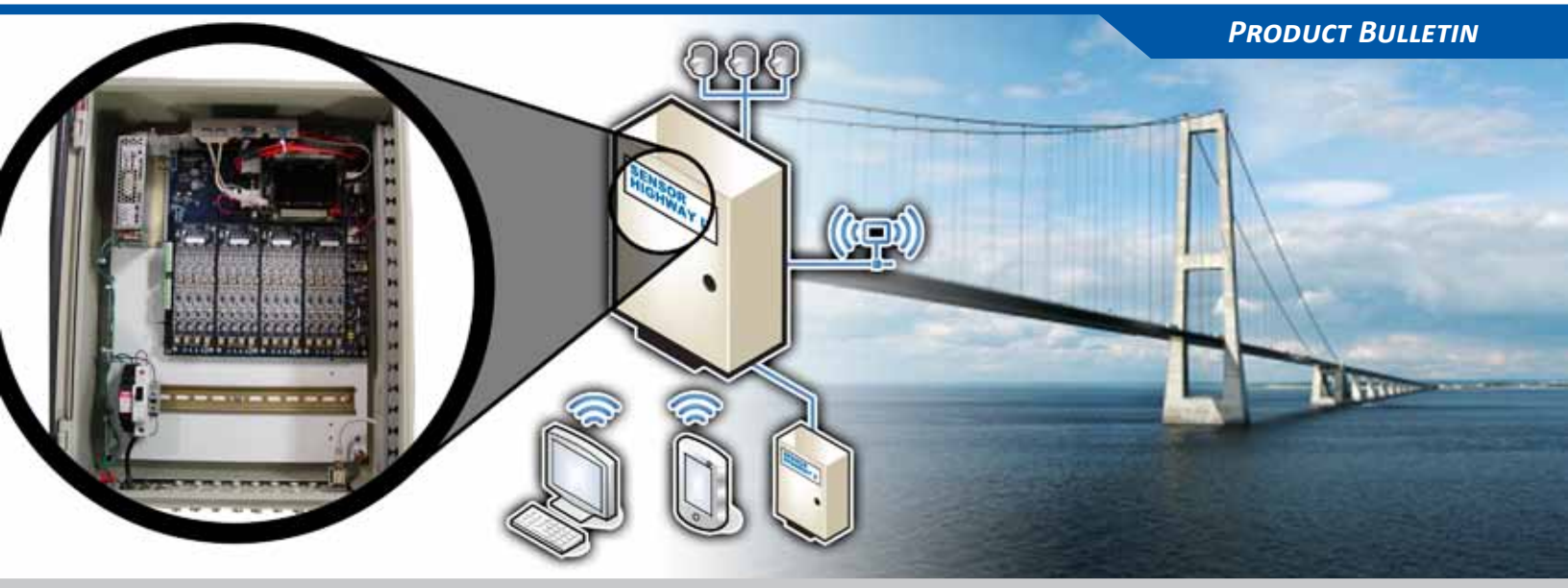
MISTRAS
A World of NDT Solutions
Products & Systems Division

PHYSICAL ACOUSTICS CORPORATION

PRODUCT BULLETIN



Sensor Highway™ II: Outdoor AE and Sensor Fusion System

MONITORING MADE EASY

The Sensor Highway™ II (SHII) is an Acoustic Emission (AE) monitoring system with up to 16 high-speed channels and 16 standard parametric input channels (expandable to over 100). The system is designed for unattended and remote monitoring use in structural health, process and condition monitoring applications. It is rated for outdoor use and comes equipped in a rugged weatherproof NEMA 4 enclosure.

YOUR APPLICATION SOLUTION

The key feature of the SHII System is its highly flexible sensor fusion interface for input and processing, using a variety of sensors. The system is able to accept AE sensors (using the standard "phantom-power" coaxial connection for powering external preamplifiers), and various other sensors with current/voltage outputs.

This interface is accomplished through the use of standard industrial, DIN Rail Mounted Signal Conditioning Modules, with options for ICP Accelerometers, Proximity Probes, Tachometers, Pressure Transducers, Load Cells, Thermocouples, Environmental Sensors, Strain Gauges, Wireless Sensors and more.

The SHII has several interfaces available for data communication and remote control. The principal interface is the built-in Ethernet 10/100/1000 BT port. Other available interfaces include: cellular modem and WiFi.

DESIGNED TO:

- Monitor effectiveness of repairs/retrofits.
- Monitor pre-existing/known active defects
- Monitor "hidden areas" where visual inspection is difficult or impossible
- Monitor high stressed areas showing flaw-like activity
- Wire break monitoring on suspension cable and cable stay bridges

OPTIONAL APPLICATION SOLUTIONS

DATA COLLECTION (SHII-DC) SYSTEM

The most basic and lowest cost system is the SHII-DC System, capable of remote acquisition and storage (short term) of sensor data, with some basic signal processing and alarm screening. The SHII-DC System is for situations where remote analysis is desirable and is usually associated with a monitoring contract. Data is usually downloaded via a remote interface and analyzed. Optionally, an Internet web access site option is available for customer status monitoring, activity, trend monitoring and customer data visualization.

