ADNK-6033-CC24
USB 2.4GHz RF Wireless Laser Mouse Designer's Kit

Product Overview

Description

Avago Technologies and Chipcon have joined forces to produce a new wireless laser mouse reference design kit. Based on the new Avago Technologies ADNS-6030 low power laser mouse sensor, Chipcon's RadioDesk™ with CC2500 2.4GHz RF transceiver, and Holtek Semiconductor HT82K68E and HT82K96E microcontrollers, this reference design kit provides a low cost, power efficient and feature-rich solution in one neat package.

The Avago Technologies ADNS-6030 low power laser mouse sensor, an 18-pin staggered dual inline package (DIP), is based on LaserStream Technology, which measures changes in position by optically acquiring sequential surface images (frames) and mathematically determining the direction and magnitude of movement. Its high-performance, low power architecture is capable of sensing high-speed mouse motion while prolonging battery life, two performance areas essential in demanding wireless applications.

The ADNS-6030 sensor along with the ADNS-6120 or ADNS-6130-001 lens, ADNS-6230-001 clip and ADNV-6330 VCSEL form a complete and compact laser mouse tracking system. There is no moving part, which means high reliability and less maintenance for the end user. In addition, precision optical alignment is not required, facilitating high volume assembly.

Features

- Complete wireless laser mouse reference design kit
- Windows® 98SE, Windows 2000 and Windows XP compatibility
- USB 1.1 low-speed compliance
- User identity code to avoid conflict with other devices
- A high data rate 2.4GHz RF link
- Transmission data rate of 250Kbps
- 15 meters communication distance
- Avago Technologies' new LaserStream Technology
- Smooth surface navigation
- High speed motion detection up to 20ips and 8G
- 800cpi resolution
- Self-adjusting power-saving modes for longest battery life
- Laser fault detect circuitry on-chip in the navigation sensor for Eye Safety Compliance
- No mechanical moving parts
- Minimal number of passive components
- High reliability

The CC2500 is a single chip 2.4GHz transceiver designed for very low power wireless applications. The circuit is intended for the ISM and SRD frequency band at 2400MHz-2483.5MHz. The RF transceiver is integrated with a highly configurable baseband modem which has a configurable data rate up to 500kbps. CC2500 provides extensive hardware support for packet handling, data buffering, burst transmissions, clear channel assessment, link quality indication and wake on radio. The main operating parameters and the 64-byte transmit/receive FIFOs of CC2500 can be controlled via an SPI interface.

The Holtek HT82K68E is an 8-bit high performance peripheral interface OTP microcontroller, designed for multiple I/O product and HT68K96E are the 8-bit high performance RISC-like microcontroller designed for USB product applications. A HALT feature is included in both HT82K68E and HT68K96E to reduce power consumption.

This kit is connectable to a PC via the USB port. It is based on the 2.4 GHz RF technology, the data generated from displacement detection/button status in the laser mouse is encoded with a pre-defined serial type protocol handled by firmware in the MCU. In the RF stage, the encoded data is used for FSK modulation. The captured data from the RF receiver stage is decoded with a corresponding packet format used for mouse applications. The final data is sent to the host through the USB interface.
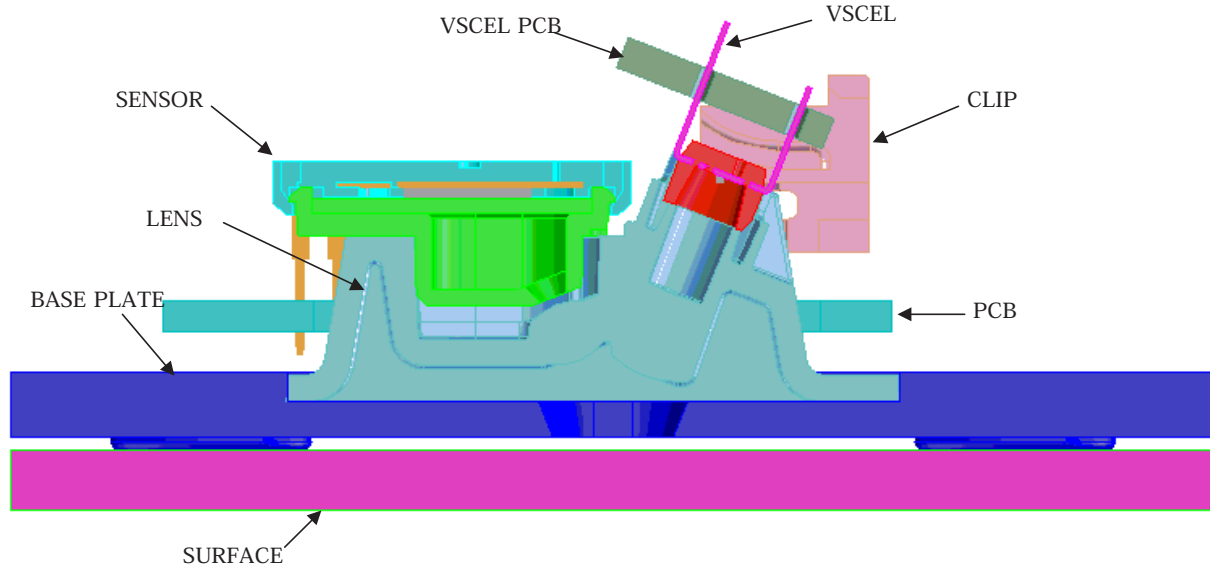

