aP58Q7M/Q8M

38 / 76 minutes

Multi-time program voice 2 chip solution

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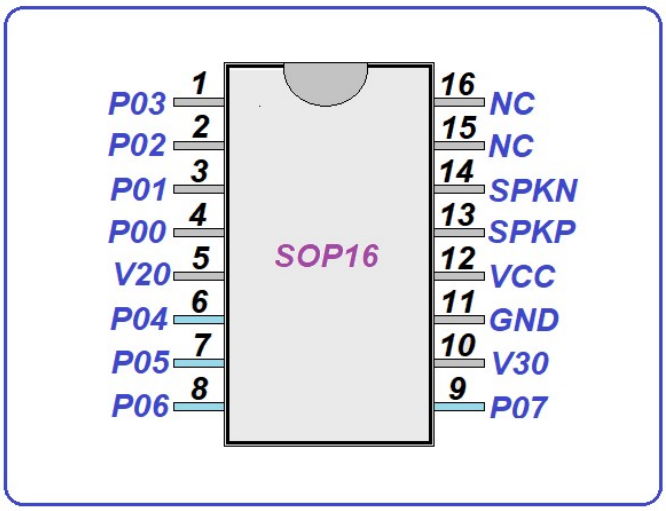
■ Part no. information

aP58QxM is combined part no. including aP58HQ and SPI flash, 2 chips
aP58Q7M = aP58HQ DSP + 64M SPI Flash
aP58Q8M = aP58HQ DSP + 128M SPI Flash

■ Features :

- Built in 8-bit DSP
- System CPU clock :24MHz
- Program memory : 512k bits(64 K Bytes) OTP.
- Voice memory : 64M/128M bits(8M/16M Bytes) FLASH memory
- 38/76 Min voice length at 5.8KHz sampling or 9.5/19 Min voice length at 23KHz sampling.
- Built-in 2k bits(256 Bytes) SRAM.
- Built-in R/C Trim (1%)
- Built-in 1 set PWM and 1 set DAC..
- GPIO x 4 available
- Built in low voltage detection and reset system circuit (LVR/LVD)
- Built-in Watch Dog Timer.
- Optional PWM driving ability : High Middle Low Buffer Drive .
- Operating Voltage Range: 2.3V ~ 5.0V.
- Five standard triggering modes are available
  - SBT mode
  - Matrix key
  - Cpu serial 1-wire mode
  - Cpu serial 2-wire mode
  - Cpu serial 3-wire mode



aP58HQ SOP16

■ PIN NAMES :

Pin No.	Designation	I/O	Description
1	P0[3] / Reset	I/O	Port-0 I/O or external reset
2	P0[2]	I/O	Port-0 I/O.
3	P0[1]	I/O	Port-0 I/O
4	P0[0]	I/O	Port-0 I/O
5	V20	P	Digital Power.
6	P04	I/O	Port-0 I/O.
7	P05	I/O	Port-0 I/O.
8	P06	I/O	Port-0 I/O
9	P07	I/O	Port-0 I/O
10	V30	P	IO Power.
11	GND	P	System Ground.
12	VCC	P	Chip Power.
13	SPK_P	O	DAC / PWM1
14	SPK_N	O	PWM2
15	NC		
16	NC		

Group Options :

Selectable options that affect each individual group are called Group Options. They are:
Edge or Level trigger.
Unholdable or Holdable
Re-trigger or Non-retrigger
Stop pulse disable or enable.

