XIDAS IOT

EC1080 E-CHIP™

Environmental Smart Sensor

Miniature • Intelligent • Low-Power • Multi-Sensor

Temperature - Humidity - Dew - Pressure - Air Quality - Movement/Accerlation - Light - Sound

Eight (8) high-precision sensors in a miniature system in package (SIP)

A single smart fusion sensor – reduces the design and integration costs of multiple sensors

On-board signal conditioning, analog-to digital conversions, filtering, calibrations, alarms, events, calculated units and other autonomous functions.

Industrial Specifications and Ease of Integration – for use with multiple wireless platforms

The EC1080 e-chip boasts eight (8) precision sensors in an exceedingly small 14mm x 19mm package. This intelligent surface mount module provides IoT solution developers with a simple plug&play product to integrate into their solutions with no additional sensor engineering or programming. A wide operating temperature range from -40°C to +85°C, and a voltage input range from 1.8V to 3.6V provides the flexibility for use in multiple applications from indoor consumer to industrial and outdoor. Xidas' e-chip family can be controlled via I2C, SPI or RS485 (optional), decoupling it from the multitude of wireless platforms for IoT, and allowing for easy adaption into any user's wireless infrastructure.

Low power consumption and on-board data logging – for extended battery life

Ultra low-power processing and sensors, combined with intelligent 'light' software that seamlessly switches components into sleep, zero-power listening, and performance modes optimizes power consumption; making the EC1080 the lowest power integrated smart sensor on the market

The measurement rates for each of the on-board sensors can be configured independently or even turned off, to minimize power consumption and adapt to multiple use cases. Levels can be set to generate interrupts or start taking readings when certain thresholds are met. Examples being if a package is dropped or mishandled, noise levels are exceeded by tenants in an AirBnB rental, a light is turned off or on, or even detecting the falls of the elderly.

An online power and memory calculator also allows for simple calculation of battery requirements and on-board data logging samples, based on user definable sample rates per individual measurement transducer. There is no need for engineers to run lengthy power calculations based on use cases – the work is done for you. If more data logging (extended storage) is required, a SPI interface is provided for external memory. Recommended components are provided in the design guide.

EDGETALK™

No sensor engineering or programming required

All E-Chips leverage Xidas' open command-based protocol called EdgeTalk™, requiring no on-board sensor programming from the user. E-Chips are a family of exceedingly small fusion sensors that are designed for very-low power applications, where the intelligence can be performed on the E-Chip, and not in a custom wireless access point (WAP) or in the cloud. All Xidas E-chips provide signal conditioning, analog-to digital conversions, filtering, on-board calibrations, alarms, events, calculated units and other autonomous functions.

Specifications

Environmental Condition	Range	Resolution	Accuracy	Response Time	Units
Temperature	-40°C to +85 °C	0.01 °C	± 0.5 °C		Fahrenheit or Celsius
Humidity	0 to 100 % RH	0.008 % r.H	± 3 % r.H	8 s (typ)	Relative Humidity
Dew point	-40°C to +85 °C	0.02 °C	± 0.5 °C		Fahrenheit or Celsius
Air Quality *	0 to 500	0.08% (typ)		<1 s	IAQ*
Light	0.01 to 83K	0.01	0.2%		Lux
Sound *	45 – 122 dB SPL	-	-		dB SPL*
Pressure	300 – 1100 hPa	0.18 Pa	± 0.6 % hPa		Hectopascal Pressure Unit
Motion (3-axis accelerometer)	± 2 g to ±16 g	14/12 Bit	0.01 %/°C		g

