ADNK-7703

One Chip USB LaserStream™ Mouse Designer's Kit

Design Guide

Lead (Pb) Free
RoHS 6 fully
compliant

Introduction

The Universal Serial Bus (USB) is an industry standard serial interface between a computer and peripherals such as mouse, joystick, keyboard, headset, etc. The ADNK-7703 design guide describes how a cost-effective USB laser mouse can be built using the Avago Technologies ADNS-7700 one chip USB LaserStream mouse sensor. The document starts with basic operation of USB laser mouse, followed by the assembly recommendation, USB interface, OTP configurations, system design considerations and applications circuits, BOM, and PCB layout in appendices.

ADNK-7703 consists of an ADNS-7700 USB reference design mouse, ADNS-7700 sensors and ADNS-6180-001/002 lens sample units and CD-ROM with all relevant technical literatures and hardware files. The ADNS-7700 sensor comprises of USB controller and Laser-Stream navigation sensor with VCSEL integrated within a single package. The complete USB mouse system is formed when ADNS-7700 sensor is used with the ADNS-6180-001 trim lens or ADNS-6180-002 wide trim lens. The on-chip One-Time-Programmable (OTP) memory provides flexibility for various configurations on resolution mode, tilt wheel, USB motion data reporting size, keyboard shortcut key, customizable VID, PID, Manufacturer string and Product string. The ADNS-7700 sensor, ADNS-6180-001 trim lens and ADNS-6180-002 wide trim lens data sheets are available from Avago Technologies website: www.avagotech.com.

USB Laser Mouse Basic

The ADNS-7700 is the primary navigation engine of the USB laser mouse based on Laser-Stream navigation technology that measures changes in position by optically acquiring sequential surface images (per frames) and mathematically determining the direction and magnitude of motion movement. It contains an Image Acquisition System (IAS), a Digital Signal Processor (DSP) and USB stream output. The IAS acquires microscopic surface images via the lens. These images are processed by the DSP to determine the direction and distance of motion. The DSP generates the Δx and Δy relative displacement values which are converted to USB motion data via USB protocol to the computer to translate into the motion of a cursor pointer on a screen display.

The Z-wheel movement is done in the traditional method by encoding the quadrature signal of an optical sensor or mechanical encoder. This design guide shows how to connect to and manage the available configuration of mouse hardware via OTP programming, as well as handle the USB protocols as a standard way of reporting mouse movement and button presses to the PC.

Features

- ADNS-7700 One chip USB laser mouse sensor with integrated VCSEL
- USB 2.0 Low Speed Compliance
- Meets HID Revision 1.11
- LaserStream™ navigation technology
- Compliance to IEC/EN 60825-1 Class 1 Eye Safety
- High speed motion detection at 45 inches per second (ips) and acceleration up to 20g
- Input buttons: 3 or 5-buttons
- Mechanical Z-Wheel interface for vertical scroll
- On-chip OTP memory for device configuration flexibility without any external software driver:
  - Enable/Disable Tilt-Wheel* function that supports horizontal scroll in Microsoft Vista OS.
  - 8/12/16-bit USB motion data reporting
- Resolution
  - Programmable from 400-1600 counts per inch (cpi) with ~100cpi incremental step
  - 3 selections of On-the-Fly (OTF) resolution mode setting
- KeyMap (KM) for keyboard shortcut key
- Customizable VID, PID, Manufacturer string and Product string

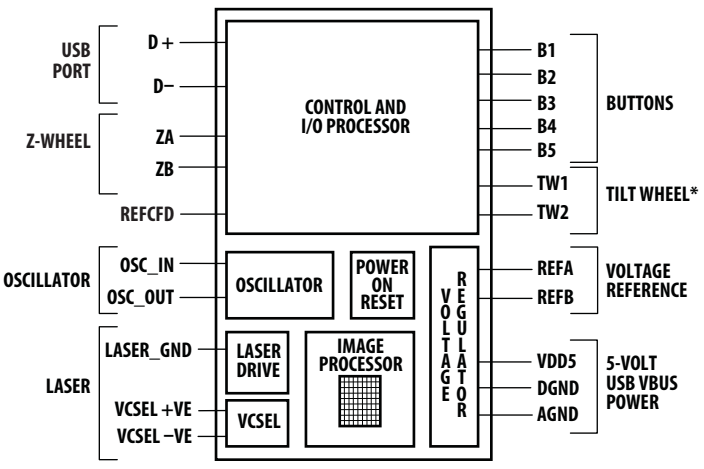


Figure 1. ADNS-7700 Block Diagram

Buttons and Tilt Wheel

In this reference design, there are 3 or 5 standard button inputs: B1, B2, B3, B4 and B5 for left, right, middle, back and forward button click respectively, as well as 2 tilt wheel* button inputs, TW1 and TW2 to tilt left and right respective as horizontal scrolling.

Button inputs are connected as standard switches. They are connected to a Schmidt trigger input with 100μA current sources pulling up to +5.0V during run, rest and USB suspend modes. When the user presses a button, the switch will be closed and the pin will be pulled LOW to GND. A LOW state at the pin is interpreted as the button being pressed. A HIGH state is interpreted as the button has been released or the button is not being pressed. Normally, the time between button presses is 6-9ms.

Debounce Algorithm

- Button inputs are sampled every 2ms.
- Two consecutive low values create a button press event.
- Three consecutive high values create a button release event.

* All designers and manufacturers of final product with tilt wheel enabled must assure that they have all necessary intellectual property rights.

Mechanical Z-Wheel

The motion of Z-wheel is detected using traditional method by encoding quadrature signal generated by the mechanical Z-encoder. ADNS-7700 supports only mechanical Z-Wheel for vertical scrolling. The mechanical Z-wheel will be connected to the ZA and ZB pins with the common pin connected to VDD5. Internal pulldowns on the ZA and ZB pads provide a nominal pulldown current to pull the output down when the Z-wheel switch opens.

The Z-Wheel reporting format which determines the vertical scroll resolution is Z/2. The following must be implemented when using with ADNS-7700. As shown in Figure 2 below, traveling along the quadrature signal to the right produces a unique set of state transitions, and traveling to the left produces another set of unique state transitions.

1. Use a rotary switch equivalent to the Panasonic part EVQVX at http://industrial.panasonic.com/www-data/pdf/ATC0000/ATC0000CE20.pdf (The key point is stable "ZA" switch state in all detent positions).
2. Solder the rotary switch into the PCB such that the common pin is closest to the cable end of the mouse. (Metal plate faces to left)
3. Connect the "A" terminal of the rotary switch to "ZA" and the "B" terminal to "ZB". ZA MUST be connected to "Signal A" in Figure 2 where the z-wheel detents are mechanically stable.

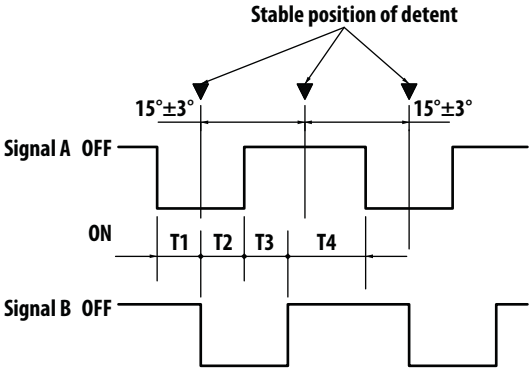


Figure 2. Z-Wheel Quadrature Signal Generation

Regulatory Requirements

- Passes FCC B and worldwide analogous emission limits when assembled into a mouse with unshielded cable and following Avago Technologies recommendations.
- Passes EN 61000-4-4/IEC 801-4 EFT tests when assembled into a mouse with shielded cable and following Avago Technologies recommendations.
- Passes IEC-61000-4-2 Electrostatic Discharge Immunity Test (ESD) and provides sufficient ESD creepage/clearance distance to withstand up to 12 kV discharge when assembled into a mouse with ADNS-6180-001 trim lens and up to 15 kV discharge when assembled into a mouse with ADNS-6180-002 wide trim lens.
- Passes IEC/EN 60825-1 Class 1Eye Safety when ADNS-7700 is driving the laser using ADNS-6180-001 or ADNS-6180-002 lens with recommended operating conditions.

Some details on ADNK-7703

The ADNK-7703 reference design mouse unit allows users to evaluate the performance of the Laser Tracking Engine over a USB protocol. This USB laser mouse uses ADNS-7700-HAMY, ADNS-7700-HCMY or ADNS-7700-HMMY sensor and ADNS-6180-002 lens. This kit also enables users to understand the recommended mechanical assembly. (See Appendix C and D)

System Requirements

PCs using Windows 2003/ Windows XP/ Windows Vista with standard USB mouse driver loaded.

Functionality

3 or 5-button, mechanical Z-wheel, tilt wheel mouse.

Operating (For USB Mode)

Hot pluggable with USB port. The PC does not need to be powered off when plugging or unplugging the evaluation mouse.

To Disassemble the ADNK-7703 Unit

The ADNK-7703 comprises of plastic mouse casing, printed circuit board assembly (PCBA), lens, Z-wheel and USB cable. Unscrewing the screw located at the base of the casing, can open the ADNK-7703 unit. Lifting and pulling PCB out of the base plate can further disassemble the mouse unit.

Caution: The lens is not permanently attached to the sensor and will drop out of the assembly.

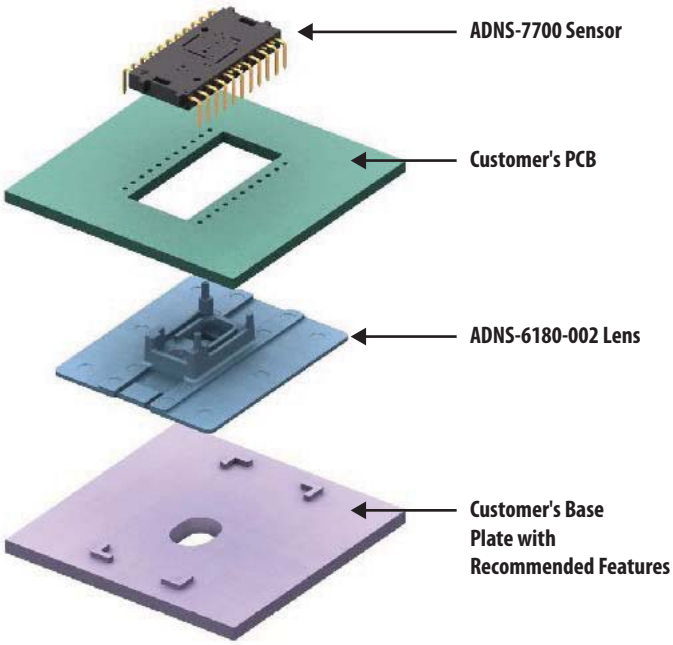


Figure 3. Exploded view drawing of ADNS-7700 sensor coupled with ADNS-6180-002 lens, PCB & base plate

While reassembly the components, please make sure that the Z-height (Distance from lens reference plane to surface) is valid. The Z-height is from 2.3 to 2.5mm with a nominal of 2.4mm as shown in Figure 4.

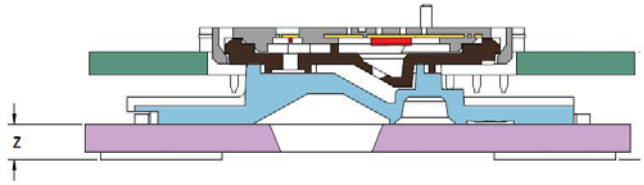


Figure 4. Distance from lens reference plane to object surface, Z

Sensor

The sensor technical information is contained in the ADNS-7700 Data Sheet.

Lens

The lens technical information is contained in the ADNS-6180-001 and ADNS6180-002 Data Sheets. The flange on the standard ADNS-6180-002 wide trim lens is for ESD protection.

3D Model Files

The 3D model files on the CD-ROM provides recommended 3D modeling of sensor, lens, PCB and base plate molding features to ensure optical alignment. See Appendix D for details.

PCB Layout & Gerber File

The Gerber File presents detailed schematics used in ADNK-7703 in PCB layout form. See Appendix C for more details.

Overall circuit

A schematic of the overall circuit is shown in Appendix A of this document. Appendix B lists the bill of materials.

USB Interface

All USB Human Interface Device (HID) class applications follow the same USB start-up procedure. The procedure is as follows

1. Device Plug-in

   When a USB device is first connected to the bus, it is powered and running firmware, but communications on the USB remain non-functional until the host has issued a USB bus reset.