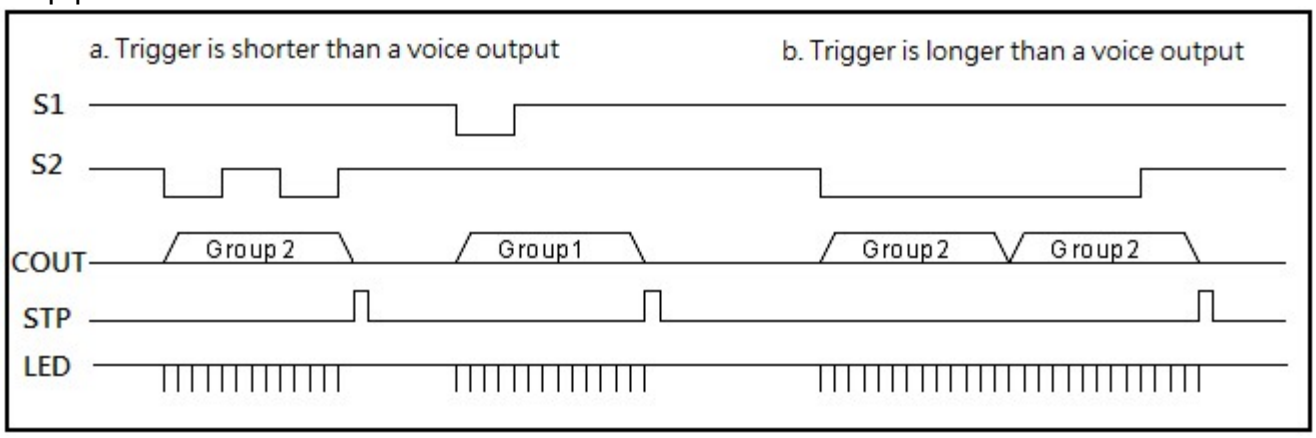


Fig. 1 Level, Unholdable, Non-retrigger

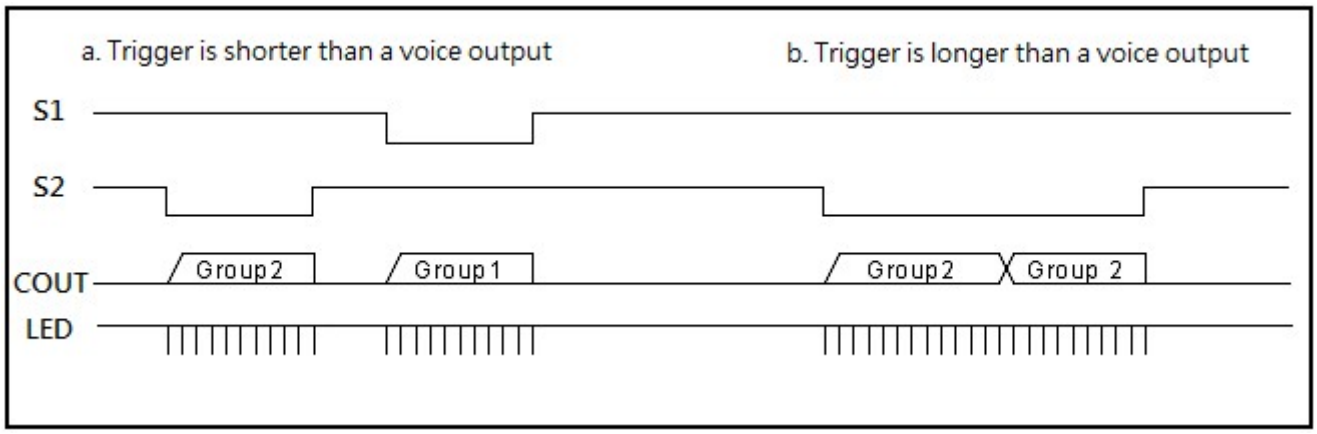


Fig. 2 Level Holdable

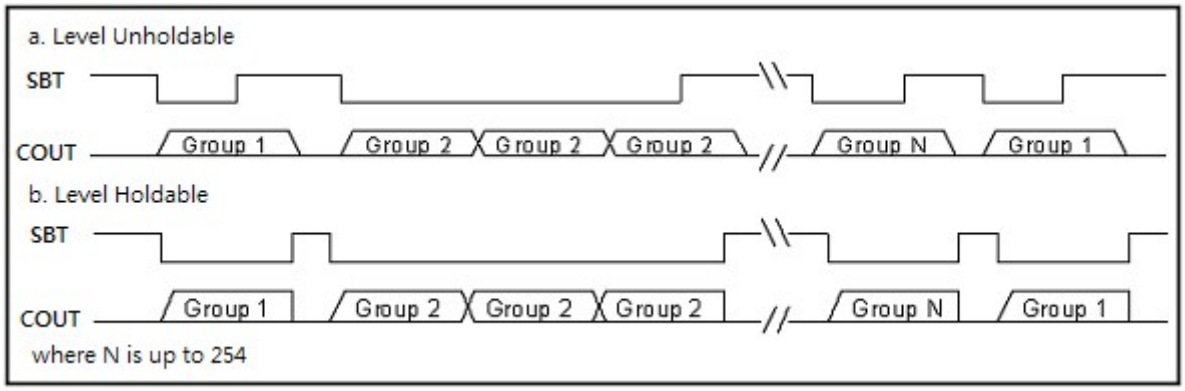


Fig. 3 SBT sequential trigger with Level Holdable and Unholdable

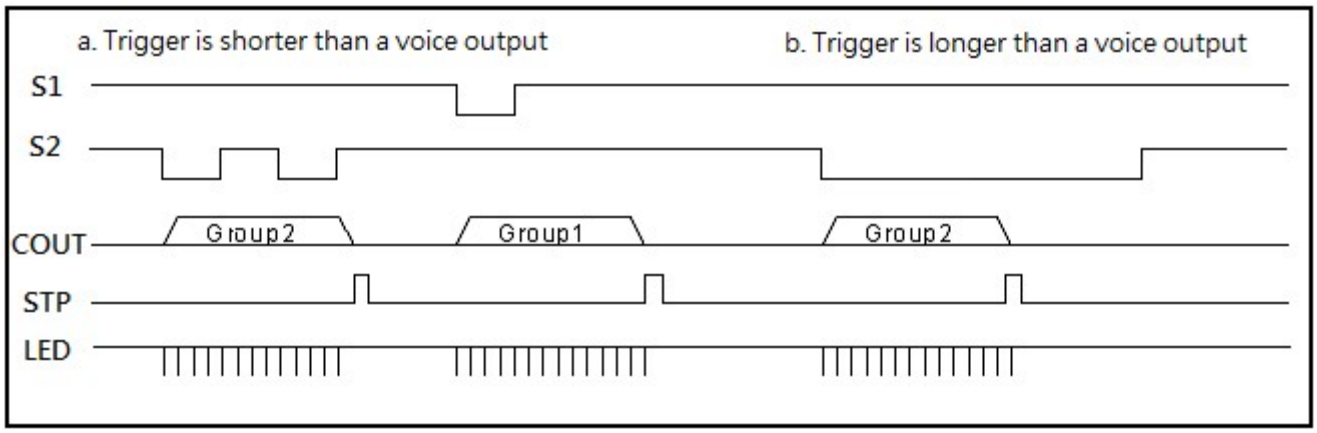


Fig. 4 Edge, Unholdable, Non-retrigger

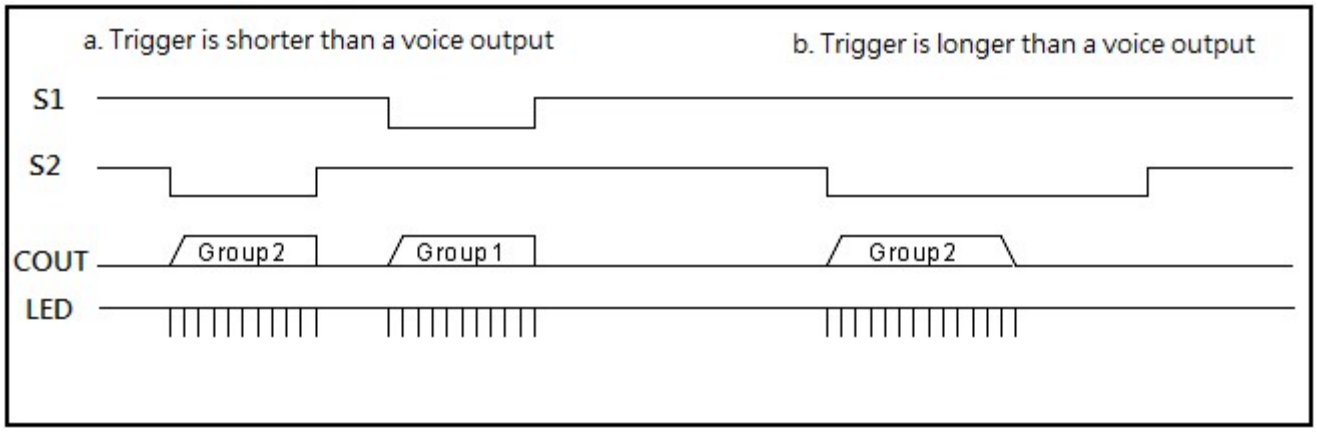


Fig. 5 Edge, Holdable

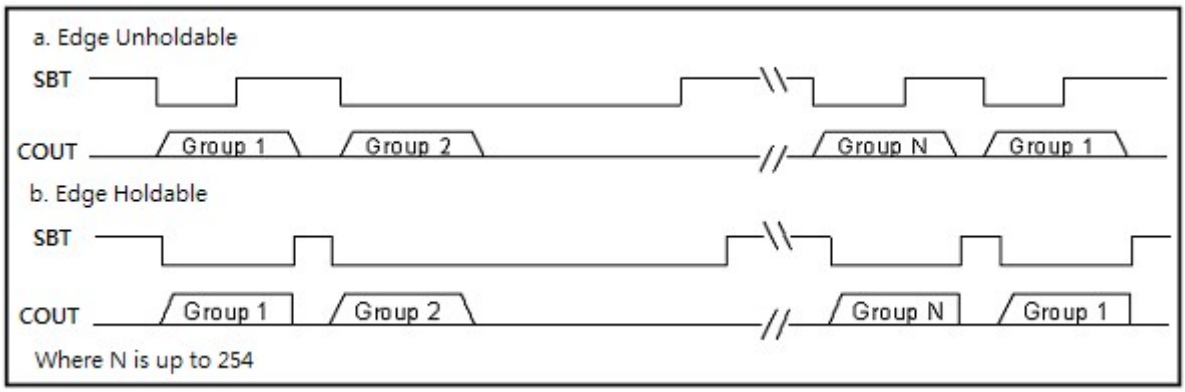


Fig. 6 SBT sequential trigger with Edge Holdable and Unholdable

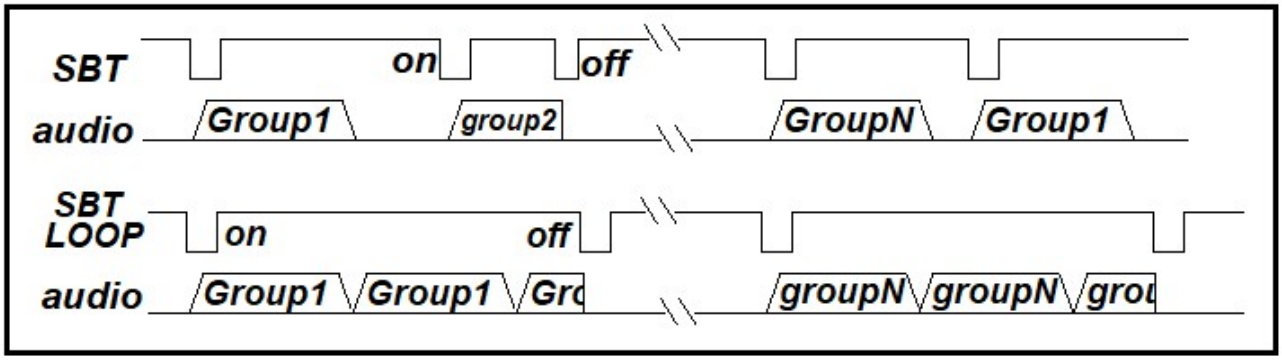


Fig. 7 SBT sequential trigger with On/Off

● Trigger mode :

1. SBT mode :

Maximum Voice Groups : 254 for each I/O. All I/O can be chosen input or output. Each Voice Group can have its independent trigger options (See Fig. 1,2,4 and 5).

