

STS4 WIRELESS STRUCTURAL TESTING SYSTEM

DESCRIPTION

The new STS4 from BDI is the world's only data acquisition system that has been designed by civil engineers expressly for structural testing. This next-generation wireless system is rugged, highly efficient, and compatible with existing STS-WiFi systems.

BDI has developed our STS systems based on the experience we've gained through testing hundreds of structures all over the world in difficult field conditions. Because we've slogged through the mud, rappelled from ropes, and swayed in bucket trucks—all in bad weather—we know that ease-of-use is a must. Therefore, all of our sensors are very easy to install, the software is simple to operate, and the built-in sensor verification routines ensure you'll collect quality data. The field time saved using the STS4 compared to standard data acquisition systems will more than pay for itself after just a few uses.



STS4 PRIMARY NODE



APPLICATIONS

- Highway and Railroad Bridges: Steel, concrete, timber, FRP
- Lift Bridges: Wirelessly record torques, displacements, and other parameters
- Hydraulic Structures: Radial gates, nav-lock, lift, and miter gates.
- Laboratory Testing: Ideal to help students understand the capabilities of sensor measurements and data acquisition equipment.
- Cable Forces: Use our BDI Accelerometers to help measure in-situ cable forces.

STANDARD STS4 FEATURES

- A complete wireless “turn-key” load testing system
- Intelliducer sensors automatically identify themselves — no tracking channel numbers!
- Standard 802.11b/g/n wireless protocol with wired Ethernet backup
- Backwards compatible with STS-WiFi systems.
- Existing owners can reuse their sensors

NEW STS4 CAPABILITIES

Based on the larger ranges of sensors being used for structural testing, the new STS4 has all of the same features as our highly-successful STS-WiFi testing systems, but are smaller, lighter weight, and more versatile.

- New Extension Node: Communication and power for up to 16 data channels via the expansion port on the STS4 Primary Node.
- Auto Temperature compensation support for sensors with thermistors.
- Increased sensor voltage input range to ± 5.0 VDC
- Added internal SD Flash memory (up to 16 GB)
- Programmable excitation voltage (+1 to + 5 VDC)
- New +15 VDC unregulated excitation port
- Increased sample rate of up to 1,000Hz
- Programmable shunt capabilities to verify sensor functionality.
- Power over Ethernet support (POE)
Power one Primary Node and three Extension Nodes while trickle charging the battery!
- Internal Li-Ion battery with integrated charging circuitry
- More efficient power conservation modes
- Fully IP67 rated
- Compatible with existing WinSTS Software
- New, completely redesign STS-LIVE data acquisition software with graphing and evaluation capabilities. Mac OS X and multi-language support.
- Custom programming with LabView Support
- New STS Base Station, with wireless repeater capabilities (no cables between multiple Base Stations), increased range, and POE support.

STRUCTURAL TESTING SENSORS

Select from our ruggedized range of sensors below. Or, if you already have your own, chances are they can be configured to plug-and-play into the STS4, just send us your specifications. Many of the following sensors can be supplied with internal thermistors to allow for temperature compensation.

- BDI temperature-compensated strain transducers
- Tiltmeters
- LVDT's
- Accelerometers
- BDI AutoClicker Load Position Indicator
- Load cells
- String wire potentiometers
- Foil strain gage completion units
- Pressure transducers
- Wireless torque modules
- Piezometers
- Amperage transducers
- Universal terminal plug allows many other sensors

WE STAND BELOW OUR WORK!



