



**Eval Kit Manual**

# **AS726x-iSPI**

## **Evaluation Kit User Guide**

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## 1 Introduction

AS726x<sup>1</sup>-intelligent Spectral Interface (iSPI) Evaluation Kits provide a platform to evaluate **ams** AS726x products with AS726x – iSPI software running on Windows based personal computer. This user guide describes the standard features and functions of AS726x-iSPI evaluation kit.

Please note, the AS726x iSPI is a common hardware platform that is equipped with the specifically requested AS726x device and its corresponding firmware pre-installed in the flash EPROM . The differing iSPI demo kits utilize common functions and components as described here. A comment in this manual will be given separately in case of any differences between the single individual demo kits. The following table lists the demo kits the sensor and filter channel characteristics and relevant channel references detailed in the device data sheet and presented by the graphical user interface.

XYZ = CIE1931 (detector with standard observer function), DK = Dark (detector capped), CL= Clear (detector without filter)

	AS7261 Demo-Kit	AS7262 Demo Kit	AS7263 Demo Kit
Sensor reference	AS7261	AS7262	AS7263
Spectral response	X, Y, Z, DK, NIR 850nm, CL	V 450nm, B 500nm, G 550nm, Y 570nm, O 600nm, R 650nm	R 610nm, S 680nm, T 730nm, U 760nm, V 810nm, W 860nm

**Figure 1: Alternative Demo kits with sensor reference**

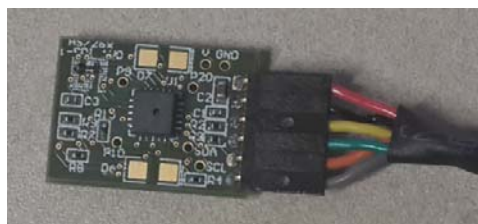
### 1.1 Kit Content

The following items are delivered with this Demo Kit.

Pos.	Item	Comment
1	AS726x-iSPI Board	Evaluation Board (Hardware release $\geq 1V1$ )
2	USB Memory Stick	Documents and Software
3	Cable	FTDI USB-MPSSE Cable

**Figure 2: Kit Content**

### 1.2 Connection



**Figure 3: AS726x-iSPI and Cable Connection**

J2's Pin 1 (the pin with square pad) needs to be connected to Red wire of the cable.

## 2 Getting Started

The evaluation kit requires one time installation of FTDI CDM Driver for the USB-MPSSE cable if it is not already installed on the computer. The installation file can be found in the USB Memory Stick. For additional assistance on installation of the FTDI driver, please refer to [www.ftdichip.com](http://www.ftdichip.com) for more information.

The AS726x Spectral Sensing – iSPI software does not require separate installation. Simply copy the following files to any folder on the host system and start the .exe file to start the GUI.

	File	Comment
1	AS726x_Spectral_Sensing_iSPI_GUI.exe	Executable file
2	FTD2XX_NET.dll	DLL file for the USB converter

Figure 4: AS726x Spectral Sensing –iSPI GUI Software Files

## 3 Hardware Description

The AS726x-iSPI design consists of AS726x device with associated flash memory, LED circuit, and a jumper configuration header for UART/I<sup>2</sup>C interface selection.

