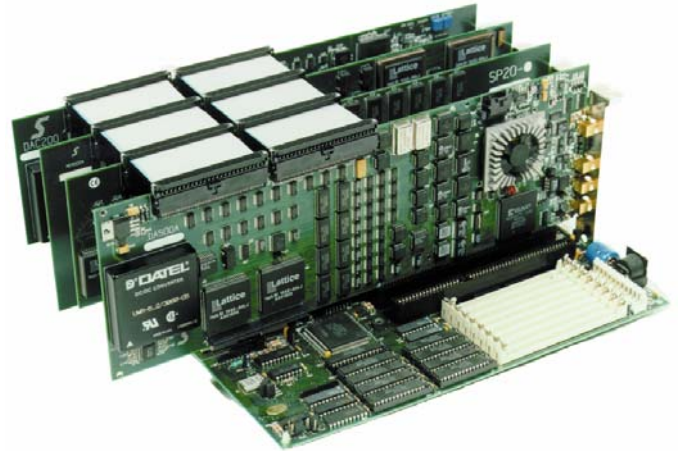




The Connection That Makes High Performance PC Based Systems Possible!

FEATURES

- Up to 500 MB/s Transfers Between Boards
- Bypass Host System to Improve Response Time
- Operate Multiple SABs in a Single PC
- Packetized Data Mode to Maximize Bandwidth Utilization



SAB Connection Between Boards

OVERVIEW

Today's most advanced PCs make significant use of the PCI bus, generally in combination with some ISA slots for compatibility with peripherals designed for the original PC bus while adding the higher performance capabilities of the new technology. But while the PCI bus offers a significant improvement in data transfer rates as compared to ISA, relying on it for data movement in time critical applications is still problematic, especially in a Windows operating environment.

The Signatec Auxiliary Bus (SAB) eliminates all bottlenecks in the movement of data between data acquisition boards, signal processing boards, memory boards, D/A boards, etc. Additionally, multiple SABs can be implemented in a single computer, which further increases the available system data bandwidth.

The SAB does not replace the host bus but, rather, augments it. An optimized application uses the SAB for time critical data movements and the host bus for less critical operations. Since both buses are in simultaneous operation, system throughput is maximized. The SAB makes it possible to construct high performance instrumentation systems using cost effective PC platforms.

Version 3 of this bus takes system performance to another level. With the addition of packetized data transfers, bus bandwidth utilization can be substantially increased in system applications involving multiple simultaneous transfers. Packetizing the data essentially time multiplexes

the data transfers between multiple sources and destinations in a user-defined fashion.

The SAB supports two modes of data transfer: Packetized Data and Block Transfer. All versions of the SAB support Block Transfer mode. The blocks that are transferred in this mode are typically much larger than "data packets". This mode moves data fast and is a much simpler mechanization than Packetized Data, but it cannot efficiently multiplex data for some real time applications.

The Signatec Auxiliary Bus was introduced in 1993. It consists of a 64 bit data bus mechanized via two 100 conductor ribbon cables running across the top edge of standard ISA/PCI boards as shown in the picture above. SAB version 1 used a maximum data clock rate of 25 MHz to deliver a maximum, sustained data rate of 200 megabytes per second (MB/s) in Block Transfer mode. SAB Version 2 increased the clock rate to 62.5 MHz providing a transfer rate of 500 MB/s. SAB Version 3 supports block transfers at 200 and 500 MB/s, and adds packetized data transfers at 533 MB/s. This transfer rate allows for a bus overhead of 6.7% percent while still maintaining 500 MB/s transfers. Support for both 32 and 64 bit transfers is provided. Operation at 32 bits reduces the maximum possible data rate by a factor of 2.

HARDWARE DESCRIPTION

Bus Control

SAB data flow is controlled in one of two ways: via the host processor sending commands over the host bus, or via a SAB Bus Controller that sends commands over the SAB. Packetized Data mode requires a version 3 compliant SAB Bus Controller. Presently Signatec's PMP8A DSP board is the only product that can perform this task. The SP20 DSP board also can act as a SAB Bus Controller but is limited to operating in Block Transfer mode at no more than 200 MB/s.

Packet Transfer

Packet Transfer mode was added starting with version 3 of the SAB specification. This mode was specifically added to maximize the utilization of the SAB bandwidth in system applications. Packet Transfer mode allows data transfers between multiple sources and destinations to be interleaved onto the bus at the maximum bus speed, independent of the actual data speeds internal to the individual boards. This is accomplished by the addition of very deep FIFOs at the SAB interface of each board. Operation in Packet Transfer mode requires a Bus Controller implementing SABv3+ protocols, such as the PMP8A.

