



***ASM1506C/2006C/2506C***  
***DATA SHEET***

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# **ASM1506C/2006C/2506C**

**- VERY LOW-COST VOICE SYNTHESIZER WITH 4-BIT MICROPROCESSOR**

## **1.0 General Description**

The ASM1506C/2006C/2506C is very low cost voice synthesizer with 4 - bit microprocessor . It has various features including 4-bit ALU, ROM, RAM, I/O ports, timers, clock generator, watchdog timer(WDT), voice synthesizer , etc . It consists of 22 instructions in the device . With CMOS technology and halt function can minimize power dissipation . Its architecture is similar to RISC , with two stages of instruction pipeline . It allows all instructions to be executed in a single cycle , except for program branches and data table read instructions (which need two instruction cycles).

## **1.1 Feature**

- ◆ Single power supply can operate from 2.4V through 5.5V
- ◆ Internal Program ROM: 4K x 10-bit
- ◆ 1 sets of 17-bit DPR can access up to 80K x 10 bits data memory space
- ◆ Data Registers:
  - 64 x 4-bit data RAM (00-1Fh plus 40h-5Fh)
  - Unbanked special function registers (SFR) range: 20h-3Fh
- ◆ I/O Ports:
  - PRA: 4-bit I/O Port A (2Bh)
  - PRB: 2-bit Output Port B (2Dh)
- ◆ On-chip clock generator: Resistive Clock Drive(**RM**)
- ◆ Timer: 1
  - Timer0: a 9-bit auto-reload timer/counter
- ◆ Stack: 2-level subroutine nesting
- ◆ HALT and Release from HALT function to reduce power consumption
- ◆ Watch Dog Timer (**WDT**)
- ◆ Instruction: 1-cycle instruction except for table read and program branches which are 2-cycles
- ◆ Number of instruction: 22
- ◆ The Voice function can be implemented by microprocessor instruction
  - One 8-bit COUT output for ASM1506C/2006C/2506C