### 3.1 Hardware Architecture

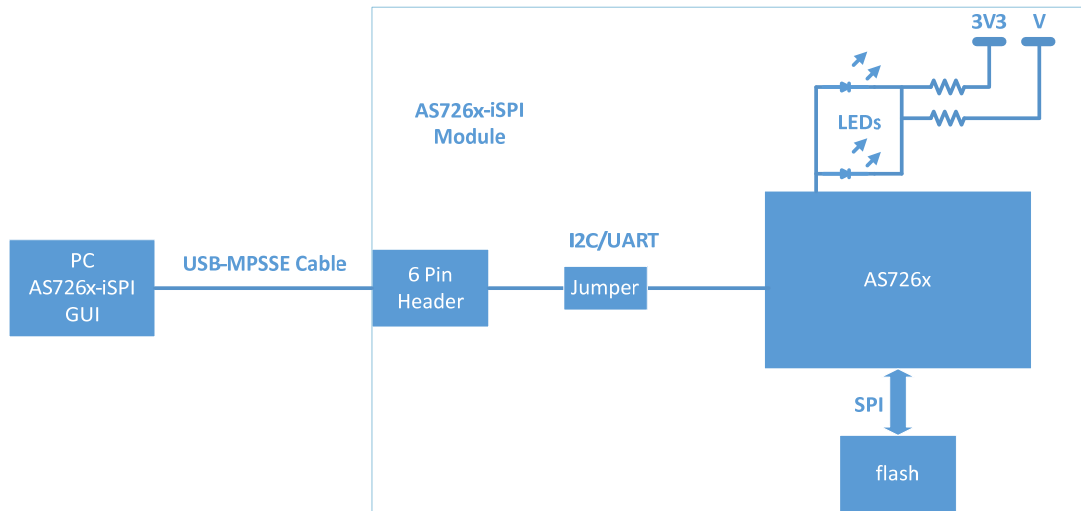


Figure 5: Board Block Diagram

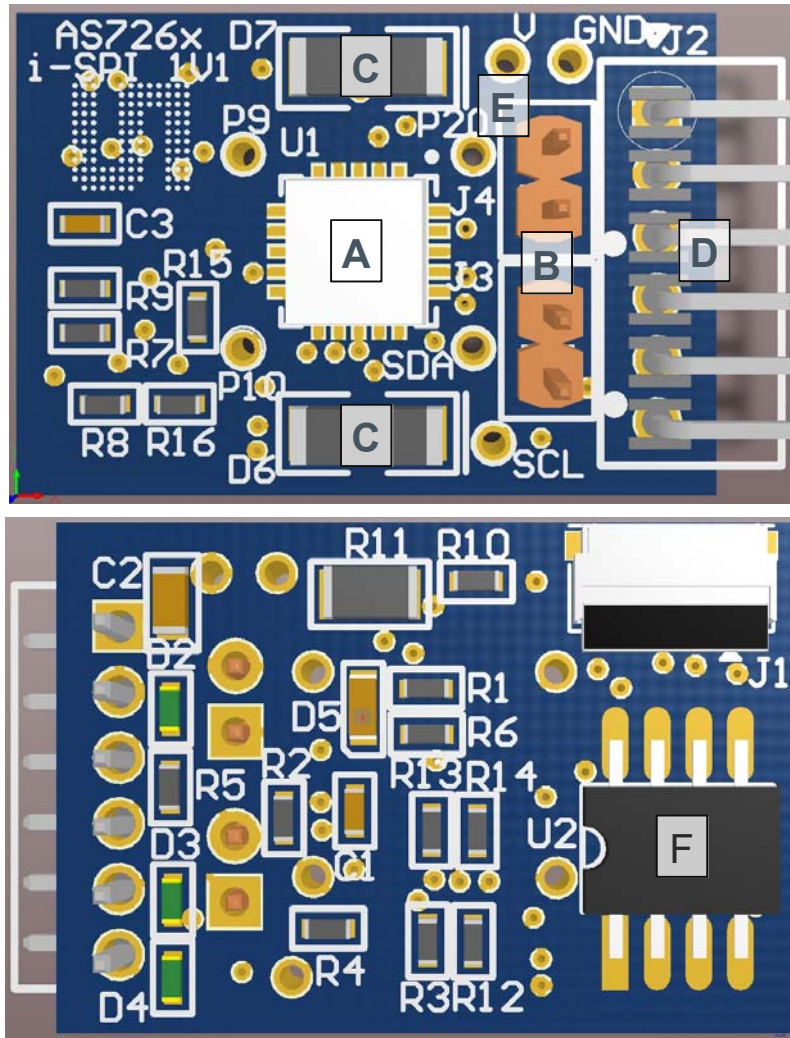


Figure 6: PCB (Top, bottom)

Pos.	Designator	Comment
A	U1	AS726x Intelligent Spectral Sensor
B	J3, J4	Headers for UART or I <sup>2</sup> C interface selection;
C	D6, D7	Place Holders for LEDs;
D	J2	Six Pins Header; Connect to PC with USB-MPSSE cable;
E	V	Test Point for External Supply for LEDs;
F	U2	Flash memory;

Figure 7: Devices, Connectors and LEDs

### 3.2 Power Supply

The AS726x-iSPI module is powered by the included FTDI C232HM-DDSHL-0 USB-MPSSE cable that connects to a personal computer. The voltage supplied to the iSPI is 3.3V.

### 3.3 UART/ I<sup>2</sup>C Interface

The AS726x intelligent spectral sensor supports either UART or I<sup>2</sup>C interface as the communication path. By default, AS726x-iSPI demo kit is shipped as using I<sup>2</sup>C interface. AS726x Spectral Sensing iSPI GUI software can be used to evaluate AS726x features.

If the UART interface is desired, please adjust the jumper setting as below. Any terminal software configured as 115200 Baud Rate, 8-Bit Data, No Parity, 1-Bit Stop would be fine.

