

xStrain

Bridge Sensor Digitizer

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Key Features:

- Rugged aluminum enclosure with IP67 protection
- Distributed digitizer for monitoring strain gauge sensors in SHM system
- High quality mV/V AD conversion with 24-bit Delta Sigma resolution
- 4 channels (mV/V), 350Ohm full bridge
- User configurable sampling rate
- Ethernet/Wi-Fi/DigiMESH® or GSM communication protocols
- Internal Micro SD card for local storing of the event files
- GPS or RTC time and data synchronization
- Easy installation, wireless or using simple CAT5e cable
- POE capability
- Ultra low power consumption
- Wide range of Operating Temperature: -40°C ~ 85°C



Overview

xStrain is a distributed digitizer for monitoring Wheatstone Bridge sensors in SHM system. It offers an affordable and flexible solution for field/remote acquisition of data from sensors with very low voltage output (mV). xStrain is designed for applications in harsh environments and small places. Size, weight, and cabling are critical design requirements in almost any installation. By taking advantage of the extreme performance and small size, xStrain is able to deliver unprecedented control and acquisition capabilities in a compact, rugged package with extreme industrial certifications and ratings for operation in harsh industrial environments. Temperature ranges of -40° to 55° C (-40° to 131° F) and a variety of international safety, electromagnetic compatibility (EMC), and environmental certifications and ratings are all available with xStrain.

xStrain can be used as standalone digitizer or as a part of daisy chain SHM system. Series of xDAS units can be connected in a network using standard CAT5e cable for easy installation. xStrain can accept various type of sensors required for SHM instrumentation like: strain gauge transducers, load cell sensors, pressure sensors, displacement sensors, etc

Technical Information

Software

Proprietary Digitex Software included with xStrain. Fully compatible with xPlorer hardware and server software, xWave can work as part of xDAS SHM system. Available Digitex PC software for data acquisition, streaming, data archiving, reporting, etc.

Hardware

General	
Type	24-bit $\Delta\Sigma$
Sampling Rate	200 sps (100, 500, 1000)
Filters	Software
Communication	Ethernet, Wi-Fi, GSM
Channels [mV/V]	1/2/4; $\pm 39.06\text{mV}$ to 5V
Gain	1, 8, 16, 32, 64, 128
Excitation	5V

Power	
Powering	From CAT5e data cable
Input Voltage	12-24 VDC or PoE
Power Cons.	1-2W (w/o sensor)
Sensor Power	Supplied from digitizer

User Interface	
Informational LED	
System Configuration Panel	
Web Application Panel	

Physical	
Packaging	Rugged aluminum
Protection	IP66/IP67
Weight	700g
Dimensions	130x120x65mm