Figure 1. Sectional view of PCB assembly highlighting all laser mouse components (laser mouse sensor, clip, lens, VCSEL, PCB, and base plate)

Schematic Design of ADNK-6033-CC24 Designer's Kit Wireless Laser Mouse
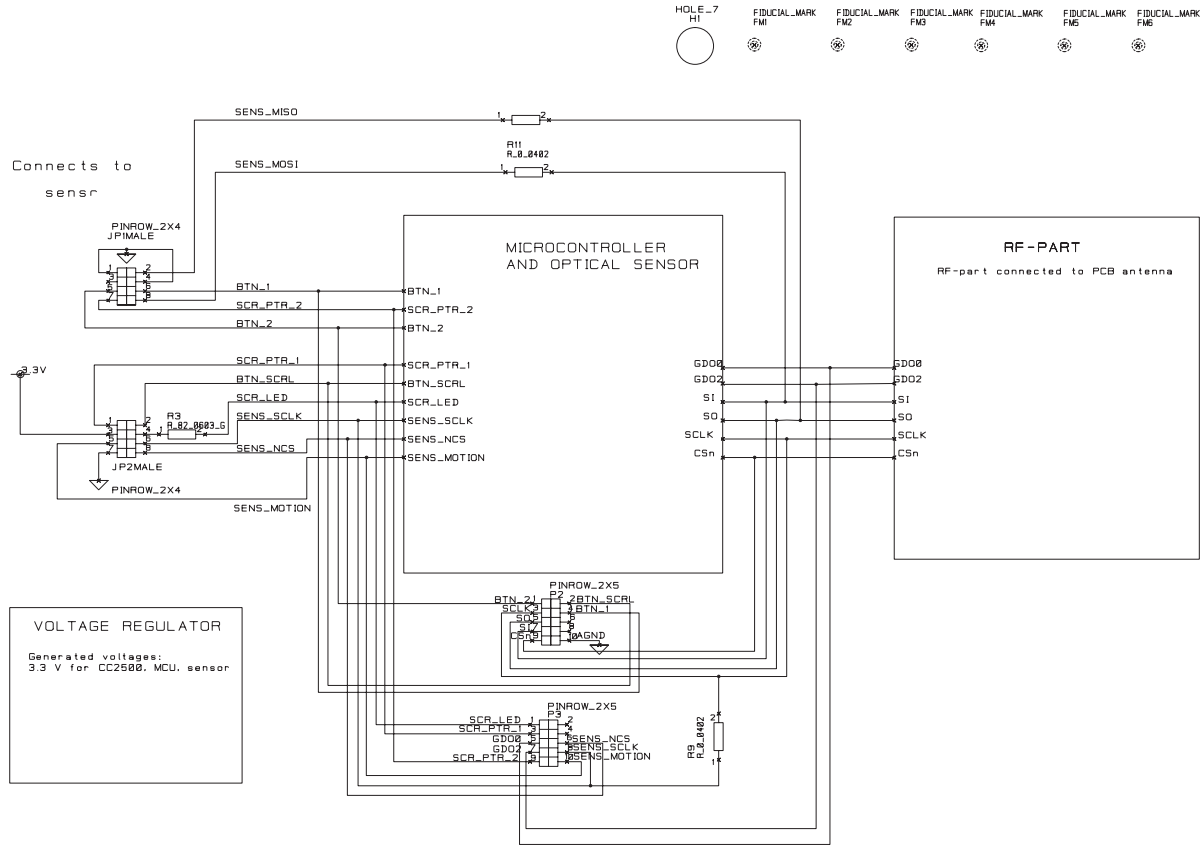

