IR-EK2
Infrared Gas Sensor Evaluation Kit

Get started quickly in gas sensor instrument design using Infrared Gas Sensors from e2v.

Simply attach the universal power supply, connect to a PC USB port and plug in an e2v infrared gas sensor.

The e2v 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.

Gas sensors to be ordered separately

INTRODUCTION

The e2v IR-EK2 Gas Sensor Evaluation Kit will drive the e2v 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 e2v 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 e2v 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.

FEATURES

- For use with e2v 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

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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 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
Lamp drive frequency	4 Hz
Lamp drive voltage	3.0 V to 5.0 V (adjustable)
Channel gain (at 4 Hz)	Minimum 41 Maximum 400 (approx)
Channel bandwidth	1.5 Hz to 10 Hz (-3dB)
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 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
- Universal Mains Adapter
- USB lead
- Data Logging Software and User Guide on CD
- Gas flow hood

Note: Gas Sensors should be ordered separately.