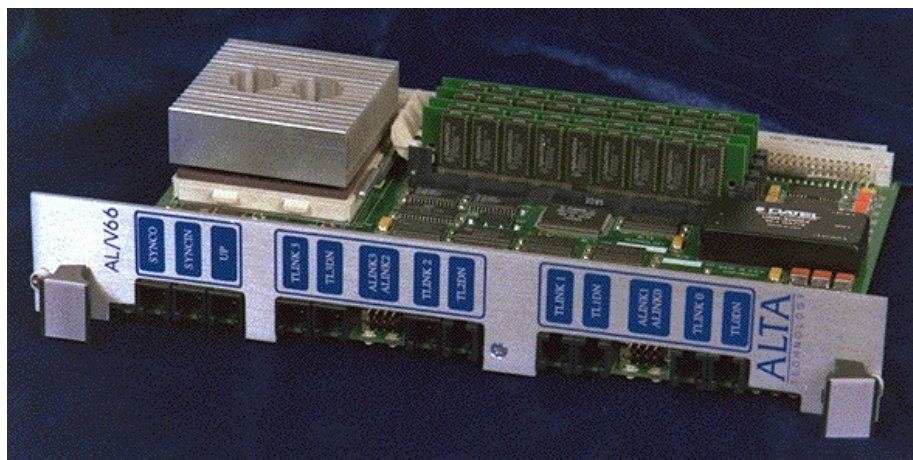# Alta Board-Level Products

AL\V66
Scaleable 21066 Alpha Nodes
with ALINK Communications

A processing node (based on DEC's 21066A Alpha processor) that connects to a variety of host architectures either as a dedicated compute engine or part of a scaleable network of processors.

Product Overview

The Alta AL\V66 is a single board compute node based on Digital's 21066A Alpha microprocessor. Its 6U VME packaging connects to a variety of host architectures via high-speed I/O channels or "links". Each processing node has four full duplex serial links (TLINKs) and up to four advanced fibre channel links (ALINKs) that can be attached to other processors or peripheral devices. This connectivity allows AL\V66 nodes to be used both as single node accelerators or combined with additional processing nodes for scaleable high performance parallel configurations.

Functionally, an AL\V66 node can be viewed as a conventional Alpha processor with eight links (ALINKs plus TLINKs) controlled by a communications processor. As higher performance is required, additional nodes can be connected using the ALINKs. This architecture provides a scaleable high-performance engine for compute-intensive applications where the user can distribute the application across a multiprocessor network. Point-to-point and packetized ALINK messaging provides a communications framework for the design of parallel architectures and customized embedded or hosted accelerators.

AL\V66 nodes interface with a variety of host architectures and peripherals through Alta's **H**ost **A**LINK **I**nterface (HAI) products. The HAI acts as gateway for a specific host bus (such as PCI, SBus, SCSI or EISA) to interface with a network of processors using Alta's high-speed ALINKs and/or TLINKs.

![ALTA TECHNOLOGY]

21066
Alpha
Processor

I/O Control
Memory Control

64 "All cache" Memory

32

DMA Link Engine

ALINK
ALINK
ALINK
ALINK

TLINK
TLINK
TLINK
TLINK

Control In
Control Out

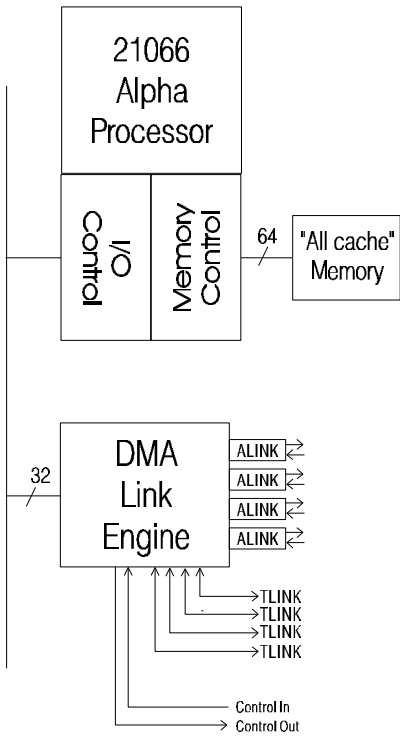## How does the AL\V66 node operate?

The Alpha processor on an AL\V66 board uses a local PCI bus to communicate with an ALINK, while an embedded SGS Thomson T425 processor acts as a control (and communications) processor. Alpha programs are compiled and configured on a host workstation and then downloaded to both processors through the links. The Alpha makes requests of the control processor for communications services and the control processor provides the services through the PCI interface.

The control processor provides hardware support for process management tasks such as timer functions and interrupt functions. The memory subsystem utilizes the most advanced EDRAM technology -- cache and DRAM on a single chip -- for low latency, high performance memory access.
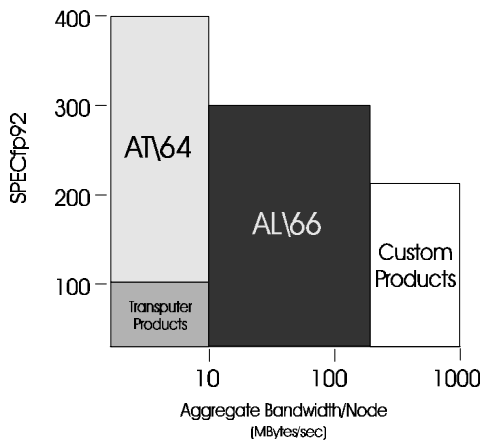
What is an ALINK?

