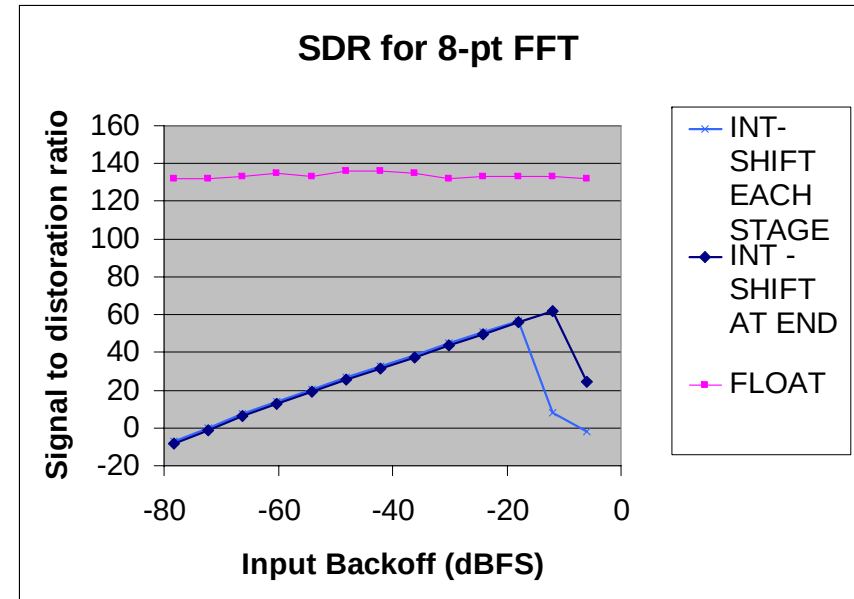


Figure 1. Test set-up for performance comparison of double-precision floating-point, single-precision floating point, and 16-bit integer FFT implementations.



Plot 1. Signal-to-distortion ratio for input signal power versus distortion power. Distortion is created by rounding and saturation in going from a high-precision format to one of lower precision.