

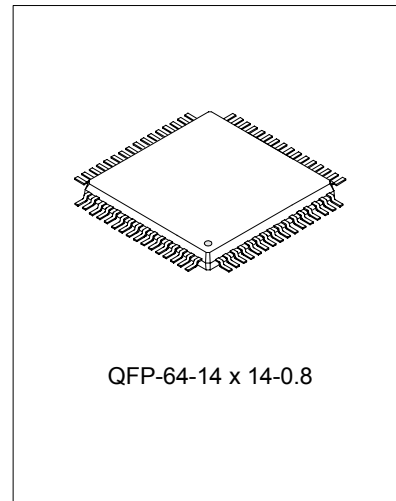
CD DIGITAL SERVO SIGNAL PROCESSOR WITH MCU (2 DIGITS LED DISPLAY)

DESCRIPTION

The SC9636-006 is a single-chip CD processor for CD player system and signal processing. It includes CD servo controller, CD processor, DAC and earphone amplifier. Its built-in microcontroller can realize the CD control and display by eight keys and two LEDs.

FEATURES

- * Two parameter jumpers (four groups of parameters)
Pickup and mechanism matching:
SONY KSS213C, SAMSUNG B31
SANYO DA11, THOMSON TCP11TK
Jianghai GM9350
- * CD-A, CD-R, CD-R/W compatible
- * Automatically mute



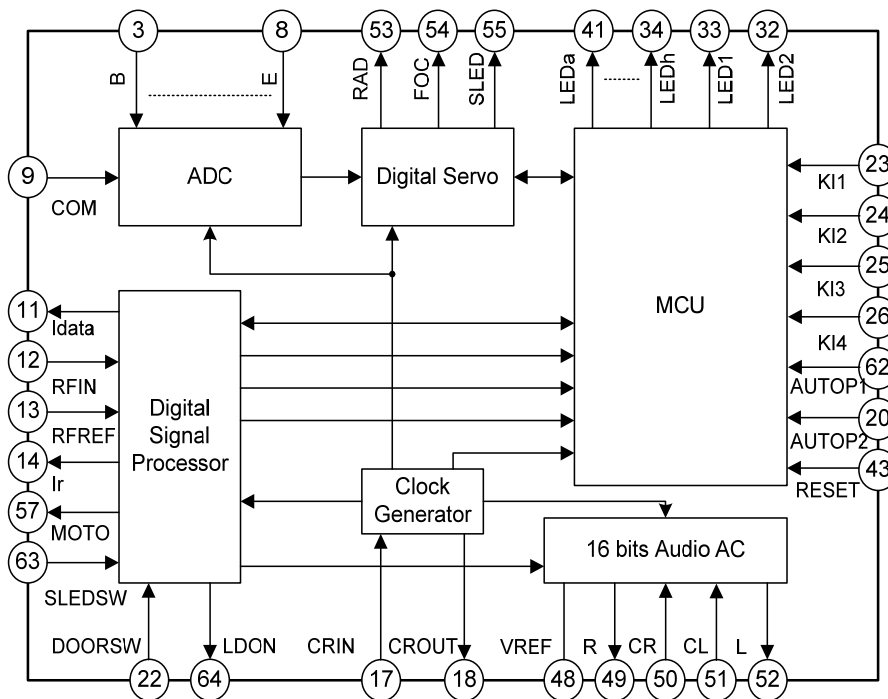
ORDERING INFORMATION

Device	Package
SC9636-006	QFP-64-14X14-0.8

APPLICATIONS

- * Low cost CD player system (BOOM-BOX)

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS (T_{amb}=25°C)

Characteristics	Symbol	Range	Unit
Supply Voltage	VDD	-0.5 ~ +5.5	V
Input Voltage On Pins	VIN	-0.5 ~VDD + 0.5	V
Operating Temperature	T _{opr}	-20 ~ +75	°C

ELECTRICAL CHARACTERISTICS (VDD=4.5~5.5V;VSS=0V;T_{amb}=-10~+60°C)