2. Bus Reset

   The pull-up resistor on D– notifies the hub that a device has just been connected. The host recognizes the presence of a new USB device and initiates a bus reset to that device.

3. Enumeration

   The host initiates SETUP transactions that reveal general and device specific information about the mouse. When the description is received, the host assigns a new and unique USB address to the mouse. The mouse begins responding to communication with the newly assigned address, while the host continues to ask for information about the device description, configuration description and HID report description. Using the information returned from the mouse, the host now knows the number of data endpoints supported by the mouse (2). At this point, the process of enumeration is completed.

OTP Configuration

ADNS-7700 sensors can be configured for different functionalities as shown in Table 1 via pinout configuration on button inputs and software OTP programming in the mouse production line. The ADNK-7703 unit is designed with the flexibility to have different pinout configuration for each option, refer to application circuits in Appendix A.

Table 1. OTP Configurable Options

Part Number	Configuration Options	REG 0xC7	REG 0xC1	REG 0xC1	Pinout Configurations						
		TW_NEN	OTF_{1-0}	KM_{1-0}	B1	B2	B3	B4	B5	TW1	TW2
ADNS-7700-H4MY	3B	1	00	00	Left	Right	Middle	NA	NA	NA	NA
	3B + TW (Default)	**0**	**00**	**00**	**Left**	**Right**	**Middle**	**NA**	**NA**	**Tilt left**	**Tilt right**
ADNS-7700-HAMY	3B	1	00	00	Left	Right	Middle	NA	NA	NA	NA
	3B + TW (Default)	**0**	**00**	**00**	**Left**	**Right**	**Middle**	**NA**	**NA**	**Tilt left**	**Tilt right**
	3B + TW + OTF	0	01	00	Left	Right	Middle	NA	OTF	Tilt left	Tilt right
	3B + OTF + 3LED	1	01	00	Left	Right	Middle	LED2	OTF	LED1	LED0
ADNS-7700-HCMY	5B	1	00	00	Left	Right	Middle	Back	Forward	NA	NA
	5B + TW (Default)	**0**	**00**	**00**	**Left**	**Right**	**Middle**	**Back**	**Forward**	**Tilt left**	**Tilt right**
	5B + OTF	1	01	00	Left	Right	Middle	Back	Forward	NA	OTF
	3B + TW + OTF	0	01	00	Left	Right	Middle	NA	OTF	Tilt left	Tilt right
ADNS-7700-HMMY	5B	1	00	00	Left	Right	Middle	Back	Forward	NC	NC
	5B + TW (Default)	**0**	**00**	**00**	**Left**	**Right**	**Middle**	**Back**	**Forward**	**Tilt left**	**Tilt right**
	5B + KM1/OTF_L	1	01	01	Left	Right	Middle	Back	Forward	NC	KM1/ OTF_L
	5B + KM1/OTF_L + KM2	1	01	10	Left	Right	Middle	Back	Forward	KM2	KM1/ OTF_L
	4B + TW + KM1/ OTF_L	0	01	01	Left	Right	Middle	Back	KM1/ OTF_L	Tilt left	Tilt right
	3B + TW + KM1/ OTF_L	0	10	01	Left	Right	Middle	NC	KM1/ OTF_L	Tilt left	Tilt right
	3B + TW + KM1/OTF_L + KM2	0	10	10	Left	Right	Middle	KM2	KM1/ OTF_L	Tilt left	Tilt right

OTP Programmer Software Reference Tool

The on chip OTP memory allows device configuration flexibility to override the default setting of ADNS-7700 sensors without any external software driver. The OTP programming for write, read and lock operations are clearly stated in DNS-7700 sensor data sheet. OTP programmer software reference tool is provided by Avago for customer evaluation on the ADNS-7700 sensor. It is used to load a predefined configuration of OTP registers to the OTP memory.

This software is using WinDriver provided Jungo Ltd as the USB driver for reliable communication link in the programming mode. WinDriver must be installed separately after completion of this software GUI installation with an OTP un-programmed ADNS-7700 USB mouse connected to the desired USB port. After WinDriver driver installation, whenever an OTP un-programmed ADNS-7700 USB mouse is plugged to the specific USB port, the mouse device can only be used for OTP programming purpose and HID mouse function is disabled. However, this USB port can still function as HID device application on any other USB device as the WinDriver only lock the OTP un-programmed ADNS-7700 sensor that comes with default Avago's VID (192F) and PID (0716).

ADNS-7700 OTP Programmer Installation procedures:

1. Connect an OTP un-programmed ADNS-7700 USB mouse to USB port.
2. Click on Setup.exe to start installation.
3. Upon completion of step 2, go to Windows menu Start – All Programs – Avago – Install Driver to install the USB driver
4. Click on the Shortcut to A7700 USB Mouse OTP PROG ver1.2.3.exe icon on desktop to start the program.
5. The default GUI as shown in Figure 6 will be loaded. The device status should show "USB connected" when the USB device has VID = 192F and PID = 0716 to recognize as ADNS-7700 sensor.

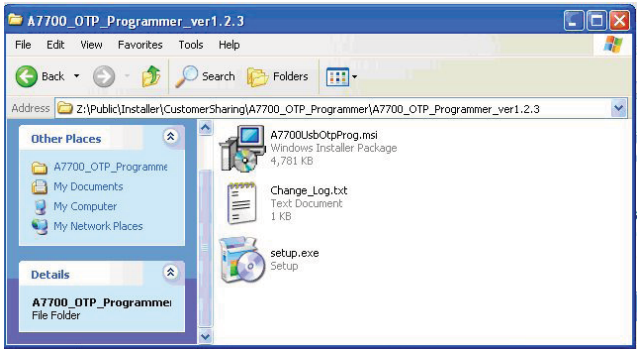


Figure 5. Illustration of ADNS-7700 OTP Programmer Installation Folder Directory

6. Click on Open Code File with default password "avago" to select the OTP profile to be configured into ADNS-7700's OTP memory. The OTP profile can be in text file format but MUST be in the written as format as shown in Figure 8.
7. Laser power can be set to continuous mode and to be read out from Thorlabs Optical Power Meter PM100.
8. For engineering purpose, an engineering GUI page can be opened from toolbar at Tools with default password "avago". In engineering mode, the following operation can be executed:
   a. OTP programming (Auto Program)
   b. Verifying OTP content (Verify)
   c. Read all OTP registers content and export to text file (OTP Registers Read and Export)
   d. Multiple registers USB Read and Write. USB write is not a permanent OTP write as the USB write value will refresh with sensor reset value or OTP written value after hot plug. (Sensor Register)
   e. Laser Power Configuration (Thorlabs Optical Power Meter PM100)
   f. Password Authorization (Authorization)