* IAQ Index and Sound Decibel Index Levels
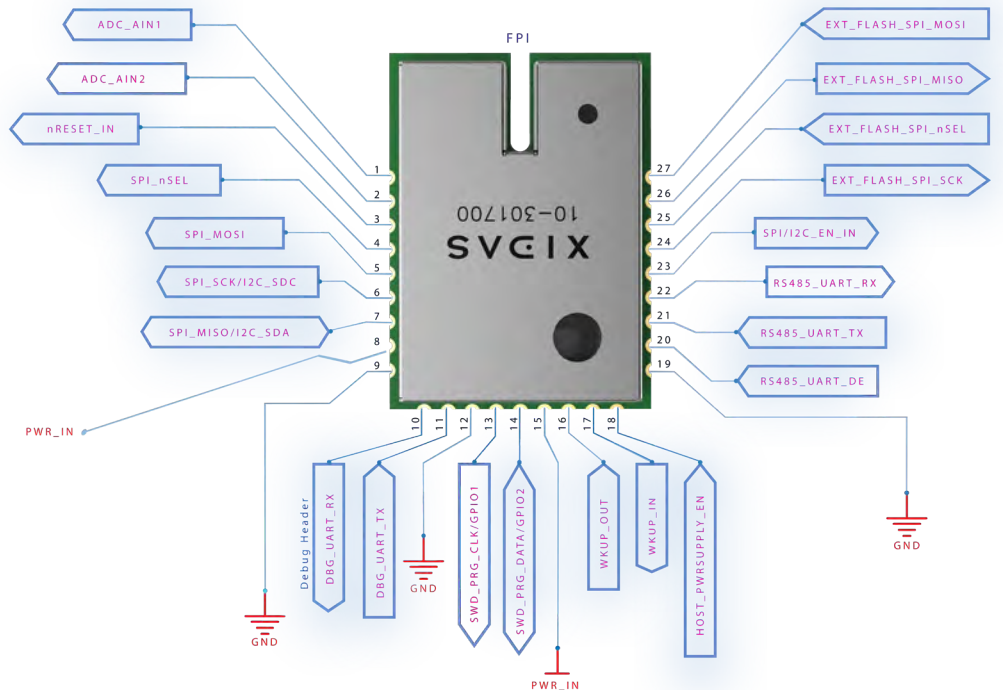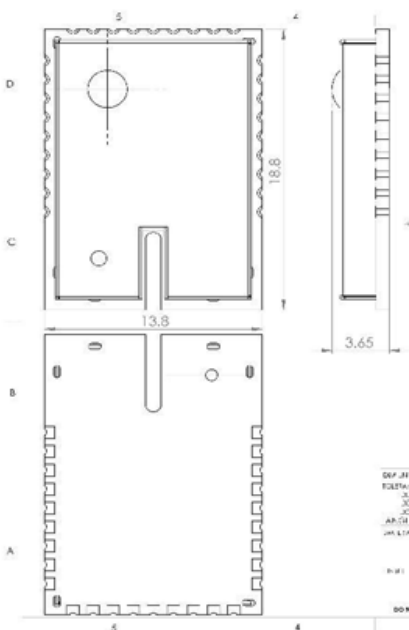
Low-Power and Memory Calculator

The EC1080 is completely user-configurable, allowing you to decide which sensors you want to use (turn on/off) and how often you want to take a measurement. Below are two examples of operation modes and the corresponding power consumption. (The EC1080 does not include wireless telemetry inside, allowing it to be open to any communications standard. Battery Life/ Power consumption does not take into account your telemetry.)

Example 1:

All sensors on at different measurement rates

E-Chip Operating Voltage	1.8
Battery Voltage (Min) (Volt)	3.3
Battery Storage (mAH) *	2000

Sensor	Events/Hour
Temperature	12.00
Dew	12.00
Pressure	12.00
Humidity	12.00
Air Quality	1.00
Ambient Light **	1.00
Motion **	1.00
Noise Sensor **	1.00
Power (uW)	120.09
Ave Bat Current (uA)	36.39
Battery Life	6.27 years
On-Board Data loggigng days**	4.29 days

* Table assumes the use of a 2000 mAH battery

**Light, Motion, Light Sensors operate on a listening, sleep-mode. If a threshold is triggered, the sensors will be awakened and an alarm will be generated. Assumption triggered once per hour

***Datalogging days are the amount of days the E-Chip can collect and store this data without needing to be connected to the Internet and transmitting

Example 2:

No gas sensor

E-Chip Operating Voltage	1.8
Battery Voltage (Min) (Volt)	3.3
Battery Storage (mAH) *	2000

Sensor	Events/Hour
Temperature	6.00
Dew	6.00
Pressure	6.00
Humidity	6.00
Air Quality	off
Ambient Light **	1.00
Motion **	1.00
Noise Sensor **	1.00
Power (uW)	76.28
Ave Bat Current (uA)	23.12
Battery Life	9.88 years
On-Board Data loggigng days**	7.85 days

* Table assumes the use of a 2000 mAH battery

**Light, Motion, Light Sensors operate on a listening, sleep-mode. If a threshold is triggered, the sensors will be awakened and an alarm will be generated. Assumption triggered once per hour

One Miniature Sensor Designed For
100's of Applications...