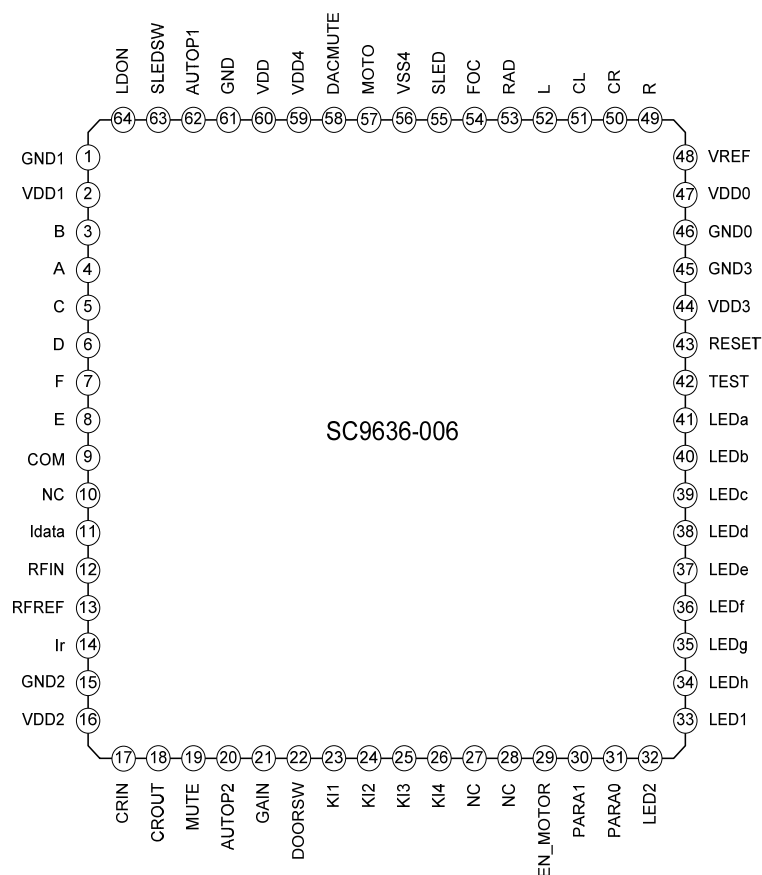
Characteristics	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage	VDD		4.5	5.0	5.5	V
Supply Current	IDD	5V	28	30	32	mA
RFIN Input Signal	VRFIN		—	1	—	V
Reference Voltage	V _{lr}		—	0.5VDD	—	
Common Mode DC	V _{com}		—	2.5	—	V
Input Current Of Central Diode 1	ID1		0	—	9	μA
Input Current Of Central Diode 2	ID2		0	—	9	μA
Input Current Of Central Diode 3	ID3		0	—	9	μA
Input Current Of Central Diode 4	ID4		0	—	9	μA
Input Current Of Satellite Diode 1	IR1		0	—	4.5	μA
Input Current Of Satellite Diode 2	IR2		0	—	4.5	μA
LED Output Current Low-Level	IOL		0	5	10	mA
LED Output Current High-Level	IOH		0	10	20	mA
LDON Output Current Low-Level	ILDON		0	—	2	mA
Output Load Resistance DAC	RL	The left channel is the same as the right	5	—	—	KΩ
Full-Scale DAC Output Voltage	VFS	The left channel is the same as the right	0.9	1.1	1.2	V
RAD Output Current	IRAD	High level is the same as low level	0	1	—	mA
FOC Output Current	IFOC	High level is the same as low level	0	1	—	mA
SLED Output Current	ISLED	High level is the same as low level	0	1	—	mA
MOTO Output Current	IMOTO	High level is the same as low level	0	5	10	mA
Low Level Output Voltage	VOLDRIVE1	RAD, FOC, SELD	0	—	0.4	V

(To be continued)

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Characteristics	Symbol	Condition	Min.	Typ.	Max.	Unit
High Level Output Voltage	VOHDRIVE1	RAD, FOC, SELD	VDD-0.4	—	VDD	V
Motor Low Level Output Voltage	VOLmoto		0	—	1.0	V
Motor High Level Output Voltage	VOHmoto		VDD-1	—	VDD	V
RAD, FOC, SLED, MOTO Output 3-State Leakage Current	IZODRIVE	RAD, FOC, SELD, MOTO	-10	0	+10	μA
DAC Total Harmonic Distortion Plus Noise	(THD+N)/S		60	65	70	dB
DA Filter Attenuation	Filter_DA	0 to 19 kHz	-	-	0.001	dB
		19 to 20 kHz	1	-	2	dB
		24KHz	25	-	-	dB
		25 to 35 KHz	40	-	-	dB
		35 to 64 KHz	50	-	-	dB
		64 to 68 KHz	31	-	-	dB
		68 KHz	35	-	-	dB
69 to 88 KHz	40	-	-	dB		
OSC Frequency	Fsystem		—	8.4672	—	MHZ