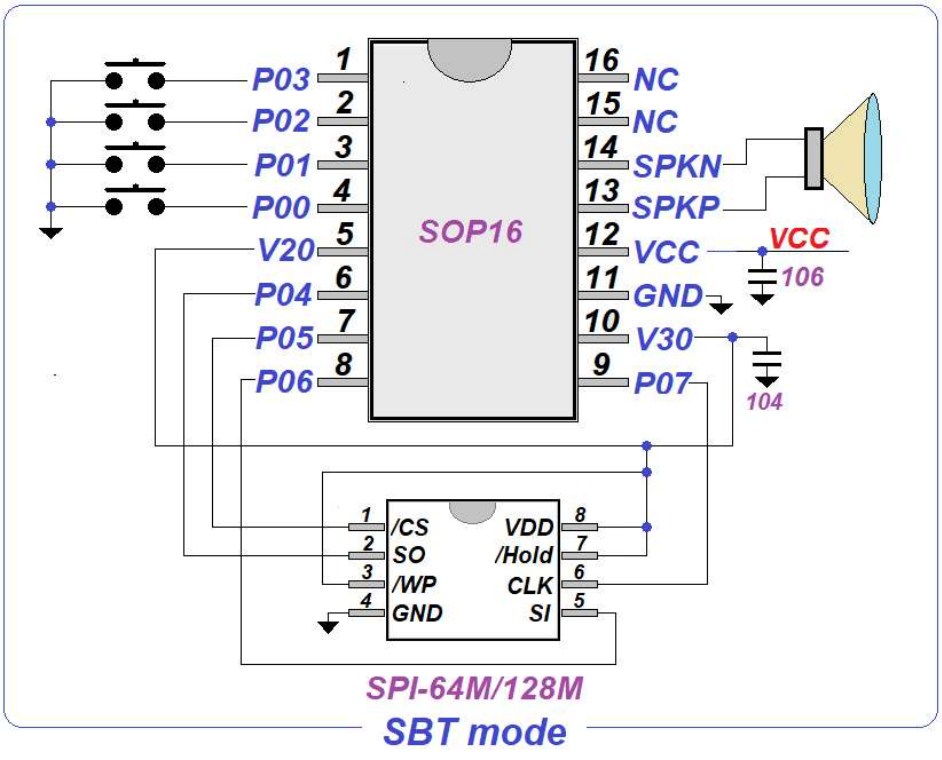
SBT mode has an additional on/off function. (See Fig. 7).

P00	P01	P02	P03
SEQ/VOL/OUT	SEQ/VOL/OUT	SEQ/VOL/OUT	SEQ/VOL/Reset/OUT

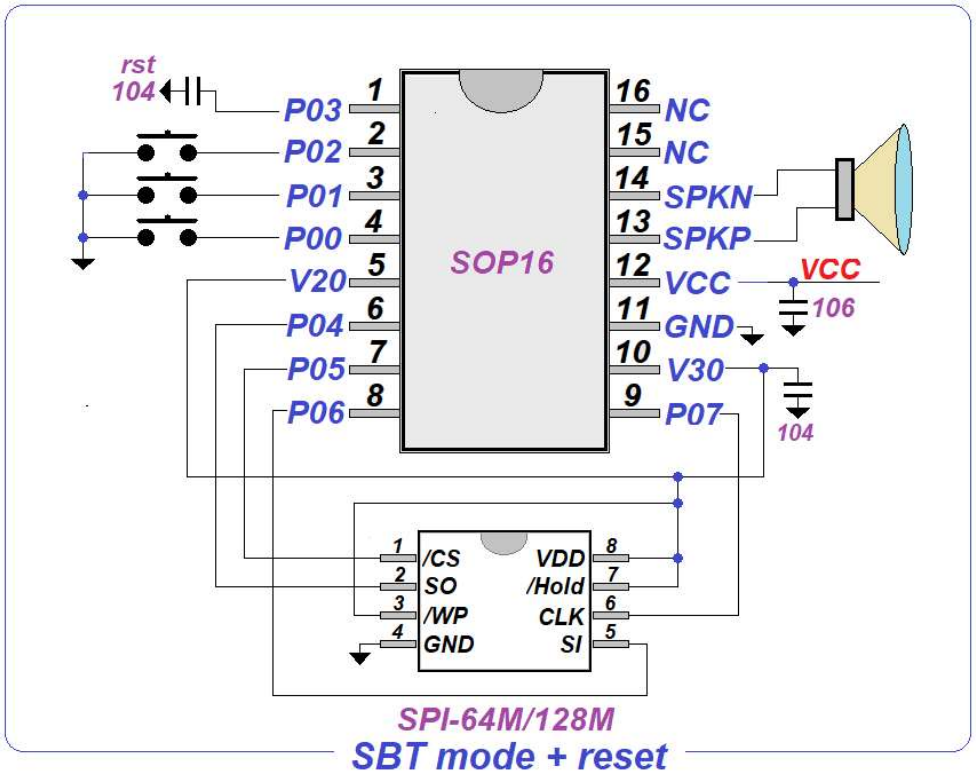
SEQ : Sequential Play (See Fig. 3 and 6).

VOL : Volume Control

Output : BusyH , BusyL , 3Hz , 6Hz , LED-dyna , StopH , StopL



Note : 106 must be connected directly on the VCC and GND pins of the chip.
104 must be connected directly on the V30 and GND pins of the chip.



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104 must be connected directly on the V30 and GND pins of the chip.

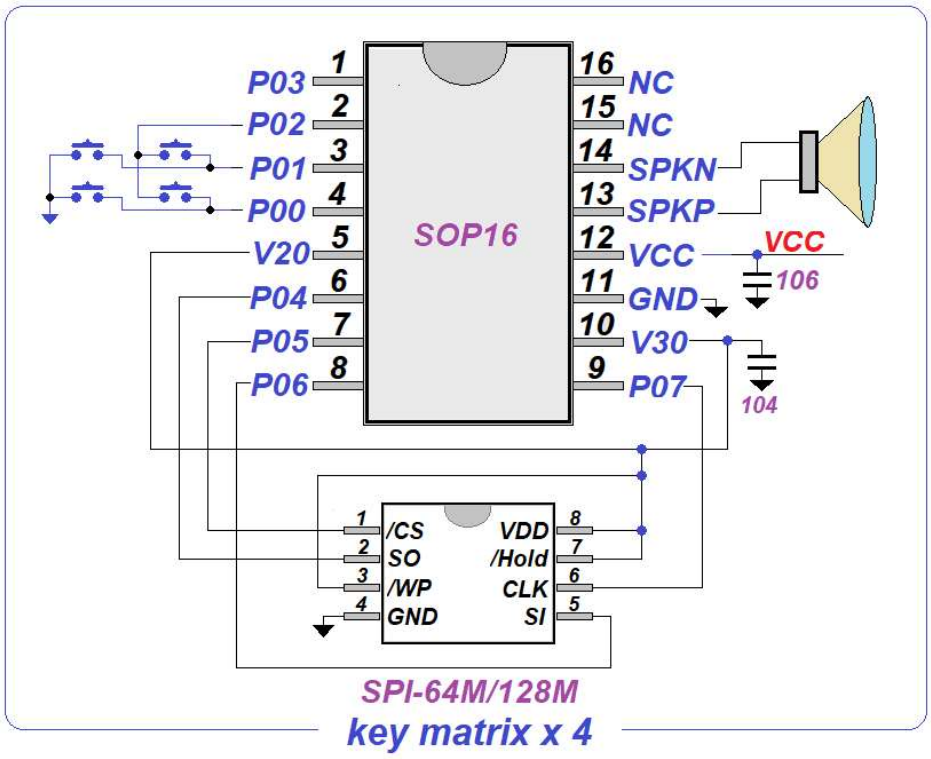
2. Key matrix mode :

The sound group is triggered by combining P00 to P03 and GND in a matrix. All I/O scan is chosen input or output. Each Voice Group can have its independent trigger option (see Figures 1, 2, 4 and 5).