Sensors	Asset Management	Environmental Health & Compliance	Agricultural	Exhibits & Archives	Clean Rooms	Data Centers	Food & Tobacco	Medical	Pharmaceuticals	Materials
Humidity	X	X	X	X	X	X	X	X	X	X
Temperature	X	X	X	X	X	X	X	X	X	X
Light	X	X	X	X		X	X	X		
Air quaky	X	X		X	X	X	X			X
Dew point	X			X						X
Pressure	X	X			X	X		X	X	
Motion	X									
Noise	X	X								
	Packages	ISO 14001	Green Houses	Museums	Semiconductors	H VAC	wine cellars	Blood Banks	Pharmacy	Paint
	Medicine	Industrial factories	Food Storage	Exhibition rooms	Electronics	Cooking	Bakery	Tissue Balks	Chambers	Rubber
	Fragile	Offices	Seed Monitoring	Display cabinets		Light	Cheese	Forensic Medicine	Animal Testing	Plastics
	Product	Homes	Feed Drying	Storerooms			Meat	In-vitro Fertilization		Leather & Textiles
	Food	Trains	Cod Chain	Arches			Pasta	Hospitals		Paper
	Animals	Planes					Tobacco Humidors			Chemical Drying
	Shipping Containers	Wearables								Brick Drying
		Cities								Ceramics Drying
		Airports								
		School								
		Churches								

ASSET TRACKING & COLD-CHAIN MANAGEMENT

When goods are shipped, particularly high value products, companies will track the package. This also includes tracking of complete shipping containers. Apart from location, it is also useful to know when products are damaged either by mishandling during shipment or from a controlled environment (i.e transportation of food or medicines) being compromised. The EC1080 e-chip can provide:

- Shock detection to alert for sudden impacts that an asset is subjected to such as handlers tossing products or handling roughly

- Drop detection to alert immediately if a product is dropped or a fall is detected

- Orientation detection – Many products need to be shipped upright or on a particular side up,

- Detection of a package or a door in a container being opened by accurately metering the intensity of light as seen by the human eye regardless of light source.

- Damaging temperature fluctuations detection if products need to be transported in a controlled environment

EMPLOYEE, FAMILY, LIVESTOCK HEALTH

COVID-19 and Indoor Air Quality
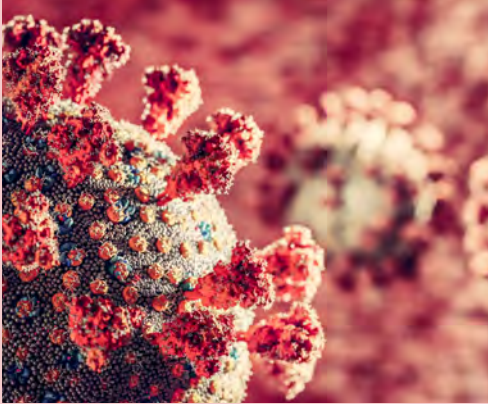
With every exhaled breath, VOCs, CO_2, and small droplets get in our ambient air. If someone is infected, respiratory droplets and airborne transmission can carry the virus to others. The lower the ambient humidity and temperature is, the longer the aerosol can stay in the air. The Corona virus cannot specifically be detected in the air but the amount of used air is easily measurable. By a concentration-controlled ventilation, both the infection risk and the impact can be significantly reduced. With the EC1080, a stoplight approach can be used when too many people have saturated the air in an indoor environment.

We don't always see it, but our environment is shaping our health every moment of every day. Where we live and work, what we eat, and how we interact with the world around us can tip the scales (sometimes literally) between healthy or not. Some effects of the environment on health can include **asthma, malaria, cholera, disease, cancer** and **physical injury**. The EC1080 e-chip can help detect, alert and measure the environmental conditions we cant see. Examples include:

- Millions of people live in areas where **air pollution** can cause serious health problems. Local air quality can affect our daily lives. Like the weather, it can change from day to day. EPA developed the Air Quality Index. The higher the AQI value, the greater the level of air pollution and the greater the health concern. The EC1080 e-chip measures volatile organic compounds (VOCs) which are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors.