All Signatec SAB version 3 products also have the ability to run at lower clock rates in Block Transfer mode for compatibility with older SAB products.

Signatec External Bus (SEB)

Some Signatec products, like the PMP8A DSP Board, include an external I/O connection called the Signatec External Bus (SEB). It is intended primarily for connection to devices outside of the PC but can also be used as yet another connection between PC boards. The SEB is an exact electrical implementation of the SAB, but in 32-bit mode only.

SAB Specification

A specification for the SAB is available which provides detailed information pertaining to the operation, timing, physical layout, electrical connections, etc. sufficient to actually design a compatible product. A copy of this specification can be obtained from our web site at <http://www.signatec.com>

System Capabilities

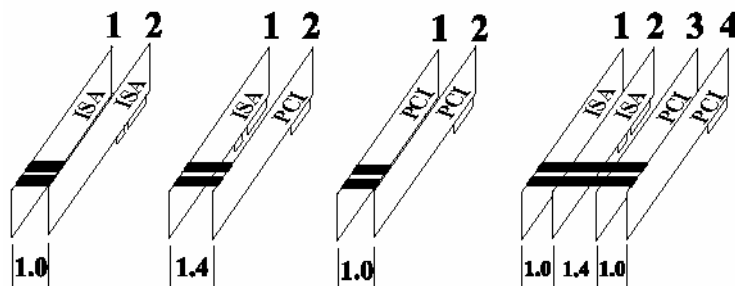
The system solution offered by Signatec is based on supplying a comprehensive range of products incorporating the Signatec Auxiliary Bus. This 64-bit bus provides transfer rates up to 500 MB/s. SAB boards act as modular building blocks for constructing high performance systems that mechanize a wide variety of applications. Shown in the figure below are elements of such a system. Many systems can be constructed using standard desktop PC's. For demanding applications Signatec can supply a total turnkey system utilizing one of our industrial computer systems.



Devices connected to the SAB may communicate via SAB interrupt and control lines. This allows the boards to accomplish multiple acquisition, transfer, and processing cycles under control of the signal processor device without PC intervention. Bypassing the host bus and operating system can significantly improve system performance.

SAB CABLE ASSEMBLY ORDERING GUIDE

SAB Cable Assemblies are ordered by forming a part number as shown below. The part number shows the number of connectors on the cable, the spacing between each connector measured in inches followed by a keying designator identifying ISA (A) or PCI (P) board. Most PC motherboards employ a board spacing of 0.8 inches from ISA to ISA board and PCI to PCI board. The nominal connector spacing for the cable should be 1 inch for this case. The standard spacing for the last PCI slot to the first ISA slot is 1.36 inches. The nominal connector spacing for this connection should be 1.6 inches. For computers with larger separations between boards, specify a connector spacing for the SAB cable that is slightly larger than the connector spacing on the motherboard. The connector spacing may be specified in 0.1-inch increments. Normally two SAB assemblies are required per system.

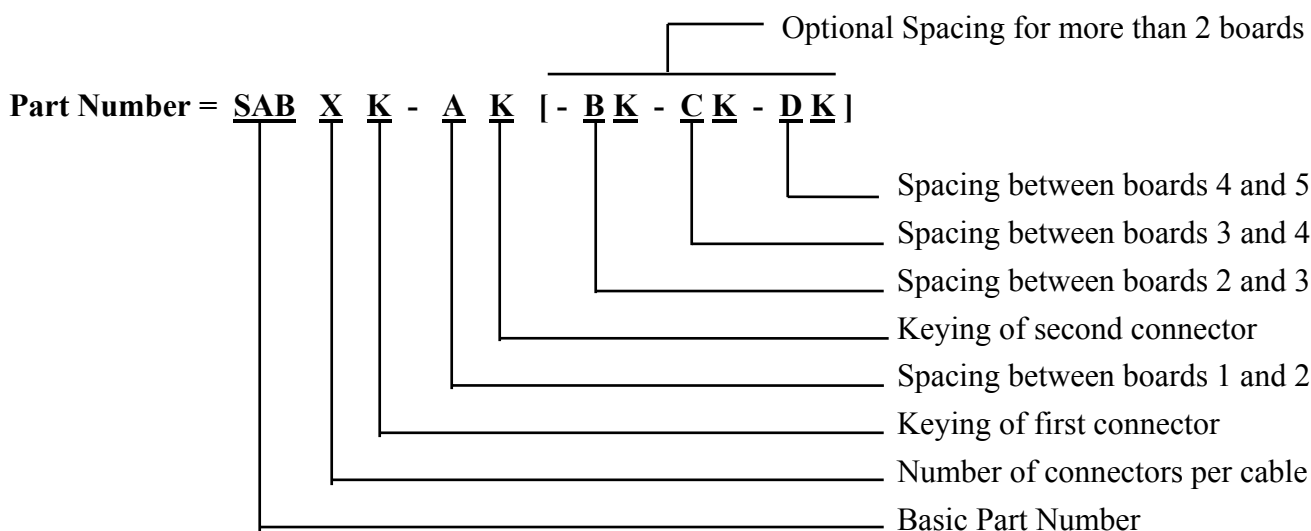


Example A

Example B

Example C

Example D



Example A: SAB2A-1A ISA to ISA Cable Assembly with 2 connectors at 1 inch separation.

