

Get started quickly in gas sensor instrument design using pellistor and electrochemical gas sensors from SGX.

Simply attach the universal power supply, connect to a PC USB port and plug in an SGX pellistor or electrochemical gas sensor.

The SGX data logging and control software allows the performance of electrochemical and pellistor gas sensors to be assessed and makes it easy to capture performance data.

Users can experiment with different settings before designing their own instrument. Circuit diagram and parts list supplied.



Gas sensors to be ordered separately

INTRODUCTION

The SGX ECVQ-EK3 Gas Sensor Evaluation Kit will drive the SGX range of electrochemical and pellistor (including thermal conductivity) gas sensors, automatically measure the sensor outputs and calculate gas concentration levels.

Sensors can be monitored automatically via the USB interface with an easy-to-use control and data logging PC application provided on CD. Alternatively a terminal program such as HyperTerminal can be used to send simple commands to the on-board microcontroller. The user manual provides a comprehensive set of commands.

The PCB provides sockets for use with SGX electrochemical and pellistor gas sensors. Electrochemical devices and VQ500 series pellistor heads can be plugged directly onto the PCB. Terminal blocks are also provided for individual pellistor devices or for connecting to VQ600 series pellistor head cables. A temperature sensing IC is provided on the PCB close to the sensor socket positions.

For electrochemical sensors the bias voltage can be adjusted or set to zero and the output is given in nA or mA. For pellistor devices the bridge voltage can be adjusted and the bridge output is given in mV. In both cases, where the sensor has a linear response to concentration, a basic calibration can be performed using the supplied software to give a concentration reading in ppm, %volume or %LEL (Lower Explosive Limit).

An expansion connector provides access to four configurable alarms (open collector), two analog outputs and four digital inputs. LEDs on the board mimic the status of each alarm. A JTAG header allows advanced users to upload their own software to the microcontroller (MSP430F2616) and make full use of the available interfaces.

A universal mains adapter is also supplied or the user may connect a 9 V power supply to the terminal block connector.

FEATURES

- For use with SGX electrochemical gas sensors
- For use with SGX pellistor/thermal conductivity gas sensors:
 - Individual bead pairs
 - VQ500 series heads
 - VQ600 series heads
- Simple control and set-up of sensors
- USB interface to a Personal Computer (PC)
- Free PC application software for easy control and data logging
- Adjustable pellistor bridge voltage (1.6 V to 4.6 V)
- Adjustable electrochemical bias voltage (-700mV to +350mV)
- 16-bit Analog to Digital Conversion (ADC) for sensor outputs
- Calibrate sensors with linear response and monitor gas concentration levels
- PCB mounted temperature sensor IC
- Four configurable alarm outputs
- Two configurable analog outputs (12-bit DAC)
- Four digital inputs
- Expansion header for additional applications
- JTAG header for user software upload
- Supplied with universal mains adapter
- Supplied with user manual on CD
- Gas flow hoods available separately

ELECTRICAL DATA

Universal Mains Adapter

| | |
|-------------------|-----------------------------|
| Input Voltage | 90 - 264 V ac |
| Input Frequency | 50 – 60 Hz |
| Adapters supplied | UK, Europe, USA, Australia. |
| Output | 9 V dc |

PCB Interfaces

DC Supply Input

| | |
|------------------|--|
| SK4 | 2.1 x 5.5 mm Socket, centre positive |
| TB1 | Terminal Block |
| Input Voltage | 9 V ± 10% |
| Input Protection | Over voltage & current, Reverse voltage |

Gas Sensor Sockets

| | |
|-----|---------------------------------|
| S1 | VQ500 Series Pellistor |
| S2 | Electrochemical Sensor |
| TB2 | VQ600 or individual compensator |
| TB3 | VQ600 or individual pellistor |