Figure 2. Overall Circuit-level block diagram for ADNK-6033-CC24 designer's kit wireless laser mouse
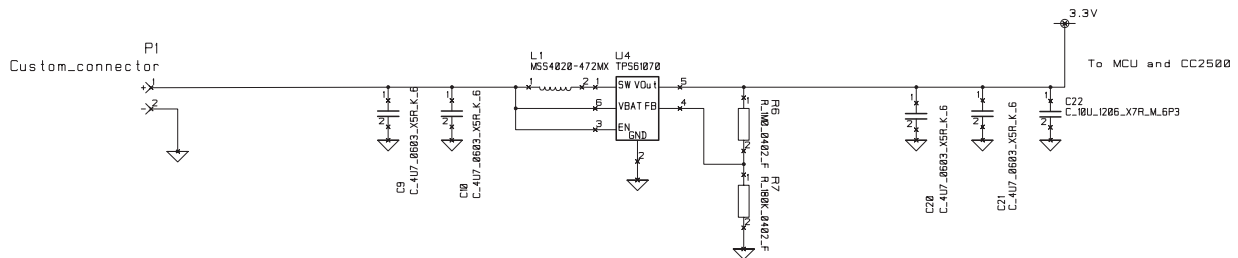

Figure 3. Circuit diagram of voltage regulator schematic in ADNK-6033-CC24 designer's kit wireless laser mouse
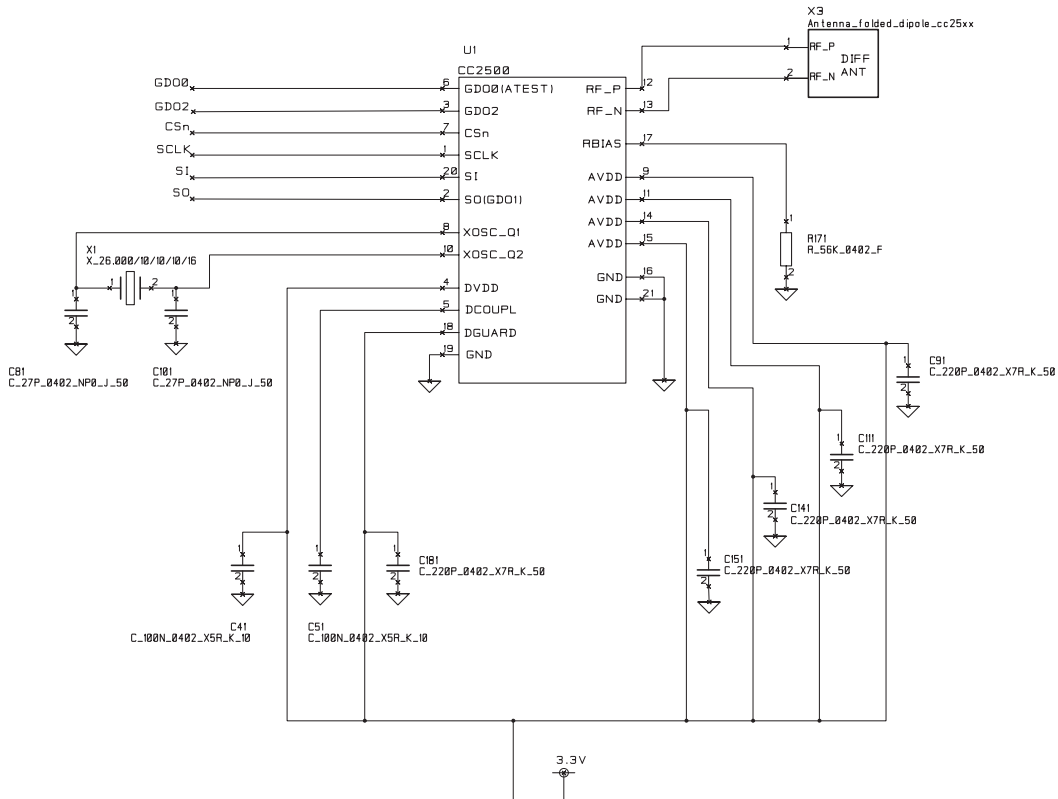