**FIGURE 1.1 : Block Diagram of ASM1506C/2006C/2506C**

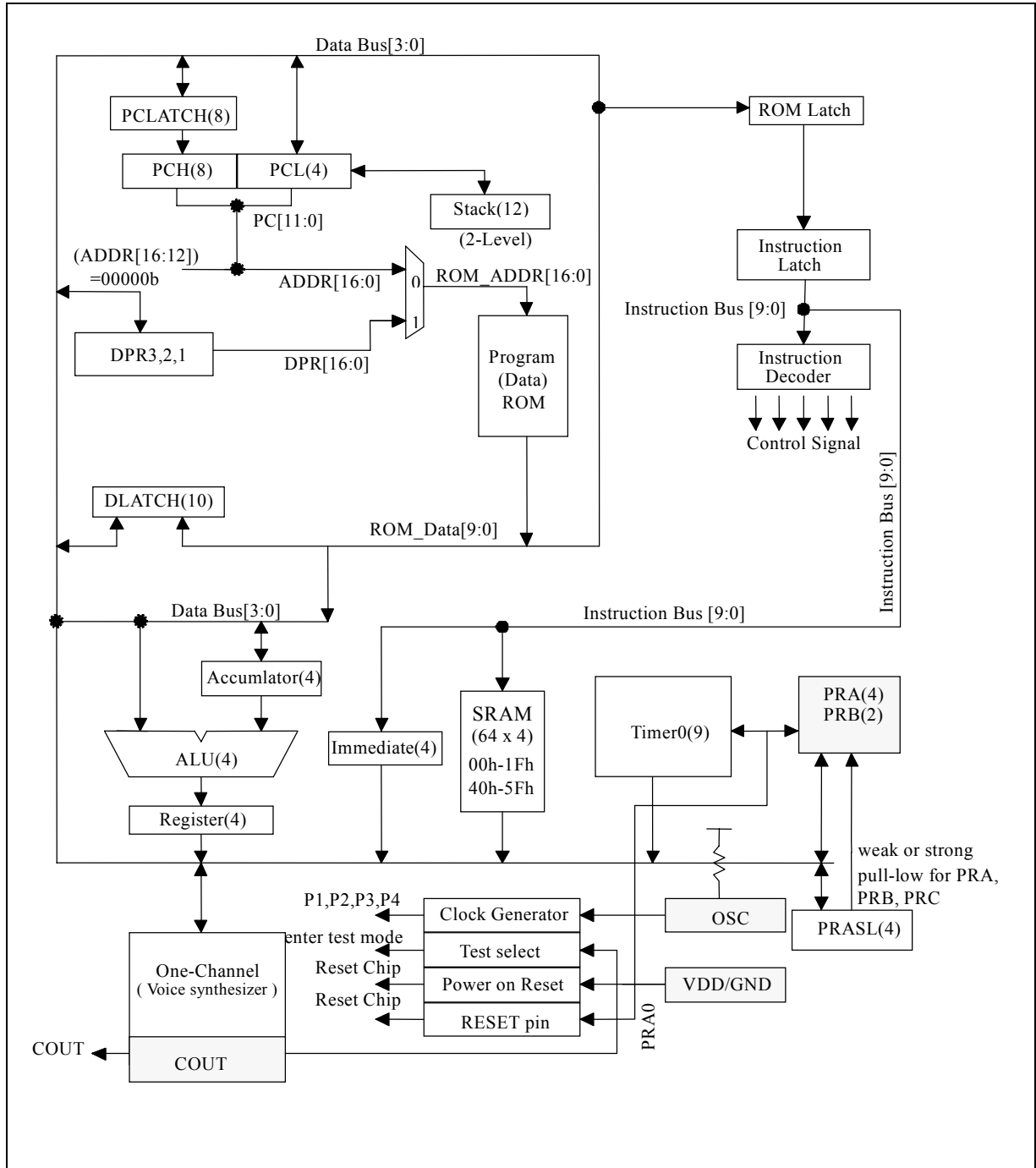
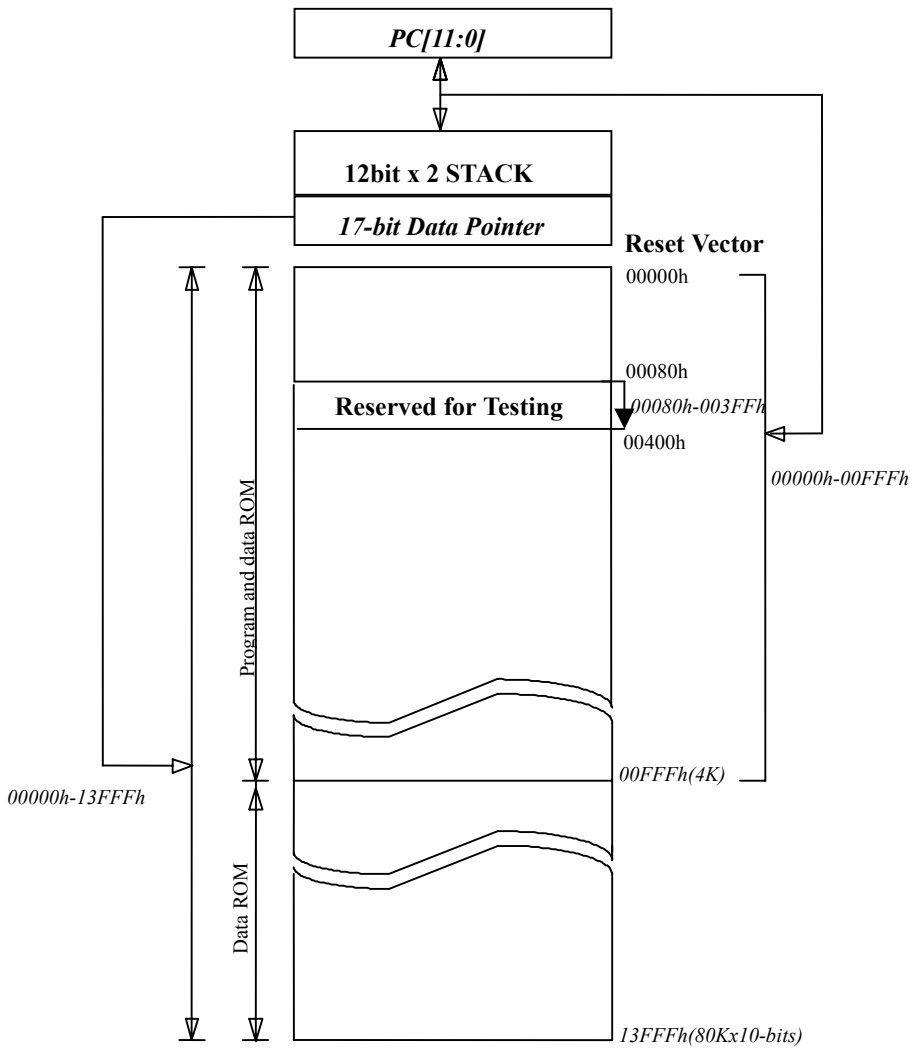