	P00	P01	P02	P03	keyN
4 mkey	scan in	scan in	scan out	Vol/Reset/Out	mkey1~mkey4
6 mkey	scan in	scan in	scan in	scan out	mkey1~mkey6

Output : BusyH , BusyL , 3Hz , 6Hz , LED-dyna , StopH , StopL

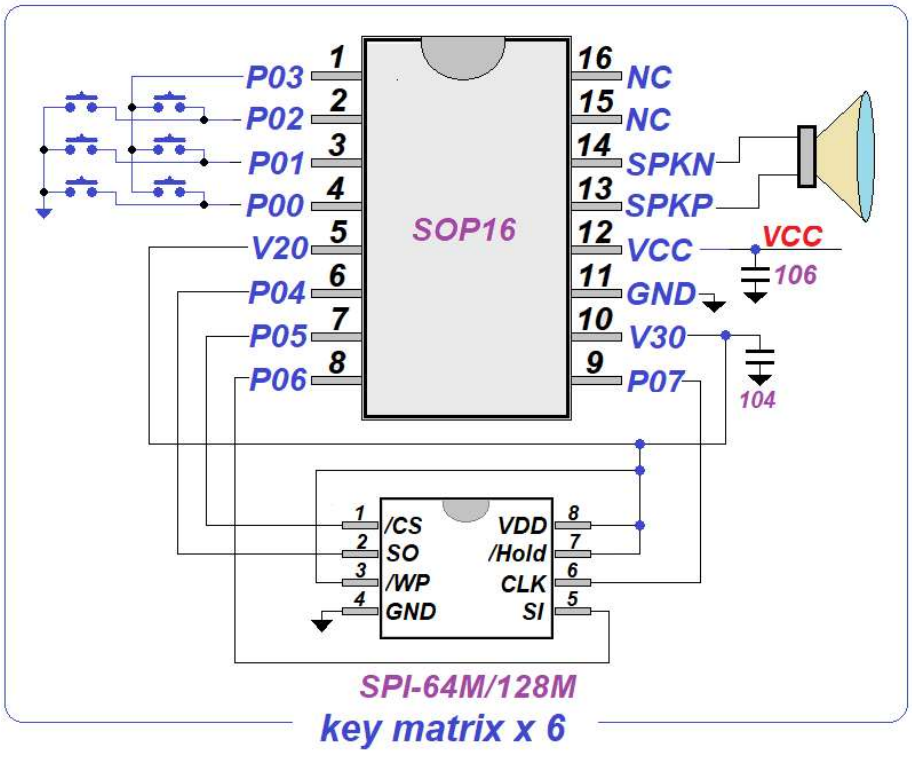
VOL : Volume Control



Ps : p03=input = reset

P03 = output option = busyH , busyL , 3Hz , 6Hz , LED-dyna , stopH , stopL

Note : 106 must be connected directly on the VCC and GND pins of the chip.
104 must be connected directly on the V30 and GND pins of the chip.



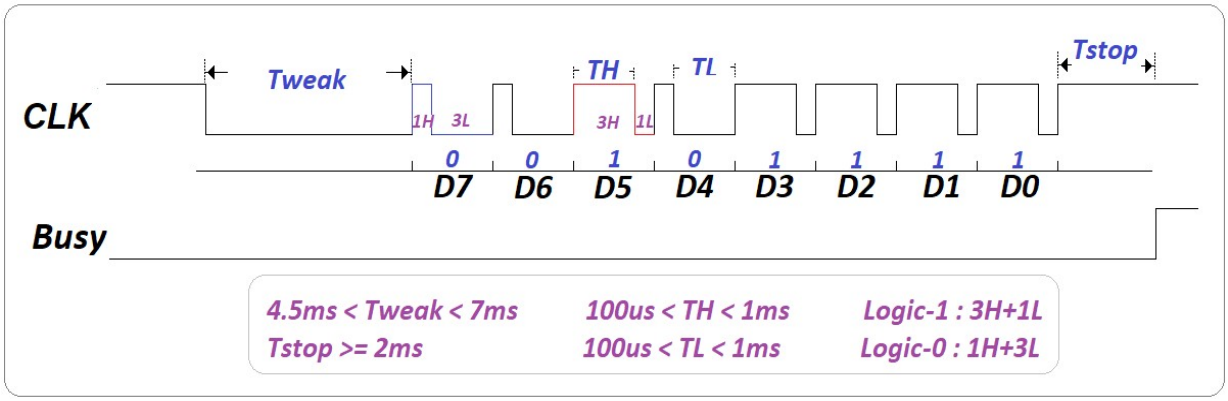
Note : 106 must be connected directly on the VCC and GND pins of the chip.
104 must be connected directly on the V30 and GND pins of the chip.

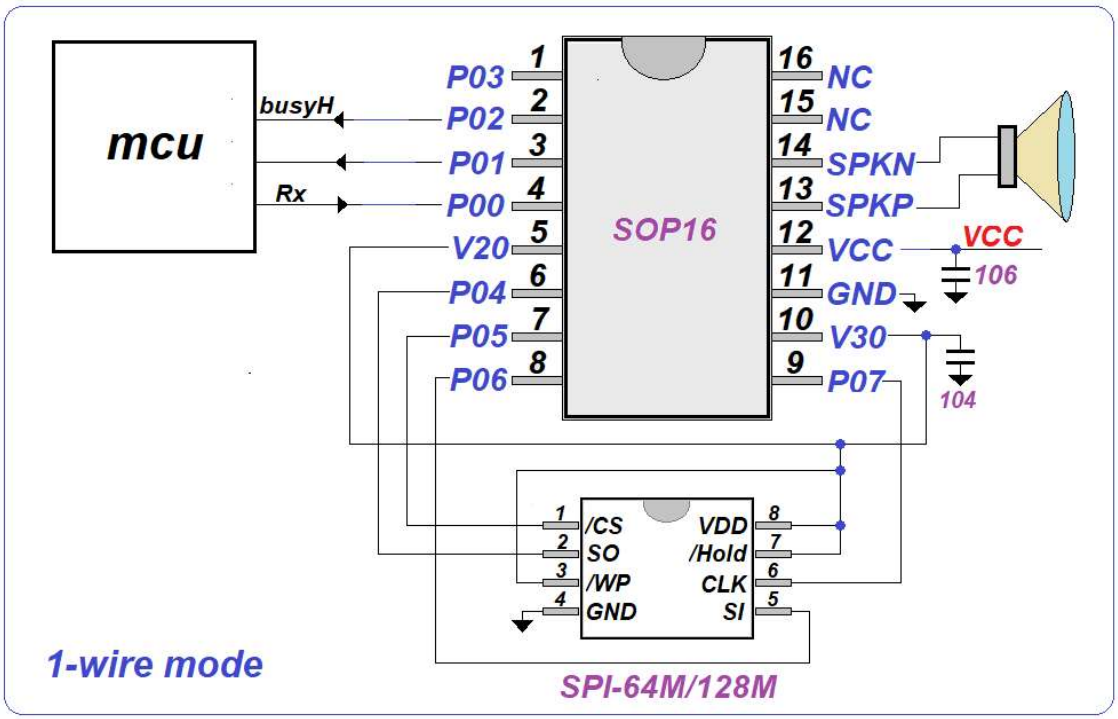
3. 1-wire mode :

P00	P01	P02	P03
Rx	Out	Out	Out/Reset

Out option : busyH , busyL , 3Hz , 6Hz , LED-dyna , stopH , stopL

P03 = input = reset option





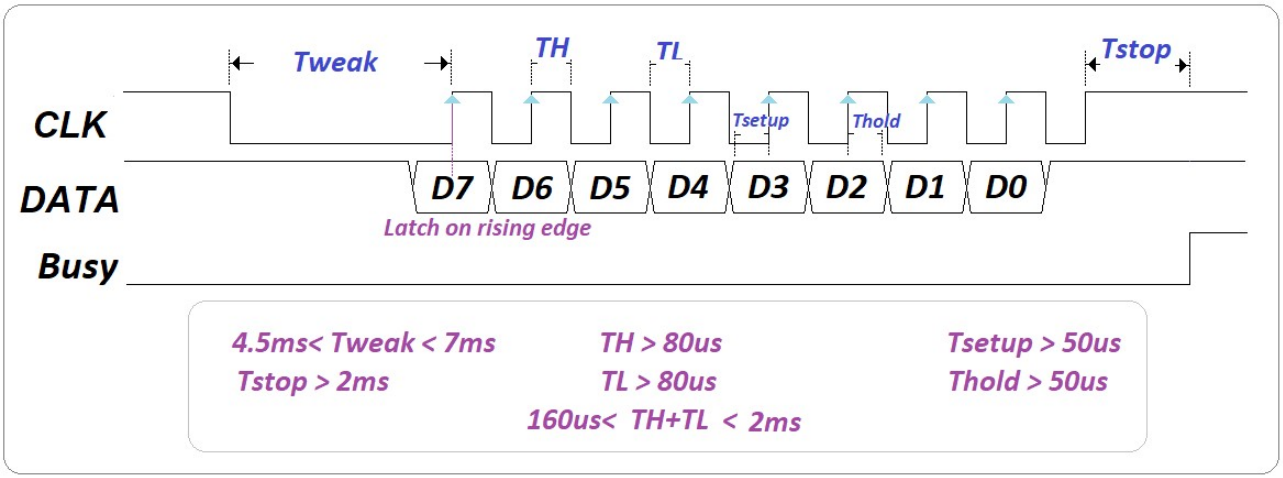
Note : 106 must be connected directly on the VCC and GND pins of the chip.
104 must be connected directly on the V30 and GND pins of the chip.