- Organic chemicals are widely used as ingredients in household products. Paints, varnishes and wax all contain organic solvents, as do many cleaning, disinfecting, cosmetic, degreasing and hobby products. Fuels are made up of organic chemicals. All of these products can release organic compounds while you are using them and to some degree, when they are stored. The EC1080 detects when **indoor air quality** becomes detrimental.

IAQ Index	Air Quality	Impact (long-term exposure)	Suggested action
0 – 50	Excellent	Pure air; best for well-being	No measures needed
51 – 100	Good	No irritation or impact on well-being	No measures needed
101 – 150	Lightly polluted	Reduction of well-being possible	Ventilation suggested
151 – 200	Moderately polluted	More significant irritation possible	Increase ventilation with clean air
201 – 250	Heavily polluted	Exposition might lead to effects like headache depending on type of VOCs	optimize ventilation
251 – 350	Severely polluted	More severe health issue possible if harmful VOC present	Contamination should be identified if level is reached even w/o presence of people; maximize ventilation & reduce attendance
> 351	Extremely polluted	Headaches, additional neurotoxic effects possible	Contamination needs to be identified; avoid presence in room and maximize ventilation

- **Noise pollution** is a major environmental pollution whose impact on health is now widely recognized. The World Health Organization (WHO) has stated after air quality it is the second largest negative environmental contributor to health. As a result, many countries have implemented policies and strategies, for many years, to reduce noise pollution and to preserve quiet areas. In general, sounds above 85 dB are harmful, depending on how long and how often you are exposed to them and whether you wear hearing protection, such as earplugs or earmuffs. The EC1080 E-chip is ideally suited to provide cost effective production of strategic noise maps over time and even alarm you if you are sustaining loud noise for too long.

Decibel levels of common sounds
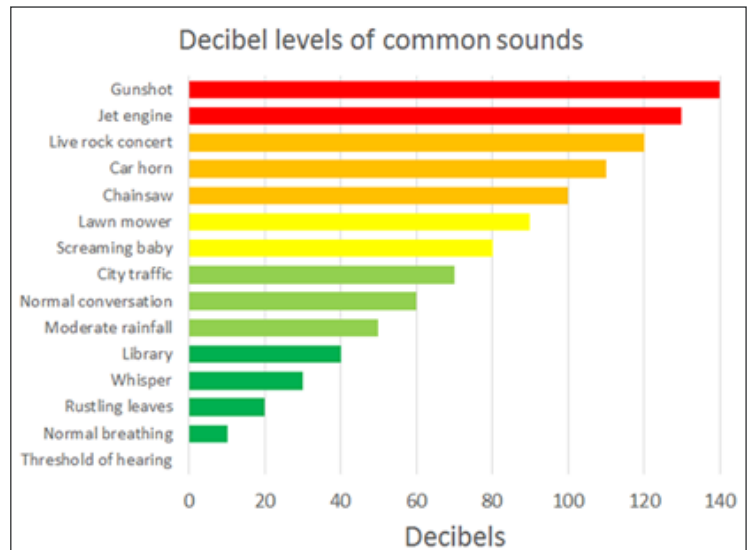
- **Light pollution** poses a serious threat in particular to nocturnal wildlife and agriculture having negative impacts on plant and animal physiology. It can confuse the migratory patterns of animals, alter competitive interactions of animals, change predator-prey relations, and cause physiological harm. The rhythm of life is orchestrated by the natural diurnal patterns of light and dark; so disruption to these patterns impacts the ecological dynamics.

AGRICULTURE & GREENHOUSES

Greenhouses are closed environments where conditions are optimized for plant growth. In order to provide the ideal condition in both indoor and outdoor environments, one requires the appropriate measurement of the environment. The ultimate goal is maximize plant growth and productivity, while minimizing energy consumption. The EC1080 provides a complete picture of the environmental conditions within your greenhouse, allowing you to optimize controls. Plants are directly affected by the air temperature, humidity, pressure and light of their surroundings. The EC1080 can capture all of this and even provide audio data to allow users to see how noise pollution affects the growth of their crops!

ISO 14001:2015

ENVIRONMENTAL MANAGEMENT

In a world of rising cost of resources and growing public awareness of the environment an effective Environment Management System (EMS) can give companies a significant competitive advantage. ISO 14001 is the standard for business and focuses on environmental impact, supported by effective management processes. The EC1080 logs and time-tags all the critical environmental measurements to support ISO-14001 audit logs and becomes a great companion for EMS systems.