Figure 4. Circuit diagram of CC2500 RF transceiver schematic in ADNK-6033-CC24 designer's kit wireless laser mouse
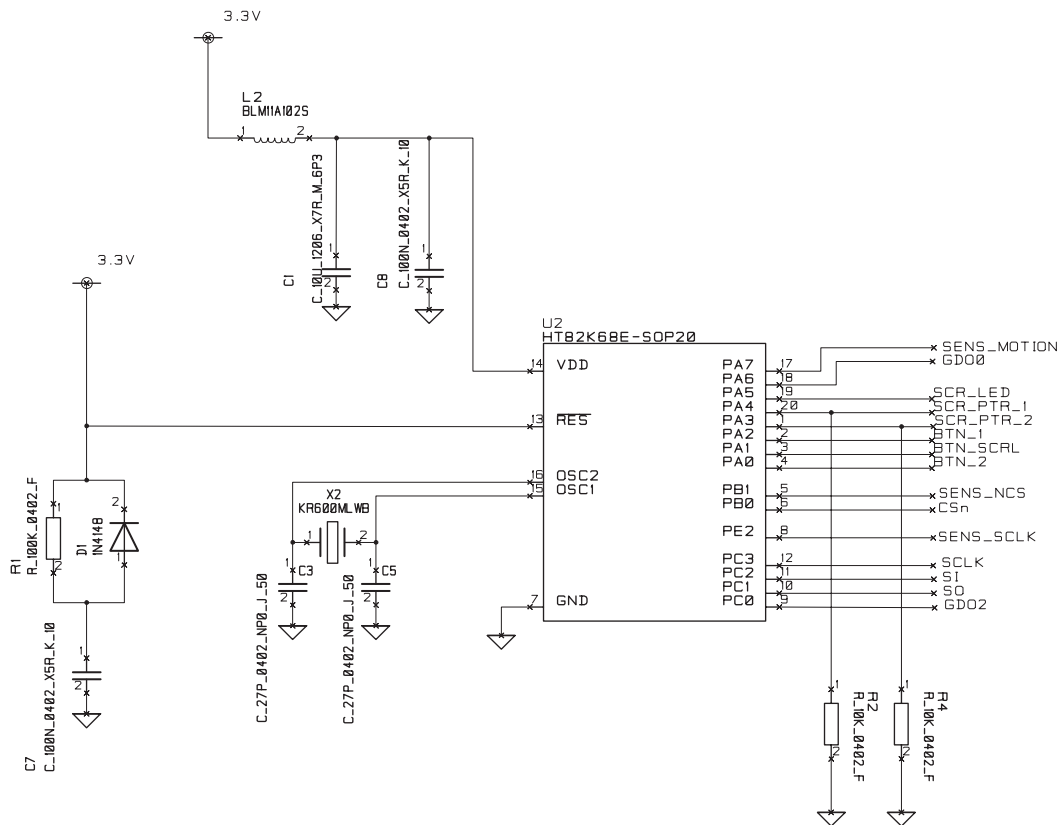
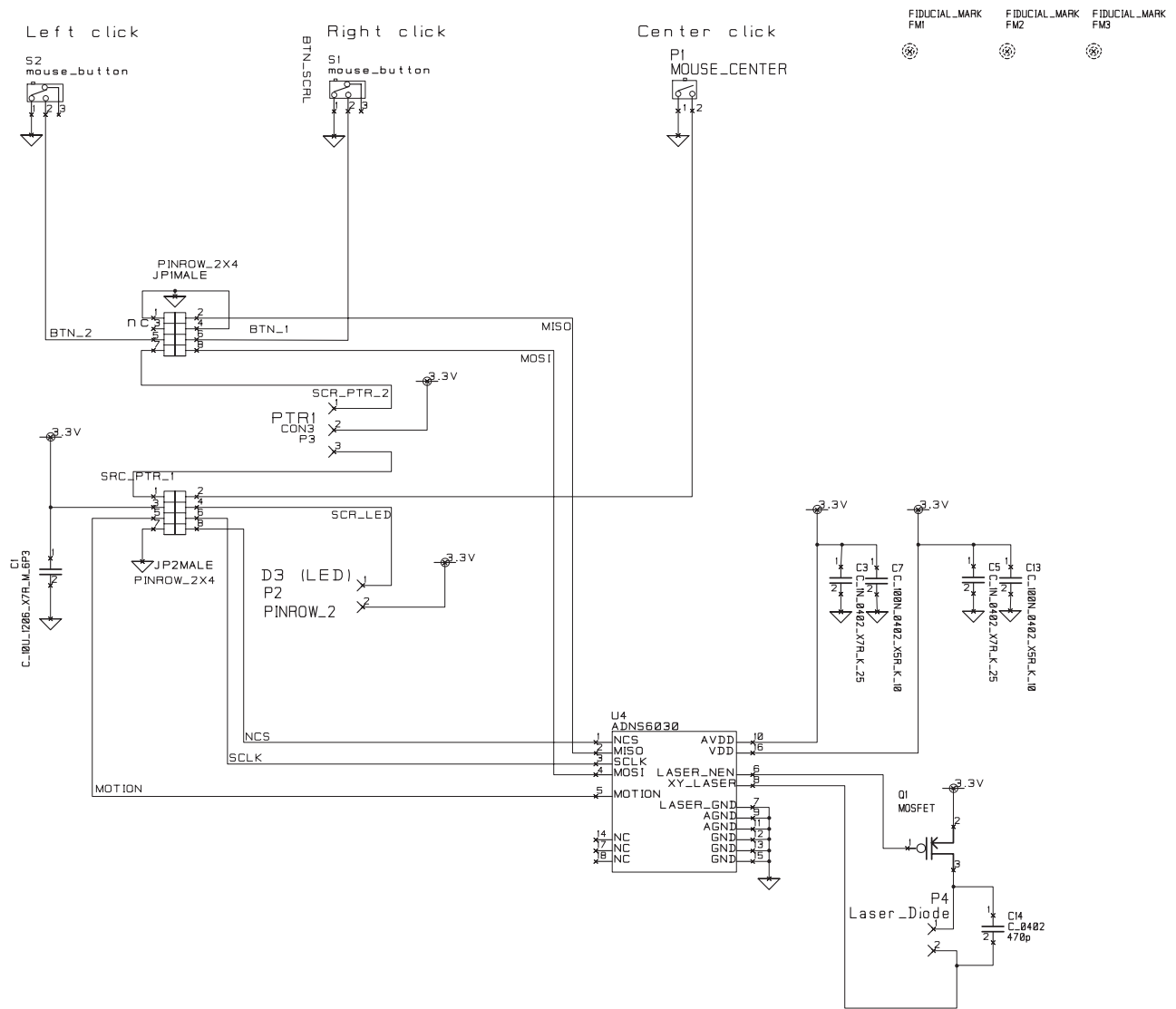**Figure 5. Circuit diagram of HT82K68E microcontroller schematic in ADNK-6033-CC24 designer's kit wireless laser mouse**

