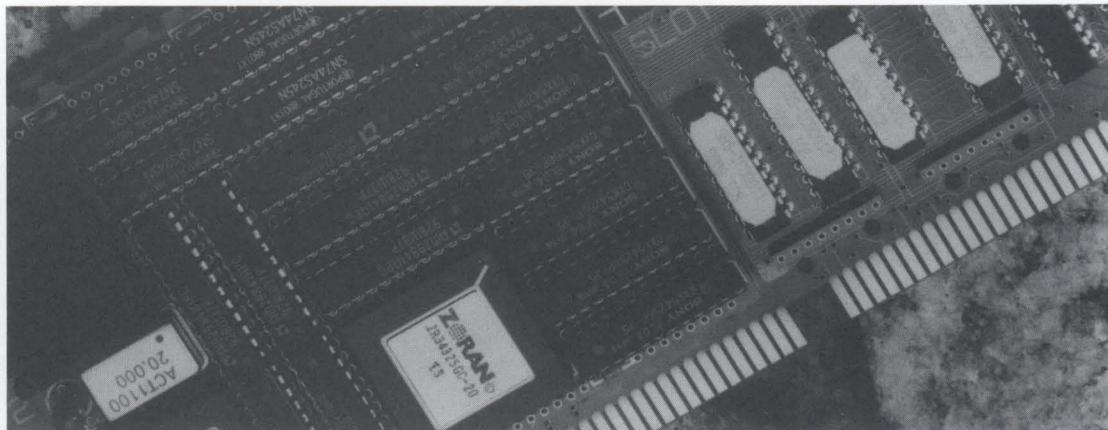


INFORMATION  
FOR  
PARALLEL PROCESSING

## QVA-T QUINTEK VECTOR ACCELERATOR TRAM MODULE



- 45 MFLOP peak power.
- Floating point arithmetic to IEEE P754-1985 standard.
- Transparent software support from Fortran, Pascal or C.
- Library of vector routines available.
  
- Multiple modules may be combined in parallel.
- 1 or 4 Megabyte Dram transputer memory.
- Motherboards available for Sun, VME, IBM PC/AT.



The Quintek Vector Accelerator QVA-T is a size 4 TRAM module designed to speed up vector operations for engineering, mathematical and image-processing by factors up to 30 over a single transputer.

The QVA-T integrates a Zoran ZR34325 vector co-processor with an Inmos T800 transputer onto a standard size 4 TRAM. The transputer is provided with 1 or 4 megabytes of dynamic memory and the co-processor has 256k of static memory.

Quintek provides full software support with a vector library callable from Fortran, Pascal and C, a hardware driver, a tutorial and test suite all to make the exceptional processing power readily accessible. The QVA-T can for example perform a two-dimensional 128x128 point complex FFT in 80 ms including the time for setting up the call and transferring the results.

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## Applications

The QVA-T may be used for numeric array processing for mathematical and engineering simulations, for spectral analysis and digital filtering of radar, sonar or transducer signals, and for reconstruction of medical scanner images, image filtering, image decimation and interpolation and for real-time control applications.

## Software Support

The QVA-T is designed to accelerate Fortran, Pascal and C functions and so bring the benefits of very fast hardware to existing programs with minimum software changes.

The QVA software is organised as a library of vector routines running on the ZR34325 co-processors together with driver utilities to organise data transfers and to load and run the modules efficiently.

Two library versions are available: the Zoran library with its fully comprehensive list of vector routines and the Quintek library which provides an optimised subset with worked examples. Users may extend the library by writing their own ZR34325 routines with the aid of the Zoran Development System.

## Benchmarks

Vector processor:	ZR34325-20 MHz
1024 point real FFT	1.5 ms
1024 point complex FFT	2.1 ms
3x3 convolution (256x256 points)	20.1 ms
32-tap FIR (128 real points)	0.47 ms
10 x 10 matrix multiplication	0.16 ms
1024 element dot product	0.22 ms

These figures are for data resident in static ram processed by a ZR34325C with 20Mhz clock. The measured time for a 1024-point complex FFT including the data transfer to and from Dram is 3.504 ms. The same computation using the Top Express single-precision CFFT algorithm on an IMS T800-20 transputer, with 4 cycle memory takes 117 ms. Thus the QVA-T offers a speed-up of 33.4 times.

## FFT Processing

The FFT algorithm supported by the QVA-T is an efficient way of extracting the frequency components from signals and images. In the frequency domain one can process data in a way which is not easily accessible in the spatial domain. It becomes straightforward to undertake filtering, bandwidth limiting, spectral analysis or diffraction pattern reconstruction.

## Convolution and Filtering

Convolution is used to transform limited portions of a signal or image. It provides an instantaneous measure of how close the neighbouring pattern matches the trial pattern. It can be used for noise reduction, digital filters, image restoration or completion, contrast enhancement, feature extraction, edge detection and measurement.

## The Zoran ZR34325 Vector Signal Processor

The ZR34325 stands out from other DSP chips having an instruction set composed almost entirely of high-level algorithms such as FFT, FIR, matrix multiply and polynomial expansion.

The FIR instruction for example convolves a data sequence stored in static ram with coefficients previously loaded into internal memory and the MTX instruction multiplies a matrix in the static ram with a matrix stored in the internal memory.

The QVA-T has up to 4 MBytes of dynamic RAM and 256 KBytes of static RAM, allowing it to handle complete complex images or large Fortran programs. All floating-point arithmetic is performed according to the IEEE P754-1985 specification.

## Motherboard Systems

The QVA-T measures 92.6 x 110.5 mm and will fit into motherboards which meet the Inmos TRAM specification. It uses standard server software and supports a subsystem port. Motherboards are available for a wide range of hosts including IBM PC/AT, Sun, VME and NEC PC.

QVA-T modules may be connected together on the motherboard into a parallel processing network. All software is organised for a parallel environment which extends naturally to multi-TRAM systems. One can for example nearly quadruple the throughput in processing images by using a network with four QVA-T modules.

## The QVA-T Package

The QVA-T is supplied complete with the QVAFFT software package. This comprises a library of one- and two-dimensional FFT and vector routines with driver, header and interface software to run under MS DOS with 3L Parallel C v2.1, 3L Parallel Fortran v2.0 or occam.

Also included are an FFT Demonstration Program, a Tutorial Program, a Test Suite, Make Utilities and a comprehensive manual detailing the use of the library and driver software.

## Product Support

Quintek fully supports both hardware and software, and can advise on obtaining the full benefits from our high performance products. Products are guaranteed for 12 months from the date of purchase.

## Ordering Information

Part Number	Dram	Sram
QVA-T25-D1M-Z-S256k	1Mbyte	256kByte
QVA-T25-D4M-Z-S256k	4Mbyte	256kByte

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