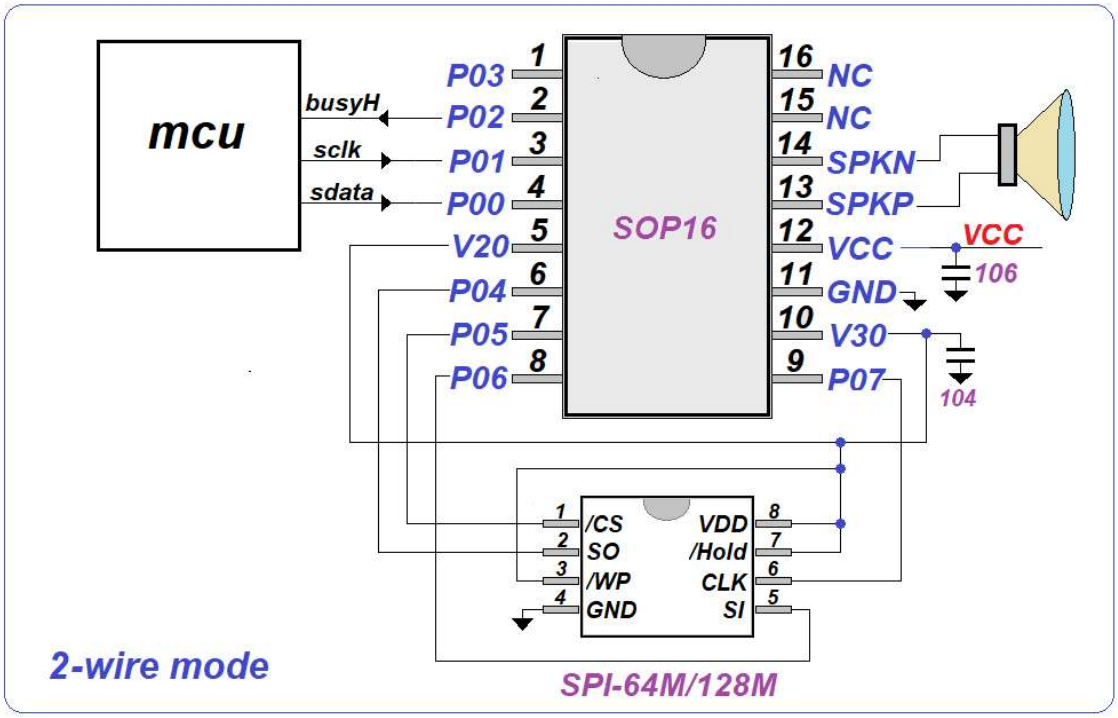
4. 2-wire mode :

P00	P01	P02	P03
sdata	sclk	Out	Out/Reset

Out option : busyH , busyL , 3Hz , 6Hz , LED-dyna , stopH , stopL

P03 = input = reset option





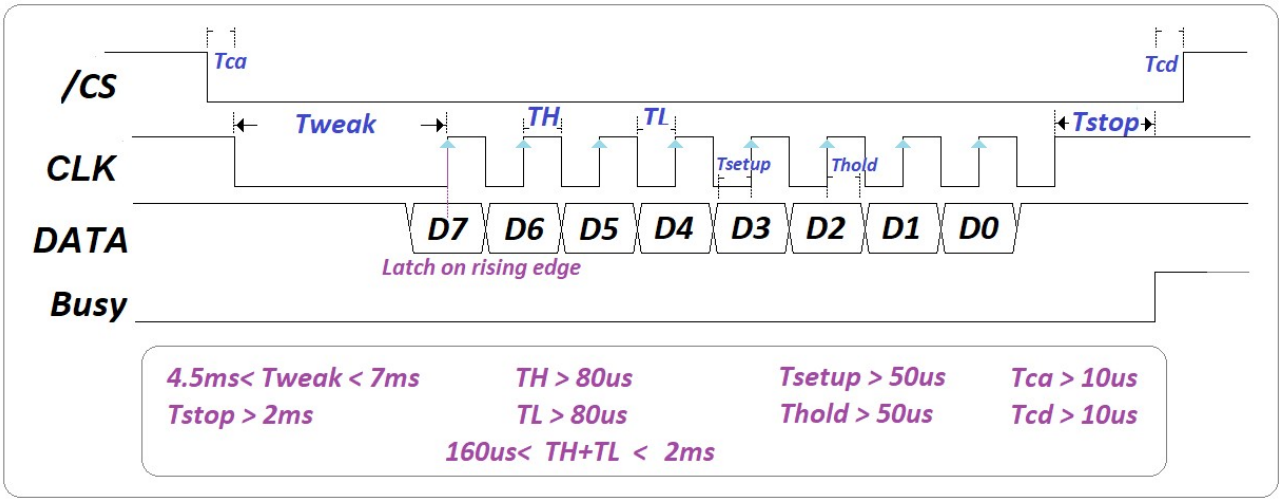
Note : 106 must be connected directly on the VCC and GND pins of the chip.
104 must be connected directly on the V30 and GND pins of the chip.

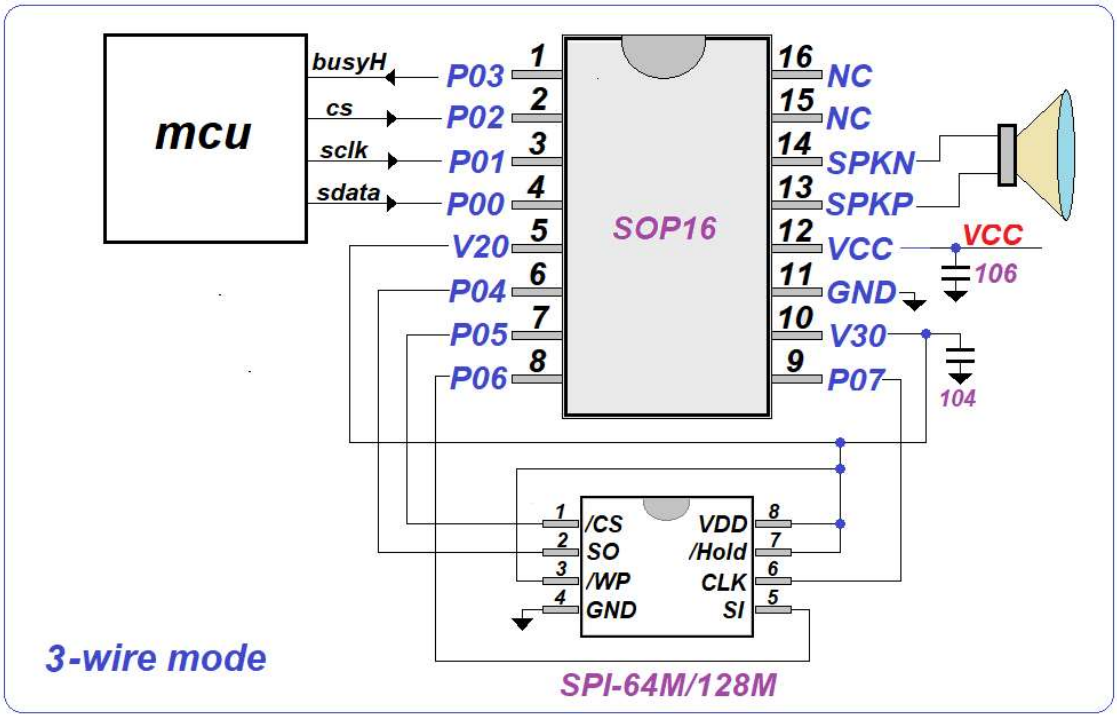
5. 3-wire mode :