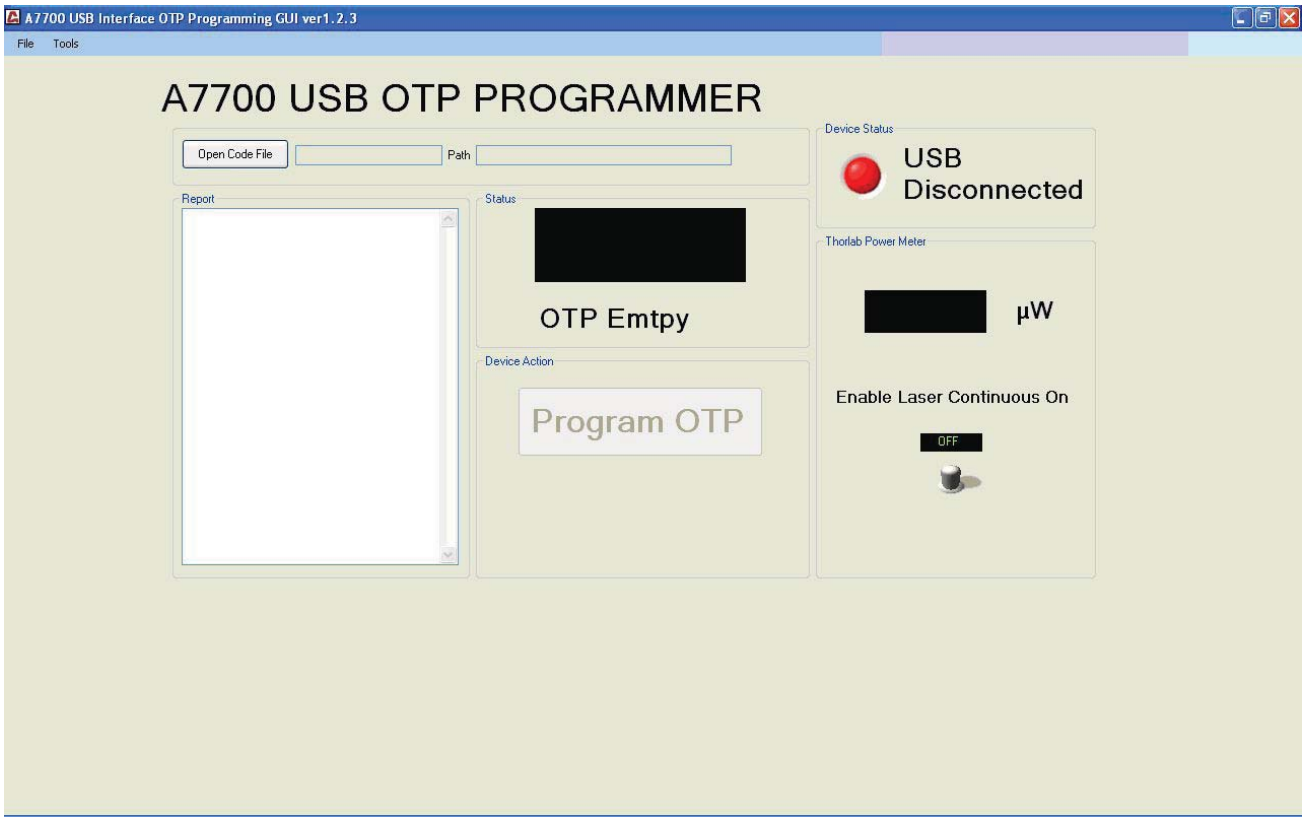


Figure 6. Default GUI

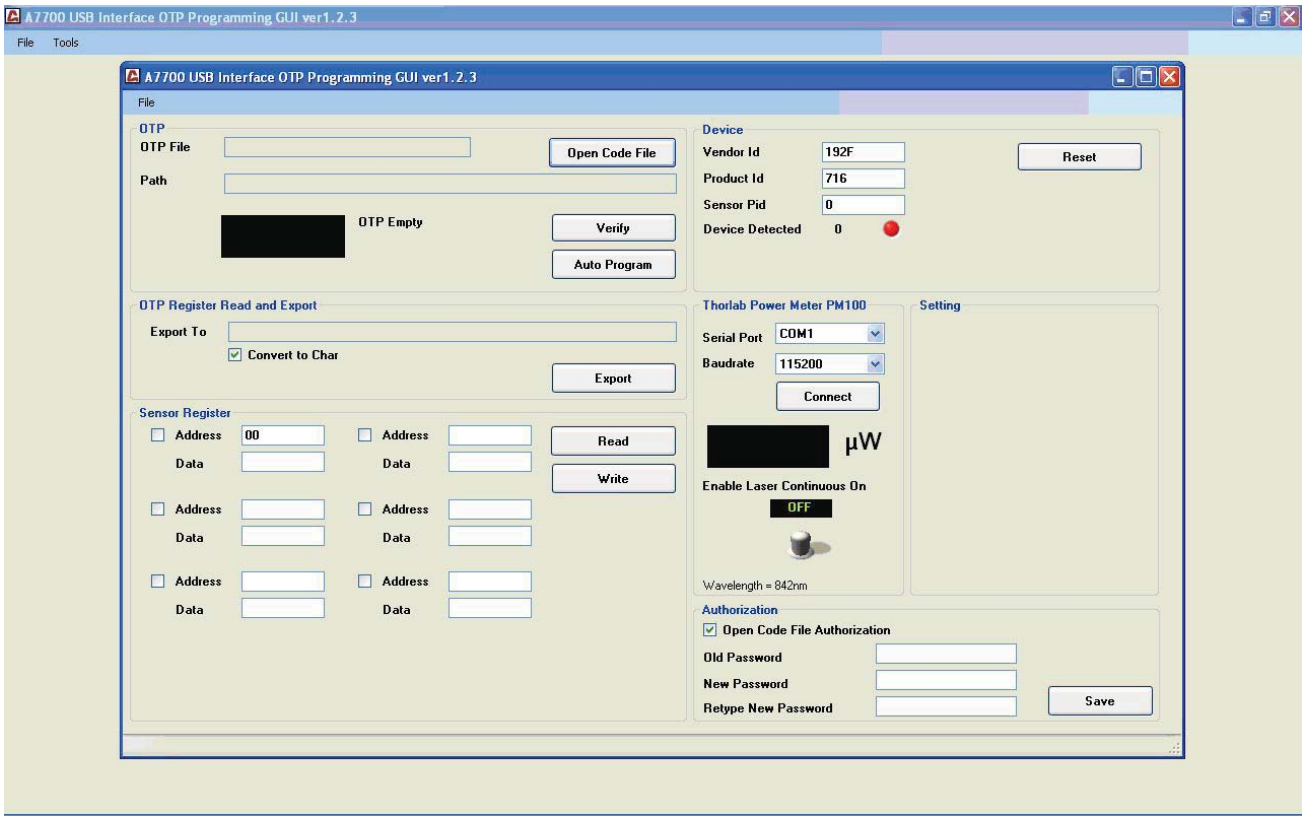


Figure 7. Engineering GUI

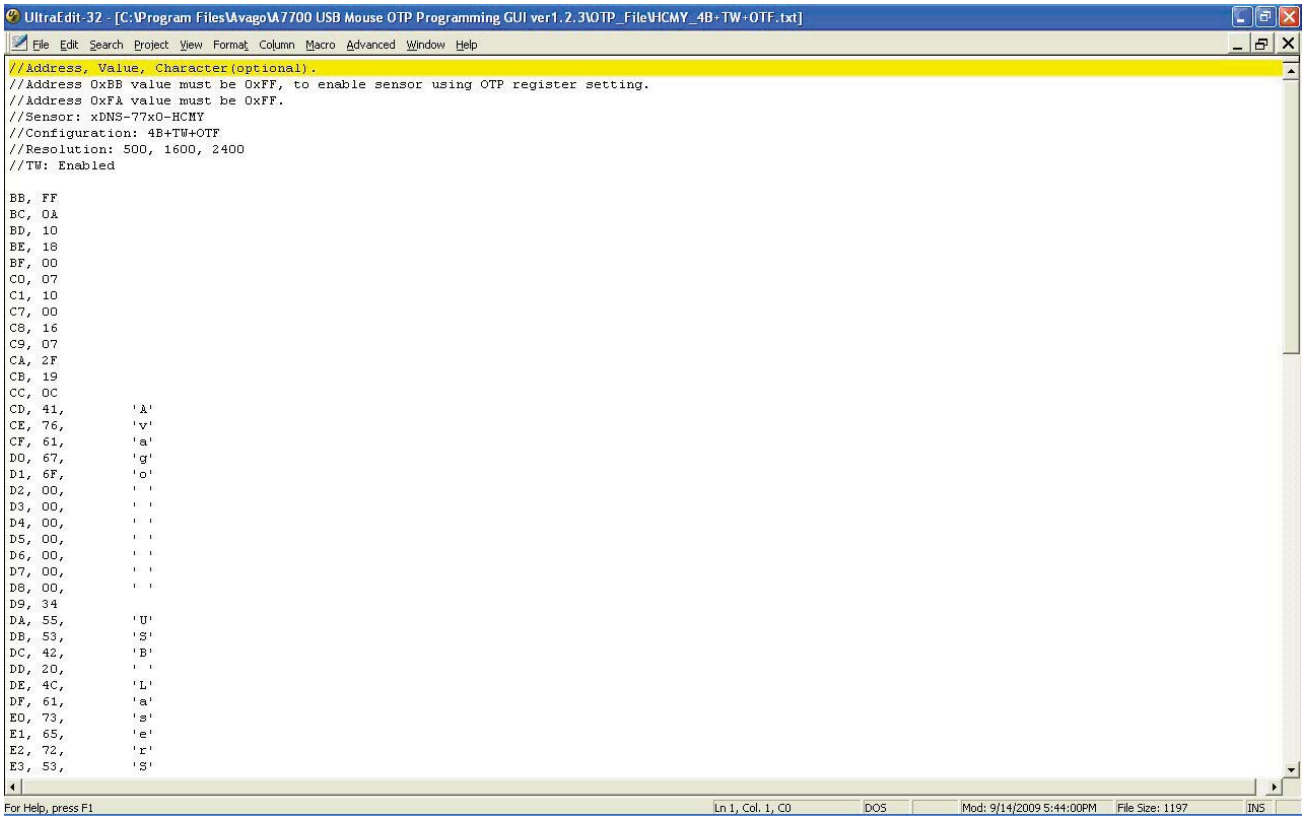
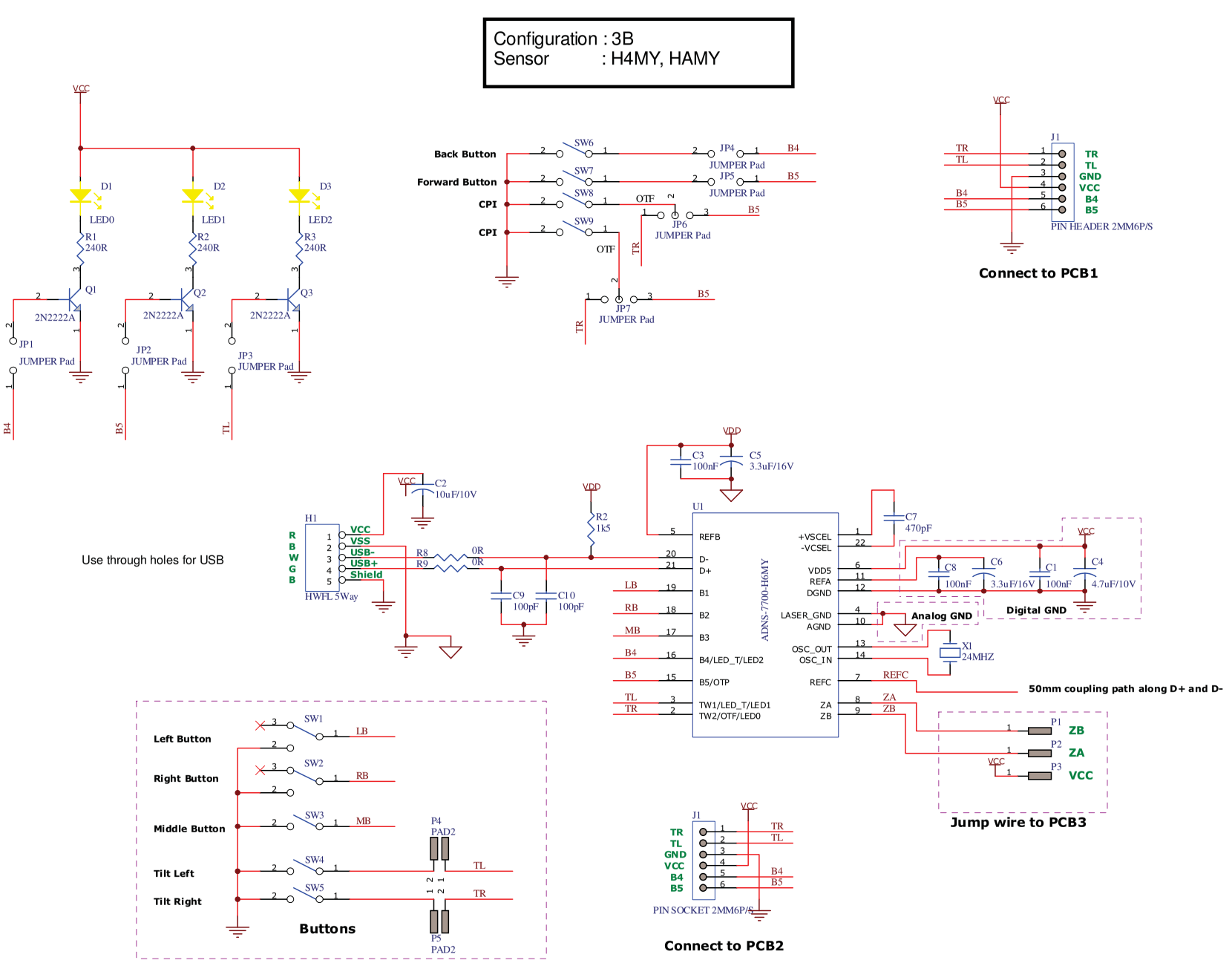
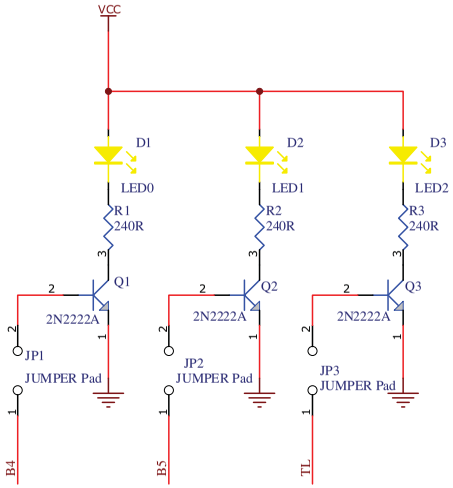


