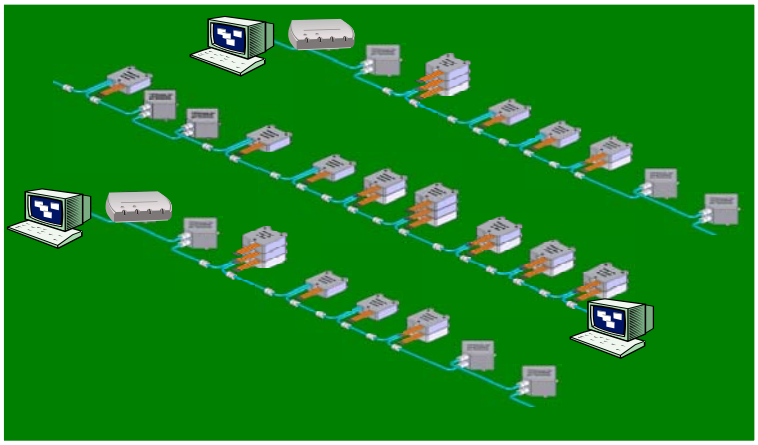
Smart Sensors Network System

MODEL 6000

- **Minimum Interconnecting Cables**
- **Multichannel Synchronous Sampling**
- **Easy to Design, Use and Maintain**
- **Self-Describing Units - TEDS**
- **Plug and Play**
- **Increased Performance, Reliability, Noise Immunity**
- **Flexible System**
- **Small Ruggedized Packaging**
- **Low Installation and System Cost**



Network System: NIC, IBMs Stacks, Smart Sensors

Description

The Smart Sensors Network System is a distributed sensor instrumentation system with synchronous/simultaneous sampling consisting of miniature smart digital sensors and transducer modules interconnected to a Network Interface Controller (NIC) through a multi-drop digital serial bus (IntelliBus). Small electronic modules called IBIM's (IntelliBus Interface Modules) are used to interface any traditional analog transducer to the bi-directional digital bus (see Figure 1 and 2). The Network Interface Controller (NIC) provides a gateway between the transducer bus (IntelliBus) and a host computer, or depending on the configuration, with a telemetry system, or a remote computer through an Ethernet port.

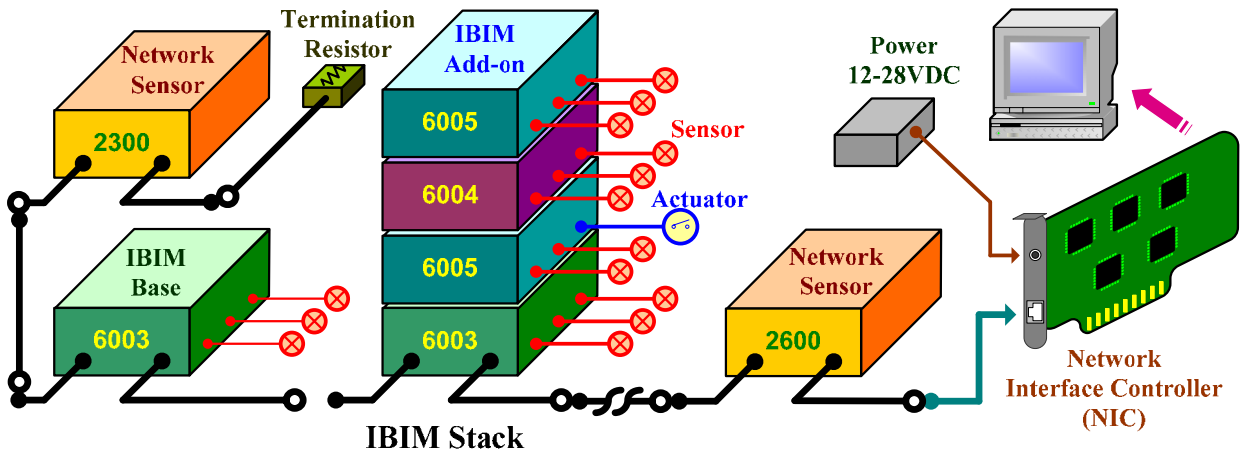


Figure 1: Smart Sensor Network System Functional Diagram

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The NIC is the master of the digital network. Only 1 IBIM can transmit at any given time after receiving a command from the NIC. The NIC provides DC power to the IBIM's, and the proper signals to achieve synchronous/simultaneous data sampling among all the IBIM's on the Transducer Bus.

