

## IR-EK2 Datasheet

### Infrared Gas Sensor Evaluation Kit

**Get started quickly in gas sensor instrument design using Infrared Gas Sensors from SGX.**

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

The SGX data logging and control software allows the performance of single gas or twin 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.

## INTRODUCTION

The SGX IR-EK2 Gas Sensor Evaluation Kit will drive the SGX range of infrared gas sensors and automatically measure the sensor outputs and calculate gas concentration levels.

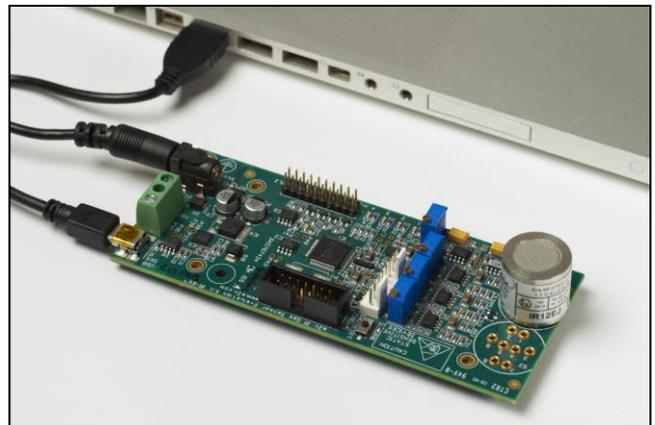
Sensors can be controlled automatically via the USB interface with an easy-to-use control and data logging PC application provided on CD. Alternatively a terminal program such as HyperTerminal can be used to send simple commands to the on-board microcontroller. The user manual provides a comprehensive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

The PCB provides sockets for use with SGX 6- and 7-pin (single gas) or 8-pin (twin gas) infrared gas sensors. For devices which do not have integrated temperature monitoring, a temperature sensing IC is provided on the PCB close to the gas sensor socket positions.

The evaluation kit allows experimentation with different bulb drive voltages. Reference and active channel gains can also be adjusted or set to a fixed level. This allows operation with the full range of SGX infrared gas sensors. Sensors can be calibrated and then the gas concentration levels monitored.

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.



*Gas sensors to be ordered separately*

## FEATURES

- For use with SGX Infrared Gas Sensors
- Simple control and set-up of sensors
- Operates 6- or 7-pin (single gas) sensor or 8-pin (twin gas) sensor
- USB interface to a Personal Computer (PC)
- Free PC application software for easy control and data logging
- Adjustable bulb drive voltage (3.0 V to 5.0 V)
- Adjustable reference and active channel gains
- 16-bit Analog to Digital Conversion (ADC) for reference and active channels
- Calibrate sensors and monitor gas concentration levels
- Monitor gas sensor temperature on devices with integrated thermistor or IC temperature sensor
- PCB mounted temperature sensor IC provided for devices without integrated temperature monitoring
- 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
- Supplied with gas flow hood

**Note: The IR-EK2 cannot be used with INIR and Smart IR gas sensors.**

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# 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 | 6-Pin or 7-Pin IR Gas Sensor |
| S2 | 8-Pin IR Gas Sensor          |

Only one device can be fitted at a time.

### Signal Monitor

|     |                                  |
|-----|----------------------------------|
| PL3 | 8-pin 0.1" Friction Lock (Molex) |
|-----|----------------------------------|

|   |                          |
|---|--------------------------|
| 1 | Reference signal monitor |
| 2 | 0 V                      |
| 3 | Active 1 signal monitor  |
| 4 | 0 V                      |
| 5 | Active 2 signal monitor  |
| 6 | 0 V                      |
| 7 | Bulb control (3V3 logic) |
| 8 | 0 V                      |

### 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

|     |                                     |
|-----|-------------------------------------|
| VR0 | Ref. channel gain (single/twin gas) |
| VR1 | Active Ch.1 gain (single/twin gas)  |
| VR2 | Active Ch.2 gain (twin gas only)    |
| VR3 | Lamp drive voltage (3.0 V to 5.0 V) |

## 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<br>Storage temp: -25 °C to +85 °C<br>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   |
| Lamp drive frequency           | 4 Hz   |
| Lamp drive voltage             | 3.0 V to 5.0 V (adjustable)                    |
| Channel gain (at 4 Hz)         | Minimum 41<br>Maximum 400 (approx)             |
| Channel bandwidth              | 1.5 Hz to 10 Hz (-3dB)                         |
| Temperature sensor IC accuracy | ± 2 °C (at 25 °C)<br>± 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 or Vista       |
| Screen resolution                      | 1024 x 768 Pixels         |
| RAM                                    | 1 GB                      |
| Disk Space                             | 1.6 GB                    |

# ORDERING INFORMATION

**IR-EK2** - IR Gas Sensor Evaluation Kit containing:

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

**JAS767906AA** – Additional Gas flow hood

**Note:** Gas Sensors ordered separately.



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