STS 4 EXTENDER NODE

	STS4-4-IW3	STS4-4-ID5 (Extender Node)
Measurement Type	Single-ended or Differential: voltage, millivolts, digital	Single-ended or Differential: voltage, millivolts, digital
Processor	Stellaris® Arm® Cortex™-M3	Stellaris® Arm® Cortex™-M3
Memory Internal Memory: Internal MicroSD Flash:	8 MB (Operating System) 2Gb Standard (Expandable to 16Gb), Auto measurement data back-up system.	8 MB (Operating System) 2Gb Standard (Expandable to 16Gb), Auto measurement data back-up system.
Maximum Sample Rate	1000 Hz	1000 Hz
Programmable Gain Settings	13 gain settings, ranging from 1mV diff, to 10V single ended	13 gain settings, ranging from 1mV diff, to 10V single ended
Analog to Digital Resolution	24-bit ADC	24-bit ADC
A/D Convertor Type	Sigma delta	Sigma delta
Voltage Reference System	Ratiometric ¹	Ratiometric ¹
A/D Temperature Tolerance	Gain drift 1 ppm/°C	Gain drift 1 ppm/°C
Input Channels	4	4
Temperature sensor Inputs (Thermistor)	One per input channel	One per input channel
STS4-4-ID5 Support	Up to 3 Extension Nodes	n/a
Excitation Voltages		
V_x (programmable)	+0 to +5 VDC @ 20mA (per channel)	+0 to +5 VDC @ 20mA (per channel)
V₊₁₅	+15 VDC @ 200mA (combined)	+15 VDC @ 200mA (combined)
Analog Voltage Accuracy		
V_x (programmable)	16 bit resolution, typ. 5ppm/°C	16 bit resolution, typ. 5ppm/°C
V₊₁₅	±5%	±5%
Signal Input Voltage Range	±5.0 VDC	±5.0 VDC
Power Supply		
Li-Ion Battery	+10.8 VDC (Nominal), 6.2Ah, 67Wh	n/a
DC Supply	+24 VDC @ 3.0 Amp (max for charging)	n/a
Power over Ethernet	+48 VDC per - IEEE 802.3af	n/a
Node-to-Node	+9VDC to +24VDC, power source dependent (supply only)	+9VDC to +24VDC, power source dependent (input and supply)
Typical Power Consumption		
Base Consumption	0.7W	0.7W
Typical Acquisition²	1.5W	1.5W
Sleep Mode	<10mW	<10mW
Communication		
Wireless	802.11b/g/n (2.412 - 2.484 GHz)	n/a
Ethernet	10T-Base (TCP/IP)	n/a
Node-to-Node	Proprietary high speed Low Voltage Differential Signal communication protocol	Proprietary high speed Low Voltage Differential Signal communication protocol
Sensor Interface		
Connector	10-Pin Mil-Spec circular bayonet snap-lock. IP67 Rated.	10-Pin Mil-Spec circular bayonet snap-lock. IP67 Rated.
Intelliducer Support³	Yes	Yes
Physical		
Enclosure	Combination aluminum extrusion and high strength molded parts.	Combination aluminum extrusion and high strength molded parts.
Protection	IP67	IP67
Size	8.0in x 4.5in x 3.25in (203mm x 115mm x 83mm)	8.5in x 4.5in x 2.0in (215mm x 115mm x 51mm)
Weight	2.63 Lbs. (1200 g.)	1.37 Lbs. (625g.)
Operating Temperature Battery Operation: DC Supply Only:	-10°C to +55°C -30°C to +65°C	n/a -30°C to +65°C
Storage Temperature	-40°C to +85°C	-40°C to +85°C
Compliance		
CE	Coming Soon!	Coming Soon!
FCC	Coming Soon!	Coming Soon!
Wireless Module:	FCC, IC, and CE Certified	n/a
Computer Requirements for BDI Software		
WinSTS	Windows® XP, Vista, 7 (32 or 64-bit OS)	
STS-LIVE	Windows® XP, 7 (32 or 64-bit OS), MAC OS X 10.7 or Higher	
Interference To Third Party Software	Platform independent TCP/IP client/server, LabView ⁴ support	
Multi-Language Support	STS-LIVE	
Warranty	3 Years	3 Years

¹ Ratiometric: The system reference voltages are all derived from the same high precision ultra stable source. Any residual drift would change excitation and ADC reference effectively canceling drift out.

² Typical power drain is calculated with four 350 Ω full bridge strain transducer connected to the system and collecting data at the highest sample rate possible. This does not include battery charging power consumption.

³ Intelliducer support refers to BDI's intelligent sensor connector interface. The intelligent sensor interface contains the sensor ID, calibration factor, gain setting, etc. within a memory chip inside the sensor connector.

⁴ BDI can provide a *.dll file for custom programming capabilities with LabView.

New STS4 nodes and Intelliducer sensors have all been designed to be backwards-compatible with existing BDI STS-WiFi systems, you'll just need to upload and install the latest WinSTS from our website. The new STS4 nodes and sensors will appear alongside other nodes in the WinSTS screen. For systems consisting of all STS4 nodes, all previous Intelliducer sensors will work, and a completely new software package called STS-LIVE will be used to operate the system and activate the new capabilities.

WIRELESS LOAD TESTING: THE ONLY WAY TO GO!