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Left click

S2
mouse_button

Right click

BTN_SCRL

S1
mouse_button

Center click

P1
MOUSE_CENTER

FIDUCIAL_MARK
FM1

FIDUCIAL_MARK
FM2

FIDUCIAL_MARK
FM3

PINROW_2X4
JP1MALE

nc

BTN_2

BTN_1

MISO

MOSI

SCR_PTR_2

3.3V

PTR1
CON3
P3

3.3V

SRC_PTR_1

SCR_LED

JP2MALE
PINROW_2X4

D3 (LED)
P2
PINROW_2

3.3V

3.3V

3.3V

C1
C_10U_1206_X7R_M_6P3

C3
C_1N_0402_X7R_K_25

C7
C_100N_0402_X5R_K_10

C5
C_1N_0402_X7R_K_25

C13
C_100N_0402_X5R_K_10

U4
ADNS6030

NCS
MISO
SCLK
MOSI
MOTION

AVDD
VDD
LASER_NEN
XY_LASER
LASER_GND
AGND
AGND
GND
GND
GND

NC
NC
NC

NCS

SCLK

MOTION

Q1
MOSFET

3.3V

P4
Laser_Diode

C14
C_0402
470p

Figure 6. Circuit diagram of ADNS-6030 sensor and buttons schematic in ADNK-6033-CC24 designer's kit wireless laser mouse