	J3	J4
UART Interface	OFF	ON
I <sup>2</sup> C Interface	ON	OFF

Figure 8: Jumper Setting

Please note that you should reset the USB-MPSSE cable with a plug-out/plug-in action when you switch between UART and I<sup>2</sup>C interface during your evaluation.

### 3.4 LEDs Pads

AS726x-iSPI module has two place holders for LED light sources. Since spectral sensing results are greatly influenced by the illumination sources that are selected, care should be taken to consider delivered wavelengths and/or spectral power distribution in LED illuminant component selections. By default, no LEDs are populated.

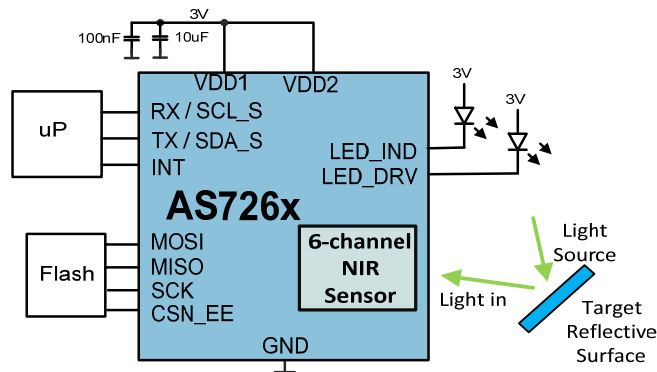


Figure 9: Generic Application

A generic application of AS726x is to illuminate a target and utilized the AS726x sensor elements to observe the results. Illuminant LED selection is determined by the spectral responsivity of reflected light and characteristics of the target that is to be observed. For example, if the target is expected to absorb 680nm light and the application needs to distinguish the target from others, a broadband white LED might be used as the light source with AS7263 and the 680nm channel should be checked. Applications will differ widely, and LED component selection is important to fulfill the application requirement.

LEDs can be powered either by onboard 3.3V rail or by an external voltage source. If the 3.3V rail is used, populate LEDs on D6/D7 and install a zero-ohm resistor on R10. If a 3.3V supply is insufficient for the required LED forward voltage, an external voltage supply can be connected to the test point, V and the current limit resistor R11 should be installed. Please note that R10 must be removed when connecting an external voltage source to the module. The AS726x can be configured to drive LEDs with 12.5mA, 25mA, 50mA, or 100mA current. LED D5 is designated as an indicator LED The LED drive currents can be controlled and configured using the virtual I<sup>2</sup>C register, 0x07 (the register address 0x87 for write).

Addr: 0x07/0x87		LED Control		
Bit	Bit Name	Default	Access	Bit Description
7:6	RSVD	0	R	Reserved
5:4	ICL_DRV	00	R/W	LED_DRV current limit 'b00=12.5mA; 'b01=25mA; 'b10=50mA; 'b11=100mA;
3	LED_DRV	0	R/W	Enable LED_DRV 1: Enabled; 0: Disabled
2:1	ICL_IND	00	R/W	LED_IND current limit 'b00=1mA; 'b01=2mA; 'b10=4mA; 'b11=8mA;
0	LED_IND	0	R/W	Enable LED_IND 1: Enabled; 0: Disabled

**Figure 10: Register for LED Configuration**

When using the UART interface, the AT command ATLED1 = 100 or ATLED1 = 0 will turn the LEDs D6/D7 ON or OFF respectively. ATLEDC = 0xXY (one byte) configures the LED current. X sets the LED current and Y configures the indicator LED current. ATLED0 and ATLEDC controls/configures the indicator LED, D5.

AT Commands	LED (D6/D7)	LED (D5)
ATLED0 = 100/0	-	ON/OFF
ATLED1 = 100/0	ON/OFF	-
ATLEDC = 0xXY	Set LED Current	Set LED Current
X = 0000b, Y = 0000b	12.5mA	1mA
X = 0001b, Y = 0001b	25mA	2mA
X = 0010b, Y = 0010b	50mA	4mA
X = 0011b, Y = 0011b	100mA	8mA

**Figure 11: AT Commands for LED Control**

When the iSPI is initially powered, the indicator LED should illuminate for a short time and then turn off. If the LED keeps flashing, it implies something wrong in the communication between AS726x device and the flash memory.

### 3.5 Others

AS726x-iSPI module can be wired to customer controllers for development/evaluation. The test points, SDA/SCL, can be used for monitoring UART/I<sup>2</sup>C bus transactions. Pin 6 of J2 provides the connection to INT. If interrupt is required to get the sensor data, this pin will be enable monitoring of the interrupt signal.

