FCC ID: P9Y00089790000

Technical Description :

The brief circuit description is listed as follows :
- Antenna, C10, C25 and associated circuit act as Loop Antenna.
- L1, L3, C6 and C24 act as RF Filter.
- D1, D2, C8 and R1 act as Commutate Filter.
- U1 acts as RFID reader.
- Y1, C12 and C13 and associated circuit act as 13.56 MHz
  Oscillator.
- U2 acts as MCU with Voice Synthesizer.
- Q2 and associated circuit act as Audio Amplifier.
- Ball switch and music/animal sound mode switch act as
  Control Keys.

Antenna Used :

A loop antenna has been used.

Winbond
Electronics Corp.

General Description

Winbond *MFID^WB* (Magnetic Field Identification) series is used in all areas of automatic data capture allowing contactless identification of objects using magnetic field. From ticketing to industrial automation and access control, the applications of MFID are burgeoning. In recent years automatic identification procedures have become very popular in many service industries, purchasing and distribution logistics, industry, manufacturing companies and material flow systems.

W55MID50 is one of series in Winbond *MFID^WB* family that supports multi-functional Reader solution and especially focus on toy, security, and consumer related applications. The applications with

Winbond *MFID^WB* Tag series such as W55MID10 that provides read-only mask ROM-ID version transponder for mass production solution in toy industrial, meanwhile W55MID15 provides the other solution for manufacture option, which is 243 bonding-ID selection transponder. Besides the single tag transponder application, W55MID35 offers multi-transponder recognition function for intelligent and smart toy applications.

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

1.1 W55MID50 Features

- 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

Winbond
Electronics Corp.

System Description

2.1 W55MID50 System Block Diagram
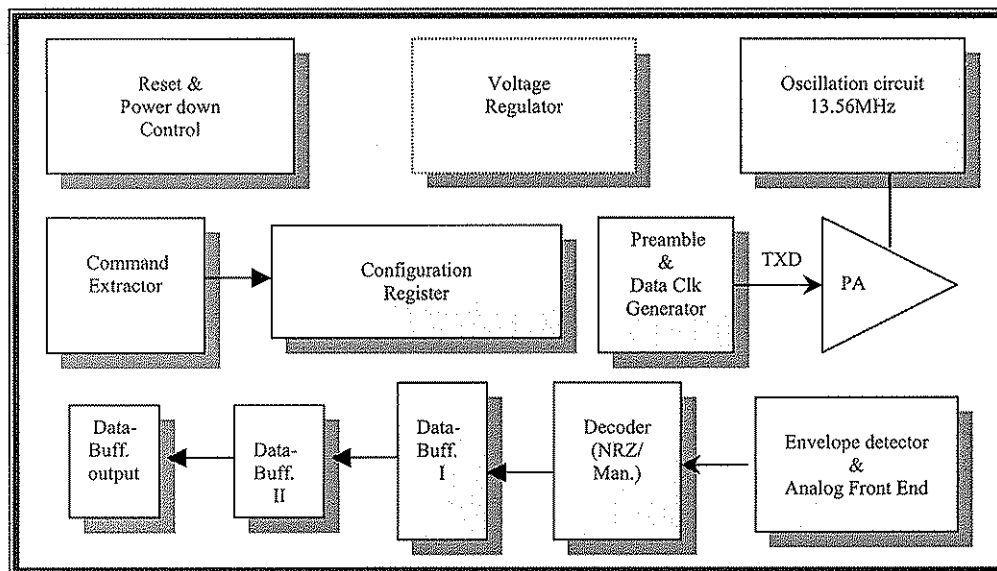
2.2 W55MID50 Functional Description

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 resonance. 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.

Winbond
Electronics Corp.

1. GENERAL DESCRIPTION

The W567Sxxx is a powerful microcontroller (uC) dedicated to speech and melody synthesis applications. With the help of the embedded 8-bit microprocessor & dedicated H/W, the W567Sxxx can synthesize 8-channel speech+melody simultaneously.

The two channels of synthesized speech can be in different kinds of format, for example ADPCM and MDPCM. The W567Sxxx can provide 8-channel high-quality *WinMelody*^{TM} , which can emulate the characteristics of musical instruments, such as piano and violin. The output of speech/melody channels are mixed together through the on-chip digital mixer to produce colorful effects. The mixer is further processed to drive dual speakers with stereo effects. With these hardware resources, the W567Sxxx is very suitable for high-quality and sophisticated scenario applications.

The W567Sxxx is also capable of transmitting infrared (IR) signals with on-chip carrier generator. As a result, toys can be designed to interact with each other for more play values. A serial interface can be supported as external memory for memory expansion or content-updateable applications.

Besides, the W567Sxxx is equipped with a 4-channel Analog-to-Digital Converter (ADC). With ADC, a toy can respond to environment conditions such as temperature or pressure via sensory devices. Therefore, toys with ADC can behave vividly than ever before.

The W567Sxxx family contains several items with different playback duration as shown below: (@5-bit MDPCM algorithm, 6 KHz sampling rate)

Item	W567S010	W567S015	W567S020	W567S025	W567S030	W567S040
*Duration	14 sec.	18 sec.	27 sec.	31 sec.	35 sec.	52 sec.
Item	W567S060	W567S080	W567S100	W567S120	W567S150	W567S170
Duration	60 sec.	104 sec.	116 sec.	129 sec.	163 sec.	197 sec.
Item	W567S210	W567S260	W567S301	W567S341		
Duration	232 sec.	265 sec.	300 sec.	334 sec.		

