Document Title

A5133 reference code for direct mode

Revision History

Rev. No.	History	Issue Date	Remark
0.0	Preliminary	May. 26 , 2022	
0.1	Add delay time after enable EFSW&EFRE	Mar. 3, 2023	

Table of contents

RF Chip-A5133
Reference code for direct mode

1. Introduction

This document describes development of simple example procedures by A5133 direct mode. It could support user how to implement two-way radio and how to initial A5133.

2. System Overview

The procedure is divided into two parts, one is Master, and another one is Slave.

Master side ：After power on and initial RF chip procedure, Master side will enter into TX state to deliver data from GIO1 pin by user. After completing a time transmission movement, leaves the TX state, after waiting for 50ms, returns to TX to transmit the state, again another time procedure.

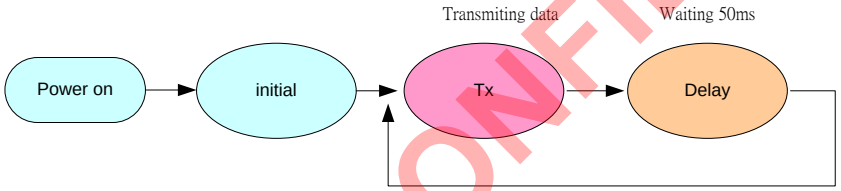


Fig1. The state diagram of master side

Slave side：After power on and initial RF chip procedure, Slave side entering the RX state, the user may from pin the GIO1 receive data. After completing a time receive movement, leaves the RX state, after waiting for 30ms, returns to the RX state once more, again another time receive procedure.

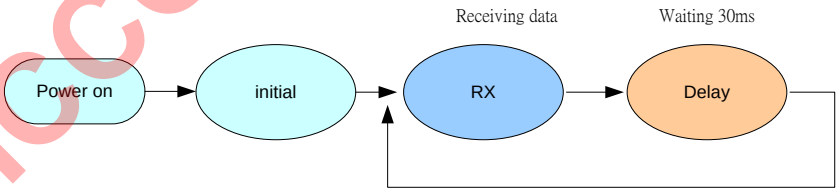


Fig2. The state diagram of Slave side

3. Hardware

3.1 System block diagram

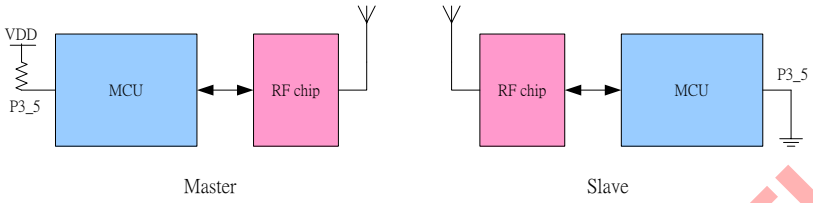


Fig3. System block diagram

MCU I/O pin 3_5 setting to use the device as Master side or Slave side.

I/O definition：
SCS, SCK, SDIO - 3 wire serial interface to access A5133 register。
GIO1 - Bidirectional pin。In TX state，this I/O is TXD pin。In RX state，this I/O is RXD pin。
GIO2 - In TX state，provides may start signal to transmit data. If is High level, then expressed that RF chip entered the TX modulation procedure, the user may start to transmit data.

MCU controls A5133 RF chip disposes the following chart:

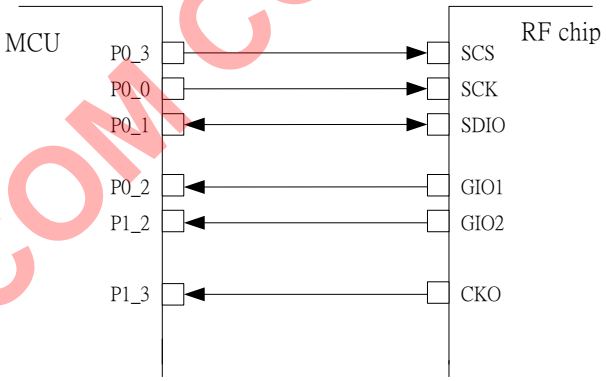


Fig4. I/O assign

4. Firmware Program

4.1 Introduction

After power on reset, MCU check its Port 3_5 to identify Master side or Slave side. If Port 3_5 = 1, MCU executes Master code in the main program; else, MCU executes Slave code in the main program.

