xTAG & xGATEWAY
IoT Solutions

Cost-effective solutions for all your IoT needs. Monitor industrial equipment with Deviceworx xTAG Sensors, transfer data to local or cloud storage and connect to legacy industrial equipment through Deviceworx xGATEWAY.

- Sense physical parameters (e.g. vibration, temperature, humidity, current, light, etc.) within harsh industrial environments. Use machinery state data such as hours operating within Materials Requirements Planning or Energy Resource Planning (MRP or ERP) solutions to allocate resources and improve operational efficiency. Use machinery health data such as vibration characteristic changes to forecast failures before they happen to limit downtime and increase efficiency.

- Sense parameters affecting crop growth rate and quality within harsh agricultural environments (e.g. temperature, humidity, soil pH and moisture, etc.). Remotely track crop conditions to make decisions affecting production in real-time to maximize the effectiveness of fertilizer and irrigation.

- Trace produce health (color) and environmental conditions (temperature, humidity, shock) during transport. Recover lost product revenue due to poor transportation and environmental issues. Fix transportation problems to reduce loss or recover financial damages by proving to shippers that damage occurred during shipping.

- Connect legacy systems to local networks or the cloud to support remote monitoring and control. Connectable legacy devices include PLCs, SCADA RTUs, panel controllers and many others. "Retrofit" IoT functionality to older systems and give them the advantages of newer connected systems and avoid the very costly alternative of their replacement. Retrofit IoT to legacy hardware to gain operational insight for efficiency gains or obtain remote system control to free up operators who would otherwise continually monitor these systems.

- Synchronize sensed data to all popular IoT cloud services like Amazon AWS IoT, Microsoft Azure IoT, & Google Cloud IoT to couple the data with existing data sources.

- Select device connections that match your priorities: industrial-grade 100m+ wireless for simplicity or fast plug-and-play wired connections for bullet-proof comms.

xTAG Sensing Options

The xTAG Sensor design supports high-speed vibration data acquisition (25 to 1600 samples per sec in X, Y and Z dimensions). Additionally, the xTAG supports gyroscopic sensing at the same sample rate (current orientation in 3 dimensions). The xTAG can be used to determine machine on/off status or to forecast machine failures - dramatically reducing costs associated with unplanned downtime. The xTAG BLE has been designed to draw very little power from its battery during normal operation. When sensing "part time", it is capable of collecting vibration data for many years (replaceable battery lifespan depends on daily acquisition frequency, duration and sampling rate). The xTAG can be set up to collect samples based on machine activity. For example, collect samples for a set duration every time a machine starts. In this context, an xTAG BLE battery life of 5 or more years can be achieved.

The xTAG design has been created to support additional sensing options through a simple substitution of its front membrane. A variety of chips can be added to this membrane that also includes a pushbutton and LED. Membrane substitution supports:

- Color sensing. Sense installed color alarm states or track produce health.

- Hall effect sensing. Count machine shaft rotations or measure machine current draw through magnetic field measurements.

- Environmental sensing, including temperature, pressure and humidity. This is useful for both machine monitoring and produce traceability applications.

