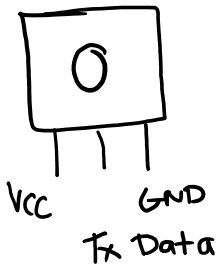
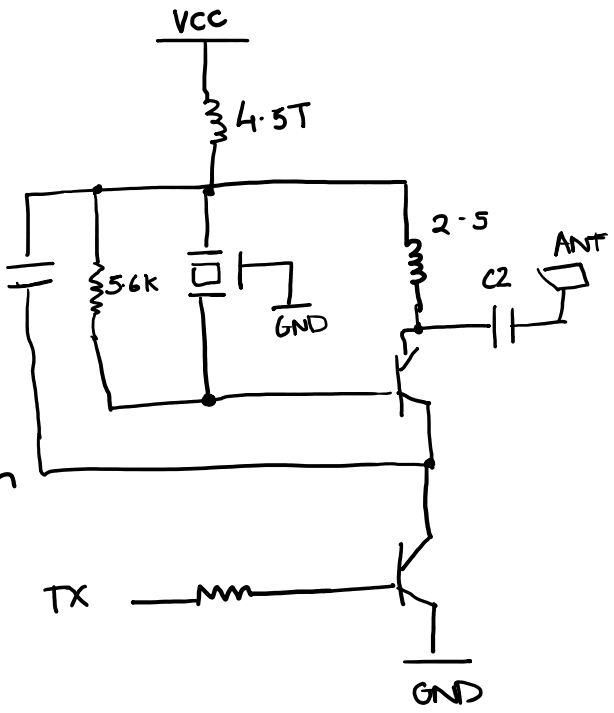
07 March 2017 19:00

Tx Module



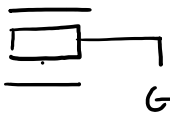


Transmission Distance 20 - 200m

AM transfer rate 4 kb/s

Transmission power 10mW

Emission Frequency 433MHz



← SAW Resonator - surface acoustic resonator

Message Encoding

Headers include (To, From, Id, Flags)

Headers inside payload & protected by Frame check sequence

Hello World!

Preamble

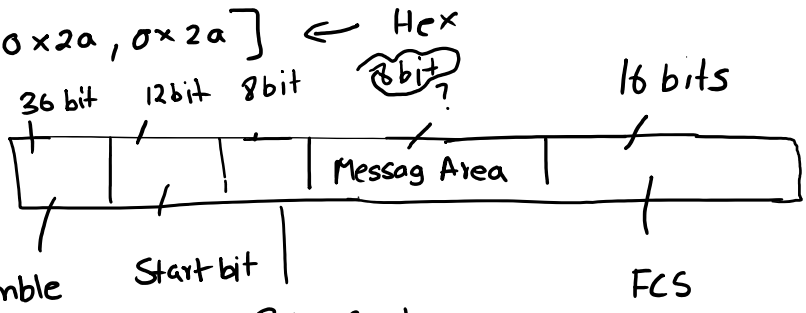
[0x2a , 0x2a , 0x2a , 0x2a , 0x2a , 0x2a] ← Hex

[101010 x6] ← Binary (36 bits)

Start bit

[0x38 , 0x2c]

[111000 , 101100 ← Binary 12 bits



[111000, 101100 ← Binary 12 bits

72 Bits

2000 bits/sec

1 ⟶ 2000 = 0.036

? ⟶ 72 360ms

FCS Count Frame Check Sequence

Message lenght + 3 + RH_ASK_Header_len

The whole Packet Encoding

Symbol Array =
static uint8_t symbols[] =
{
  0xd, 0xe, 0x13, 0x15, 0x16, 0x19, 0x1a, 0x1c,
  0x23, 0x25, 0x26, 0x29, 0x2a, 0x2c, 0x32, 0x34
}

Preamble & Start Bit Encoding
{0x2a, 0x2a, 0x2a, 0x2a, 0x2a, 0x2a, 0x38, 0x2c}

Encoding for the message length
p[0] = 00001000 >> 4 = 00000000 = symbol[0]
p[1] = 00000000 & 00001111 = 0000 = symbol[0]

index = 2
p[] = {0xd,0xd}
Therefore the byte count is a 8 bits wide and

Encoding the Headers
p[2] = 11111111 >> 4 = 00001111 = symbol[15]
p[3] = 00001111 & 00001111 = 1111 = symbol[15]
p[4]= 11111111 >> 4 = 00001111 = symbol[15]
p[5] = 00001111 & 00001111 = 1111 = symbol[15]
p[6] = 00000000 >> 4 = 00000000 = symbol[0]
p[7] = 00000000 & 00001111 = 00000000 = symbol[0]
p[8] = 00000000 >> 4 = 00000000 = symbol[0]
p[9] = 00000000 & 00001111 = 00000000 = symbol[0]

The header is 10 bytes long
index = 10
p[] = {0xd,0xd, 0x34, 0x34, 0x34, 0x34 0xd, 0xd, 0xd, 0xd }

Encoding the message
p[10] = 01001000 >> 4 = 00000100 = symbol[4]
p[11] = 00000100 & 00001111 = 0100 = symbol[4]

index = 12
p[] = {0xd,0xd, 0x34, 0x34, 0x34, 0x34 0xd, 0xd, 0xd, 0xd, 0x16, 0x16 }

Encoding the Frame Check Sequence
p[12] = symbol[5]
p[13] = symbol[15]

p[14] = symbol[14]
p[15] = symbol [6]

Index = 16
p[] = {0xd,0xd, 0x34, 0x34, 0x34, 0x34 0xd, 0xd, 0xd, 0xd, 0x16, 0x16, 0x19,0x34,0x32,0x1a}

Total number of 6-bit symbols to send = _txBufLen = 16 + 8 = 24
↳ Preamble & Start bit

The complete frame of message with symbol is :
{0x2a, 0x2a, 0x2a, 0x2a, 0x2a, 0x2a, 0x38, 0x2c, 0xd,0xd, 0x34, 0x34, 0x34, 0x34 0xd, 0xd, 0xd, 0xd, 0x16, 0x16, 0x19,0x34,0x32,0x1a)

Preamble Header Message FCS