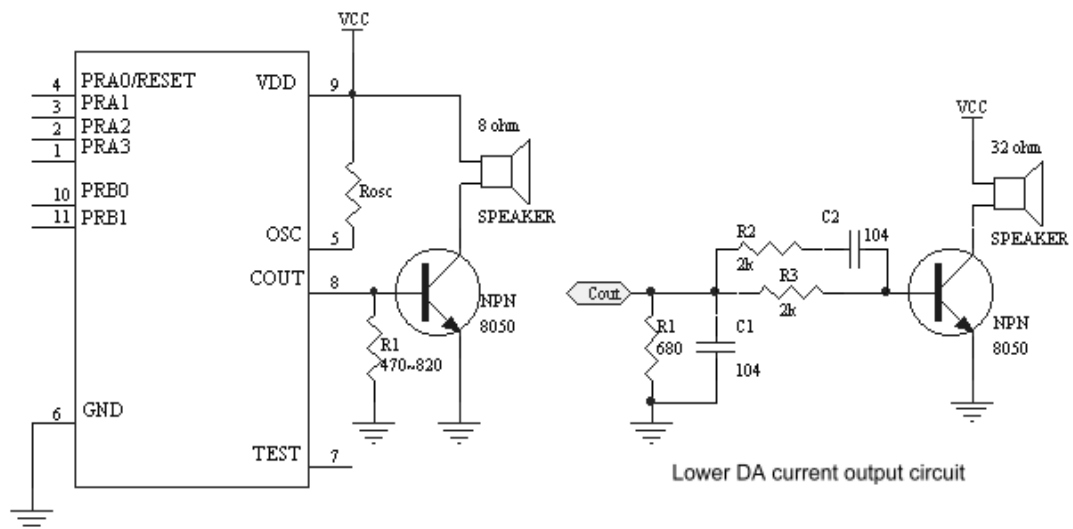
FIGURE 1.2 : External ROM Map of ASM1506C/2006C/2506C



