

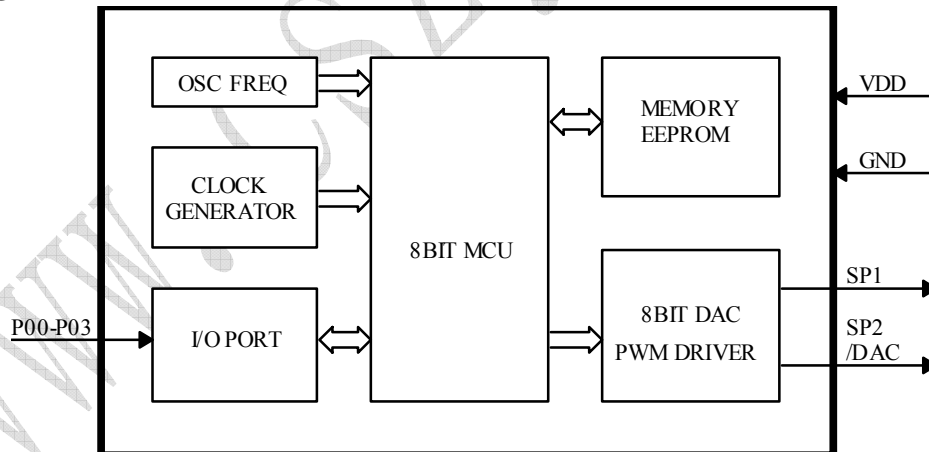
FEATURES

- Embedded OTP memory and 8-bit MCU
- Built-in oscillator and Power On Reset circuits to reduce external components.
- 2.2V – 3.6V single power supply and < 5uA low stand-by current.
- 10, 21 and 42sec voice duration at 6 KHz sampling with 4-bit ADPCM compression.
- Combination of voice building blocks to extend playback duration.
- Table entries are available for voice block combinations.
- User selectable PCM or ADPCM data compress.
- Voice Group Trigger Options: Edge / Level; Hold / Un-hold; Retrigger / Non-retrigger.
- Programmable I/Os, Timer Interrupt and Watch Dog Timer.
- PWM Vout1 and Vout2 drive speaker directly with 2 levels volume control.
- D/A COUT with ramp-up ramp-down option to drive speaker through an external BJT.
- Windows based development system and USB programmer support

DESCRIPTION

ABT' T51XX is a 8-bit CPU based Voice chip series. It is fabricated with Standard CMOS process with embedded voice storage OTP memory. It can store from 10 to 42sec voice message with 4-bit ADPCM compression at 6KHz sampling rate. 8-bit PCM is also available as user selectable option to improve sound quality. Depending on IC body, there are up to eight programmable I/O pins. Key trigger and Parallel CPU trigger mode can be configured according to different application requirements. User selectable triggering and output signal options provide maximum flexibility to various applications. Fully integrated system oscillator, power-on reset, 8-bit current mode D/A output and PWM direct speaker driving output to minimize external components count. Two level volume control for PWM direct speaker driving output.

