

Technical Description of 2.4GHz Wireless Microphone – DS61D (Dongle)

The Equipment Under test (EUT) is a 2.4GHz Transceiver for a wireless dongle which is operating at 2405.001 to 2475.001MHz with 10MHz channel spacing. The EUT is energized by a 30-pin connector of Ipad. When the EUT is inserted to the iPad, it will pair the corresponding wireless microphone for wireless data transfer. The EUT has a video output jack, which is used for the expand picture on TV via the video cable.

1. Technical description

DSP (SN93051) –

It is a 2.4GHz wireless microphone baseband processor, There is a I2S interface for digital audio output to the external ADC.

DAC (AK4386) –

The AK4386 is a 24bit low voltage & low power stereo DAC. This I2S interface receive digital data for the DSP. Audio output signal fed to the LPF.

LPF –

The active Low Pass filter will achieve a -3dB cutoff at 8KHz, and -20dB attenuation at 16KHz (fs). After pass through the LPF, the audio signal will be fed to the ADC input of the MCU.

MCU (PIC24FJ64GB002)–

It is a flash microcontrollers with USB and ADC. Audio signal fed from the LPF to the ADC input of the MCU, convert to digital data format for iPad interface, then fed to the iPad through the iPad connector.

Input button –

By pressing the pairing key on the microphone and the receiver simultaneously, a security ID will be generated and store on the serial flash memory.

RF module (KD0038A) –

A 2.4GHz transceiver (A7125) is employed. It shared the 16MHz crystal clock from the DSP (SN93051) for the time base. On Tx cycle, data packet is transmit by 2.4GHz carrier and FSK modulation. On Rx cycle, acknowledge data will be received.

Power supply

A DC to DC step up regulator is employed to maintain a 3.6V voltage from the batteries. Another low drop out regulated is employed to maintain a low ripple 3.0V for the system voltage supply of the DSP.

Serial Flash :

Firmware and application data are stored in the serial flash memory. Those data will load into the internal RAM of the DSP when the system boot up.

2. Theory of operation

- Frequency band: 2405.001-2475.001MHz

- Number of channel: 8

-Channel Frequency Table

		TX Channel(MHz)	RX Channel(MHZ)
channel	1	2405.001	2405.001
	2	2415.001	2415.001
	3	2425.001	2425.001
	4	2435.001	2435.001
	5	2445.001	2445.001
	6	2455.001	2455.001
	7	2465.001	2465.001
	8	2475.001	2475.001

- Channel spacing: 10.000MHz

At searching mode, the transceiver will stay in receiving mode, hops to 8 hopping channels to search for the signal from the dongle.

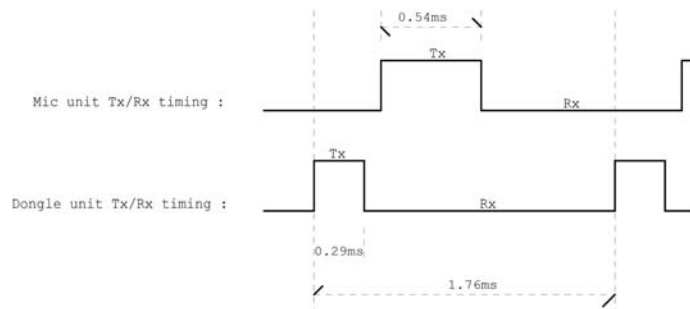
When a valid signal is found on a channel, it will stay in the same channel for communication.

If there is a signal lost, it will go back to the searching mode again.

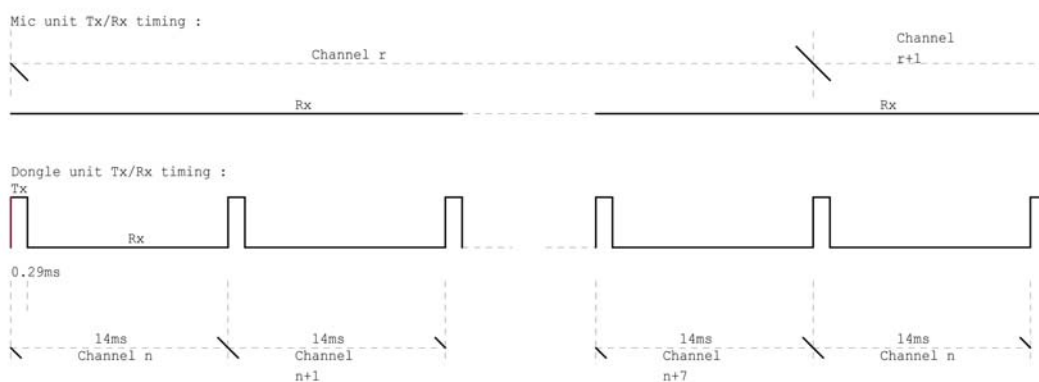
Frame time =1.76ms

DS61M/DS61D RF timing :

Communicating mode :



Searching mode :



3. RF module description

Brand/Type of RF chip used: AMICCOM/ A7125

Crystal frequency: 16 MHz

IF frequency: 2MHz

VCO frequencies:

		TX VCO(MHz)	RX VCO(MHz)
channel	1	2405.001	2403.001
	2	2415.001	2413.001
	3	2425.001	2423.001
	4	2435.001	2433.001
	5	2445.001	2443.001
	6	2455.001	2453.001
	7	2465.001	2463.001
	8	2475.001	2473.001