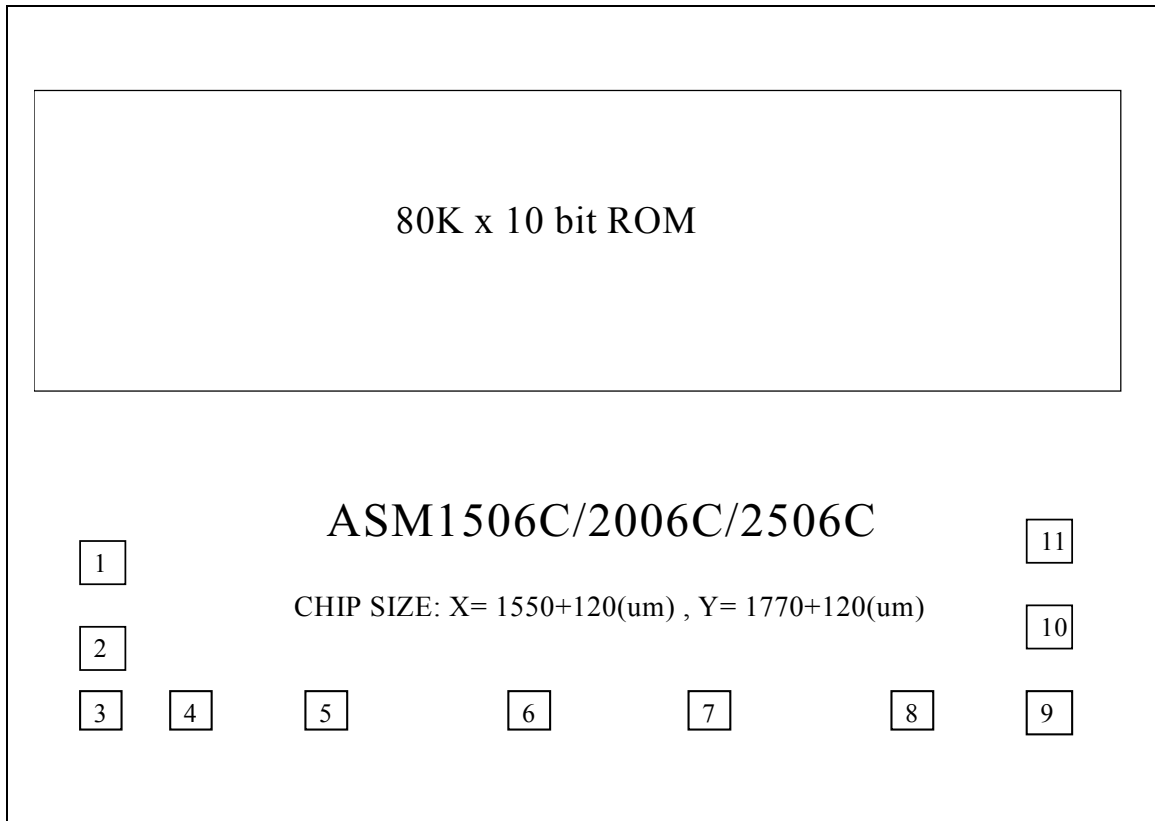
## 1.2 Pin-Out

ASM1506C/2006C/2506C Pin-Out			
VDD	I	-	Power supply during operation
PRA3-1	I/O	STI Std./O.D.	I/O port with programmable strong pull-low or weak pull-low or fix-input-floating capability Output type with standard or Open-Drain output
PRA0/RESET	I/O	STI Std./O.D.	I/O port with programmable strong pull-low or weak pull-low or fix-input-floating capability Output type with standard or Open-Drain output <i>Mask option selected as an external RESET pin with weak pull-low capability</i>
OSC	I	-	RM mode Oscillator input
COU	O	-	Current Output of Audio
GND	I	-	Circuit Ground Potential
TEST	O	-	Enter Test Mode. ( TEST = High )
PRB0-1	O	Std./O.D.	Output type with standard or Open-Drain output

## 1.3 Application circuit



## 1.4 Bonding Diagram



**Substrate must be connected to GND.**

ASM1506C/2006C/2506C Pad Location				CHIP SIZE: X= 1550+120(um) , Y= 1770+120(um)			
PAD #	PAD Name	X	Y	PAD #	PAD Name	X	Y
1	RA3	-664.92	-476.16	7	TEST_PAD	105.44	-800.84
2	RA2	-664.92	-604.28	8	COUT	303.96	-800.84
3	RA1	-662.64	-800.84	9	VDD	683.04	-800.84
4	RA0	-468.24	-800.84	10	RB0	664.92	-599.84
5	OSC	-281.04	-800.84	11	RB1	664.92	-481.44
6	GND	-111.72	-800.84				

## 1.5 DC Characteristics for ASM1506C/2006C/2506C

SYMBOL	PARAMETER		VDD	MIN.	TYP.	MAX.	UNIT	CONDITION
VDD	OPERATING VOLTAGE			2.4	3	5.5	V	depending on Freq.
Isb	SUPPLY CURRENT	STANDBY	3			1	uA	4MHz, RM in HALT Mode
			5			1		
Iop		OPERATING	3		2		mA	
			5		7			
Iih	INPUT CURRENT /Internal pull low		3		3		uA	4MHz, RM in HALT Mode (IO Ports with weak pull-high pull-low)
			5		9			
			5		-5.2			
Ioh	OUTPUT HIGH CURRENT		3		-3		mA	4MHz, RM (IO ports)
			5		-8			
Iol	OUTPUT LOW CURRENT		3		7			
			5		20			
dF/F	FREQUENCY STABILITY			-10		10	%	$\frac{F_{osc}(3v-2.4v)}{F_{osc}(3v)}$
dF/F	Fosc VARIATION			-20		20	%	VDD=3V, Rosc=1M, 4MHz

**FIGURE 1.3 : Frequency Range for Rosc in RM mode**

Resistor(k ohm)	1200	1000	620	470
3v Freq.(MHz)	3.27	4.11	6.28	7.84