- Sound sensing. Ideal for monitoring both machine on/off status and health.*
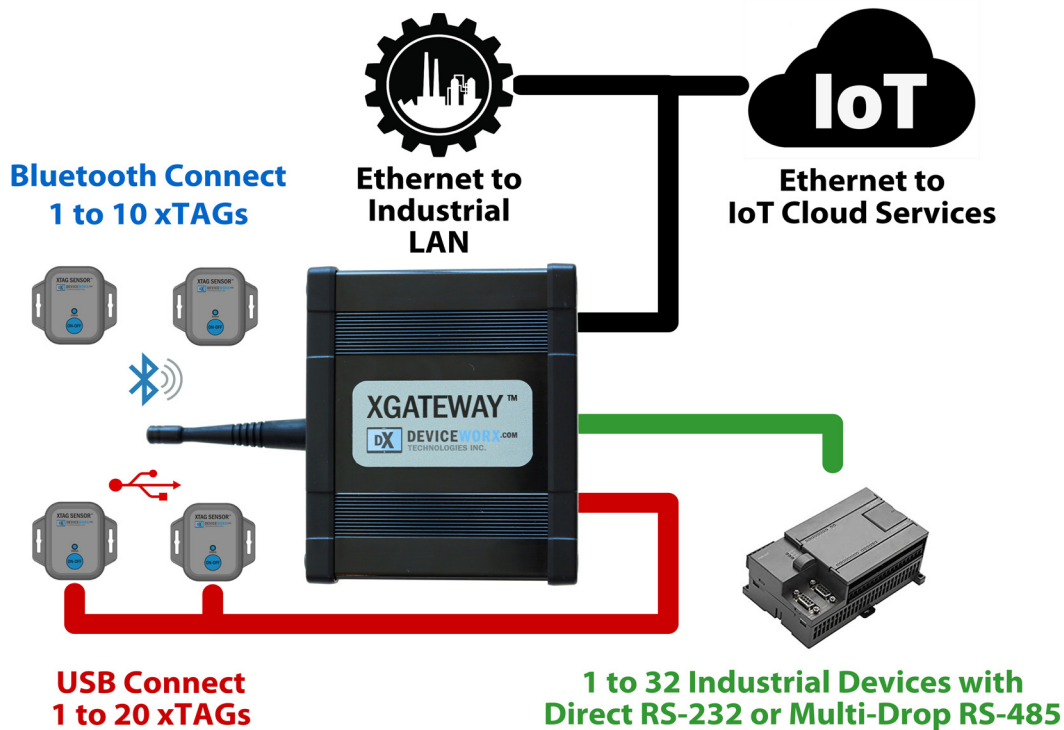
xTAG to xGATEWAY Connection Options

xTAGs are available in two variants. The xTAG BLE supports 2 Mbit/sec Bluetooth Low Energy (BLE) 5.0 connectivity to xGATEWAYs. This facilitates the simplest possible xTAG installs where xTAGs can be up to 100 meters from xGATEWAYs and won't require local power. Use xTAG BLE devices when possible to simplify installs and reduce their costs. In some installations, wireless just won't work effectively due to electromagnetic noise, or physical barriers between xTAGs and xGATEWAYs. When wireless is a challenge, select the xTAG USB variant for reliable 12 Mbit/sec communications between USB-powered xTAGs and xGATEWAYs.

Regardless of the variant selected, all xTAGs are accessible to xGATEWAYs without xTAG configuration. This is sometimes referred to as "zero configuration networking" or "plug and play". Complex addressing of devices is never required. xGATEWAYs can automatically discover all xTAG BLE devices nearby and a physical connection to an xTAG USB is all that is required before an xGATEWAY can access its data.

Some xTAG changes beyond membrane substitution may be required

xGATEWAY

Bluetooth Connect
1 to 10 xTAGs

Ethernet to Industrial LAN

Ethernet to IoT Cloud Services

USB Connect
1 to 20 xTAGs

1 to 32 Industrial Devices with Direct RS-232 or Multi-Drop RS-485

The xGATEWAY supports IoT Gateway and IoT Edge Processing functionality. It collects xTAG and third-party sensor data, processes the data when required, and then forwards the data on to either a local server or the cloud.

