

Circuit Description

The camera is based on a single-chip COMS camera sensor (MI-0360) providing a high quality video, built-in an audio microphone, auto turn on/off IR LED for night vision and audio alert when audio volume over preset level. Microprocessor (ES08V01A) codes and decodes the video and audio signal and sends the digital signal to nRF24L01, which has an oscillator of 16MHz for transmitting RF radio. nRF24L01 is a single chip radio transceiver for the world wide 2.4 - 2.4835 GHz ISM band. It includes a power amplifier, the crystal oscillator 12MHz and 27MHz, a demodulator, modulator and Enhanced ShockBurst™ protocol engine. Output power, frequency channels, and protocol setup are easily programmable through a SPI interface. Current consumption is very low, only 9.0mA at an output power of -6dBm and 12.3mA in RX mode. Built-in Power Down and Standby modes make power saving easy. It makes it possible to use the high data rate offered by nRF24L01 without the need of a costly, high-speed microcontroller (MCU) for data processing/clock recovery. By placing all high speed signal processing related to RF protocol on-chip, nRF24L01 offers the application microcontroller a simple SPI compatible interface, the data rate is decided by the interface speed the micro controller itself sets up. By allowing the digital part of the application to run at low speed, while maximizing the data rate on the RF link, reduces the average current consumption in applications. MCU can then clock out the payload from an nRF24L01 RX FIFO. In ShockBurst™ TX, nRF24L01 automatically generates preamble and CRC, IRQ notifies the MCU that the transmission is completed. All together, this means reduced memory demand in the MCU resulting in a low cost MCU, as well as reduced software development time. and a three level deep TX FIFO. The MCU can access the FIFOs at any time, in power down mode, in standby modes, and during RF packet transmission. This allows the slowest possible SPI interface compared to the average data rate, and may enable usage of an MCU without hardware SPI. This means that nRF24L01 will transmit ACK with the same address as it receives payload at. and therefore the receive address for data pipe 0 has to be equal to the transmit address to be able to acknowledge. Highly reduced current consumption due to short time on air and sharp timing when operating with acknowledgement traffic. Lower system cost. Since the nRF24L01 handles all the high-speed link layer operations, like re-transmission of lost packet and generating acknowledgement, it is no need for hardware SPI on the system microcontroller to interface the nRF24L01. The interface can be done by using general purpose IO pins on a low cost microcontroller where the SPI is emulated in firmware. With the nRF24L01 this will be sufficient speed even when running a bi-directional link.