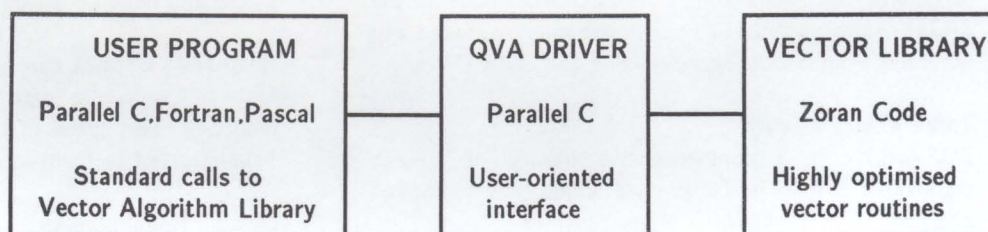# QUINTEK VECTOR ACCELERATOR SUPPORT SOFTWARE

- **Vector Functions for Maths, Signal and Image Processing**

- **Library Functions callable from high level languages**

- **Supported under Parallel Processing compilers**
  3L Parallel C, 3L Parallel Fortran,
  Helios C and Helios Fortran.

- **Comprehensive driver utilities for hardware**

- **Extensible for custom applications**

USER PROGRAM	QVA DRIVER	VECTOR LIBRARY
Parallel C,Fortran,Pascal	Parallel C	Zoran Code
Standard calls to Vector Algorithm Library	User-oriented interface	Highly optimised vector routines

These software packages accompany the Quintek Vector Accelerator boards to speed up vector and mathematical operations in a user's program by factors of up to 30 over a single transputer.

The software is provided in two parts: The Driver and the Library. The Driver software comprises functions to control the hardware and the movement of data. The Library comprises optimised routines invoked by the Driver to run on the VSP. Two versions are available: the Zoran library which offers a comprehensive list of routines and the Quintek library which provides an optimised subset with worked examples.

The QVA hardware is available in several forms. The Driver software is written to make applications easily portable between the various hardware products and yet can take full advantage of their particular features.

Quintek

INFORMATION

Fast Fourier Transform Package

The QVAFFT package demonstrates how the QVA system can be applied to filter one- and two-dimensional images using Fast Fourier Transforms. It includes the Driver to load and run modules, the Make Utility for program building and a Tutorial Program to demonstrate how to incorporate the library of 23 functions into a Fortran, Pascal, C or occam application.

Quintek Vector Accelerator Library

QVALIB provides a set of basic vector algorithms optimised for use on the QVA system. It incorporates the QVAFFT package with the Driver, Make Utility and Tutorial Program together with a range of Maths, Signal-processing and Image processing functions organised to use QVA hardware efficiently.

Quintek Image Processing Library

QVA-QIPL is a version of the Quintek Image Processing Library written in 3L Parallel C for the Harlequin board extended by the QVA system to accelerate FFT, convolution and correlation functions.

Zoran Assembler/Linker

This utility is available for users who wish to write their own library functions using Zoran assembly code for the ZR34325 processor. The linked code may be loaded and accessed from user programs using the QVA Driver.

Zoran Vector Library

ZORANLIB is a comprehensive library of Vector algorithms written in Zoran code which may be loaded and called via the Quintek driver routines.

Maths Functions are provided for arithmetic, algebraic, statistical and histogramming operations on real and complex numbers. Matrix operations are provided for multiplication, inversion, solution of linear equations, factorisation of matrices, and for the decomposition of eigenvalues and singular values.

Signal-processing functions include one-dimensional FFT, FIR and IIR filters and polynomial computations.

Image-processing functions are provided for two-dimensional FFT, convolution and correlation. Sophisticated image element selection is available to optimise decimation and interpolation methods.

Version 2.0 includes:

rAdd	rAddCN	rAtan2	rCos	rDiv
rDot	rExp	Hist	rLimitH	rLimitCN
rLimitL	rLimitLH	rLogE	rLog2	rLog10
rMax	rMin	rMult	rMultCN	rMultI
rMultICN	rPow	rRecip	rSign	rSign2
rSin	rSqrt	rSub	rSubCN	cAdd
cAddCN	cDiv	cMult	cMultI	cMultICN
cSub	cSubCN	cAtan	cFFT2	ccFFTI2
ciFFT2	ciFFTI2	rFFT2	rFFT2	rFFTI2
cFconv	cFFT	cFFTI	ciFFT	ciFFTI
rFFT	rFFTI	mCHOL	mESLP	mESLCHOL

Applications

The vector processing power of the QVA system may be applied to a wide range of computationally intensive tasks in a serial or parallel processing environment:

Numeric array processing is well handled by the QVA system. The ability to speed up vector calls provides a simple and powerful technique of reducing modelling time and increasing resolution of engineering, physical and finite element models.

Signal-processing algorithms provided by the QVA are particularly well suited to Radar and Sonar analysis for their digital filtering, convolution and bandwidth compression requirements. The QVA system combines the performance of special-purpose chips with the flexibility of programmable algorithms.

Image-processing systems for medical electronics, object recognition and measurement, seismology and photographic enhancement can benefit from the efficient 2-dimensional FFT, convolution and correlations algorithms provided by the QVA. Convolution methods are often restricted to 3x3 kernels but the efficiency of the QVA system makes 5x5, 7x7 or 9x9 kernels practical and provides greater flexibility and precision in filters and edge detection.

Real-Time Control can benefit from the application of fast self-adjusting digital filters to generate stable feedback. The speed of the QVA system ensures that sophisticated techniques can be tested quickly.

System Requirements

Quintek software packages run on an IBM PC/AT fitted with a Quintek QVA-PC board, or QVA-T TRAM and an IMS B008 motherboard.

The packages support programs developed on 3L Parallel C, 3L Parallel Fortran, Helios C and Helios (Meiko) Fortran, and IMS D700D occam compilers. If new software is to be written for the ZR34325 then the Zoran Assembler/Linker will be needed with an 80286 or 80386 PC and floating-point accelerator.

Ordering Information

Software Package:		
QVAFFT		
QVALIB		
QIPL-QVA		
ZR63451-1 Zoran Assembler/Linker		
ZR63452-1 ZoranLib		
ZR63455-1 Zoran Development System		