FCC ID: SQ9QLX7622

Technical Description :

The brief circuit description is listed as follows :

Record Player :

- U1 W55MID50, X1 and associated circuit act as MFID Reader and 13.56 MHz Crystal Oscillator.
- U2 W588S100 and associated circuit act as 8-Bit MCU with Voice/Melody Synthesizer.

Record :

- U3 W55MID15, L4 and associated circuit act as MFID Transponder.

Antenna Used :

A Loop Antenna has been used.

Winbond Electronics Corp.

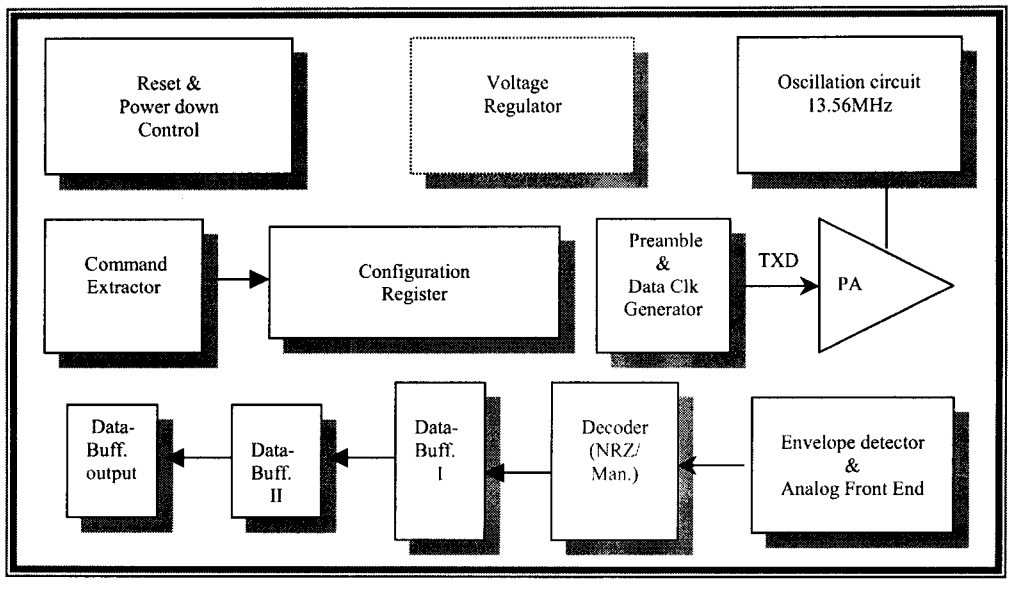
Winbond *MFID*^{WB} Reader

W55MID50

Data Sheet

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.

W588SXXX Data Sheet

Winbond Electronics Corp.

8-BIT MCU WITH VOICE/MELODY SYNTHESIZER (*PowerSpeech*™ Series)

Table of Contents-

1. GENERAL DESCRIPTION

The W588Sxxx is a powerful microcontroller-based speech synthesizer with 3 channels of speech and melody for multi-tasking applications.

The W588Sxxx provides slow mode operation and PWM output to help reduce the power consumption for longer battery life. Also, the W588Sxxx adopts the MDPCM, ADPCM or PCM algorithm to reproduce high quality sound outputs.

Other powerful functions like IR carrier generation and event synchronization mechanism are provided to meet the requirements for more complicated multi-tasking applications.

The W588Sxxx family contains several items with different playback duration as shown below: (@5-bit MDPCM algorithm, 6KHz sampling rate)

ITEM	**W588S003**	**W588S006**	**W588S010**	**W588S013**	**W588S016**
*Duration	4 sec.	7 sec.	12 sec.	16 sec.	20 sec.
ITEM	**W588S020**	**W588S025**	**W588S030**	**W588S040**	**W588S050**
Duration	25 sec.	29 sec.	32 sec.	50 sec.	58 sec.
ITEM	**W588S060**	**W588S080**	**W588S100**	**W588S120**	-
Duration	66 sec.	100 sec.	118 sec.	133 sec.	-