Master code：
1) Setting master side frequency.
2) Entering TX state, Waiting for that pin GIO2(TMEO) is 1.
3) Using pin GIO1，User can start to transmit TX packet. Transmit data will be shift out on synchronization to the rising edge of the CKO pin.
4) The transmission completes, leaves TX state, enters into standby state.
5) Delay 50ms, returns the Step 1.

Slave code：
1) Setting Slave side frequency.
2) Entering RX state, receiving data by pin GIO1.
3) User can also wait GIO2 = 1(FSYNC, GIO2s=[0001]), receive data shift in on synchronization to the rising edge of the CKO pin.
4) Completes the receive movement, leaves RX state, enters into standby state.
5) Delay 30ms, return Step 1.

4.2 Format for TX transmit packet

In order to enable RF chip to demodulate the packet, the suggestion transmission packet format is as follows,

- Preamble code : suggest Preamble code≧4 bytes, it can make the stable DC average, demodulation.
- ID code(Sync code) : Setting ID code length are 4 bytes。Transmits in the packet ID code, must be the same with in RF chip ID code.
- Payload : Transmit packet.

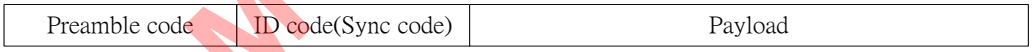
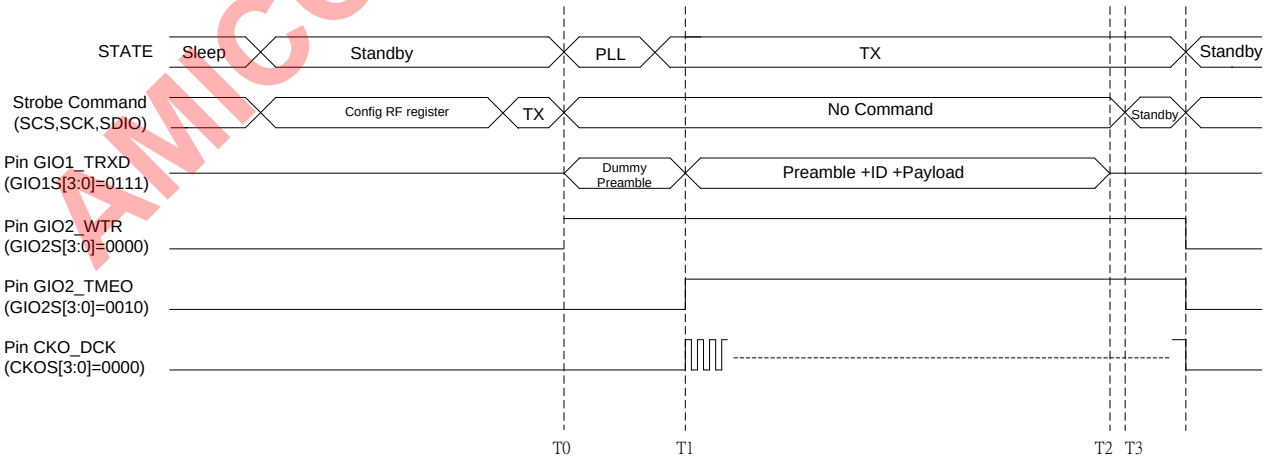


Fig5. TX packet format

4.3 TX, RX timing chart



T1-T0 : Dummy Preamble 180 bits at 2Mbps data rate
T2-T1 : Transmitting time (Preamble code +ID +Payload)
T3-T2 : Dummy bit ≧2us

Fig6. TX timing chart

- GIO1S[3:0]=0111，pin GIO1 is TXD pin in TX state.
- GIO2S[3:0]=0010，Enable TX modulation.
- GIO2S[3:0]=0000，function WTR on.