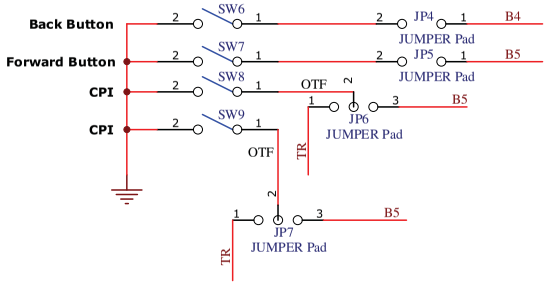
Figure 8. OTP Profile Format

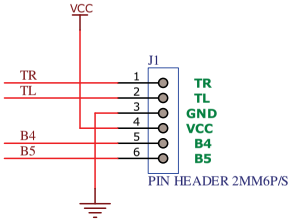
Appendix A: Application Circuits



Configuration : 3B+TW
Sensor : H4MY, HAMY

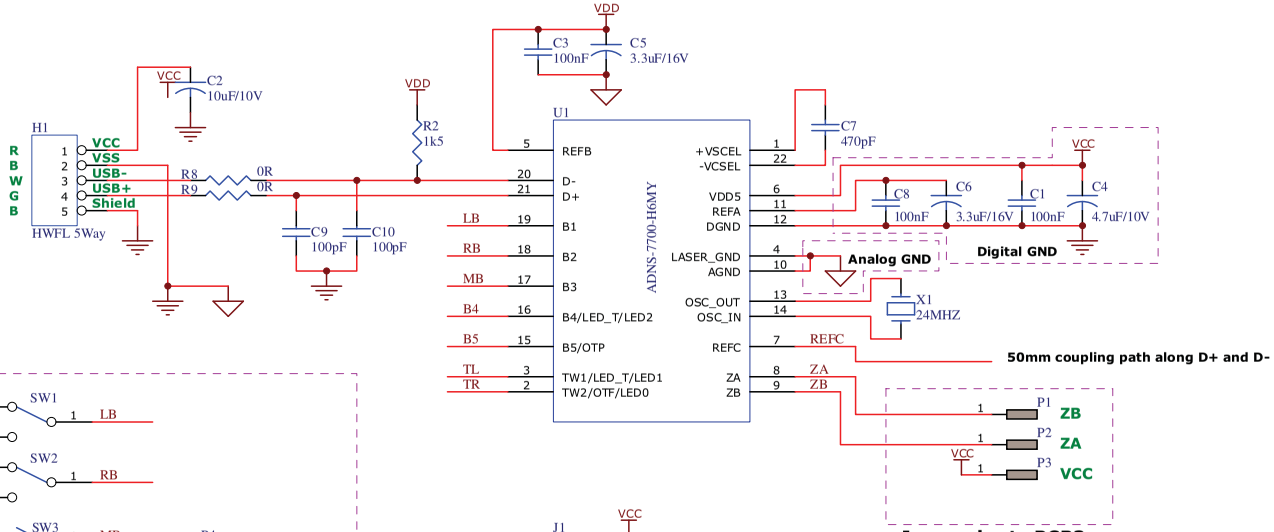




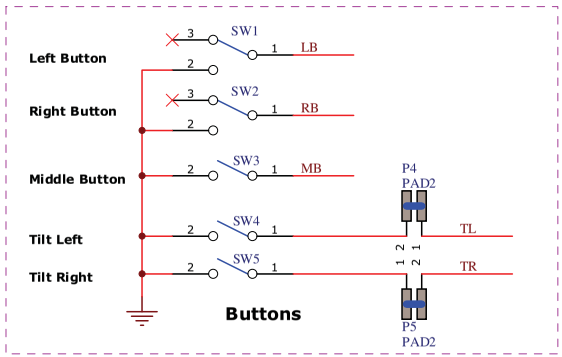


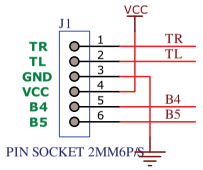
Connect to PCB1

Use through holes for USB

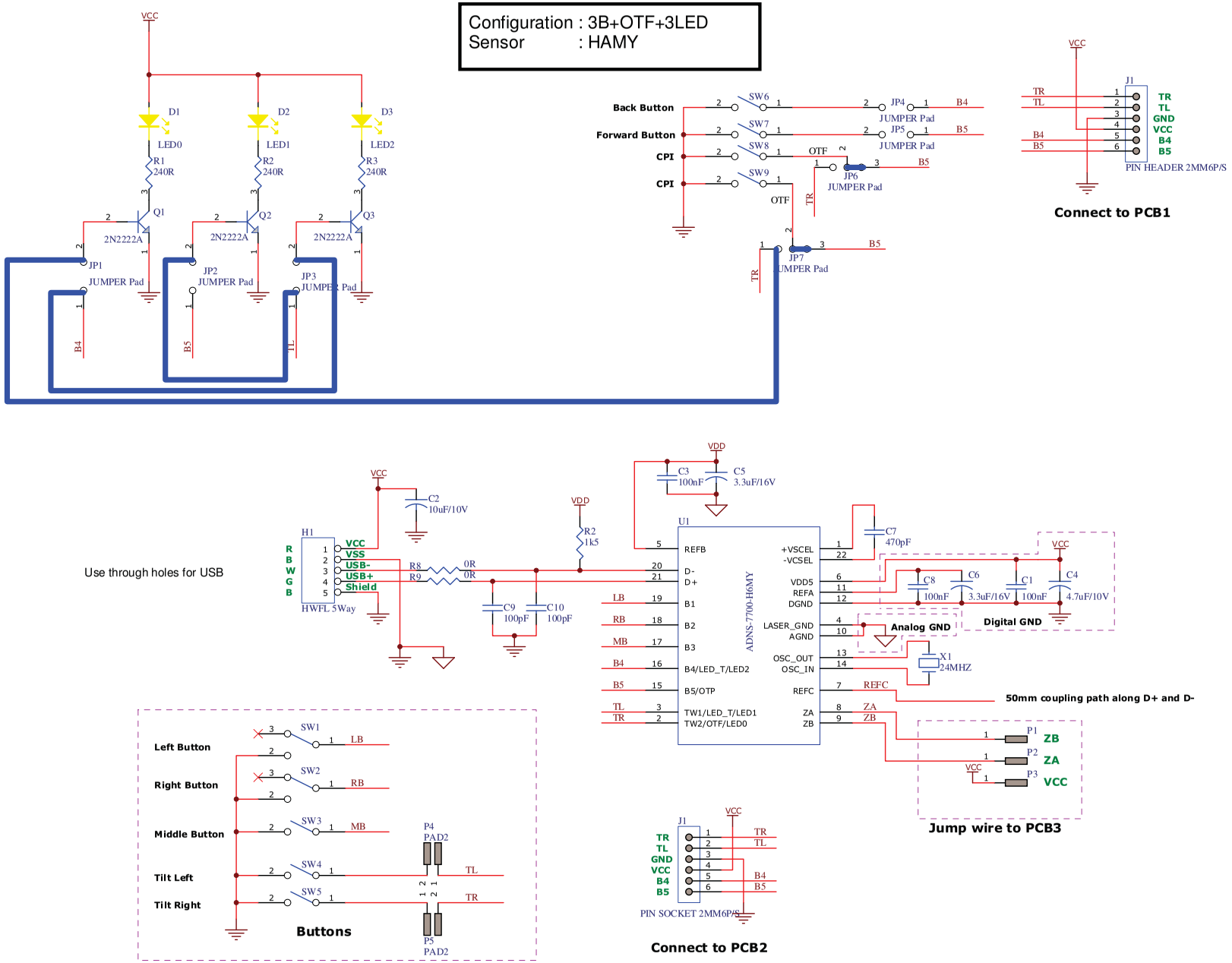


Jump wire to PCB3

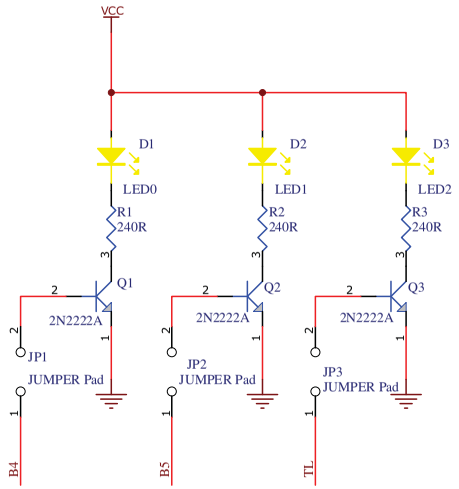


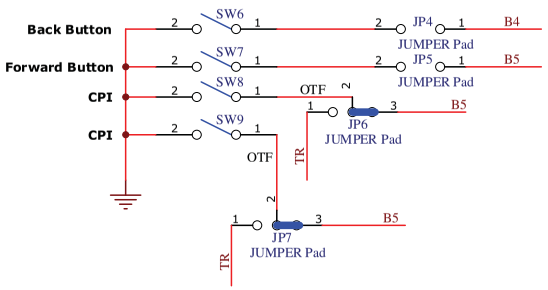


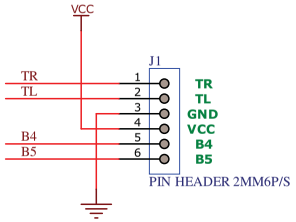
Connect to PCB2


Configuration : 3B+OTF+3LED
Sensor : HAMY
VCC
D1
D2
D3
LED0
LED1
LED2
R1 240R
R2 240R
R3 240R
Q1
Q2
Q3
2N2222A
JP1 JUMPER Pad
JP2 JUMPER Pad
JP3 JUMPER Pad
B4
B5
TL
Back Button
Forward Button
CPI
CPI
SW6
SW7
SW8
SW9
JP4 JUMPER Pad
JP5 JUMPER Pad
JP6 JUMPER Pad
JP7 JUMPER Pad
OTF
TR
J1
TR
TL
GND
VCC
B4
B5
PIN HEADER 2MM6P/S
Connect to PCB1
Use through holes for USB
H1
VCC
VSS
USB-
USB+
Shield
HWFL 5Way
C2 10uF/10V
R8 0R
R9 0R
C9 100pF
C10 100pF
R2 1k5
C3 100nF
C5 3.3uF/16V
U1
ADNS-7700-H6MY
REFB
D-
D+
B1
B2
B3
B4/LED_T/LED2
B5/OTP
TW1/LED_T/LED1
TW2/OTF/LED0
+VSCEL
-VCSEL
VDD5
REFA
DGND
LASER_GND
AGND
OSC_OUT
OSC_IN
REFC
ZA
ZB
C7 470pF
C8 100nF
C6 3.3uF/16V
C1 100nF
C4 4.7uF/10V
Analog GND
Digital GND
X1 24MHZ
50mm coupling path along D+ and D-
P1 ZB
P2 ZA
P3 VCC
Jump wire to PCB3
Left Button
Right Button
Middle Button
Tilt Left
Tilt Right
SW1
SW2
SW3
SW4
SW5
P4 PAD2
P5 PAD2
Buttons
PIN SOCKET 2MM6PS
Connect to PCB2