Up to 510 nodes can be connected in a multi-drop configuration to the NIC. The maximum number of IBIM's in the bus depends on the number of channels in each IBIM node, clock speed, power consumption, length of the cable, and sampling rate. The higher the sampling rate, the lower the number of transducer channels. See Figure 4.

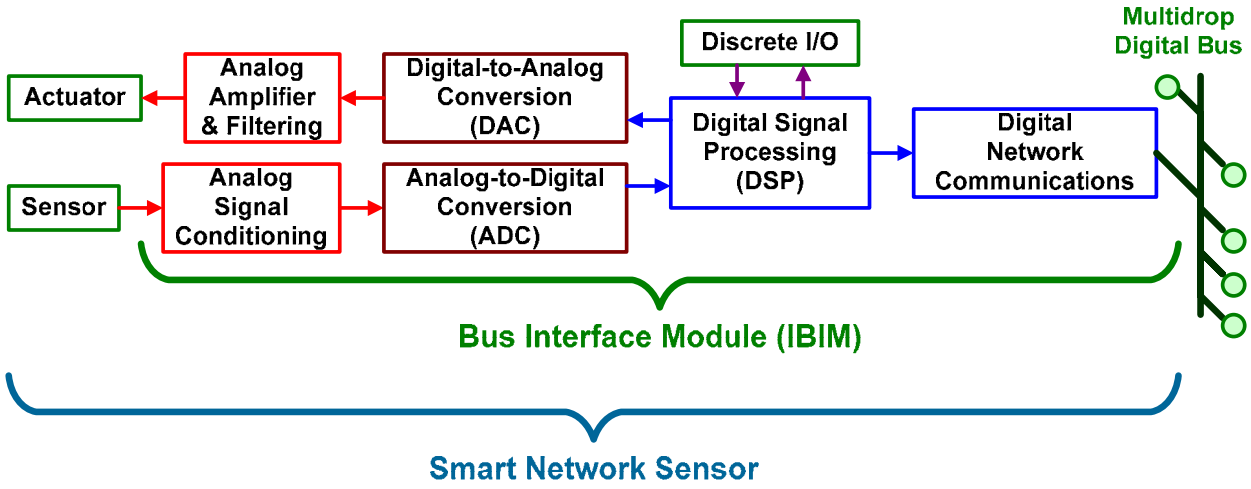

Figure 2: Smart Networked Transducer

The multi-drop sensor network nature of VIP's system Model 6000 allows drastic reduction of cables by interconnecting all of the transducers through a common digital bus cable. Cables carrying digital signals are less susceptible to these problems and are easier to interface than cables carrying analog signals

Reliability is significantly improved by reducing the total number of interconnecting cables and by designing a system that includes self-test and self-calibration features

Relevant transducer and/or IBIM information is stored in the Transducer Electronic Data Sheet (**TEDS**) in on-board, non-volatile memory. Automatic system setup and configuration is obtained by reading the TEDS from each unit on the bus.

The use of a common interface reduces the complexity of the system design, integration, maintenance and operation.

Features such as transducer identification, self-test, self-calibration, test setup configuration, configuration status, etc. can be performed under computer control with minimal need for any manual trimming or adjustments.

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The Smart Sensors Network System accepts different types of transducers (traditional analog types as well as new smart sensors), allows easy expansion or reduction in the number of measurement channels, and handles a large number of channels. VIP Sensors also offers smart accelerometers based on Piezoelectric, Variable Capacitance and Piezoresistive technologies. These self contained units interface directly to the IntelliBus network and provide digital data.

Smart PR Accelerometer: 1.5 x 1.5 x 0.8 inches

Base IBIMs such as the Model 6003, in addition to providing signal conditioning and processing functions, also provide network communication; therefore, they may be used as stand-alone modules or as the base for module stacks as shown below. Add-on modules, such as Models 6005 and 6007, in conjunction with base IBIMs form module stacks, provide a high channel count in a very small volume. A single stack (one base) may contain up to thirty three (33) channels of signal conditioning/ processing in a volume of 1.5” x 1.5” x 5.8”.

