

Technical Description of 2.4GHz Wireless Microphone – DS61M

1. General description

The Equipment Under test (EUT) is a 2.4GHz Transceiver for a wireless Microphone which is operating at 2405.001 to 2475.001MHz with 10MHz channel spacing. The EUT is energized by two AA batteries. After switched on the EUT, the voice signal can be transmitted from microphone to corresponding dongle for wireless speaking.

Mic and LPF –

The condenser microphone will pick up the sound wave. 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 DSP for processing.

DSP (SN93050) –

It is a 2.4GHz wireless microphone baseband processor, built in a high quality 16bits ADC with microphone pre-amplifier. Audio compression is using ADPCM 44.1KHz sampling rate.

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 (SN93050) 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

The microphone is powered by an 2 X AA batteries.

A DC to DC step up regulator (U15) is employed to maintain a 3.3V voltage from the batteries. Another low drop out regulated (U13) is employed to maintain a low ripple 3.0V for the system voltage supply.

Serial Flash :

Firmware and application data are stored in the serial flash memory (U12). Those data will load into the internal RAM of the DSP (U11) 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)
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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.

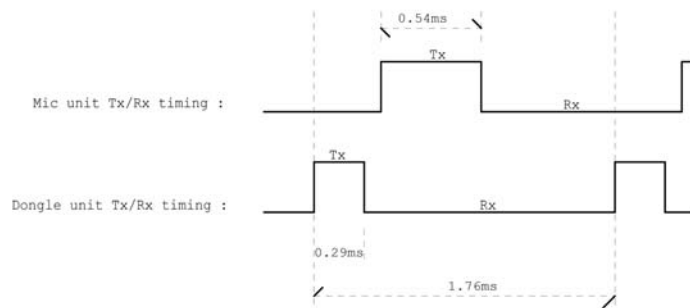
When a valid signal is found on a channel, it will stay in the same channel for communication.

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

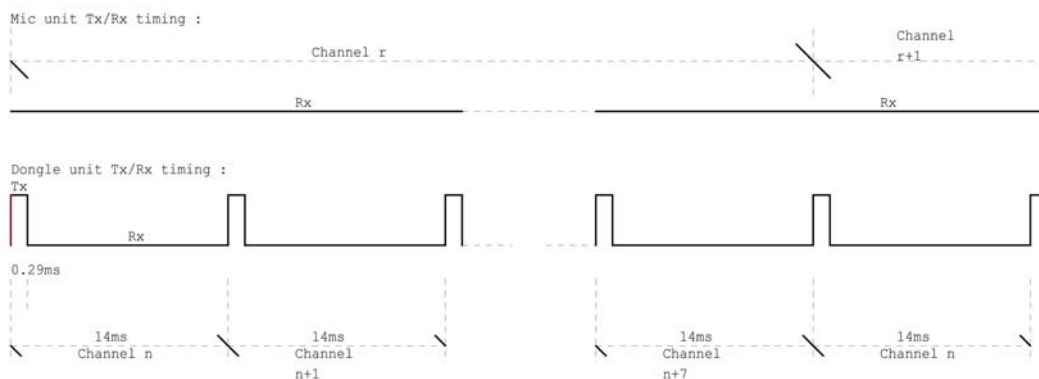
Frame time =1.76ms

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