Configuration : 3B+TW+OTF
Sensor : HAMY

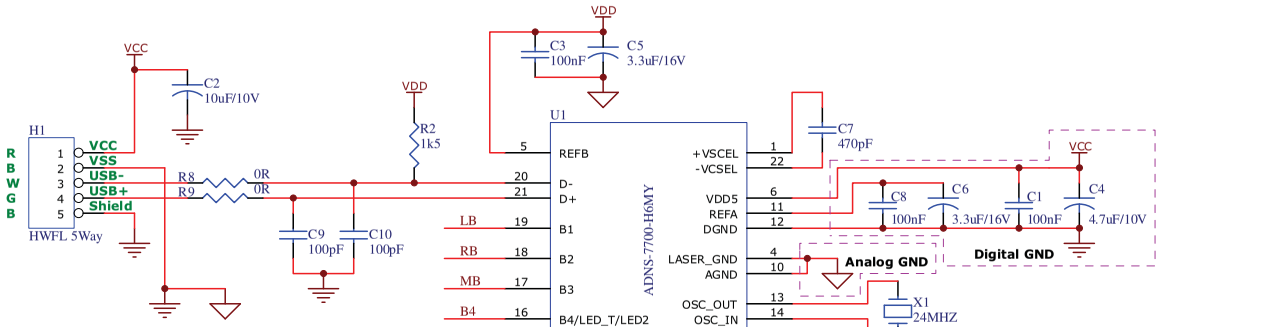




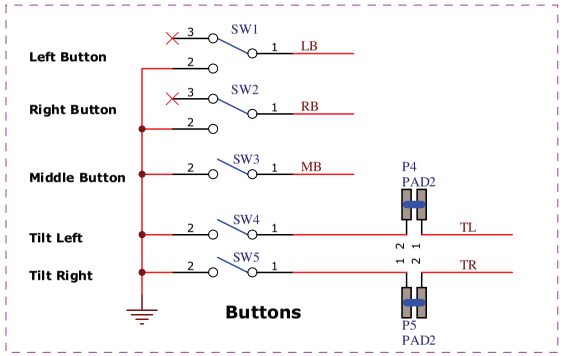


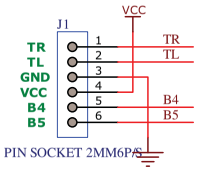
Connect to PCB1

Use through holes for USB



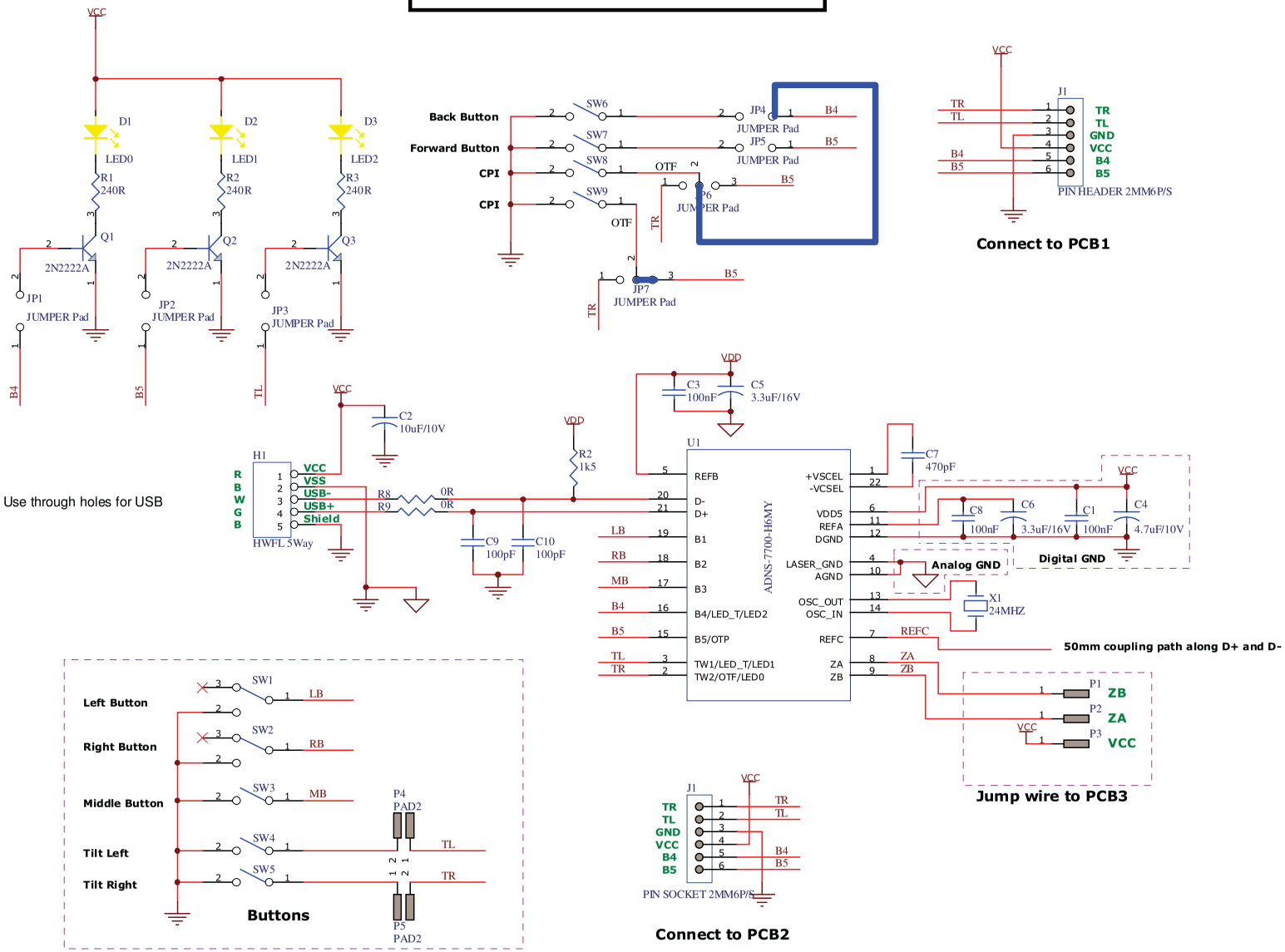
Jump wire to PCB3



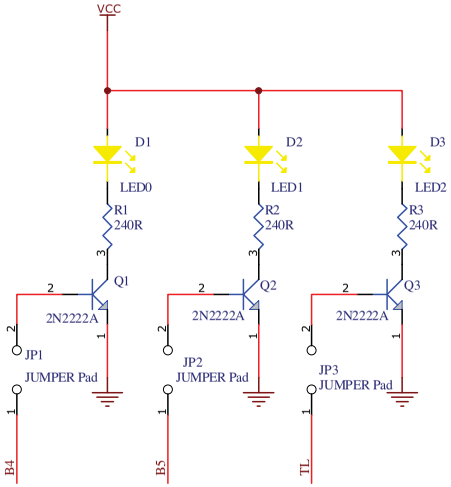


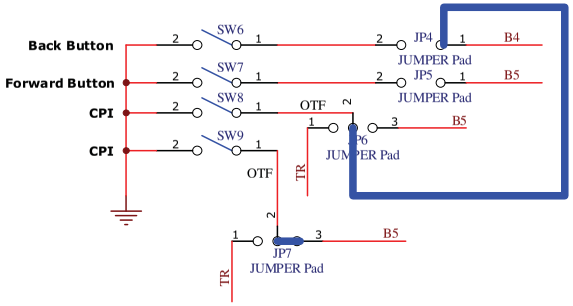
Connect to PCB2

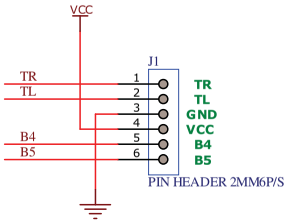
Configuration : 5B
Sensor : HCMY, HMMY



Configuration : 5B+TW
Sensor : HCMY, HMMY

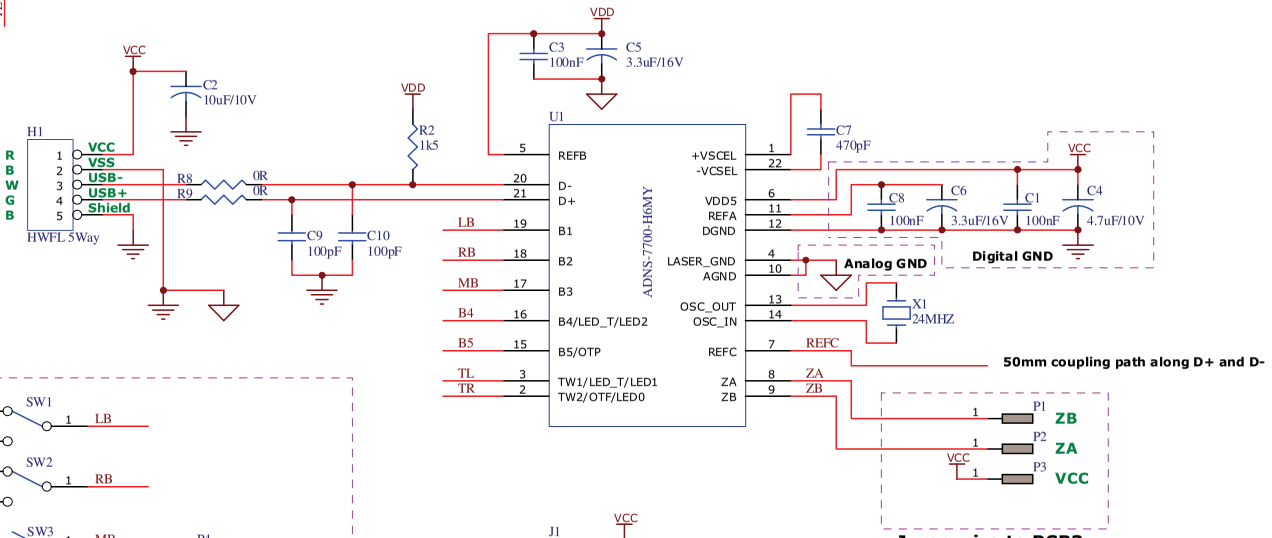




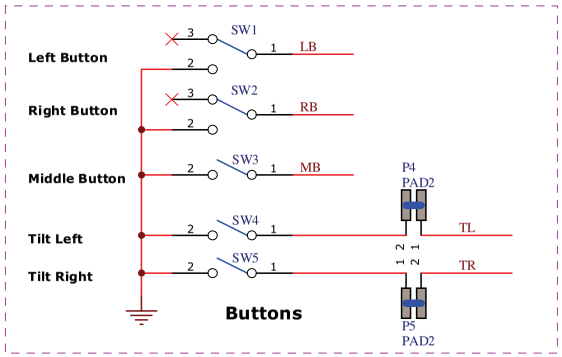


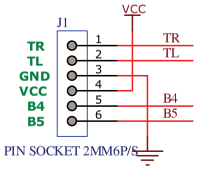
Connect to PCB1

Use through holes for USB

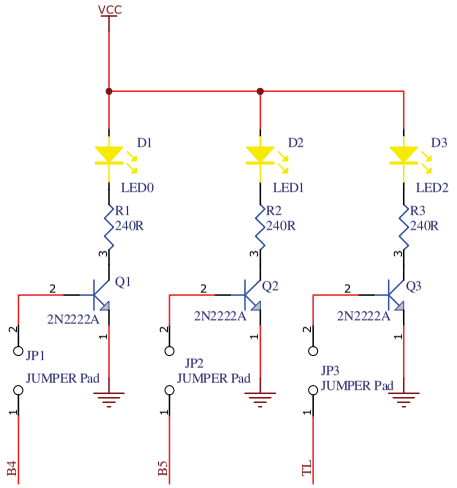


Jump wire to PCB3

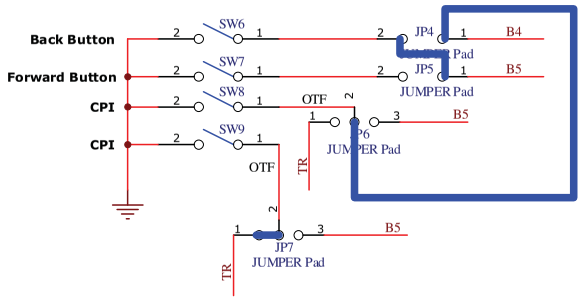


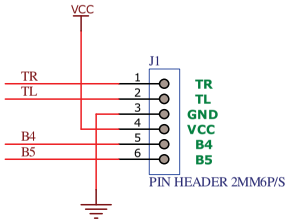


Connect to PCB2



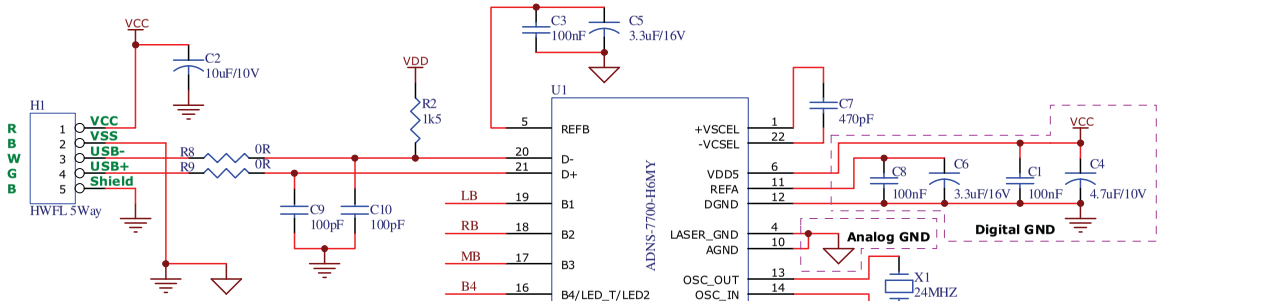
Configuration : 5B+OTF
Sensor : HCMY



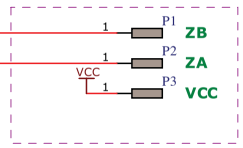


Connect to PCB1

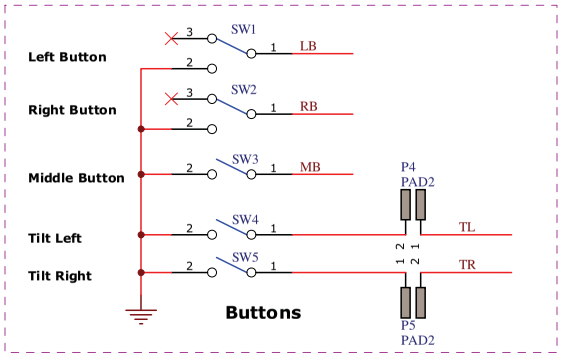
Use through holes for USB

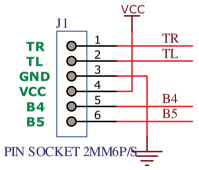


50mm coupling path along D+ and D-

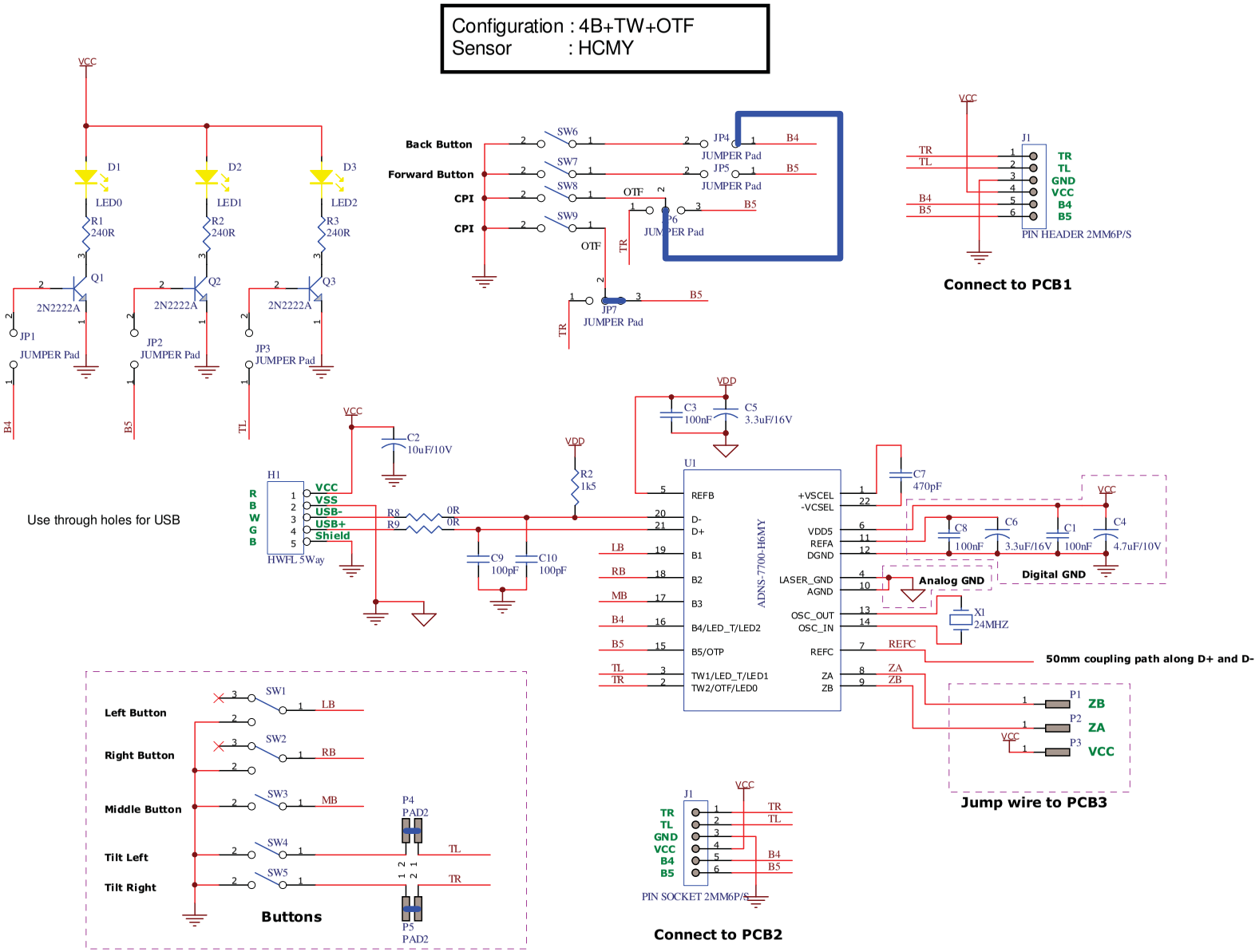


Jump wire to PCB3

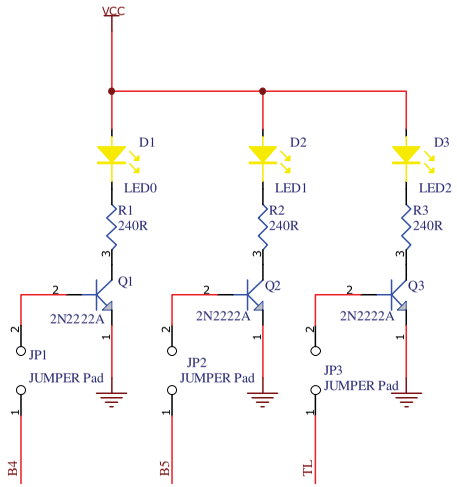


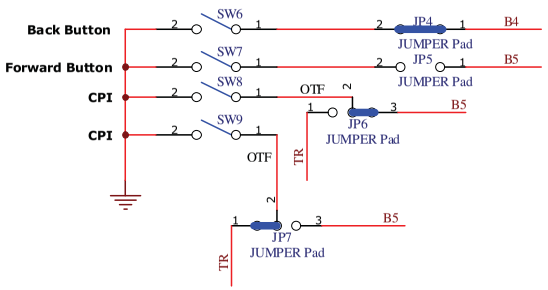


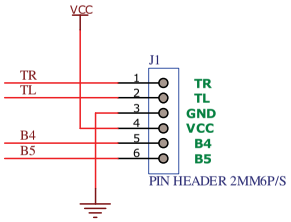
Connect to PCB2


