FCC ID:KTU-7192RF

Technical Description :

The brief circuit description is listed as follows :
- U2 W55MID50 acts as RFID Reader IC.
- Y1 and associated circuit act as 13.56 MHz Oscillator.
- SW-A,SW-B act as Control Keys.
- U1 NY5B085 acts as MCU and Sound Synthesizer.

Antenna Used :

A loop antenna has been used.

General Description

Winbond *MFID*^{WB} (Magnetic Field Identification) series W55MID50 supports selectable multi-level transmission power, programming base Control Register (*CR*) for W55MID15 single-tag ID or W55MID35 multi-tag IDs data recognition, serial-mode or parallel-mode uC interface, and power-down mode. The W55MID50 especially focus on toy, security, and consumer related applications.

The system applications with Winbond *MFID*^{WB} Tag series such as W55MID15 provides the single-tag bonding-ID solution for manufacture, which has 243 bonding-IDs can be selected for use. Besides the single-tag transponder, W55MID35 provides multi-tag transponder recognition function for intelligent and smart toy applications. Topically, 6 ~ 8 tags can be recognized in the same time as well as are located in the same reader antenna area. A special application for smart toy, W55MID35 supports both ***Repeated-ID*** mode and ***Unique-ID*** mode in operation.

W55MID50 provides a wide variety of applications for toy, security, and consumer market meanwhile the W55MID50 is the most cost effective solution for current *MFID*^{WB} related application market.

1.1 W55MIDxx Series Selection Guide

W55MID Series Selection Guide

|	W55MID15	W55MID35	W55MID50	W55MID20	W55MID55
Category	Single-tag	Multi-tag	Reader	R/W-tag	R/W-Reader
Frequency	13.56MHz			13.56MHz	
ID type	Bonding-ID		X	Programmable-ID	X
# of available IDs	243 IDs		X	Infinite	X
ID length	10-bit		X	64-bit	X
Anti-collision	X	5 ~ 8 Tags	X	5 ~ 8 Tags	X
TX power	X		4-level option	X	4-level option
uC interface	X		Serial/Parallel	X	Serial/Parallel
Package	Dice form		Dice/SOP-20	Dice form	Dice/SOP-20
E/S	Now			Apr. 2003	
Production	Jan./E, 2003			May, 2003	

Features

2.1 W55MID50 Features List

- ❑ Magnetic field resonance frequency: 13.56MHz
- ❑ Data clock: 22 ~ 66KHz
- ❑ Inductive coupled power supplies for transponder's no battery operation
- ❑ On-chip rectifier, voltage limiter, clock extraction, power management, uC interface
- ❑ Provides NRZ and Manchester coding data format
- ❑ Adjustable 4-level of Reader transmission power selection
- ❑ Provides serial and parallel mode uC interface
- ❑ uC data output rate ≥ 1Mbps

- ❑ Low power, low voltage operation
- ❑ Supports power-down mode ≤ 1uA
- ❑ Operating distance: 0 ~ 10cm
- ❑ Operating voltage: 2.4V ~ 5.5V
- ❑ Operating temperature: 0 ~ 70 °C
- ❑ Package: Dice form, PDIP-20, SOP-20
- ❑ Reference design PC board Size: 2.0x2.0cm^2 (without PCB antenna)
- ❑ Winbond patented "Automatic Reader Transmission Power Adjustment" for Reader optimum transmission power adjust
- ❑ Minimize external components

Architecture Overview

3.1 W55MID50 System Block Diagram
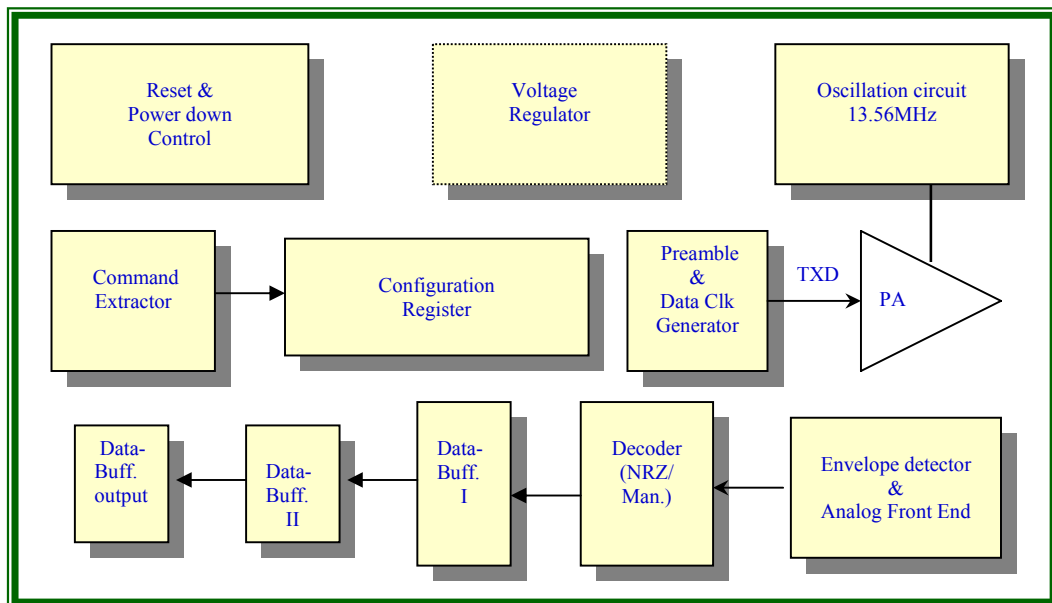
3.2 W55MID50 Functional Description

Transmission Power Amplifier (PA)

It provides 4 different selectable transmission power for Reader chip to support *MFID*^WB Tag's radiation power supply. The external inductor coupling circuit is designed for 13.56MHz magnetic field resonation. The coupled center frequency will depend on equivalent value of external PCB inductor and capacitor.

Envelope Detector & Analog Front End

The major function of this unit provides *MFID*^WB Tag's data can be extracted.

Voltage Regulator

The voltage regulator generates the system needs of device power supply.

Configuration Register

System configuration register controls the all functional settings of W55MID50 such as Tag data format, Tag detection cycle, output data format, and PA transmission power selection.

Reset and Power-down Control

The function of system power-down control mode is normally used for power consumption saving.

Crystal Oscillation

The 13.56MHz system clock generator generates the need of device system clock.

Decoder NRZ/Manchester

This unit is in charge of Tag data format decoder, which can provide Tag-ID data format decoding of NRZ or Manchester.

Data Buffer and Output

This unit buffers the Tag-ID data, which is under de-frame processing.

3.3 W55MID50 Pad/Pin Description

Symbol	PAD No.	PIN No. (PDIP-20, SOP-20)	I/O	Functional Description
D3	1	1	O	Data output #3
D2	2	2	O	Data output #2
D1	3	3	O	Data output #1
D0	4	4	O	Data output #0
XIN	5	5	I	Connect to external 13.56MHz oscillator
XOUT	6	6	O	Connect to external 13.56MHz oscillator
VSS	7	7	GND	Digital power return path
CMD	8	8	I/O	R/W configuration register
CLK	9	9	I	Command R-W/ Read data clock
VDD	10	10	Power	Power path
RX_VDD	11	13	Power	Power path of Rx
RX_VSS	12	14	GND	Power return path of Rx
ENV	13	15	I	Envelope detector input
/RESET	14	16	I	Reset
TagIn	15	17	O	Indication of tag arrival
COIL	16	18	O	PA output to connect with PCB antenna
TX_VSS	17	19	GND	Power return path of PA
TX_VDD	18	20	Power	Power path of PA