VTF
Versatile Transputer Frontend

Transputer speed direct into User Circuitry

Short development time
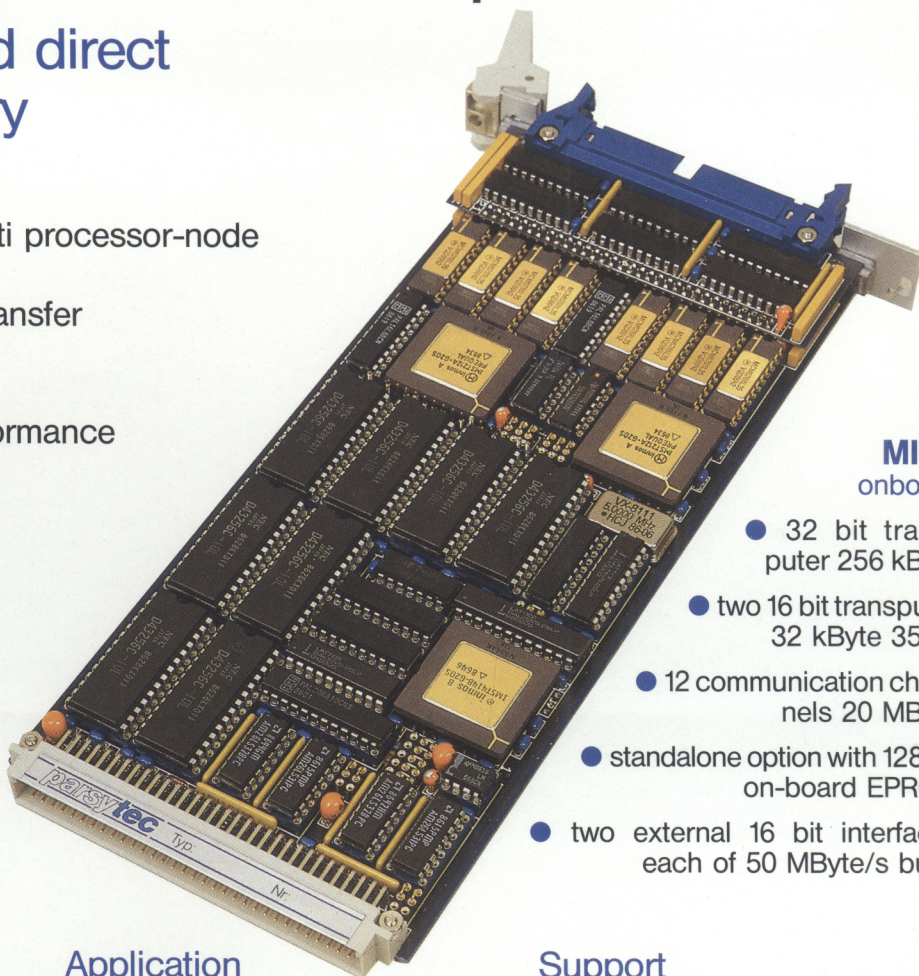using readily deployed multi processor-node

Flexible high speed data transfer
with custom hardware

Extremely high-speed performance
using 3 processors

Unlimited extendability of
local processing power

Fast and reliable program
development in OCCAM,
C, PASCAL, FORTRAN 77

Easy application within
user's products

**32
MIPS**
onboard

- 32 bit trans-
  puter 256 kByte
- two 16 bit transputer
  32 kByte 35 ns
- 12 communication chan-
  nels 20 MBit/s
- standalone option with 128 kB
  on-board EPROM
- two external 16 bit interfaces
  each of 50 MByte/s burst

Features

The Versatile Transputer Frontend (VTF) offers the system developer the power of three transputers, i. e. over 30 MIPS, the direct integration with user hardware and all on a single eurocard. The processors, having 256 or 32 KByte resp. local memory capacities, communicate over fast transputer links both with each other and with external processors. User specific hardware may be directly driven by two of the processors via supplementary 16 bit high-speed data interfaces. Transfer bursts of up to 50 MByte/s serve to indicate the terrific speed capability of the transputer. The access can be programmed under software control using a 32 KByte address window or it can be controlled by user DMA hardware.

Varying performance demands are easily satisfied by coupling additional modules via the link channels.

Application

The system designer has new application areas opened up to him when working in critical real-time control or high-speed data analysis, e. g. image processing, by using the VTF. He entirely avoids the necessity of having to develop his own high-speed multi-processing system, with its attendent time and risk penalties. Owing to the new communication technology, the simultaneous application of several VTF modules is easily accomplished thereby yielding a system performance which has been barely possible until now. The VTF may also be optionally equipped with an EPROM to form an automonous OEM module in end-products. Easy integration into the user's equipment is guaranteed by use of the simple high-speed interfaces.

10 m distance via the links allow a VTF included in frontend hardware to be controlled from remote processors.

Support

The VTF module is complemented by a variety of components and development systems from the MEGAFRAME family. The power of the hardware is complemented by the parallel processing language OCCAM and powerful configuration software for large numbers of processors. Compilers for C, PASCAL and FORTRAN 77 can also be used. High speed communication between an unlimited number of processors, is uniformly but simply supported in both hardware and software. Its integration into existing applications is easily enabled by the use of standard peripherals and sub-systems from VME, IBM, SMP, and ECB. To guarantee later expandability of a system, the communication channels of all MEGAFRAME components are both hardware and software compatible and may also be used with other transputer based products.