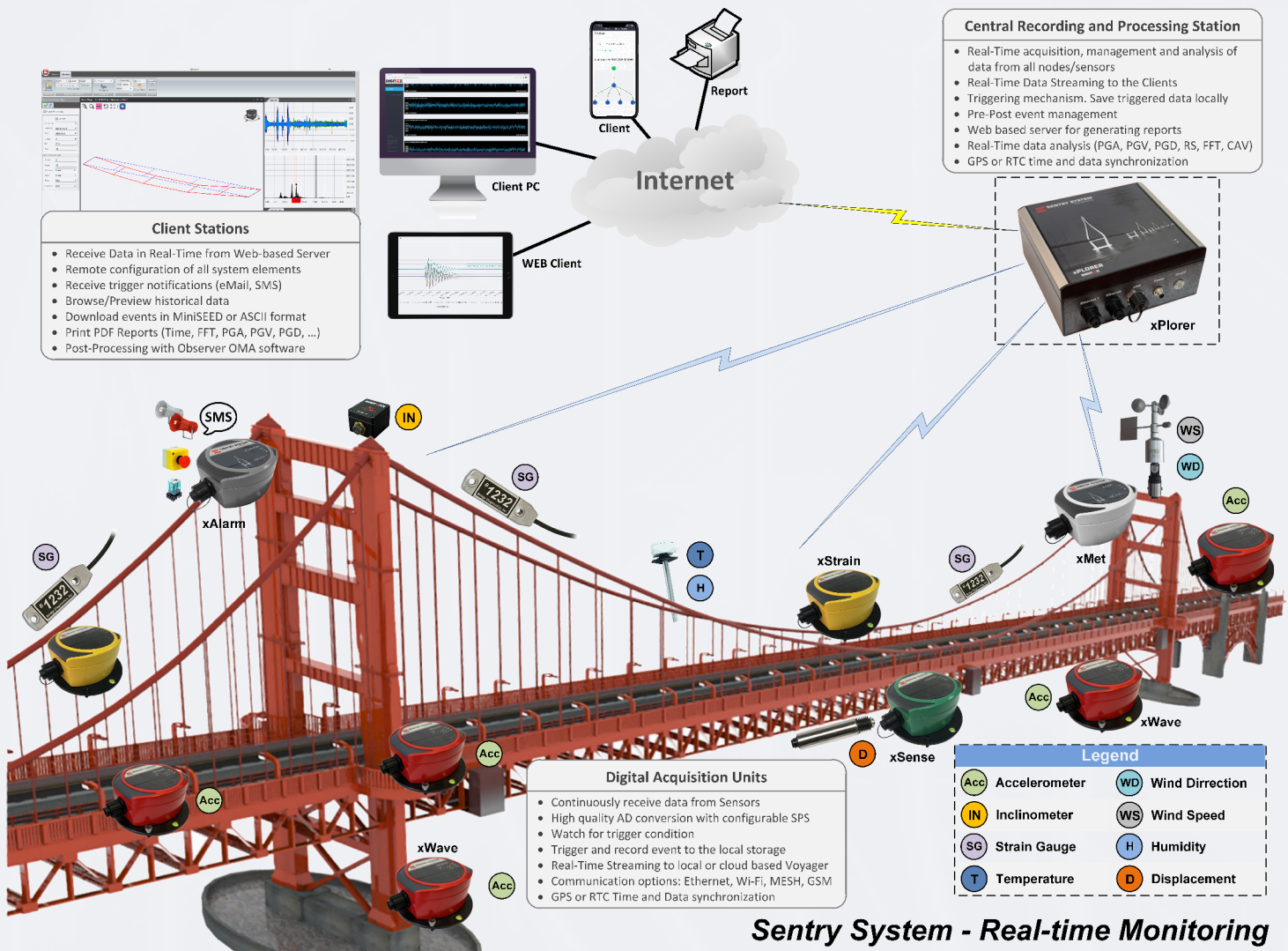
Environmental	
Operating Temp.	-40°C to 55°C
Humidity	90% non-condensing

Real Time Monitoring System Architecture

The Digitex monitoring system is based on a highly efficient, multithreaded software design that allows the system to acquire data from a large number of xDAS units, monitor and condition this data, and distribute it, in real time, over the Internet to multiple remote locations.

Sensors on the structure continuously send out data to the system. If an event such as an earthquake occurs, pre-assigned thresholds of drift are exceeded in one or multiple locations, thus triggering the recording and analyzing of data (including pre-event memory). Once an event is recorded, the system notifies a list of users (via e-mail) and uploads the event via FTP to another site.

Using the "quick analysis" capability of the Digitex system, various measures of the monitored system's response can be distributed to multiple locations and displayed in real time. The system can cross correlate data, plotting useful information about the interaction between the dynamic loads on the structure and its modal characteristics. It can be used for a rapid (rough) estimation of the dominant structure mode being observed in the selected time window, as well as an estimator of the corresponding structure damping parameters.



About Digitex

Digitex is a company specialized in design and development of real time structural health monitoring systems for a variety of industries and applications including: bridges, tall buildings, campuses, windmills, oil rigs and more. Digitex's innovative solution for ambient vibration measurements and quick health assessment of structures is jointly developed and validated with our partners and advisors from the Universities. When properly configured, the Digitex system is capable of measuring and responding to both natural and man-made events such as: earthquakes, wind, explosions and accidental heavy impacts.

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