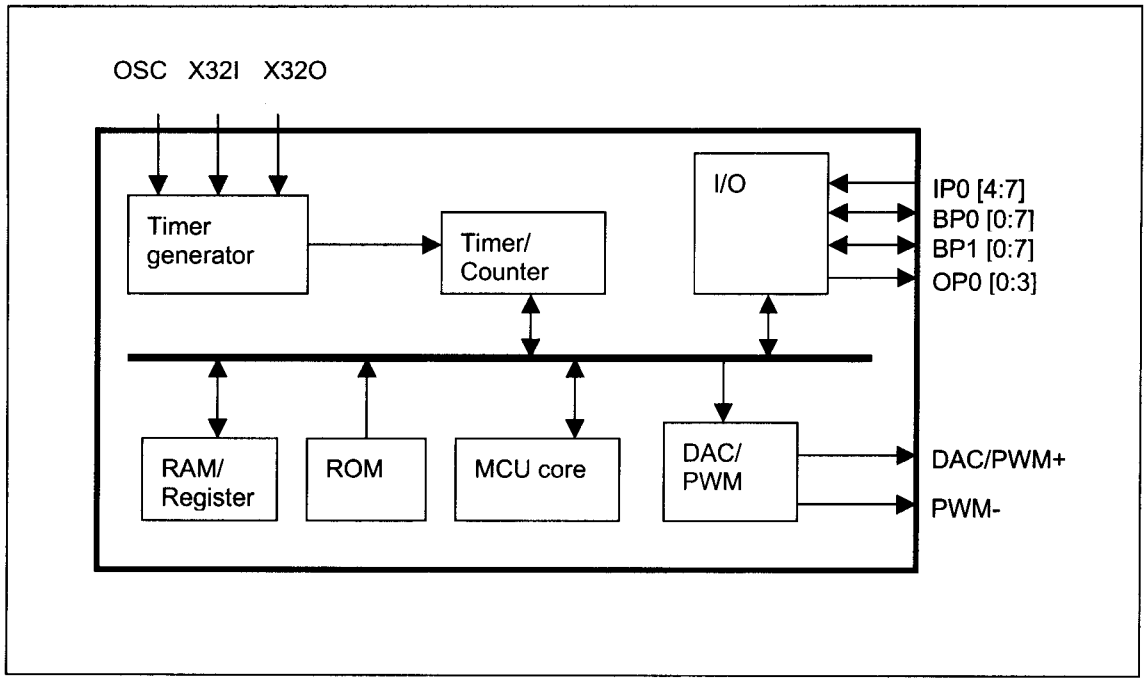
**ITEM	**W588S009**	**W588S012**	**W588S015**
Duration	12 sec.	16 sec.	20 sec.

Note:

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

**: W588S009, S012 and S015 are a little different in RAM and I/O definition. Meanwhile, *PowerScript* ™ dose not support either.

4. BLOCK DIAGRAM



Notes:

1. IP0 and OP0 are only providing in W588S009, W588S012 and W588S015.
2. BP1 is no providing in W588S009, W588S012 and W588S015.
3. PWM is no providing in W588S003 and W588S006.

5. ELECTRICAL CHARACTERISTICS

5.1 Absolute maximum ratings

PARAMETER	SYMBOL	CONDITIONS	RATED VALUE	UNIT
Power Supply	V_{DD}–V_{SS}	-	-0.3 to +7.0	V
Input Voltage	V_{IN}	All Inputs	V_{SS} -0.3 to V_{DD} +0.3	V
Storage Temp.	T_{STG}	-	-55 to +150	°C
Operating Temp.	T_{OPR}	-	0 to +70	°C

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

Winbond Electronics Corp.