An ALINK is a high-speed bi-directional data link that uses a fibre channel transceiver subsystem and a PCI busmaster interface to connect an AL\V66 to a host or to another AL\V66. An AL\V66 has up to four ALINKs, each of which is paired with one of the four serial TLINKs on the control processor. The T425 controllers on an AL\V66 communicate with the T425s on other AL\V66s by passing data and control information or by bootstrapping a network of processors. The TLINKs, which are connected across several 21066A compute nodes, form a bootstrap topology that connects to the HAI located in the host.

The full duplex ALINKs can transfer data at 25 MBytes/sec (simultaneously in both directions) and the TLINKs operate at 1.8 MBytes/sec. The maximum throughput of the PCI bus is 132 MBytes/sec.

Who can benefit from AL\V66 products?

Alpha processing nodes are specifically targeted for applications with high-communications/medium-computation requirements (see chart at left). Those applications with higher computation requirements may consider AT/64 nodes as an alternative to AL\V66s. Lower-end processors are also available.

AL\V66 nodes with 21066A processors provide value added resellers and integrators with a platform for scaleable embedded computation in existing VME systems or as attachments to workstations or network file servers. Room for future expansion is designed into AL\V66 systems. As processing requirements grow, additional AL\V66 nodes can be added for greater performance. This allows developers to leverage their initial software investment and minimize "time-to-market" for new or future products.

Single-node Performance

SPECfp92

400
300
200
100

AT\64

AL\66

Custom Products

Transputer Products

10   100   1000

Aggregate Bandwidth/Node
(MBytes/sec)

Alta's scaleable Alpha product family balances computation power and configuration flexibility to solve complex problems such as scientific computation, financial modeling, real-time simulation, communications and database applications, among others.

Plug AL\V66 processors into your present system!

HAI products provide access to industry standard bus archictectures such as EISA, SBus, and PCI. The HAI/SCSI can be used to interface the AL\V66s to hosts through a SCSI-2 port. Thus, HAI products are used to integrate AL\V66 products with a variety of hosts, such as:

ᵥ   Digital AXP™ and AXPvme™ workstations and VME Single Board Computers

ᵥ   Sun SPARCstation®

ᵥ   HP 9000™

ᵥ   IBM RISC System/6000™

ᵥ   AT&T® NCR 33xx and 55xx servers

ᵥ   Silicon Graphics Onyx® and Crimson® workstations

ᵥ   386, 486, and Pentium®-based PC Products

Alta Technology offers a wide range of complementary software, support tools and parallel processing hardware for computation, special applications and peripheral interfaces, and features 16 or 64 megabytes of local memory per processing node.

Software

DEC-supplied compilers, linkers and debuggers, plus Alta's parallel libraries, servers, loaders and development tools, provide the means to utilize the performance of the 21066 and Alta's parallel board technology. Support is provided for connection with transputer-based peripherals. After a parallel program has been compiled and configured, it is downloaded from the host through the HAI links using TCP/IP protocol and onto the 21066 Alpha processor. The T425 manages the 21066A Alpha processor functions while remaining completely transparent to the user. Development tools provide consistency across a range of platforms.

Your Guarantee of Quality

The scaleable Alpha product family is *quality-built* for lasting value. Alta uses the most current Surface Mount Technology (SMT) for affixing board components with processes being monitored by statistical process control analysis. Milspec thermal screening further enhances Alta's high reliability standards. Supplemental testing and burn-in procedures include functional tests of the on-board memory and I/O and peripheral interfaces. Alta products are completely, 100 percent designed, manufactured and tested in the USA and are covered by a one-year warranty on parts and labor.

Alta Board-Level Products

AL\V66

Specifications

Processor(s)
Digital 21066A Alpha
166 or 233 MHz
IMST425 25 MHz node controller

Memory
16 or 64 MBytes

Performance	*166 MHz*	*233 MHz*
Peak MIPS	*332 MIPS*	*466 MIPS*
LINPAC MFLOPS (64-Bit 1Kx1K)	*126 MFLOPS*	*176 MFLOPS*

Configuration
VME single node boards
6U (160 x 233 mm)

HAI Interfaces
EISA, SBus,PCI, SCSI and others

I/O Communications
ALINK Bandwidth - Full Duplex
* 25 Mbytes/Sec x 4 ALINKs*

TLINK Bandwidth - Full Duplex
* 1.8 MBytes/Sec x 4 TLINKs*

Electrical
DC voltage 5V− 5% (Opt 3V Input)

Power Dissipation   40W (Min)
*   50W (Typical), 60 W (Max)*

Environment
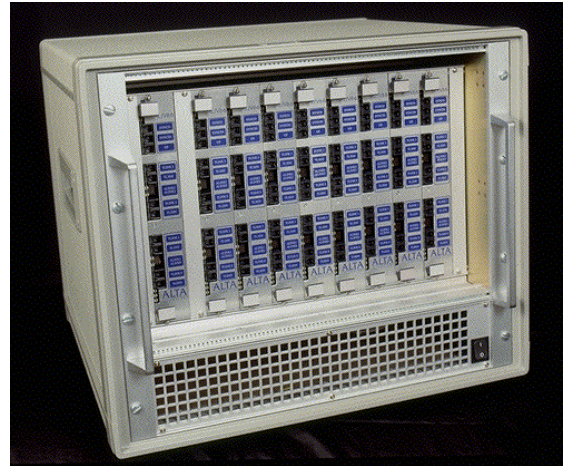*Operating Temp.   0º - 60º C*

Ordering Information	*166 MHz*	*233 MHz*
To purchase an AL\V66 processor w/16MBytes and 4 TLINKs only:		
* add 2*	*AL\V66-166-16*	*AL\V66-233-16*
ALINKs:	*AL\V66-166-16-2*	*AL\V66-233-16-2*
* add 4*	*AL\V66-166-16-4*	*AL\V66-233-16-4*
ALINKs:		

Rack mount AL\V66 processors

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