Configuration : 4B+TW+OTF
Sensor : HCMY
VCC
D1
D2
D3
LED0
LED1
LED2
R1 240R
R2 240R
R3 240R
Q1
Q2
Q3
2N2222A
JP1 JUMPER Pad
JP2 JUMPER Pad
JP3 JUMPER Pad
B4
B5
TL
Back Button
Forward Button
CPI
CPI
SW6
SW7
SW8
SW9
JP4 JUMPER Pad
JP5 JUMPER Pad
JP6 JUMPER Pad
JP7 JUMPER Pad
OTF
TR
Connect to PCB1
J1
TR
TL
GND
VCC
B4
B5
PIN HEADER 2MM6P/S
VDD
C3 100nF
C5 3.3uF/16V
C2 10uF/10V
R2 1k5
U1
H1
VCC
VSS
USB-
USB+
Shield
HWFL 5Way
Use through holes for USB
R8 0R
R9 0R
C9 100pF
C10 100pF
REFB
D-
D+
B1
B2
B3
B4/LED_T/LED2
B5/OTP
TW1/LED_T/LED1
TW2/OTF/LED0
ADNS-7700-H6MY
+VCSEL
-VCSEL
VDD5
REFA
DGND
LASER_GND
AGND
OSC_OUT
OSC_IN
REFC
ZA
ZB
C7 470pF
C8 100nF
C6 3.3uF/16V
C1 100nF
C4 4.7uF/10V
Analog GND
Digital GND
Xl 24MHZ
50mm coupling path along D+ and D-
P1 ZB
P2 ZA
P3 VCC
Jump wire to PCB3
Left Button
Right Button
Middle Button
Tilt Left
Tilt Right
SW1
SW2
SW3
SW4
SW5
P4 PAD2
P5 PAD2
Buttons
Connect to PCB2
PIN SOCKET 2MM6P/S

Configuration : 5B+KM1/OTF_L
Sensor : HMMY

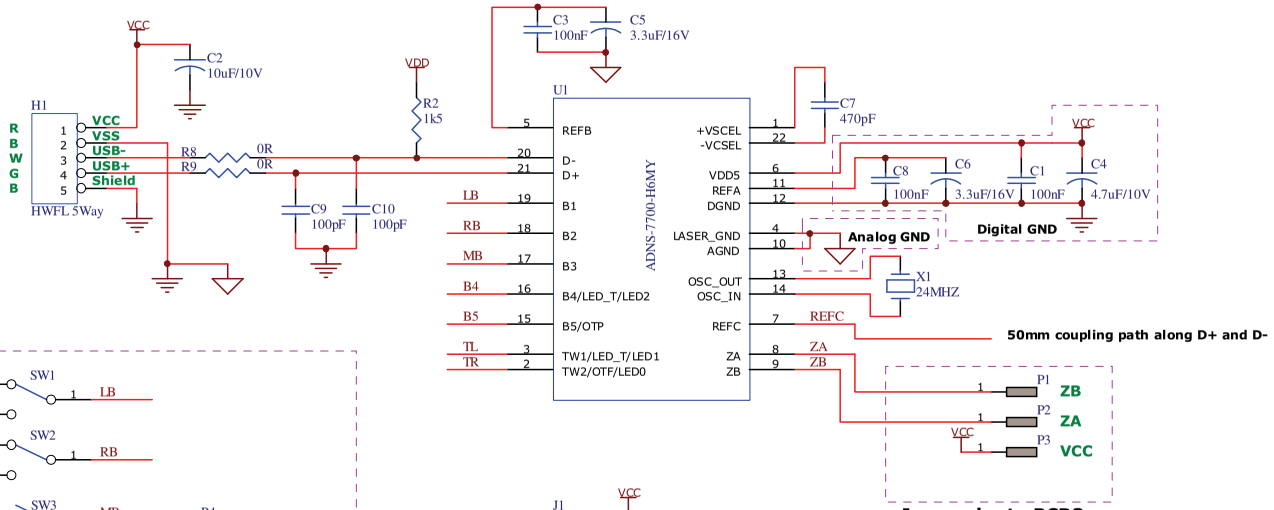




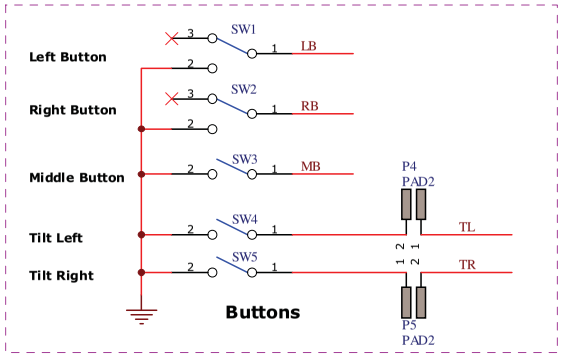


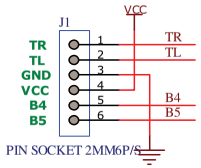
Connect to PCB1

Use through holes for USB



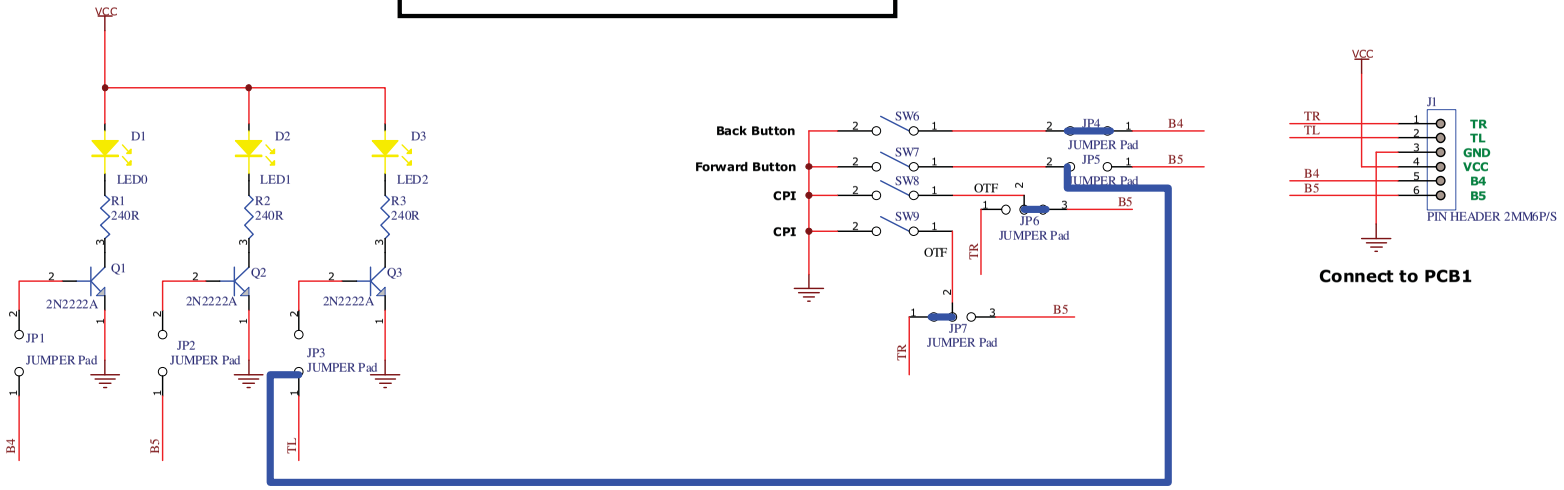
Jump wire to PCB3





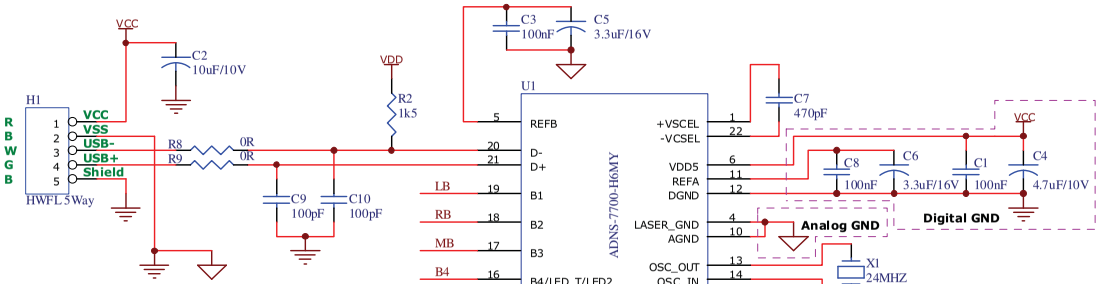
Connect to PCB2

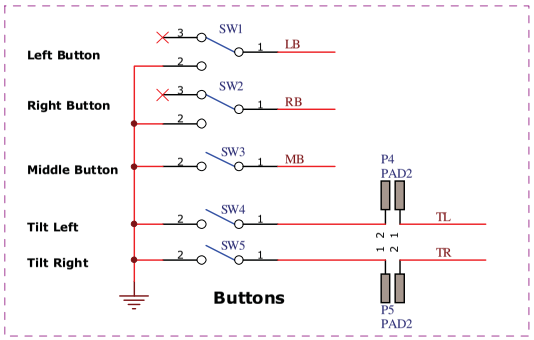
Configuration : 5B+KM1/OTF_L+KM2
Sensor : HMMY