P00	P01	P02	P03
sdata	sclk	Cs	Out/Reset

Out option : busyH , busyL , 3Hz , 6Hz , LED-dyna , stopH , stopL

P03 = input = reset option



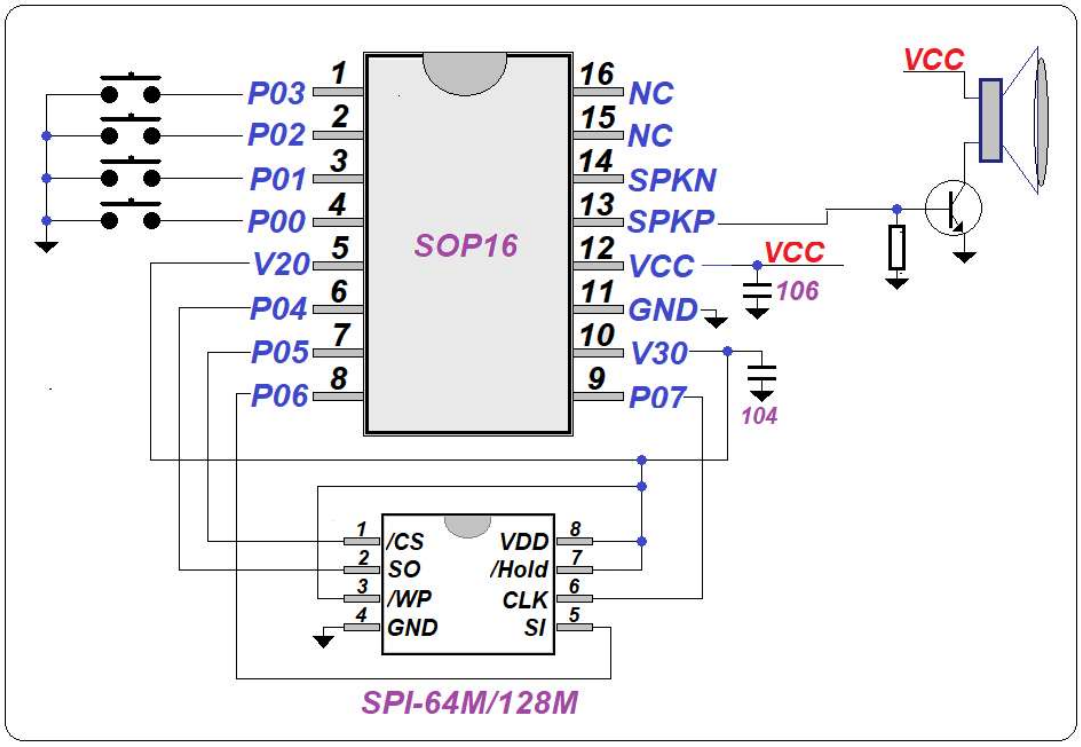


Note : 106 must be connected directly on the VCC and GND pins of the chip.
104 must be connected directly on the V30 and GND pins of the chip.

Command :

command	D7	D6	D5	D4	D3	D2	D1	D0
play sentence(n)	01 ~DF							
set volume (n)	E				N (0~15)			
reserved	F0 ~ F7							
repeat off	F8							
repeat on	F9							
Vol-	FA							
Vol+	FB							
Play Next	FC							
Play Next	1	1	1	1	1	1	0	0
Play Previous	FD							
Pause / Resume	FE (Available in PWM mode only)							
Stop	FF							

- **DAC Application :**



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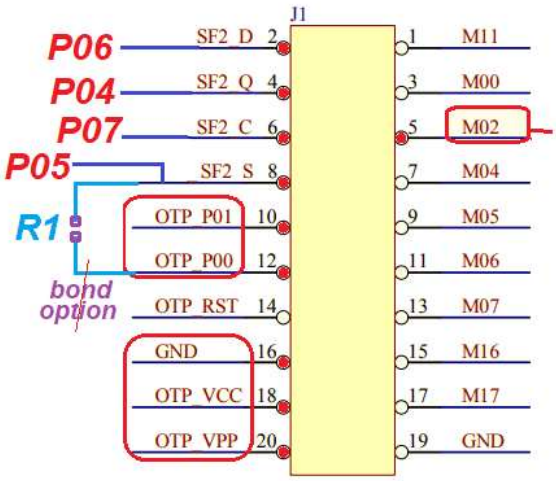
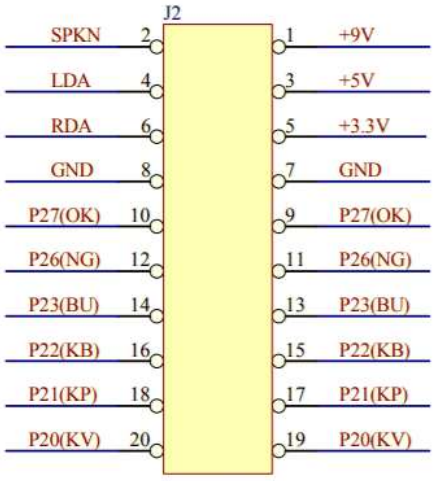
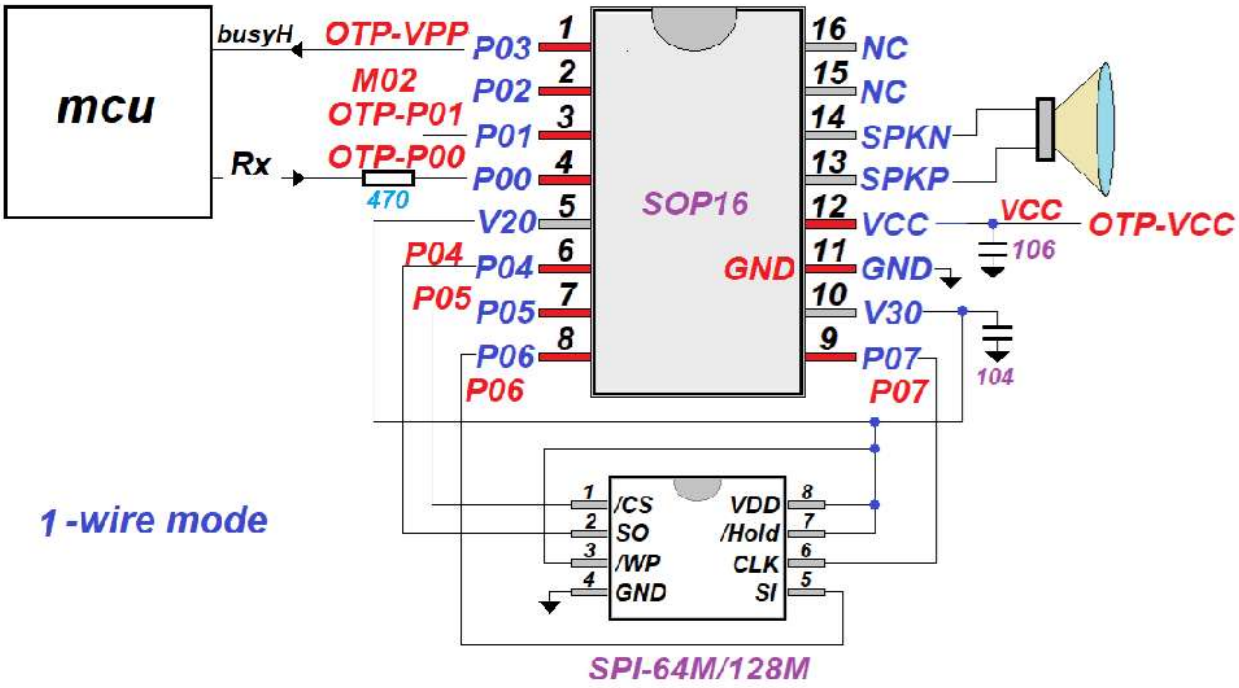
In-Circuit Program

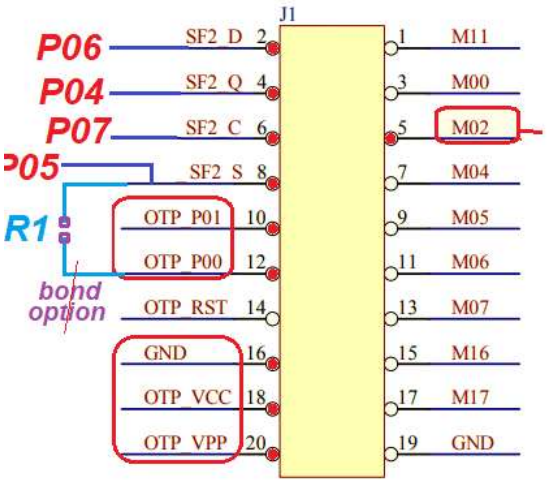


Writer (Left side)



Writer (Right side)