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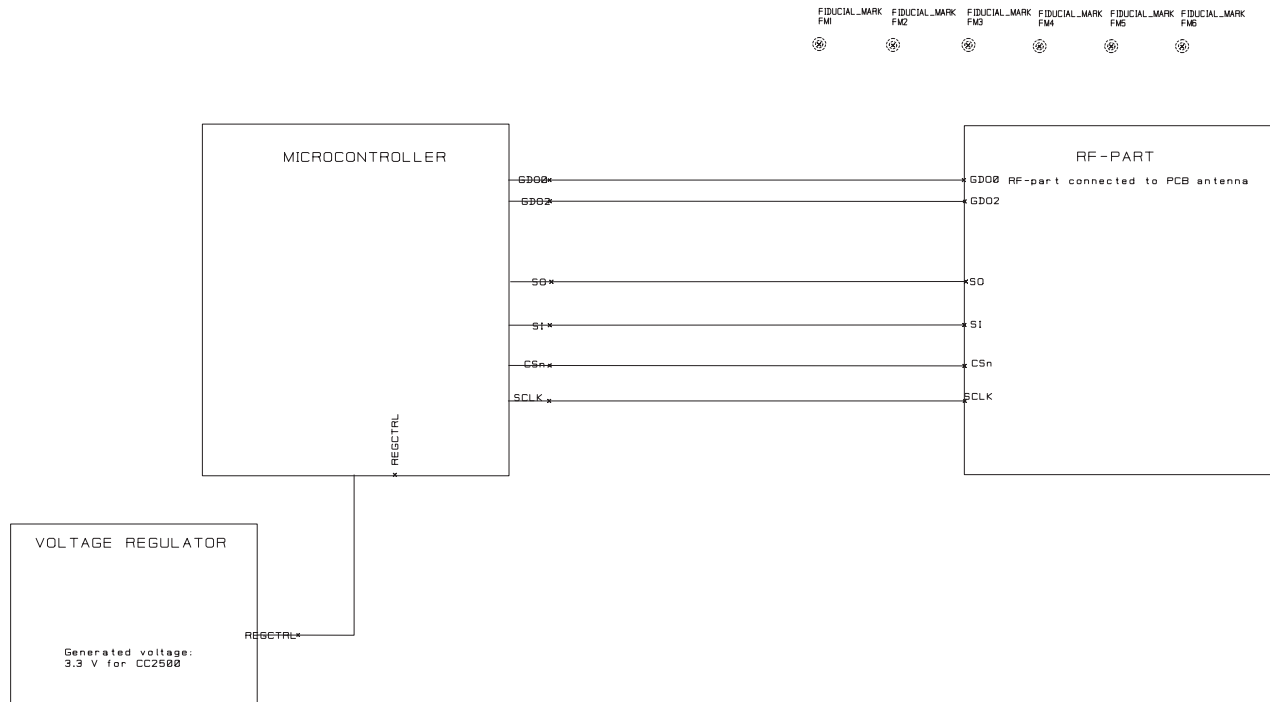# Schematic Design of ADNK-6033-CC24 Designer's Kit USB Dongle

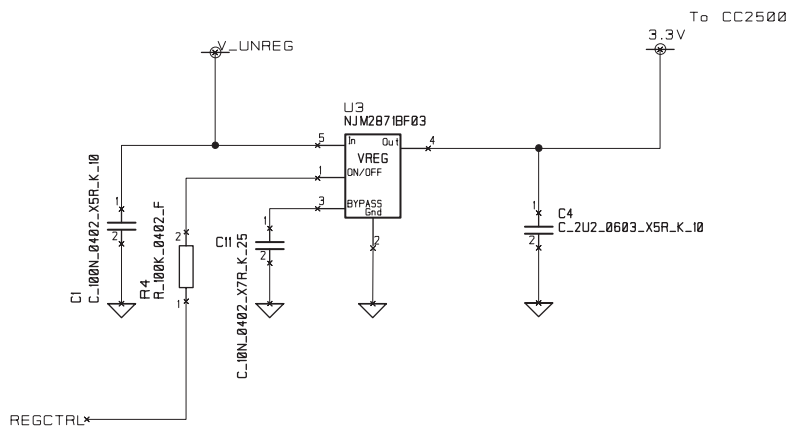**Figure 7. Overall Circuit-level block diagram for ADNK-6033-CC24 designer's kit USB Dongle**