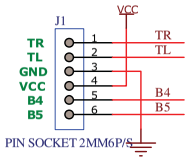


Connect to PCB1

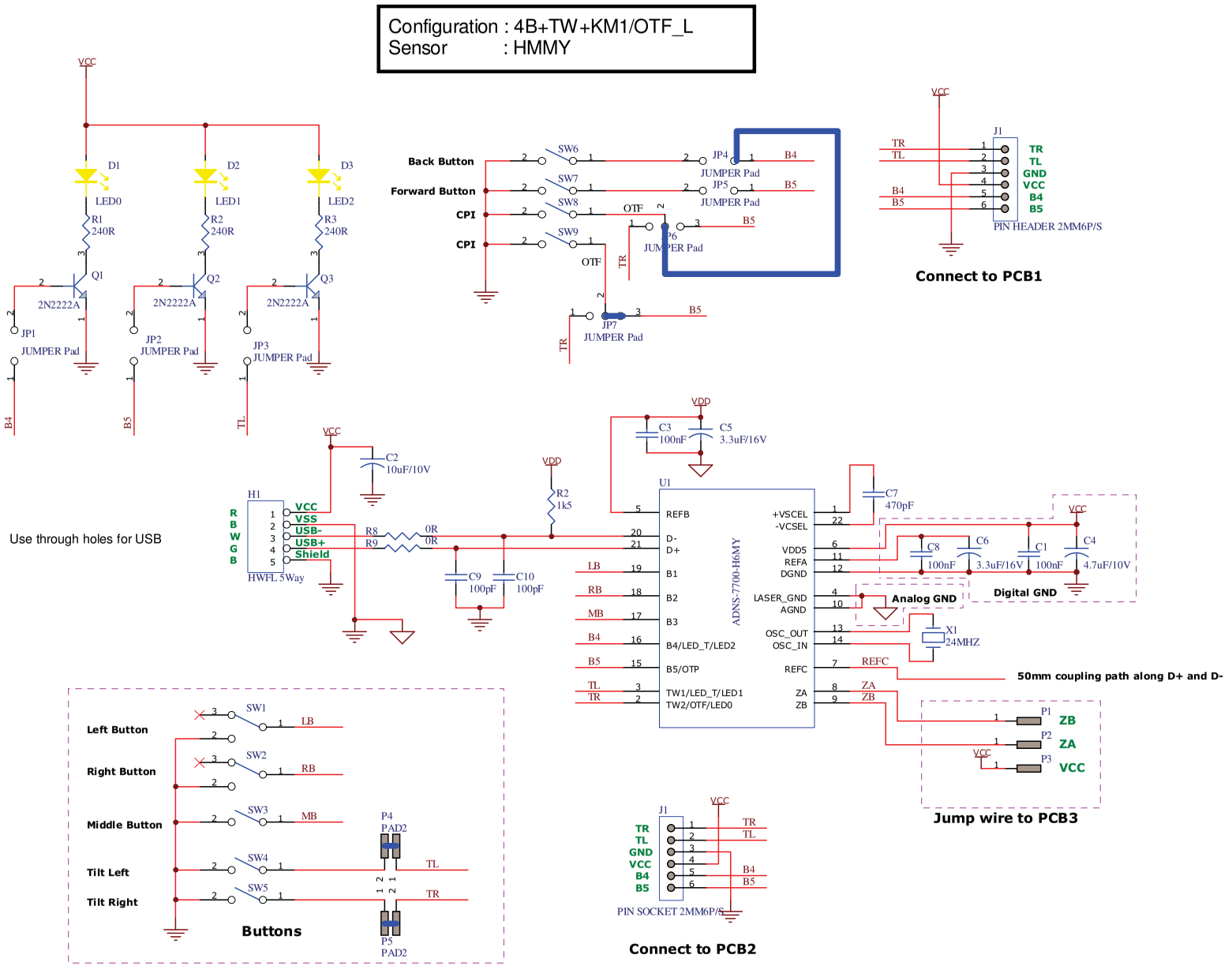
Use through holes for USB



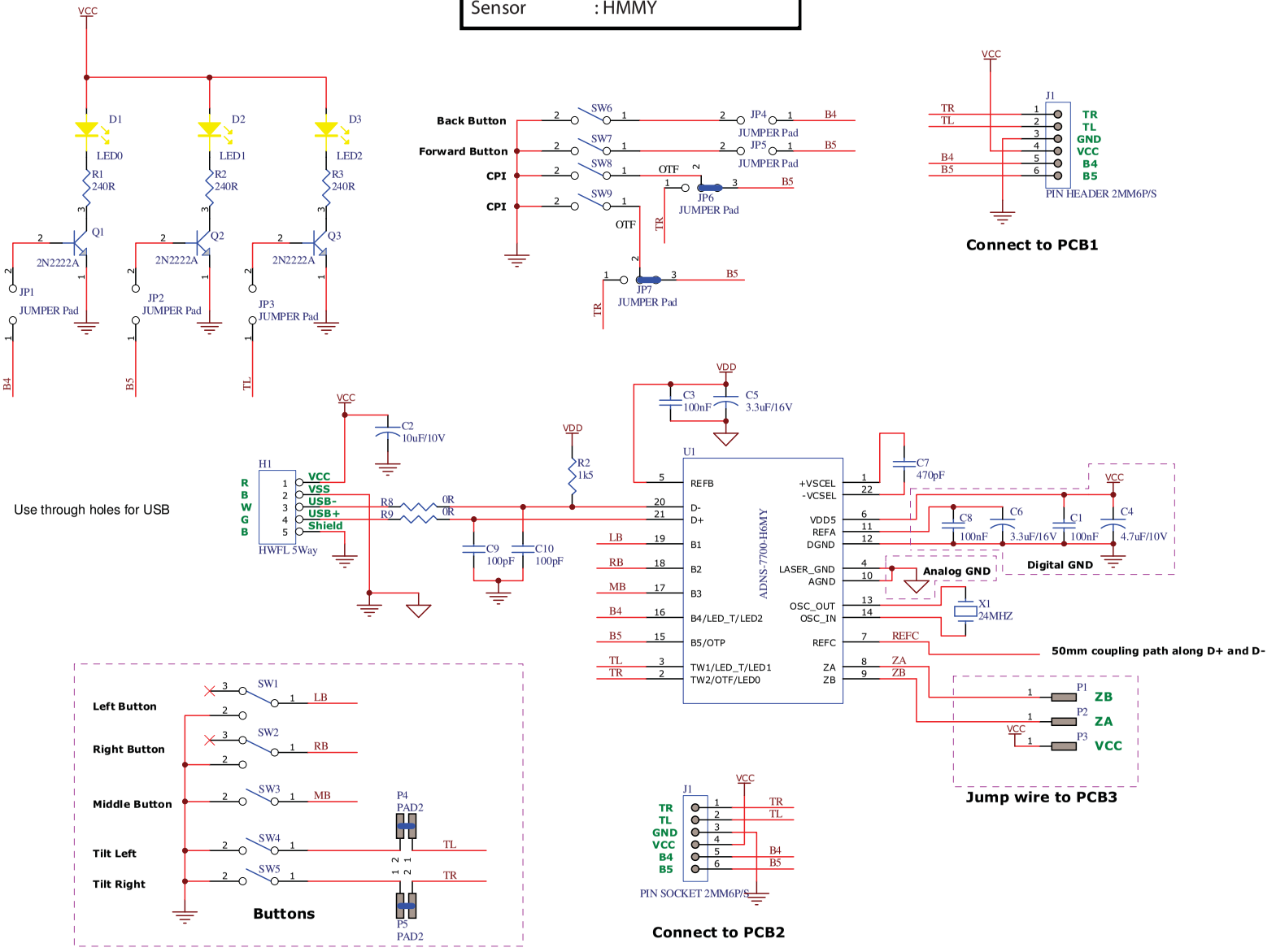




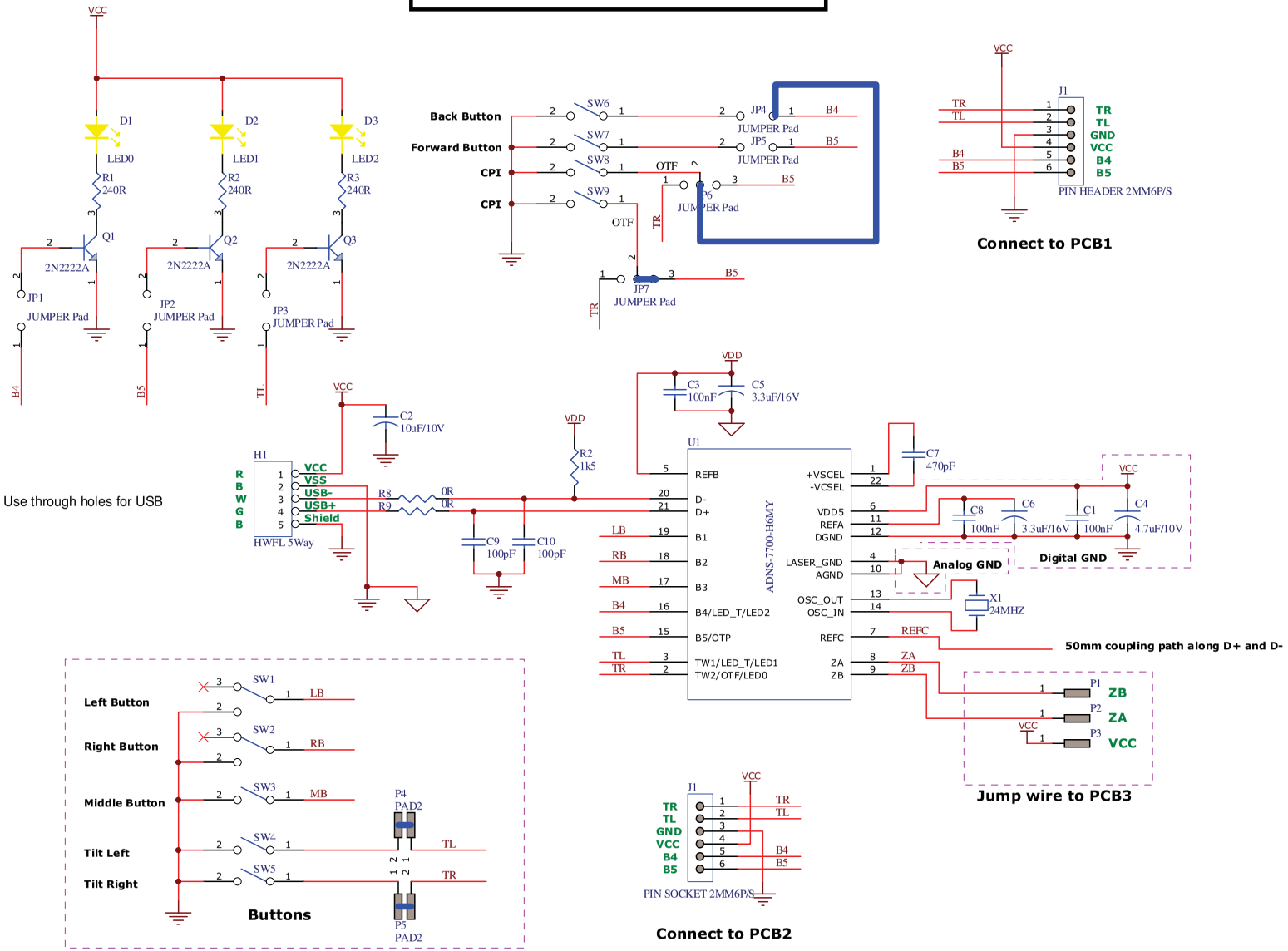
Connect to PCB2


Configuration : 4B+TW+KM1/OTF_L
Sensor : HMMY
VCC
D1
D2
D3
LED0
LED1
LED2
R1 240R
R2 240R
R3 240R
Q1
Q2
Q3
2N2222A
JP1 JUMPER Pad
JP2 JUMPER Pad
JP3 JUMPER Pad
B4
B5
TL
Back Button
Forward Button
CPI
CPI
SW6
SW7
SW8
SW9
JP4 JUMPER Pad
JP5 JUMPER Pad
JP6 JUMPER Pad
JP7 JUMPER Pad
OTF
TR
J1
PIN HEADER 2MM6P/S
Connect to PCB1
VDD
C3 100nF
C5 3.3uF/16V
C2 10uF/10V
H1
HWFL 5Way
VCC
VSS
USB-
USB+
Shield
R8 0R
R9 0R
R2 1k5
C9 100pF
C10 100pF
U1
ADNS-7700-H6MY
REFB
D-
D+
B1
B2
B3
B4/LED_T/LED2
B5/OTP
TW1/LED_T/LED1
TW2/OTF/LED0
+VSCEL
-VCSEL
VDD5
REFA
DGND
LASER_GND
AGND
OSC_OUT
OSC_IN
REFC
ZA
ZB
C7 470pF
C8 100nF
C6 3.3uF/16V
C1 100nF
C4 4.7uF/10V
Analog GND
Digital GND
X1 24MHZ
50mm coupling path along D+ and D-
P1 ZB
P2 ZA
P3 VCC
Jump wire to PCB3
Use through holes for USB
Left Button
Right Button
Middle Button
Tilt Left
Tilt Right
SW1
SW2
SW3
SW4
SW5
P4 PAD2
P5 PAD2
Buttons
PIN SOCKET 2MM6P/S
Connect to PCB2