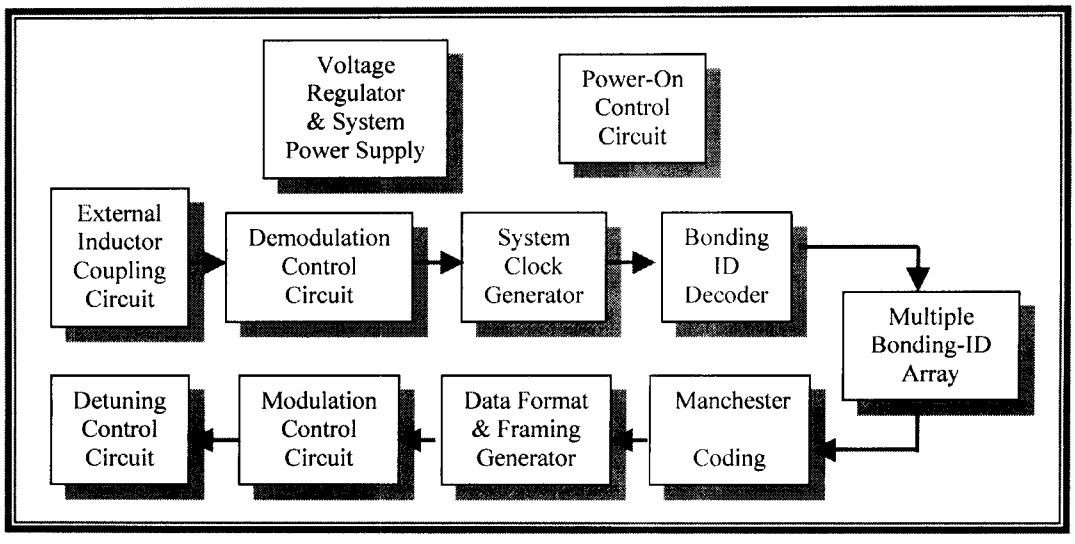
Winbond *MFID*^{WB} Transponder

W55MID15

Data Sheet

System Description

2.1 W55MID15 System Block Diagram



2.2 W55MID15 Functional Description

External Inductor Coupling Circuit

The external inductor coupling circuit is designed for 13.56MHz magnetic field resonance. The coupled center frequency will depend on equivalent inductor of external PCB inductor and a paralleled capacitor.

Voltage Regulator & System Power Supply

The voltage regulator generates the need of device power supply.

Power-On Control Circuit

System power-on control circuit initiates the device to get into initial state.

Demodulation Control Circuit

The demodulation control circuit demodulates the signal of command, which is magnetic field coupling from W55MID50 *MFID*^{WB} Reader system.

System Clock Generator

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

Bonding-ID Decoder

The memory array decoder circuit decodes the mapping location of memory array, which indicates by external RS0, RS1, RS2, RS3, and RS4 the 3-state Bonding Finger (Winbond patented).

Multiple Bonding-ID Arrays

The multiple Bonding-IDs array provides total up to 243 different bonding-ID and 10bit in each ID.

Data Format and Framing Generator

The data format and framing generator is in charge of the entire bonding-ID and command data into a Winbond defined *MFID*^{WB} tag format.

Modulation Control Circuit

The modulation control circuit modulates the Winbond defined *MFID*^{WB} transponder format into the magnetic field resonation.

Electronic Characteristics

3.1 W55MID15 Absolute Maximum Ratings

Parameter	Rating	Unit
Maximum Current in COIL	10	mA
Power Dissipation (T_a = 70°C)	100	mW
Ambient Operating Temperature	0 to +70	°C
Storage Temperature	-40 to +85	°C

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

3.2 W55MID15 DC Characteristics

(VDD-VSS = 4.5 V, Ta = 25°C; unless otherwise specified)

Parameter	Sym.	Conditions	Min.	Typ.	Max.	Unit
Operating Magnetic Field	f_{OP}	Field in resonation	-	13.56	-	MHz
Operating Voltage	V_{DD}	Field in resonation	3	-	5.5	V
Operating Temperature	Tamb	Ambient operating temp	0	25	70	°C
Operating Current	I_{OP}	f_{OP} = 13.56MHz	-	2	-	uA
Magnetic Resonat Voltage	V_M		6	-	9	V