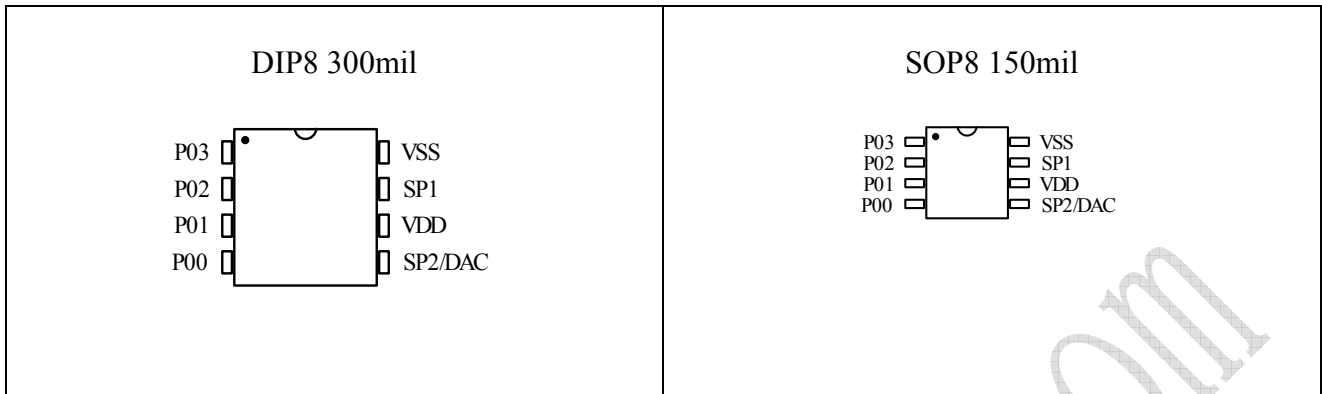
BLOCK DIAGRAM



IC BODY PACKAGE&I/O LIST

Part No.	Second(s)	DIP8	SOP8	DIP16	SOP16	Coding DICE	COB
T5110	10"	4I/O	4 I/O	--		√	√
T5120	20"	4 I/O	4 I/O	--		√	√
T5140	40"	4 I/O	4 I/O	8I/O	8I/O	√	√

PIN CONFIGURATIONS



PIN DESCRIPTIONS

Pin NO.	Pin Names	Description
01	P00	Programmable I/O pins
02	P01	Programmable I/O pins
03	P02	Programmable I/O pins
04	P03	Input pin with programmable pull-down
05	SP2/DAC	PWM output or DAC output select by programmable option
06	VDD	Positive Power Supply
07	SP1	PWM output to drive speaker directly
08	GND	Power Ground

Note:

1. Pins required for OTP program include P00 to P03, SP1, SP2_COUT, VDD and VSS.
2. P00-03 are software programmable I/O pins that can be set to different configurations such as pure input, input with pull-up, input with pull-down and output. The programmable I/O pins set up will take effect immediately after power-on reset.

ABSOLUTE MAXIMUM RATINGS

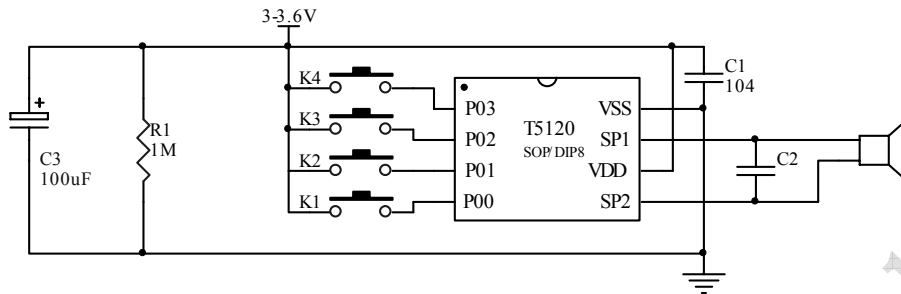
Symbol	Rating	Unit
VDD - GND	-0.5 ~ +3.8	V
VIN	VSS -0.3 < VIN < VDD + 0.3	V
VOUT	VSS < VOUT < VDD	V
T (Operating):	-40 ~ +85	°C
T (Junction)	-40 ~ +125	°C
T (Storage)	-55 ~ +125	°C

Symbol	Parameter	Min.	Typ.	Max.	Unit	Conditions
VDD	Operating Voltage	2.2	3.0	3.6	V	
ISB	Standby current	}	1	5	μA	I/O properly terminated
IOP	Operating current	}	}	15	mA	I/O properly terminated
VIH	"H" Input Voltage	2.5	3.0	3.5	V	VDD=3.0V
VIL	"L" Input Voltage	-0.3	0	0.5	V	VDD=3.0V
IVOUTL	V _{OUT} low O/P Current	}	130	}	mA	Vout=1.0V
IVOUTH	V _{OUT} high O/P Current	}	-130	}	mA	Vout=2.0V
ICO	C _{OUT} O/P Current	}	-2	}	mA	Data = 80h
IOH	O/P High Current	}	-8	}	mA	VOH=2.5V
IOL	O/P Low Current	}	8	}	mA	VOL=0.3V
RNVOUT	V _{OUT} pull-down resistance	}	100K	}	Ω	V _{OUT} pin set to internal pull-down
RNPIO	Programmable IO pin pull-down resistance	}	1M	}	Ω	PBx, PCx, PDx set to internal pull-down
RUPIO	Programmable IO pin pull-up resistance	3.3K	4.7K	}	Ω	PBx, PCx, PDx set to internal pull-up
$\Delta\text{Fc}/\text{Fc}$	Chip to chip Frequency Variation	-5	}	+5	%	Also apply to lot to lot variation

