SPECTROMETER FLEX ZIF TO ANALOG BUFFER FOR PIXEL AND DARK SIGNALS

+3.3V   C6
         10uF

U1VCC 8   OPA2364AIDGKR

V_PIXEL_BUFF

J2

FFC ZIF Connector

+3.3V   C7
         10uF

VDD 8

VIDEO 7

CLOCK FILTER

R4
10k   C10
       330pF

Filter f3dB ~ 23 kHz

V_PIXEL

2
—   U1A   1   V_PIXEL_BUFF
3
+

SYNC 6   LIS_SYNC

RST 5   LIS_RST

CLK 4   LIS_CLK

PIX SELECT 3   LIS_PIXSELECT

TO MCU

LIS READOUT CLOCK AND CONTROL

5
+   U1B   7   V_DARK_BUFF
6
—

V_DARK_BUFF

U1VEE 4

DARK-CORRECT ADJ/ON/OFF

SW1

RP1
200k

1

2

VREF 3

VREF 2

GND 1

V_DARK

SPDT

1. Decrease dark-correct:
   rotate trimpot CCW
   (CW to see *more* dark)

2. Turn off dark-correct:
   slide SW1 to GND

Keystone 5015   Keystone 5015

TP TP3
    VDARK

TP TP1
    GND

DEV-KIT SPI-OUT INTERFACE

SPECTROMETER ANALOG INTERFACE

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ADC AND VOLTAGE REFERENCE

+3.3V

C2
10uF

1.8VREF

ADC INPUT ISOLATION

R2
100

C11
100pF

V_PIXEL_BUFF → ADC_IN+

R3
100

C12
100pF

V_DARK_BUFF → ADC_IN-

U2

VCC   VREF

UNIPOLAR 16-BIT SAR WITH SPI OUT

2 IN+   SCK 7

SERIAL   SDO 6

+ ADC
−   CONV 5

3 IN-

4 GND

LTC1864LCMS8#PBF

Keystone 5015

TP   TP2
     1.8V

U3

1 NC   VREF 5

2 GND 1.8V   C4 1uF

3 EN   VIN   4   +3.3V

BANDGAP VREF 1.8V

C3 10uF

U3 revised 2019-06-06.
Rev replaces 2.048V ref with 1.8V ref.

U3 revised 2018-10-19.
Rev replaces 2.5V ref with 2.048V ref.

Previous U3 part numbers:
Texas Instruments# REF5025AIDGKR
Mouser#595-REF5025AIDGKR

TO MCU (ADC SPI MASTER)

ADC READOUT

usb-bridge

HW1
2-56 1/8in button head

vis-spi-out

HW2
2-56 1/8in button head

MCU: SPI MASTER TO EXTERNAL ADC AND SPI SLAVE TO USB-BRIDGE

TO ADC (SPI SLAVE)

TO ZIF CONNECTOR: LIS I/O

TO USB-BRIDGE HEADER:
PROGRAMMING AND SPI MASTER
SCK,MISO,MOSI,$\overline{SS}$,DR,$\overline{RST}$,+3.3V,GND