Figure 8. Circuit diagram of voltage regulator schematic in ADNK-6033-CC24 designer's kit USB Dongle
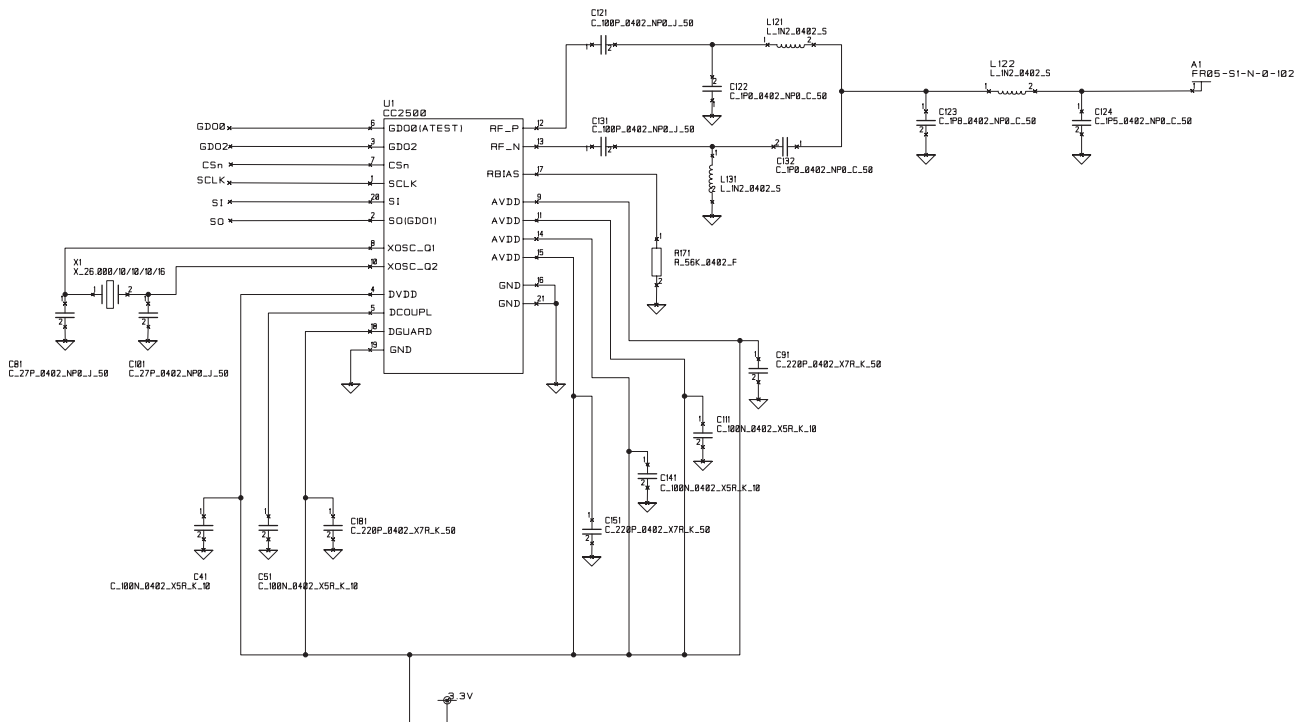
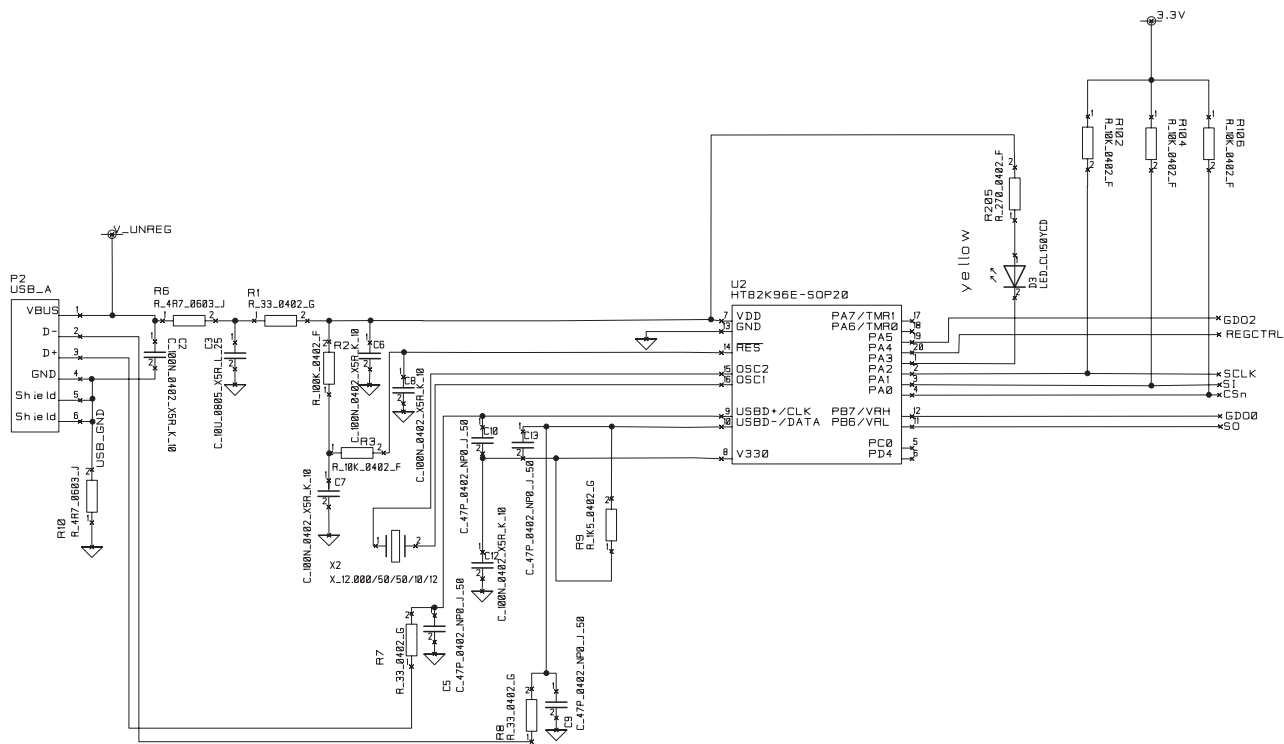**Figure 9. Circuit diagram of CC2500 RF transceiver schematic in ADNK-6033-CC24 designer's kit USB Dongle**