Key Features

- Scalable for large channel deployment, allowing for multiple units to be placed strategically on asset being monitored
- Designed for outdoor environments with a minimum power dissipation and a temperature range of (-35° to 70° Celsius) without the need for heaters or air conditioners
- Direct On-Board Terminal Block connections and DIN rail mounts for external sensor inputs
- Various communication interfaces available for data communication & remote control including Ethernet, Wireless, Cellular Modem and Satellite
- Scalable system connecting additional units in the field and time synchronization options between remote units
- RS-232/485 , 4-20mA, Voltage inputs for sensors

NETWORKED (SHII-N) SYSTEM

The SHII-N System has a built-in, multi-port Ethernet hub with the capability of linking multiple SHII's to a base station computer. In order to carry out location analysis. A time synchronization input for synchronizing the AE time-of-test measurements between units is available. The base station computer is available as either an outdoor unit for remote monitoring (in an outdoor enclosure without keyboard, mouse or display) or an indoor PC based system with full user interface.

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Smart Remote (SHII-SRM)

The SHII-SRM System performs all the tasks of data collection, full signal processing (including location determination, clustering capabilities), analysis and alarming for standalone, surveillance monitoring, 24 hours a day, all within the SHII-SRM unit. This extra capability is achieved by incorporating a more powerful, industrial temperature range CPU inside the unit, running Windows XP and AEwin™ with all its features and capabilities. It is capable of making complex, on-line asset integrity decisions while interfacing to the user, the internet or to a control room.

SOFTWARE OPTIONS & FEATURES

Basic, built-in features common to all Sensor Highway™ Systems include:

- Data Acquisition: Full AE feature and waveform data acquisition to a data file, with ability to be downloaded through Ethernet connection
- Status and Trending Capabilities: Ability to generate timed STA files for individual and web based system status reporting and trending
- AE System Set-up and Control: Client program to remotely setup the system, generating a layout (set-up) file that can be uploaded to the Sensor Highway™ II
- Data File Upload and Download: Available through an FTP server with an MS Windows™ Explorer interface for transferring files
- Alarm Capability: Built-in alarms, based on Hit/Event activity or feature based (location or cluster based is available on the SHII-SRM)
- Communications: Ethernet networking built-in for walk-up, plug-in operation and remote Ethernet/Internet communications
- AE Software Analysis Compatibilities: Fully compatible with AEwin™ for SHII (AEwin™SH). Remote user must have AEwin™SH installed on analysis workstation to analyze AE data files downloaded from the SHII System

Network SHII Software Features

In addition to the built-in software features, there is an Ethernet hub inside each SHII-N unit, which allows a networked, multiple unit, SHII System to be connected together and controlled by a single SHII base station. Depending on options and time synchronization between SHII-N units and the AEwin™SH-N software, a large, single location group can be setup, allowing large structures to be monitored by one AEwin™ software program.

Smart Remote SHII Software Features

The SHII-SRM is a standalone, remote AE system capable of operating our high performance real time AEwin™ software. In addition to its basic capabilities, the SHII-SRM has the following advanced capabilities:

- On-line data collection and signal processing
- Communication of alarm and status information over the internet
- Ability to handle many different types of source location in real time
- Clustering of location data and ability to alarm on clusters/cluster rate
- Comprehensive alarm detection capability
- Remote Internet communications over the Ethernet and WiFi, cellular or telephone modem for remote monitoring and control
- Web based remote monitoring application (RMA) to summarize state of one or more Sensor Highway™ II units

MAIN BOARD SPECIFICATIONS

Power Requirements:	85-260 VAC or 9-28 VDC
Power Consumption:	12W + sensor requirements (16-channel configuration), for DC, 25W for SRM
Digital Signal Processing:	Yes, via 2 - 4 million gate custom programmed FPGA
Digital I/O:	8 Digital Inputs and 8 Digital Outputs, standard
Number of 4-Channel AE Modules	1-4

PARAMETRICS (16 STANDARD)

On-Board Single-Ended inputs:	10kSPS, 16 bit, 0-10V input, qty: 12
On Board Differential inputs:	10kSPS, 16 bit, +/-10V input, programmable gain, offset and excitation voltage, qty: 4
Optional Parametric:	2 SPI Interfaces for strain gauge and charge Amplifier Inputs RS-232/RS-485/USB for additional digital parametrics

4-CHANNEL AE MODULE SPECIFICATIONS

Number of Channels:	4
High Pass Filters:	1kHz, 5kHz, 20kHz, 100kHz Analog
Low Pass Filter (Analog):	1MHz, 6th order
Low Pass Filters (Digital):	Software Selectable
Bandwidth:	1kHz- 1MHz
ADC:	20MSPS, 18-bit
AE Sensor Power:	Phantom Power, Selectable 5V, 28V
Preamp Gain Range	12dB/26dB/40dB

CPU BOARD SPECIFICATIONS FOR "SH-II DC"

Processor:	200 MHz, ARM920T Core
Network:	Ethernet 10/100/1000 BT
Serial:	One RS-232, One RS-485
IDE:	Full size 40-pin connector
Memory:	Flash: 64 MBytes / SDRAM: 128 MBytes
Storage:	32 GByte Compact Flash

CPU BOARD SPECIFICATIONS FOR "SH-II SRM AND "SH-II N" MODELS

Processor:	Intel Atom, 1.6 GHz
Network:	Ethernet 10/100/1000 BT
USB:	2 High Speed 2.0
Serial:	RS-232 or RS-485
Memory:	1 GByte
Storage:	2 GByte Standard Internal SSD 120 GByte Standard SATA SSD
Display:	VGA

SYSTEM PHYSICAL SPECIFICATIONS

Standard Enclosure:	Steel, NEMA 4, IP-66 (Indoor/Outdoor)
Weight:	< 25 lbs. w/enclosure
Size:	20" x 16" x 6"
Operating Temperature:	-31º - 158º F (-35º - 70º C)
Storage Temperature:	-40º - 167º F (-40º - 75º C)

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