The xGATEWAY comes pre-packaged with Connectivity-Labs LLC (C-Labs) Factory-Relay framework comprising their open-source C-DEngine ("seed engine") and multiple plug-ins. This framework provides xGATEWAY with Microsoft Azure IoT Cloud connectivity out-of-the-box. Additionally, Factory-Relay supports secure, firewalled networking within factory or industrial local networks when local data security is prioritized over the cloud. The Factory-Relay on xGATEWAY includes a plug-in for xTAG communications (USB or BLE) and can be further extended to support any other industrial protocol for comprehensive equipment connections. Factory-Relay also supports plug-ins providing IoT edge processing in any .NET language, Javascript or Python.

xGATEWAY users can develop their own applications to access data or they can engage Deviceworx to transfer xGATEWAY data into any existing local database or to a cloud-based database. Cloud databases may be proprietary or any IoT cloud infrastructure including Microsoft Azure IoT, Amazon AWS IoT, Google Cloud IoT, etc.

To enable comprehensive IoT solutions, reduce IoT system engineering and hardware costs and speed up IoT system rollouts, the xGATEWAY communicates with 3rd Party sensors in addition to xTAGs. It leverages Ethernet, USB, RS-232, RS-485 and BLE interface standards to accomplish this. Most sensor devices can communicate using one of the available xGATEWAY interfaces.

Cloud data access for legacy control hardware is an additional xGATEWAY feature. Provide legacy equipment such as Programmable Logic Controllers (PLCs), Panel Controllers, drive systems or any other controlling device with an interface to the cloud and "Retrofit" IoT functionality to this equipment. Leverage cloud reporting for planning or support remote control to facilitate easier equipment operations.

xTAG Specifications

- 85 g or 3 oz
- 50mm (2") wide, 68mm (2.5") long, 42mm (1.5") tall
- xTAG BLE: BLE 5.0 at 2 Mbps with 100m range, 3 to 8 year battery life depending on acquisition frequency
- xTAG USB: USB-powered device at 12 Mbps with 5m+ cable length (up to 100m with USB extension)
- Screw-in or magnetic-mount options
- IP67 dust/water ingress rating
- -40°C to 70°C operating temperature

xGATEWAY Specifications

- 340 g or 12 oz
- 110mm (4.33") wide, 90mm (3.5") long, 50mm (2") tall
- Quad Core ARM (Cortex-A53) Processor at 1.8 GHz
- 2 GB RAM and 16 GB Flash Memory
- Wi-Fi and Cell Data Support for Cloud Connections
- BLE 5.0 at 2 Mbps with 100m range
- USB Host at 12 Mbps with 5m cable length (increase to 100m with USB extension)
- 5 Vdc Power (3A) or 12 Vdc power (1.5A)
- RJ45 10/100/1000 Ethernet Connection
- RJ11 RS-232 or RS-485/422 (Up to 250 kbps)
- Panel mount enclosure
- -35°C to 85°C operating temperature

Next Steps

Contact Deviceworx to learn more about how our xTAG and xGATEWAY off-the-shelf IoT solutions can be used to connect your equipment to the cloud to realize all of the benefits that IoT data processing provides. Email Deviceworx (sales@deviceworx.com) or call our toll free number (1-888-409-2688) to set up a meeting and get the process started.

About C-Labs.

Connectivity-Labs LLC ("C-Labs"), founded in 2009 in Redmond WA, pro vides connectivity as well as secure remote and mobile access for industrial sensors, devices and machinery. In 2017 C-Labs was acquired by TRUMPF, a large German machine manufacturer, and in 2020 C-Labs was spun out again in order to maintain the core technology of C-Labs the "C-DEngine" as Open Source on Github. C-Labs helps customers develop scalable, secure, and simple-to-use solutions for the Internet of Things (IoT).

About Deviceworx Technologies Inc.
www.deviceworx.com

Deviceworx is a privately held firm based in British Columbia, Canada, founded in 2005. Deviceworx has a team of elite technical professionals with decades of experience in systems engineering, software development and building industrial and consumer electronic devices. Each team member brings a unique skill set to the group, allowing us to offer a wide range of design capabilities. Deviceworx has been developing proximity marketing and industrial wired and wireless, low-power, bulletproof hardware and cloud-based software solutions for more than 15 years and understands the challenges associated with industrial environments and how to overcome them.