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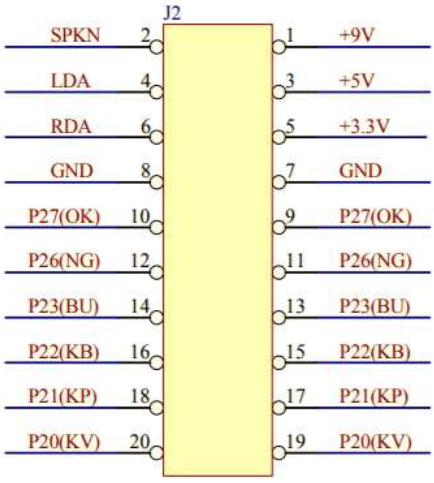

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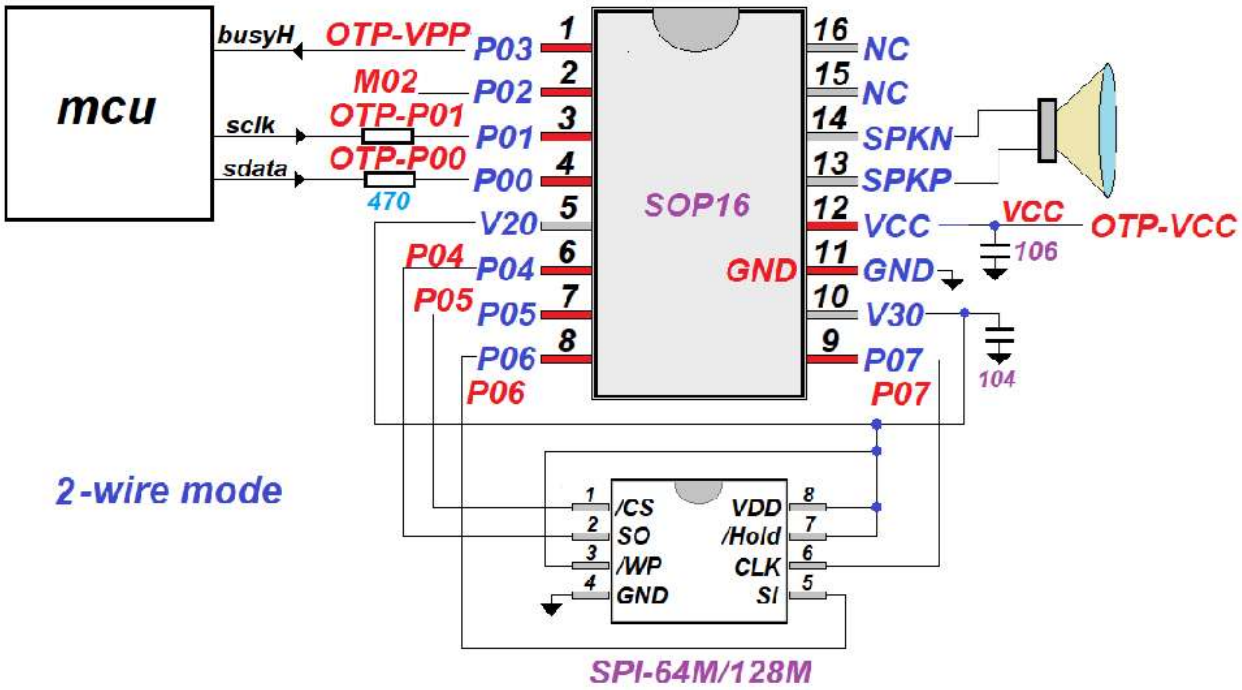
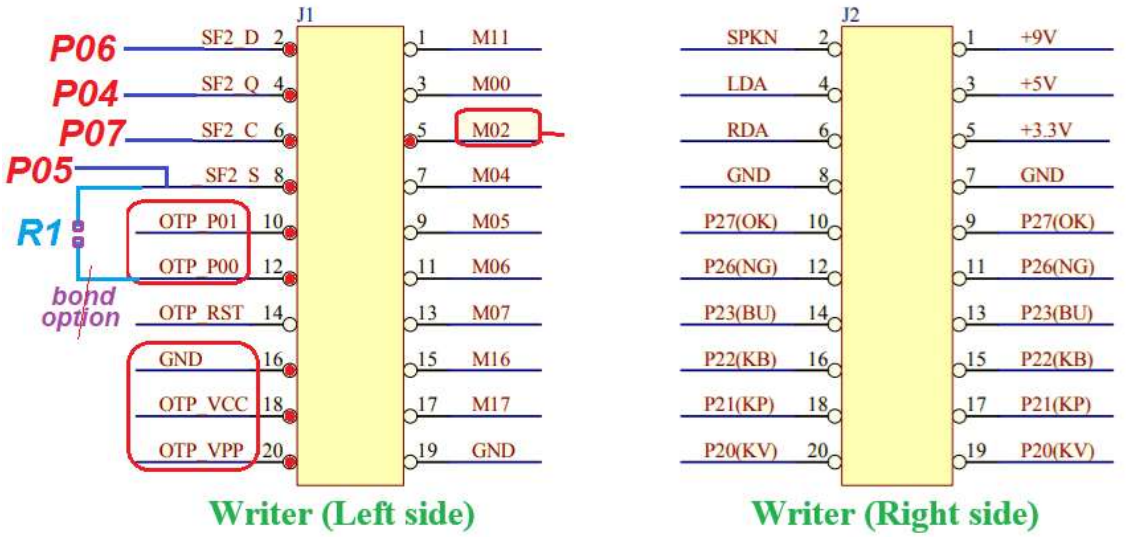
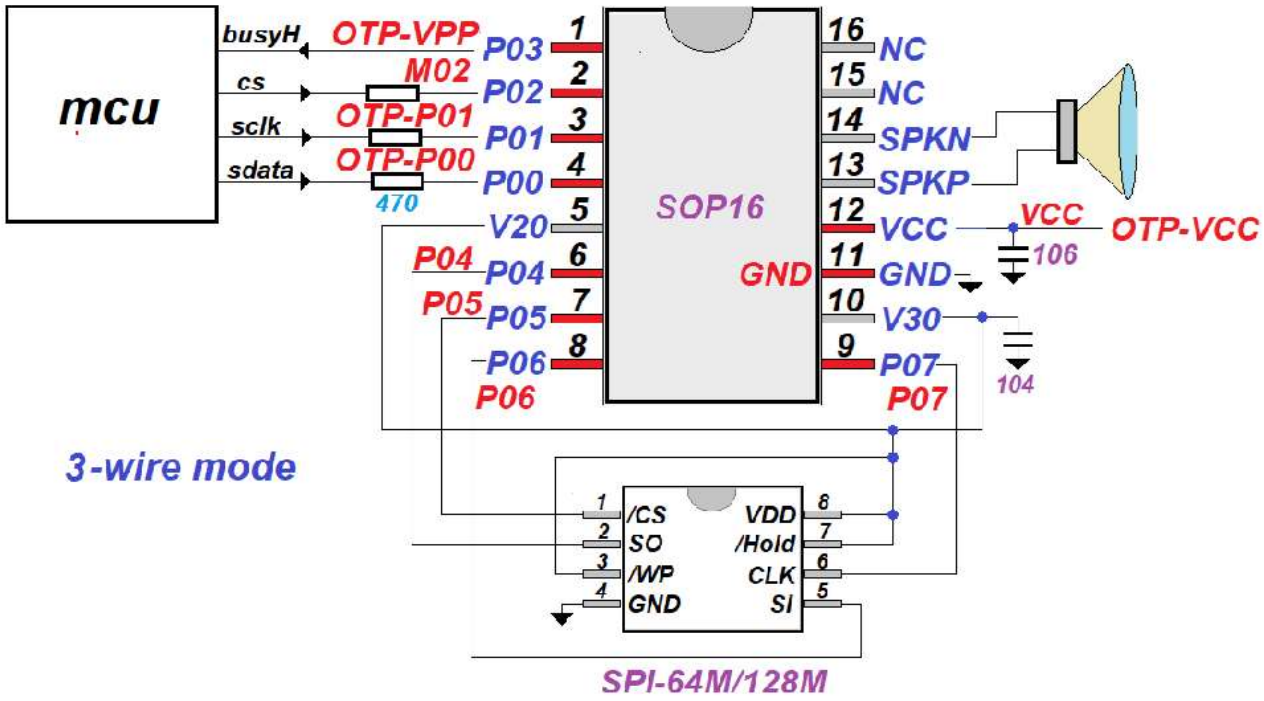