Note:

*: The duration time is based on 5-bit MDPCM at 6 KHz sampling rate. The firmware library and timber library have been xcluded from user's ROM space for the duration estimation.

Winbond
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2. FEATURES

- Wide range of operating voltage:
  - 8 MHz @ 3.6 volt ~ 5.5 volt
  - 4 MHz @ 2.4 volt ~ 5.5 volt
- Power management:
  - 4 ~ 8 MHz system clocks, with Ring type
  - Stop mode for stopping all IC operations
- Provides up to 8 inputs and 24 I/O pins
- Current-type Digital-to-Analog Converter (DAC):
  - (8+2)-bit resolution with programmable output current
  - 2 speaker outputs for stereo applications
- F/W speech synthesis with multiple format support: ADPCM/MDPCM/PCM
- 2 speech synthesis[1] channels at programmable sample rate
- 8 melody channels that can emulate characteristics of musical instruments
- 8-input/10-bit-resolution Mixer can mix the speech and melody signals flexibly
- Dynamic control of the channel assignment to the dual speaker output for stereo effects
- Built-in IR carrier generation circuit for simplifying firmware IR application
- 4-channel ADC interface (W567S301~S341) with maximum 4-KHz sampling rate and 6-bit effective resolution
- Built-in 9 timers for speech/melody synthesis and general purpose applications
- Built-in 10*7 multiplier
- Built-in Watch-Dog Timer (WDT) and Low Voltage Reset (LVR)
- Built-in 32KHz crystal oscillator with divider for time-keeping application in W567S080 ~ S341
- Built-in Serial Interface Manager (SIM) in W567S080 ~ S341
- Support PowerScript for developing codes in easy way
- Full-fledged development system
  - Source-level ICE debugger
  - Event synchronization mechanism
  - Compatible with W566B/C & W588S system
  - User-friendly GUI environment
- Available package form: (COB is essential)
  - W567S010, S015, S020, S025, S030: LQFP48
  - W567S040, S060: QFP64
  - W567S080 ~ S120: LQFP80
  - W567S150 ~ S341: LQFP100

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[1] More speech channels are available for 8-bit PCM format in the remaining melody channels.

4. BLOCK DIAGRAM
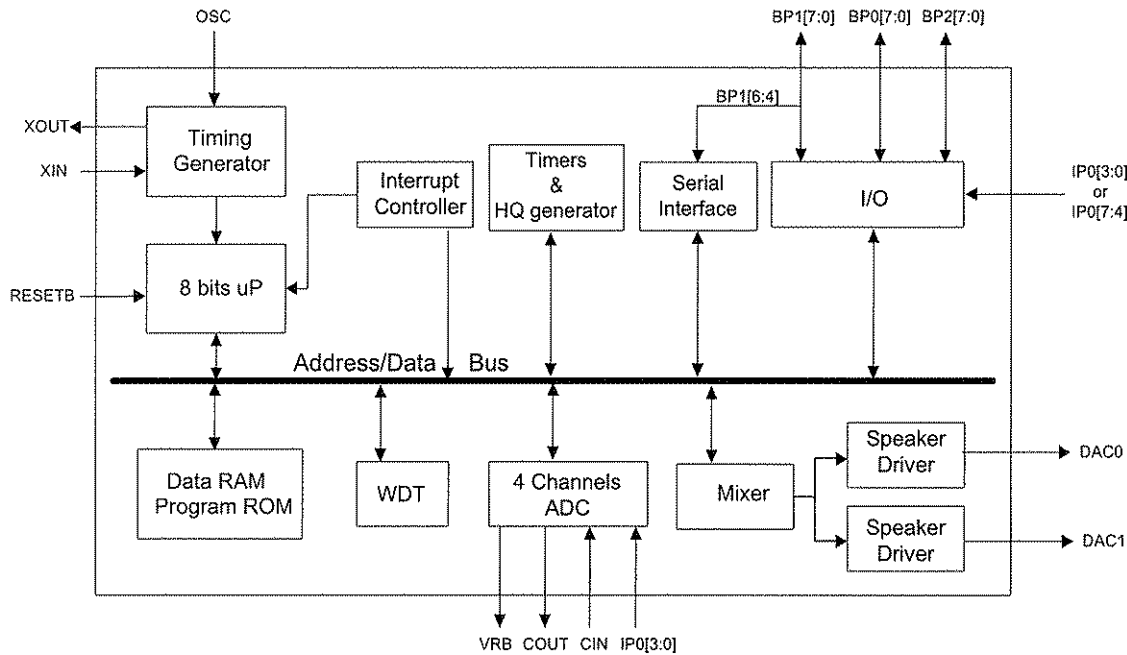
5. ELECTRICAL CHARACTERISTICS

5.1 Absolute Maximum Ratings

PARAMETER	RATING	UNIT
Supply Voltage to Ground Potential	-0.3 to +7.0	V
D.C. Voltage on Any Pin to Ground Potential	-0.3 to V_{DD} +0.3	V
Operating Temperature	0 to +70	°C
Storage Temperature	-55 to +150	°C

Note: Exposure to conditions beyond those listed under Absolute Maximum Ratings may adversely affect the life and reliability of the device.