Figure 10. Circuit diagram of HT82K96E microcontroller and USB connector schematic in ADNK-6033-CC24 designer's kit USB Dongle

Kit Components

The designer's kit contains components as follows:

Part Number	Description	Name	Quantity
ADNK-6033-CC24 Mouse Set	a. Wireless Laser Mouse b. USB Dongle	Reference Design Mouse Set	1
ADNS-6030	Laser Mouse Sensor	Sensor	5
ADNS-6120	Laser Mouse Round Lens Plate	Lens	5
ADNS-6130-001	Laser Mouse Trim Lens Plate	Lens	5
ADNS-6230-001	Laser Mouse VCSEL Assembly Clip	VCSEL Clip	5
ADNV-6330	Single Mode Vertical Cavity Surface Emitting Laser	VCSEL	5
CC2500	Chipcon 2.4GHz RF Transceiver	RF Transceiver	5
ADNK-6033-CC24 CD-ROM	Includes Documentation and Support Files for ADNK-6033-CC24 Documentations a. ADNK-6033-CC24 Laser Mouse Designer's Kit Product Overview b. ADNK-6033-CC24 Laser Mouse Designer's Kit Design Guide c. ADNB-6031 and ADNB-6032 Low Power Laser Mouse Bundles Data Sheet d. Avago Technologies ADNB-6031 and ADNB-6032 Laser Mouse Eye Safety Calculation Application Note 5230 e. Chipcon CC2500 RF Transceiver Datasheet Hardware Support Files a. ADNK-6033-CC24 Schematic b. ADNK-6033-CC24 BOM List c. ADNK-6033-CC24 Gerber File d. IGES Base Plate Feature File Software Support Files a. Microcontrollers Firmware		

Ordering Information

For ordering information, please contact your local Avago Technologies sales representative.

Avago Technologies' Partner

RadioDesk™
Chipcon **www.chipcon.com**

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T E C H N O L O G I E S