

PowerIO™ drivers

Introduction

Sabtech's VME NTDS boards are actually single board computers with a full duplex NTDS channel. This architecture provides developers with a high degree of flexibility in designing a COTS NTDS system that meets their requirements. Software drivers are also an important part of a well integrated, high performance system. However, not all drivers are the same. To fully appreciate the superiority of Sabtech's new family of PowerIO™ Drivers, it is necessary to examine the conventional device driver model for contrast.



Conventional Device Driver Model

The conventional driver model is where a vendor's device driver is installed as an extension of the operating system running on the host processor. Typically, it makes the programming interface to the I/O device look like a standard system file, using operating system calls such as *open*, *close*, *read*, *write*, and *ioctl*. At runtime, the host processor controls the device by manipulating its registers and memory. The disadvantage of this model is that the host becomes busier as the number of I/O boards increases, robbing CPU resources from the main processing tasks and tying up the VMEbus. In extreme cases, the system can become I/O bound with a serious degradation in performance. This is often the case in systems with intensive NTDS I/O requirements that do not have a mechanism for offloading tasks from the host processor. In short, this model places the entire processing burden on the host.

Sabtech's PowerIO™ Drivers

Sabtech's new PowerIO™ Drivers use a distributed processing model based on SNAPS™ to significantly boost system performance. The PowerIO™ Driver is comprised of two closely integrated components. The Host module installs as a conventional device driver, and the Peripheral module installs on the Sabtech VME NTDS board.

The PowerIO™ Host module installs under the host operating system like any other device driver. It is completely compatible with the programming interface of previous generation Sabtech drivers, while adding new features that provide tight integration with programs running on the NTDS boards.

The PowerIO™ Peripheral module is a SNAPS™ based program contained in a single binary file which is automatically loaded into RAM on the Sabtech NTDS board during Host module initialization. The processor on the NTDS board then starts executing the Peripheral module.

PowerIO™ modules communicate with each other using an efficient interrupt based interface to reduce latency. The Peripheral module moves data across the bus using VME block mode in order to reduce VMEbus overhead and increase throughput. The PowerIO™ Driver provides everything needed to implement a tightly integrated, performance tuned VME NTDS channel.

But this is just the beginning. The PowerIO™ Peripheral module is actually a fully functioning SNAPS™ application that can be expanded to offload even more work from the system's host processor. With the SNAPS™ Development Package (purchased separately) you can add your own C language code to customize the functionality of the driver.

The core of the PowerIO™ Peripheral module is the SNAPS™ real-time, multi-tasking executive that can manage and execute up to 16 concurrent tasks. The SNAPS™ Development Package includes an application programming interface (API) library for developing powerful onboard applications. For a full description of SNAPS™ and the power it gives you to build a sophisticated distributed processing system, please refer to the SNAPS™ section of the catalog.



Documentation & Sample Programs

To help you get off to a great start, PowerIO™ Device Drivers come with an easy to read User's Guide containing extensive programming examples. Included with the driver are several sample programs with C language source files. All sample code is proven and may be freely cut and pasted into your application.

Operating Systems Supported* By PowerIO™ Drivers Include:

- HP-UX (HP-743/4)
- HP-RT (HP-743/4)
- Solaris, (Sparc and UltraSparc)
- Digital Unix (Alpha Systems)
- VxWorks (Several 68K and PPC platforms)
- Windows NT (for Intel-based VME SBCs)

*Contact sales representative for availability of current versions and ordering information.

Sabtech understands the Navy's concern about deploying COTS systems that need technology upgrades every four or five years to keep up with ever increasing processing demands. While the initial cost of a COTS system is less than a militarized one, upgrade costs can be substantial over its life cycle. In this day of diminishing budgets, the distributed processing capability made possible by Sabtech's VME NTDS boards and PowerIO™ drivers provide additional computing power to help reduce the number and frequency of upgrade cycles, resulting in significant savings in time, manpower, and program dollars.