Technical description

The first of the three independent VTF processor nodes contains either a T800 32 bit transputer or a T414 transputer having a 256 kByte static RAM. The processor runs at a clock frequency of 20 MHz and the memory access time is 100 ns. The application programs can be dynamically loaded from external sources via the communication channels (links). In standalone applications, 128 kByte are replaced by an EPROM, containing the program for all three processors. Owing to the extremely compact transputer code and the real-time scheduling in hardware, this is equivalent to approximately a 256 kByte code of conventional processors.

Two further 16-Bit nodes each contain a T212 transputer having a 32 kByte static RAM. Both processors are clocked at 20 MHz, the memory access time being 35 ns. Having complete software compatibility with the T800/T414 the 16 Bit transputer with its MUX-free data/adress bus, achieves mean instruction execution times of between 45 and 135 ns. Every T212 accesses a further 32 kByte address window, outside the board, via high-speed data interfaces (HDI flat cable connection to the external environment). The program controlled data transfer rate is 10 MByte/s, and using an external DMA controller, up to 50 MByte/s. The HDI interface to the user hardware is both simple and flexible. EXTREQUEST/EXTGRANT signals synchronize the access. EXTBYTE switches over to 8 bit access width. EVENT/EVEN-

Block diagram **VTF**
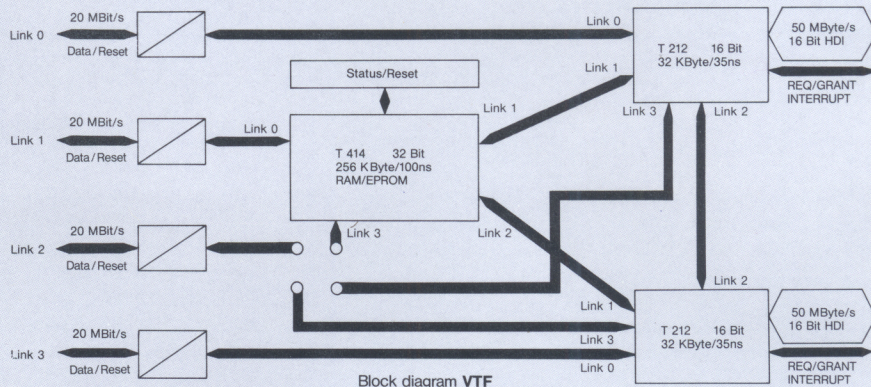
TACK lines control interrupts with a typical delay time of 0.95 microseconds (max. 2.6) from its inception to the first statement of the user routine.

The 12 transputer links of the VTF operate at 20 MBit/s homogeneously connecting the board processors to each other and to those of the outside world. Three of them are available for jumper-selectable connectivity both with each other, and to external processors. All external connections are RS-422 buffered and connected to the VG backplane according to the MEGAFRAME standard. Using standard cable a working speed of 20 MBit/s per 10 m length is guaranteed, greater distances use either 10 or 5 MBit/s jumpers.

The links have in addition a bi-directional, program-controlled, reset implementation facility. By these means, in a MEGAFRAME

network each processor controls, via the communication links, the activities of its immediate four neighbours. In the event of a fault condition the processor resets them and dynamically loads them over the same links with a new program code.

A status register stores fault conditions from the T800/T414 together with address faults of all three transputers. In the event of a fault condition in the 16-Bit node, the T800/T414 may reset it and start it anew. A fault in the 32-Bit system leads to either an internally EPROM-initiated new start or the change over to the analyse condition with a software diagnosis and a new start both via the external links. The VTF module in the extended single-eurocard format (100 x 220 mm) has a current consumption of under 3 A at 5 V supply. A 6-fold multilayer PCB technique ensures a high reliability.

Experience through pioneering

PARSYTEC makes new information technology highly usable for industrial applications. Their aim is the recognition of long-term trends as well as a consequent involvement in usable practical results.

High technology is useless in absence of the maturity that comes with experience. Consequently, PARSYTEC are engaged in the development of prototypes and preproduction runs even when an emerging technology has not, as yet, achieved universal recognition. This ensures that the user gets a mature product right from the start and help him in keeping his own competetive edge.

PARSYTEC has, with its MEGAFRAME series, deliberately set out to be the first firm in the world to introduce industrial transputer technology. This system has, in the meantime, been proved in practical application and continues to be further developed.

Competetive edge through system technology

The concept of the MEGAFRAME's bus-free technology offers the sort of system performance and flexibility which is beyond the reach of conventional techniques.

Technical performance, however, can only be useful in the context of a system capability and herein lies the supreme advantage of the MEGA-FRAME series. A series of carefully graded processing modules guarantees an unlimited extendability. Bus bridgehead modules are provided for the integration of VME, IBM, SMP, and ECB standard peripherals. Mass memories and high-grade graphics are supported by a further product line.

A thorough and well-rounded completeness together with reliability and availability gives the system developer assurance. He is able to progress from existing systems and know-how and to react flexibly to any unexpected demands.

Confidence through cooperation

New technology demands a well considered involvement together with a reliable partner. PARSYTEC ensures customer success not just with its products but also with copious support and know-how.

If you have any queries about our Parallel Processing, or you wish to be regularly informed by our representative, just give us a call or drop us a line.

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- Project support