Expansion Connector

| | |
|-----|----------------------------|
| PL2 | 2 x 10-pin 0.1" PCB Header |
|-----|----------------------------|

| | | | |
|---------------------|----|----|----------------------------|
| 3V3 Regulated | 1 | 2 | 9 V Unregulated |
| 0 V | 3 | 4 | 0 V |
| Input 1 (3V3 logic) | 5 | 6 | Output 1 (Open collector) |
| Input 2 (3V3 logic) | 7 | 8 | Output 2 (Open collector) |
| Input 3 (3V3 logic) | 9 | 10 | Output 3 (Open collector) |
| Input 4 (3V3 logic) | 11 | 12 | Output 4 (Open collector) |
| 0 V | 13 | 14 | Analog Out 1 (0 - 2.048 V) |
| 0 V | 15 | 16 | Analog Out 2 (0 - 2.048 V) |
| Spare RXD (3V3) | 17 | 18 | Spare TXD (3V3) |
| 0 V | 19 | 20 | Spare |

JTAG Connector

| | |
|-----|---------------------------|
| PL1 | 2 x 7-pin 0.1" Box Header |
|-----|---------------------------|

| | | | |
|--------|----|----|--------|
| TDO | 1 | 2 | VCCO |
| TDI | 3 | 4 | VCCI |
| TMS | 5 | 6 | Unused |
| TCK | 7 | 8 | Unused |
| 0 V | 9 | 10 | Unused |
| TRST | 11 | 12 | Unused |
| Unused | 13 | 14 | Unused |

Microcontroller Reset

| | |
|-----|-------------|
| SW2 | Push Button |
|-----|-------------|

Indicators

| | |
|---------|------------------------------------|
| D1 – D4 | Green LEDs (ON = Alarm asserted) |
| D5 | Green LED (Flash = PCB functional) |

User Adjustments

| | |
|-----|--|
| VR1 | Pellistor bridge voltage (1.6 to 4.6V) |
| VR2 | Electrochemical bias voltage (-700mV to +350mV) |
| LK1 | 1-2 (unbiased); 1-3 (biased) |

USB

| | |
|-----|-----------------|
| SK5 | Mini-USB type B |
|-----|-----------------|

MECHANICAL DATA

Dimensions

| | |
|--------------------|-----------------|
| Mains Adapter | 72 x 45 x 29 mm |
| Evaluation Kit PCB | 130 x 55 mm |

ENVIRONMENTAL DATA

Operating Temperature Range

| | |
|---------------|---|
| Mains Adapter | Operating temp: 0 °C to +40 °C Storage temp: -25 °C to +85 °C Operating humidity: 10 to 90% |
| PCBs | Operation and storage from -30 °C to +75 °C |
| Sensors | See individual sensor data sheets |

PERFORMANCE DATA

| | |
|--------------------------------|--|
| ADC Resolution | 16-Bit |
| DAC Resolution | 12-Bit |
| Pellistor bridge voltage | 1.6 to 4.6V (adjustable) |
| Electrochemical bias | -700mV to +350mV (adjustable) |
| ADC Resolution (Pel) | <0.1mV |
| ADC Resolution (Elect.) | 5nA (low range, +/-164uA) 25nA (high range, +/-819uA) |
| Temperature sensor IC accuracy | ± 2 °C (at 25 °C) ± 3 °C (-25 °C to +85 °C) |

RECOMMENDED PC SYSTEM

For Control and Data logging Software:

| | |
|-------------------|---------------------------|
| Processor | Pentium 4/M or equivalent |
| Operating System | Windows XP, Vista or 7 |
| Screen resolution | 1024 x 768 Pixels |
| RAM | 1 GB |
| Disk Space | 1.6 GB |

ORDERING INFORMATION

ECVQ-EK3 – Electrochemical/Pellistor Gas Sensor

Evaluation Kit containing:

- Evaluation PCB
- Universal Mains Adapter & USB lead
- Data Logging Software and User Guide on CD

ACCESSORIES (Order separately if required)

- **JAS767906AA** – Standard Gas Flow Hood for VQ500 series, Infrared mini-sensors and electrochemical (non-reactive gas) sensors
- **JAS769638AA** – Premium Gas Flow Hood recommended for reactive gases e.g. H₂S, NO₂, Cl₂, ClO₂, ETO

Note: Gas Sensors should also be ordered separately.