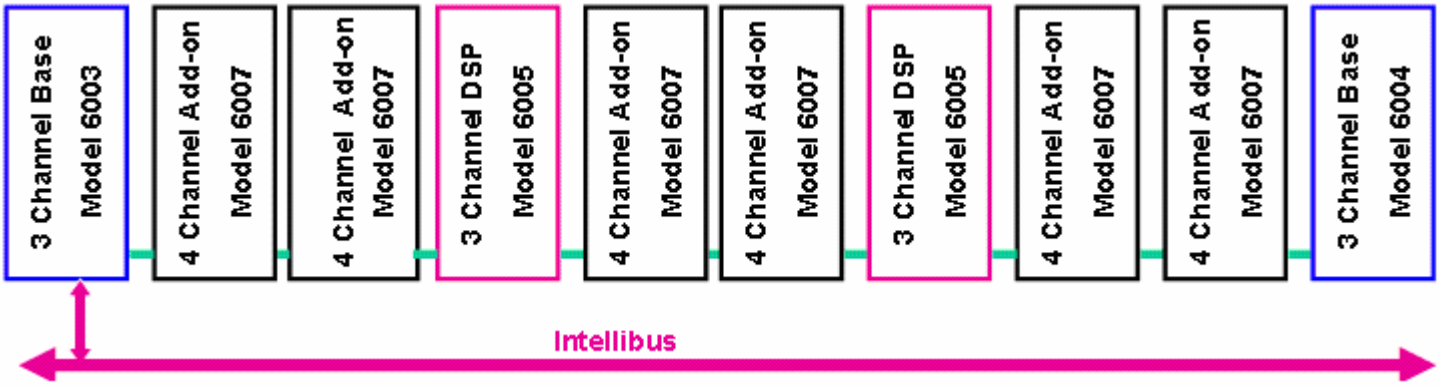
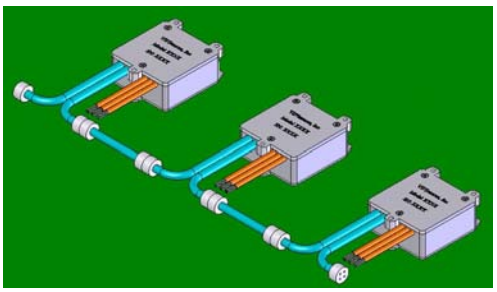
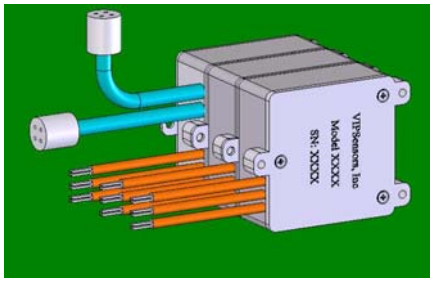


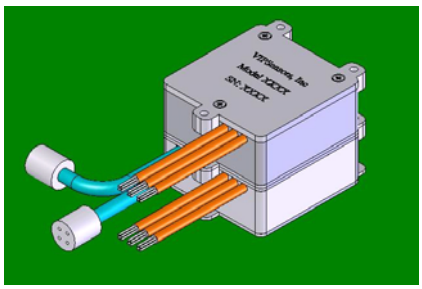
Figure 3 - IBIM Stack: up to 33 channels may be configured in a single stack, 510 channels may be in a single network