## 4 Software Description

This demo kit comes with the Spectral Sensor dashboard software running on a Windows computer for evaluating AS726x features. The USB Data Stick has the application notes for the Spectral Sensor software. Please refer to the included document for more information on the dashboard operation.



## 5 AS726x-iSPI Schematics

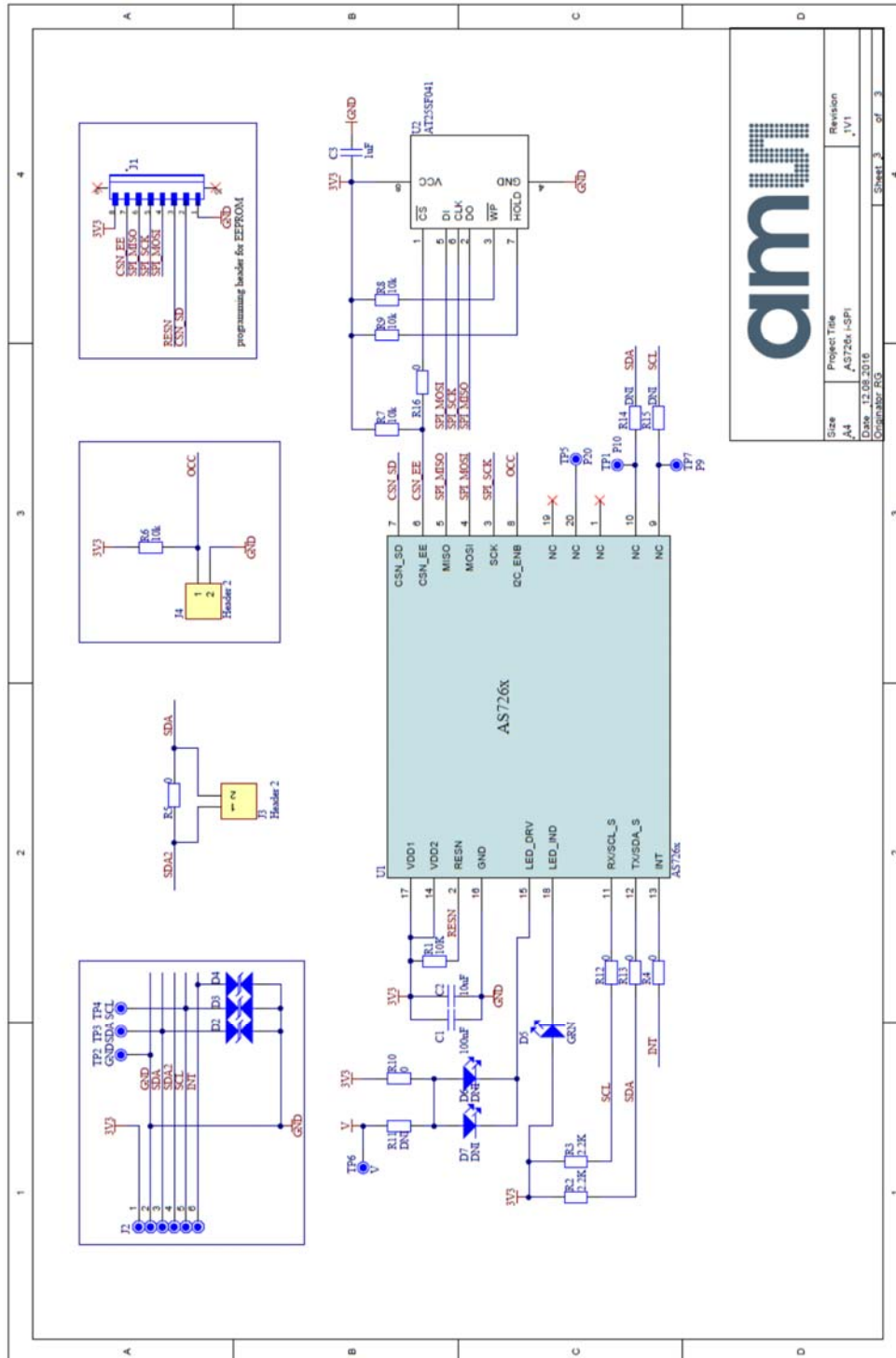


Figure 12: Schematic

## 6 Ordering & Contact Information

Name	AS7261 Demo-Kit	AS7262 Demo Kit	AS7263 Demo Kit
Reference	AS7261	AS7262	AS7273
Ordering Code	Demo/Eval Kit AS7261 – iSPI	Demo/Eval Kit AS7262 – iSPI	Demo/Eval Kit AS7263 – iSPI

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