Example B: SAB2A-1.4P ISA to PCI Cable Assembly with 2 connector at 1.4 inch separation.

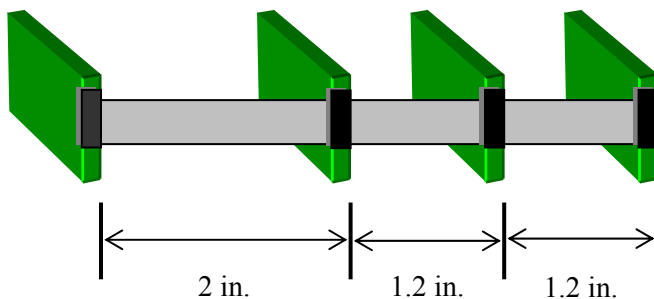
Example C: SAB2P-1P PCI to PCI Cable Assembly with 2 connectors at 1 inch separation.

Example D: SAB4A-1A-1.4P-1P Two adjacent ISA cards to two adjacent PCI cards.

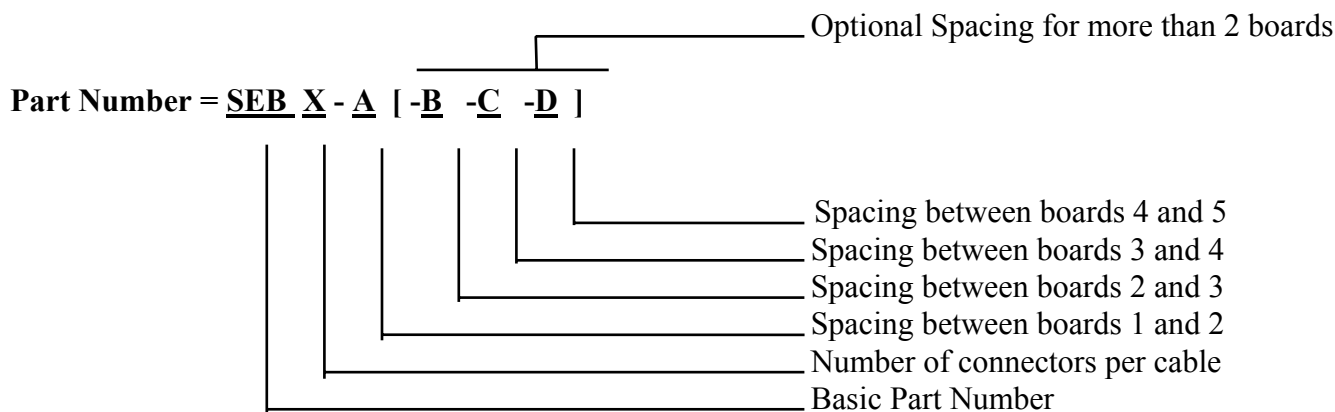
Pricing: \$15 + \$15 per connector (Cost of SAB2A-1A is \$45.00)

SEB CABLE ASSEMBLY ORDERING GUIDE

SEB Cable Assemblies are ordered by forming a part number as shown below. The part number shows the number of connectors on the cable and the spacing between each connector measured in inches. Most PC motherboards employ a board spacing of 0.8 inches from PCI to PCI board. The nominal connector spacing for the cable should be 1 inch for this case. For computers with larger separations between boards, specify a connector spacing for the SEB cable that is slightly larger than the connector spacing on the motherboard. The connector spacing may be specified in 0.1 inch increments.



EXAMPLE "D"



Example A: SEB2-1 Cable Assembly with 2 connectors at 1 inch separation.

Example B: SEB2-5P Cable Assembly with 2 connectors at 5 inches separation.

Example C: SEB4-1-1-1 Cable Assembly with 4 connectors at 1 inch of separation each.

Example D: SEB4-2-1.2-1.2 Cable Assembly with 4 connectors with 2 inches of separation between first two connectors and 1.2 inch of separation between all others.

Pricing: \$15 + \$15 per connector (Cost of SEB2-1 is \$45.00)