Base Modules - three channels each, one network node per module



Horizontal module stack configuration



Vertical module stack configuration

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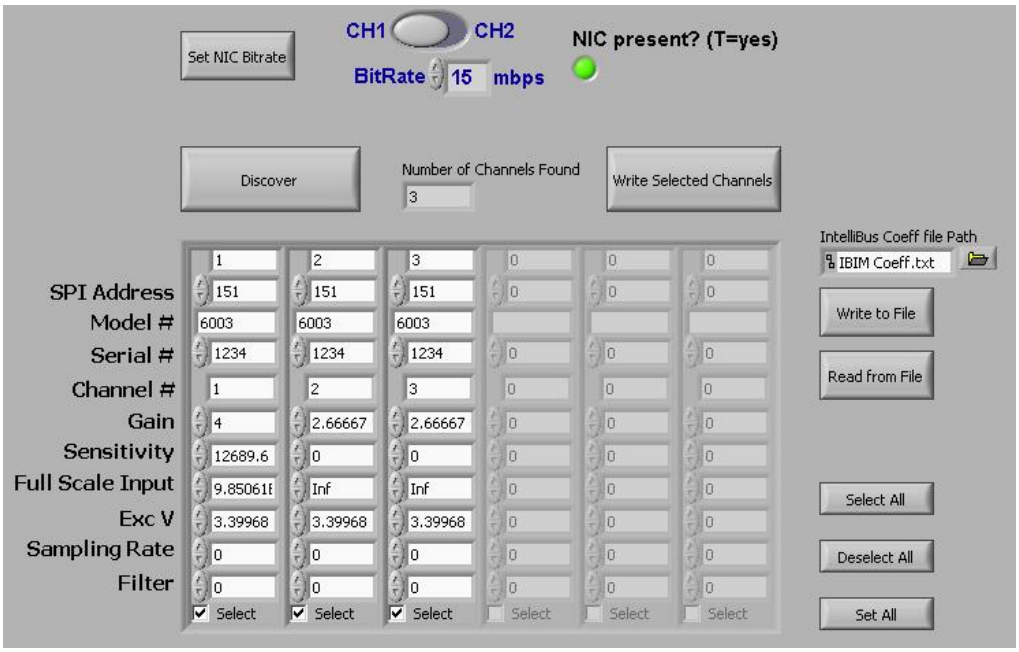
Application Software

VIP Sensors provides a powerful, easy-to-use application software that allows the user to automatically discover the bus configuration and the type of smart sensors and IBIMs present on the bus. It configures the units on the bus, reads the current setups, and acquires and displays sensor data.



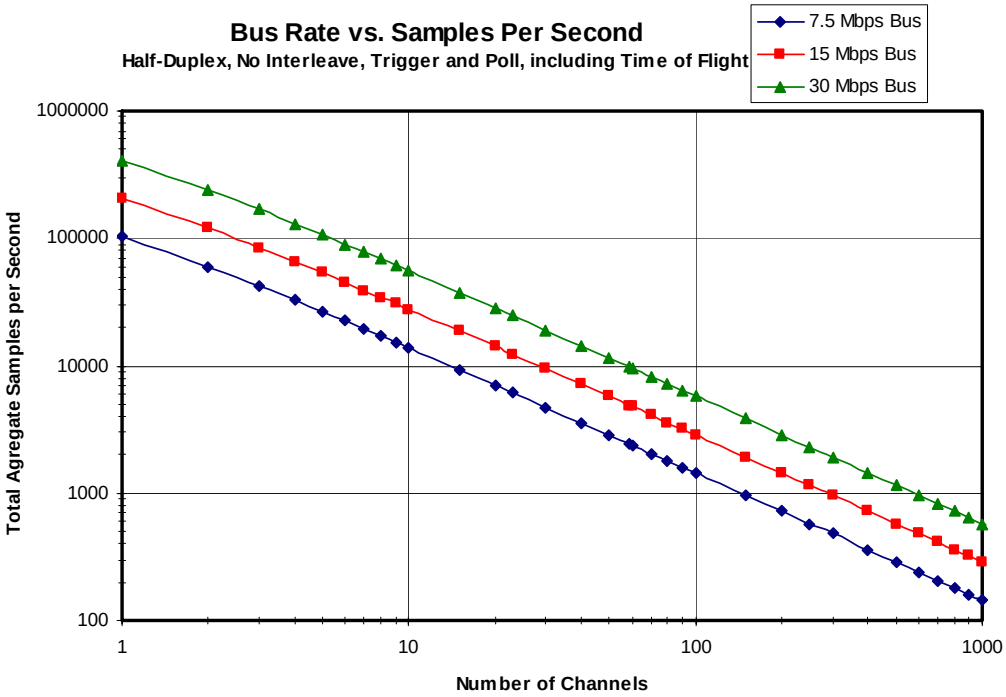


Figure 4: Bus Transfer Rate – Sample Rate Versus Number of IBIMs