Configuration : 3B+TW+KM1/OTF_L
Sensor : HMMY



Configuration : 3B+TW+KM1/OTF_L+KM2
Sensor : HMMY



Appendix B: Bill of Materials (BOM)

Main Board (PCB 1)

No	Description	Value/Color	F.Print	Qty	Designator
01.	Resistor	0R	0603 [SMD]	2	R8.R9
02.	Resistor	1k5 1%	0805 [SMD]	1	R2
03.	Capacitor Ceramic	100pF	Radial (7.6x5)	2	C9.C10
04.	Capacitor Ceramic	470pF	Radial (7.6x5)	1	C7
05.	Capacitor Ceramic	100nF	Radial (7.6x5)	3	C1.C3.C8
06.	Capacitor Electrolytic	3.3uF, 16V	Radial (6.8x4)	2	C5.C6
07.	Capacitor Electrolytic	4.7uF, 16V	Radial (6.8x5)	1	C4
08.	Capacitor Electrolytic	10uF, 10V	Radial (6.8x5)	1	C2
09.	IC Sensor	A7700	20pin (18pin)	1	U1
10.	IC – Crystal	24Mhz	DIP	1	X1
11.	Connector – PCB Socket Straight	6 Way, Single Row	2mm	1	J1
12.	Connector – RCPT Pin (Small)	–	1.02mm	18	For Sensor
13.	Cable – USB	1 meter	5 Way	1	H1
14.	Jumper Wire	–	–	–	–
15.	Switch – Micro OMRON	3 Way	Straight	2	SW1.SW2
16.	Switch – Push Button	–	DIP	3	SW3.SW4.SW5

Button Board (PCB 2)

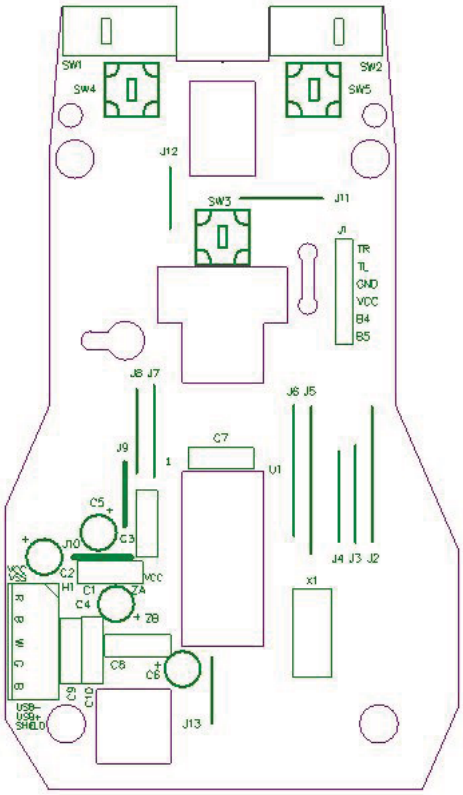
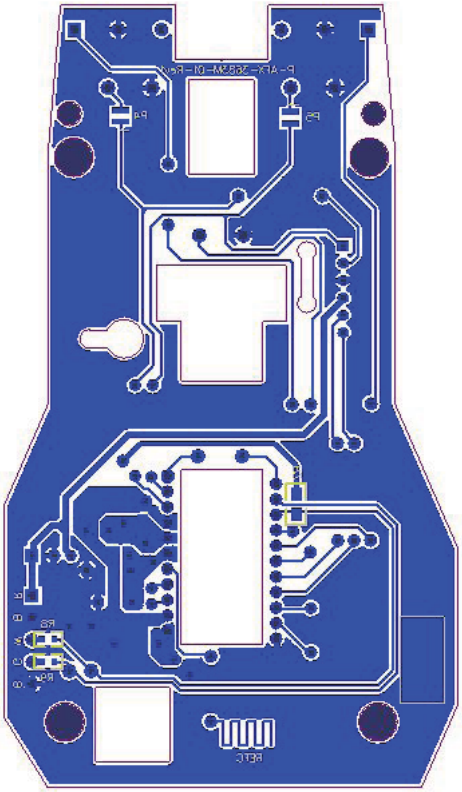
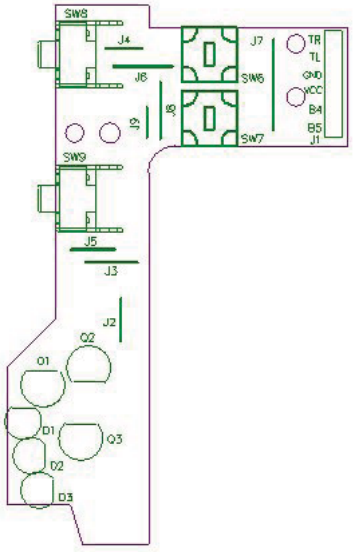
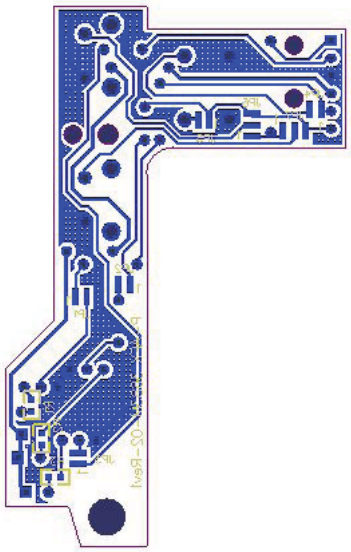
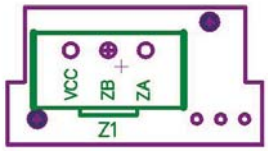
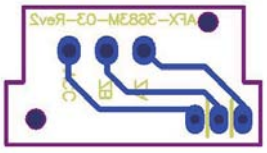
No	Description	Value/Color	F.Print	Qty	Designator
01.	Connector – Pin Header Straight	6 Way S.Row	2mm	1	J1
02.	Switch – Push Button	–	DIP	2	SW8.SW9
03.	Switch – Push Button Tactile	–	DIP	2	SW6.SW7
04.	Resistor	240R	0603	3	R1.R2.R3
05.	Transistor NPN 2N2222AG		TO-92	3	Q1.Q2.Q3
06.	LED	Yellow	3mm	3	D1.D2.D3

Z-Encoder Board (PCB 3)

No	Description	Value/Color	F.Print	Qty	Designator
01.	Z Encoder	3 Way	DIP	1	Z1

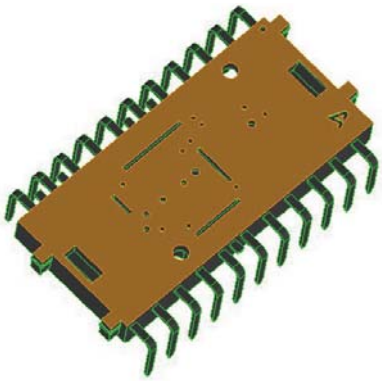
No	Description	Value/Color	F.Print	Qty	Designator
01.	Mouse casing top layer 1	–	–	1	
02.	Mouse casing top layer 2	–	–	1	
03.	Mouse casing top layer 3	–	–	1	
04.	Mouse casing bottom layer	–	–	1	
05.	ADNS-6180-002 Lens	–	–	1	
06.	Z-wheel	–	–	1	
07.	Screw	–	–	4	

Appendix C: PCB Layout

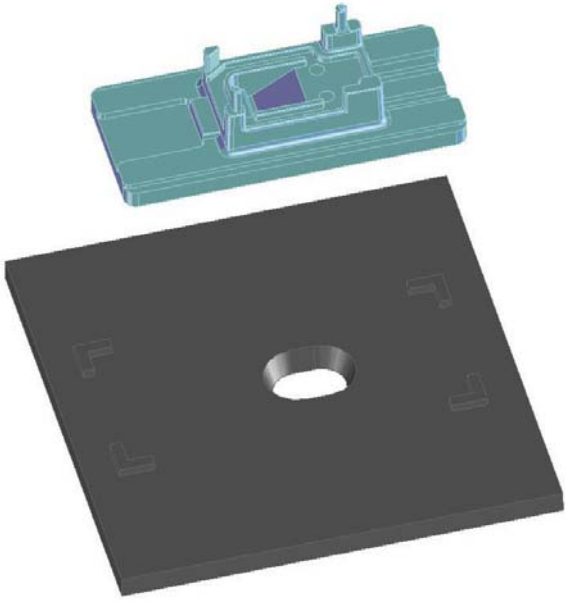
	Top Assembly	Bottom Assembly
PCB 1		
PCB 2		
PCB 3		

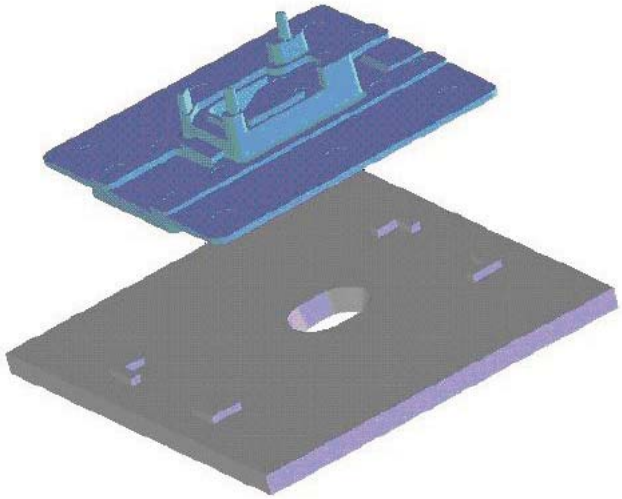
Appendix D: 3D Model Illustrations

ADNS-7700 Sensor



Base plate mounting features for ADNS-6180-001 trim lens and ADNS-6180-002 wide trim len





Appendix E: Kit Components

Part Number	Description	Name	Quantity
ADNK-7703	USB LaserStream™ Mouse	Mouse	1
ADNS-7700-HAMY	One Chip USB LaserStream™ Sensor	Sensor	3
ADNS-7700-HCMY	One Chip USB LaserStream™ Sensor	Sensor	3
ADNS-7700-HMMY	One Chip USB LaserStream™ Sensor	Sensor	3
ADNS-6180-001	Laser Mouse Trim Lens Plate	Lens	9
ADNS-6180-002	Laser Mouse Trim Wide Lens Plate	Lens	9
CD	Includes Documentation and Support Files for ADNK-7703	CD	1

Documentation

a. ADNS-7700 One Chip USB LaserStream™ Sensor Data Sheet
b. ADNS-6180-001Trim Lens Data Sheet
c. ADNS-6180-002 Trim Wide Lens Data Sheet
d. ADNK-7703 USB LaserStream Mouse Designer's Kit Design Guide
e. ADNS-7700 Eye Safety Application Note
f. ADNS-7700 System Design Recommendation Application Note
g. ADNS-7700 USB Command Details Application Note
h. ADNS-7700 HID Report and Descriptor Details Application Note

Hardware Support Files

a. ADNK-7703 BOM List
b. ADNK-7703 Schematic
c. ADNK-7703 Gerber Files
d. 3D Model Files: ADNS-7700, ADNS-6180-001, ADNS-6180-002 & Base Plate Feature

Software Support Files

a. OTP Programming Reference Software

For product information and a complete list of distributors, please go to our web site: **www.avagotech.com**

AV02-2201EN - November 6, 2009