Note:

1. The current value is for normal volume. It is double for high volume. The PWM volume is selected by using the development system software provided.
2. Where P00-P03 stands for programmable I/O pins

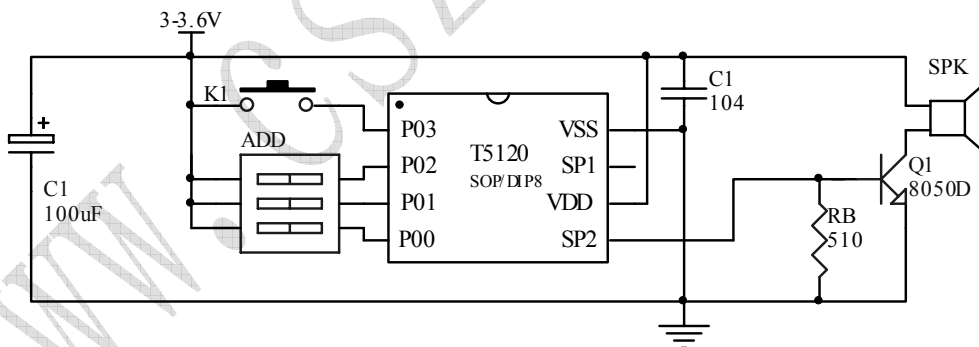
T5120 ALONE 4KEY PWM DRIVER TEST CIRCUIT



- 1、 C1 must be connected directly on the VDD and VSS pins of the chip
- 2、 R1 is optional for fast discharge of C1 and Crst when power off.
- 3、 C2 is added according to the table below:
- 4、 C3 be connected directly on the VDD and VSS pins of the chip if use the power supply .

PWM Volume	SPK	C2
Normal	8, 16 or 32 Ω	Not needed
High	16 or 32 Ω	Not needed
High	8 Ω	1000pF (102)
High	< 8 Ω	2000pF (202)

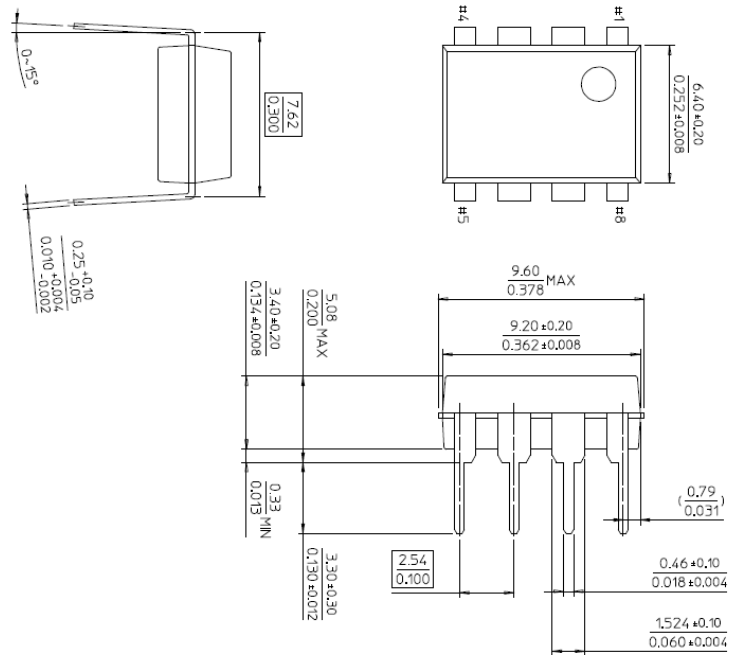
T5120 BCD KEY SBT 8SEC CIRCUIT



Note for COUT speaker drive:

1. C1 must be connected as close to the chips VDD and VSS pins as possible.
2. Rb is base resistor from 120 Ohm to 390 Ohm depends on value of VDD and transistor gain.
3. Q1 is an NPN transistor with beta larger than 150, e.g. 8050D.

8-Pin 300mil P-DIP Package



8-Pin 150mil SOP Package