Writer (Left side) Writer (Right side)



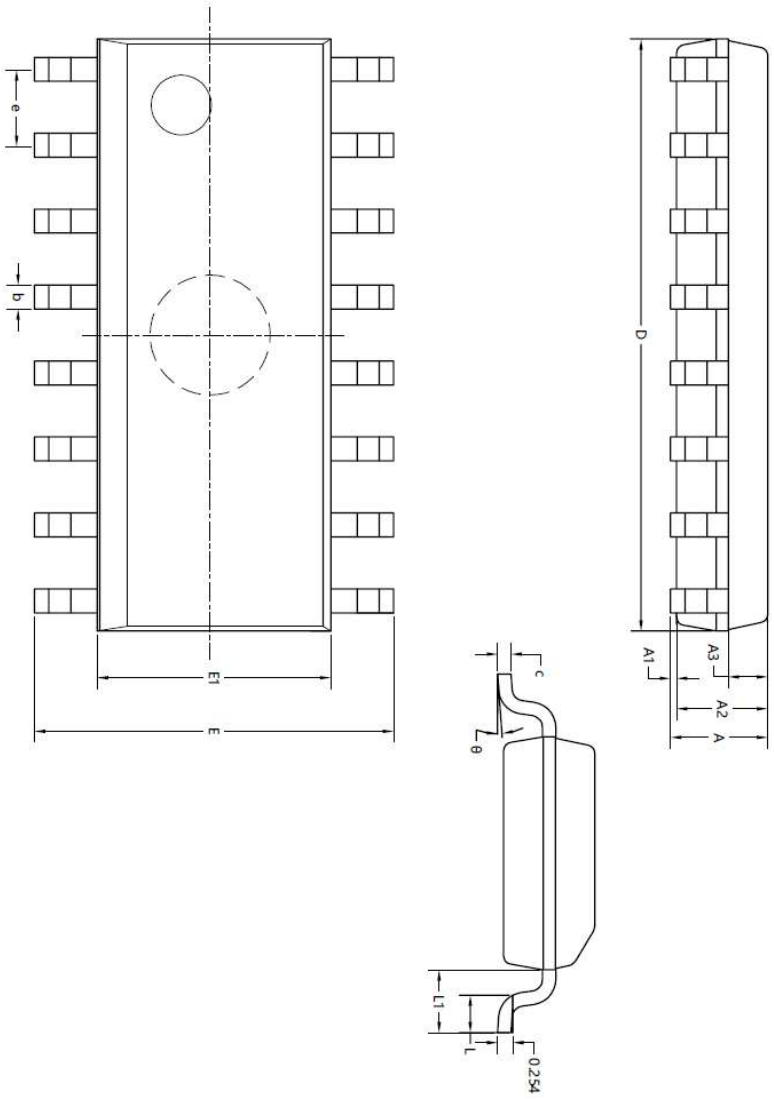
aP58Q7M (64M)					
Coding	AD5	AD6	AD8	PCM10	PCM12
SR = 5.8K	38 min.	31.5 min.	23.5 min.	19 min.	15.5 min.
SR = 6.6K	33 min.	27.5 min.	20.5 min.	16.5 min.	13.5 min.
SR = 7.8K	28.5 min.	23.5 min.	17.5 min.	14 min.	11.5 min.
SR = 9.3K	23.5 min.	19.5 min.	14.5 min	11.5 min.	9.5 min.
SR = 11.7K	19 min.	15.5 min.	11.5 min.	9.5 min.	7.5 min.
SR = 15.6K	14 min.	11.5 min.	8.5 min.	7 min.	5.5 min.
SR = 23.4K	9.5 min.	7.5 min.	5.5 min.	4.5 min.	3.5 min

aP58Q8M (128M)					
Coding	AD5	AD6	AD8	PCM10	PCM12
SR = 5.8K	76 min.	63 min.	47 min.	38 min.	31 min.
SR = 6.6K	66 min.	55 min.	41 min.	33 min.	27 min.
SR = 7.8K	57 min.	47 min.	35 min.	28 min.	23 min.
SR = 9.3K	47 min.	39 min.	29 min	23 min.	19 min.
SR = 11.7K	38 min.	31 min.	23 min.	19 min.	15 min.
SR = 15.6K	28 min.	23 min.	17 min.	14 min.	11 min.
SR = 23.4K	19 min.	15 min.	11 min.	9 min.	7 min

■ DC CHARACTERISTICS (VCC = 3.0V，VDD = 2.0V，GND = 0V，TA = 25℃)

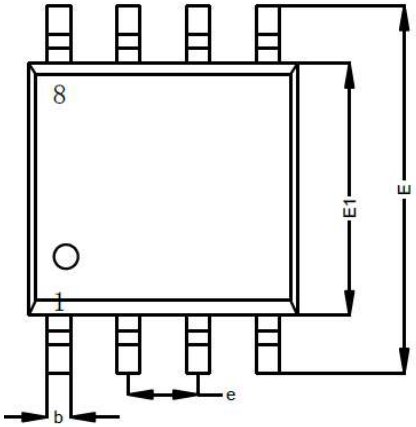
Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
PORT0[7:4] PORT0[2:0]	Driving Current(VCC、LDO3V)	1.7		4.8	mA	VOH=2.7
PORT0[3]	Driving Current		1.7		mA	VOH=2.7
SPK_P/SPK_N	Driving Current			200	mA	RL = 8Ω @3.0V
SPK_P/SPK_N	Driving Current			320	mA	RL = 8Ω @4.5V
SPK_P	Current DAC output current			3.52	mA	@4.5V
PORT0[7:4] PORT0[2:0]	Sink Current	2.4		13	mA	VOL=0.3
PORT0[3]	Sink Current		2.5		mA	VOL=0.3
SPK_P/SPK_N	Sink Current			200	mA	RL = 8Ω @3.0V
SPK_P/SPK_N	Sink Current			320	mA	RL = 8Ω @4.5V
I_STD	Standby Current		1	6	uA	<2uA @<4.5V <3uA @4.5~5.1V
V20	output Voltage		2.0		V	
	output Current			60	mA	
	output Current		1		mA	
V30	output Voltage		3.0		V	
	output Current			30	mA	80mA @4.5V
	output Current		1		mA	

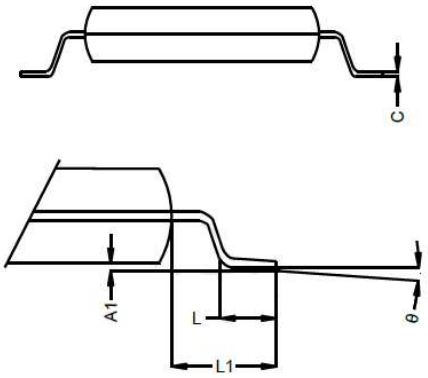
- **aP58HQ package : SOP16**

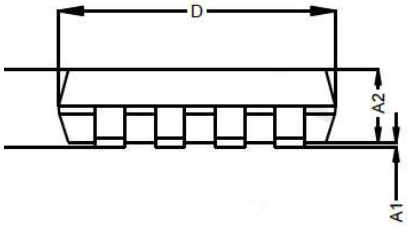


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	1.50	1.60	1.70
A1	0.10	0.15	0.25
A2	1.40	1.45	1.50
A3	0.60	0.65	0.70
b	0.30	0.40	0.50
c	0.15	0.20	0.25
D	9.80	9.90	10.00
E	5.80	6.00	6.20
E1	3.85	3.90	3.95
e		1.27BSC	
L	0.50	0.60	0.70
L1		1.05BSC	
θ	0°	4°	8°

- **Flash package : SOP8 (208 mil)**







Common Dimensions
(Unit of Measure=millimeters)

Symbol	Min	Typ	Max
A	-	-	2.150
A1	0.050	-	0.250
A2	1.700	-	1.900
b	0.310	-	0.510
c	0.150	-	0.250
D	5.130	5.230	5.330
E	7.800	7.900	8.000
E1	5.180	5.280	5.380
e	-	1.270	-
L	0.500	-	0.800
L1	-	1.310	-
θ	0	-	8°

Note：1. Dimensions are not to scale

History

23 July 2024
Internal Initial APLUS Release.

01 April 2025
Modify Page.12 Command Table set volume (n) 0E→E

25 May 2026
Modify Page.12 command table.

07 September 2026
Add In-Circuit Program in page. 13 , 14 , 15