U5_PORT-D

ATMEGA328P-MU

MCU

U5_PORT-D 0   ADC_SDO
UartSpi.h UartSpi-Hardware.h UartSpi_Miso

U5_PORT-D 1   NOT-USED-31
UartSpi.h UartSpi-Hardware.h UartSpi_AdcConv

U5_PORT-D 2   ADC_CONV

U5_PORT-D 3   NOT-USED-1
UartSpi.h UartSpi-Hardware.h UartSpi_Sck

U5_PORT-D 4   ADC_SCK
Lis.h Lis-Hardware.h Lis_Clk

U5_PORT-D 5   LIS_CLK   (PWM)
Lis.h Lis-Hardware.h Lis_Rst

U5_PORT-D 6   LIS_RST
Lis.h Lis-Hardware.h Lis_Sync

U5_PORT-D 7   LIS_SYNC

U5_PORT-B

ATMEGA328P-MU

MCU

U5_PORT-B 0   LIS_PIXSELECT
Lis.h Lis-Hardware.h Lis_PixSelect

U5_PORT-B 1   DR
Spi.h Spi-Hardware.h Spi_DataReady

U5_PORT-B 2 $\overline{SS}$
Spi.h Spi-Hardware.h Spi_Ss

U5_PORT-B 3   MOSI
Spi.h Spi-Hardware.h Spi_Mosi

U5_PORT-B 4   MISO
Spi.h Spi-Hardware.h Spi_Miso

U5_PORT-B 5   SCK
Spi.h Spi-Hardware.h Spi_Sck

$\overline{RST}$

USB-BRIDGE HEADER

J1

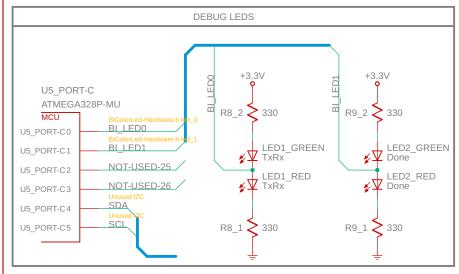| GND	1	1	16	16	MISO
+3.3V	2	2	15	15	MOSI
SCK	3	3	14	14	$\overline{SS}$
$\overline{RST}$	4	4	13	13	DR
DR	5	5	12	12	$\overline{RST}$
$\overline{SS}$	6	6	11	11	SCK
MOSI	7	7	10	10	+3.3V
MISO	8	8	9	9	GND

Header Pins

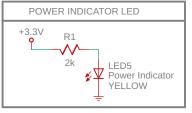**chromation**

DEV-KIT SPI-OUT INTERFACE

ADC AND USB-BRIDGE CONNECTIONS

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DEBUG LEDS

U5_PORT-C
ATMEGA328P-MU

MCU

U5_PORT-C 0	BI_LED0	BiColorLed-Hardware.h led_0
U5_PORT-C 1	BI_LED1	BiColorLed-Hardware.h led_1
U5_PORT-C 2	NOT-USED-25	
U5_PORT-C 3	NOT-USED-26	
U5_PORT-C 4	SDA	Unused I2C
U5_PORT-C 5	SCL	Unused I2C

BI_LED0

+3.3V
R8_2 330
LED1_GREEN TxRx
LED1_RED TxRx
R8_1 330

BI_LED1

+3.3V
R9_2 330
LED2_GREEN Done
LED2_RED Done
R9_1 330

MCU POWER

+3.3V
R6 10k

C1
1uF
+3.3V

NOT-USED-18

U5_PWR

RESET	VCC	AVCC
MCU		
AREF	GND	

RST
SEE SHEET 2
USB-BRIDGE HEADER

NOT-USED-20
ATMEGA328P-MU

POWER INDICATOR LED

+3.3V
R1
2k
LED5
Power Indicator
YELLOW

MCU: i2c BREAKOUT (unused)

+3.3V   +3.3V

Resistor array

R7_2 2.2k   R7_1 2.2k

J3

SDA   1 | 1 |
SCL   2 | 2 |

GPIO/I2C

MCU: 10MHz EXTERNAL OSCILLATOR

U5_XTAL_PINS
ATMEGA328P-MU

XTAL1   7*2
XTAL2   8*2

MCU

X1
ABM3C-10.000MHZ-D4Y-T

C8 27pF   1   3   C9 27pF
             2   4

MCU: ADC NOT USED

U5_ADC
ATMEGA328P-MU

MCU

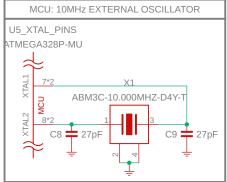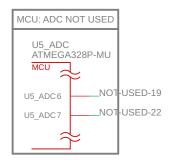| U5_ADC 6 | NOT-USED-19 |
| U5_ADC 7 | NOT-USED-22 |

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DEV-KIT SPI-OUT INTERFACE

10MHz OSC, INDICATOR LEDS, POWER

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