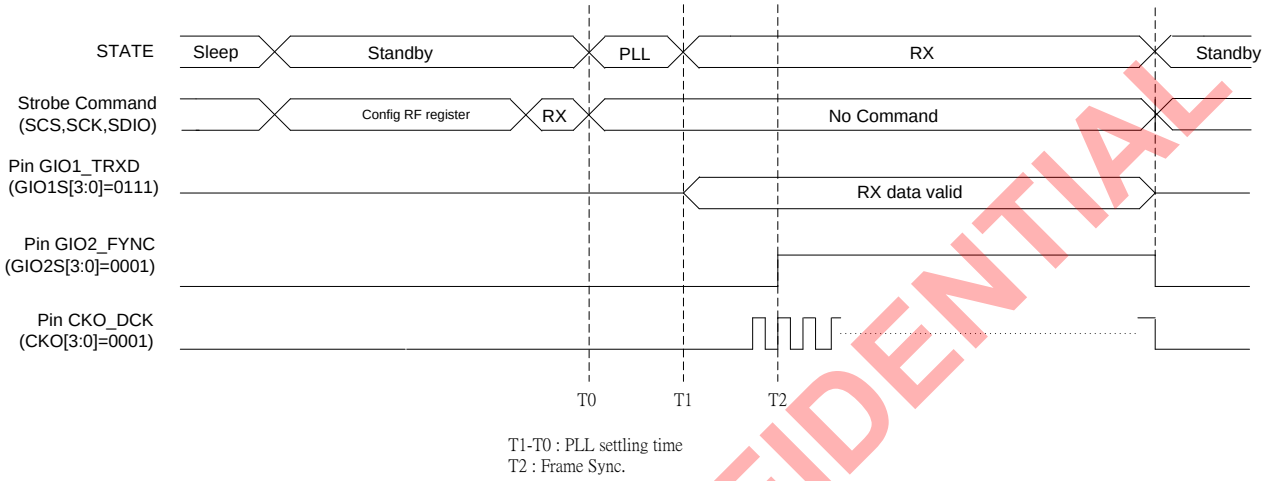


Fig7. RX timing chart

- GIO1S[3:0]=0111， pin GIO1 is RXD pin in RX state.
- GIO2S[3:0]=0001，it can indicate that receives same ID the time.
- CKOS[3:0]=0001，After ID received, provides the clock of data recovery.
- After ID(Sync code) received, User can rebuild correct data by pin CKO(CKOS[3:0]=0001).

4.4 Example code diagram

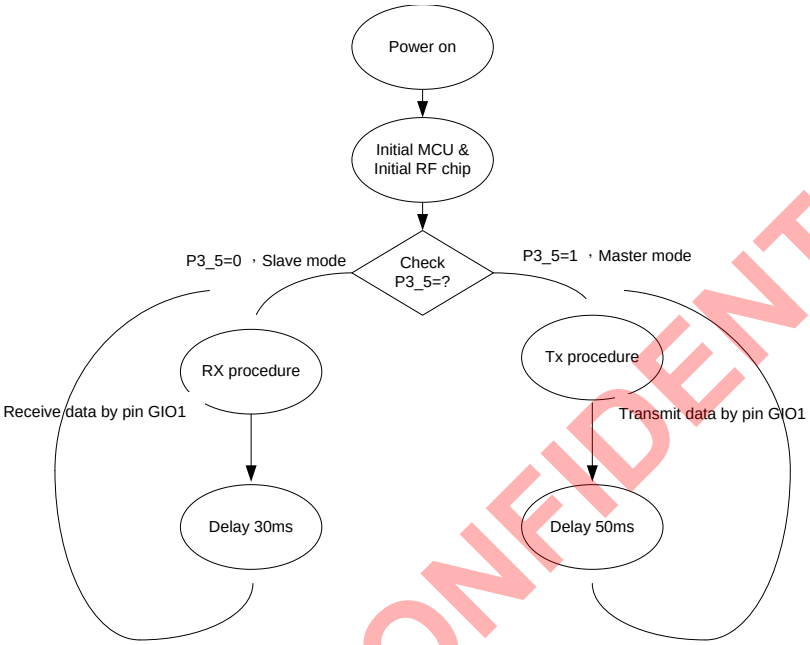


Fig8. Example code diagram