PIN CONFIGURATION



PIN DESCRIPTION

Pin No.	Symbol	Description
1	GND1	Analog Ground 1
2	VDD1	Analog Power(4.5~5.5V)
3	B	Central diode current signal input B
4	A	Central diode current signal input A
5	C	Central diode current signal input C
6	D	Central diode current signal input D
7	F	Satellite diode current signal input F
8	E	Satellite diode current signal input E
9	COM	Common Signal input
10	NC	Not connect
11	Idata	Data signal feed-back current output pin.
12	RFIN	EFM signal input
13	RFREF	The reference voltage pin for signal pickup.
14	I _r	Reference current output
15	GND2	Analog Ground 2
16	VDD2	Analog Power(4.5~5.5V)
17	CRIN	Crystal oscillation input pin. (8.4672M)
18	CROUT	Crystal oscillation output pin.
19	MUTE	Mute control output, high level activates.
20	AUPOT2	Auto play pin.
21	GAIN	RF gain control
22	DOORSW	Signal input pin for DOOR input, it is connect ground when DOOR closed.
23	KI1	Press key scan
24	KI2	Press key scan
25	KI3	Press key scan
26	KI4	Press key scan
27	NC	Not connect
28	NC	Not connect
29	EN_MOTOR	9258 MUTE Signal output.
30	PARA1	Pick-up select pin 1
31	PARA0	Pick-up select pin 0
32	LED2	LED drive com 2, high level activates.
33	LED1	LED drive com 1, high level activates.
34	LEDh	LED drive seg h, Low level activates
35	LEDg	LED drive seg g, Low level activates
36	LEDf	LED drive seg f, Low level activates.
37	LEDe	LED drive seg e, Low level activates.
38	LEDd	LED drive seg d, Low level activates.
39	LEDc	LED drive seg c, Low level activates.

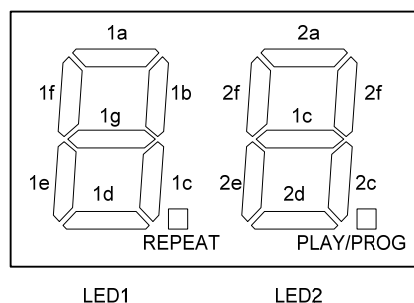
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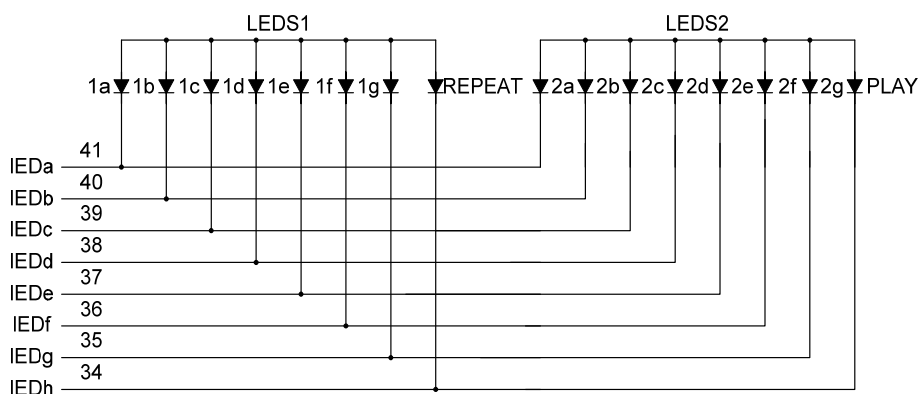
Pin No.	Symbol	Description
40	LEDb	LED drive seg b, Low level activates.
41	LEDa	LED drive seg a, Low level activates.
42	TEST	Test pin
43	RESET	Reset, low level activates.
44	VDD3	Power (4.5V~5.5V).
45	GND3	Analog Ground 3.
46	GND0	Analog Ground 3.
47	VDD0	Power (4.5V~5.5V).
48	VREF	Reference voltage output pin.
49	R	Right channel output
50	CR	Capacitor for right channel 1st order filter function
51	CL	Capacitor for left channel 1st order filter function
52	L	Left channel output
53	RAD	Tracking drive output
54	FOC	Focus drive output
55	SLED	Sled drive output
56	VSS4	Ground
57	MOTO	Spindle drive output
58	DACMUTE	DAC mute control input(HIGH is mute)
59	VDD4	Digital Supply(4.5V~5.5V)
60	VDD	Digital Supply(4.5V~5.5V)
61	GND	Digital Ground
62	AUTOP1	Auto play when power on.
63	SLEDSW	Sledge motor position monitor signal input
64	LDON	Laser control signal output.

FUNCTION DESCRIPTION

1. LED DISPLAY

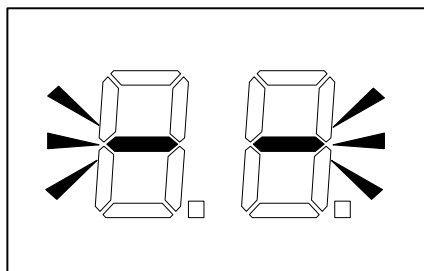


PIN NAME	PIN NO.	LED1(P33)	LED2(P32)
LEDa	41	1a	2a
LEDb	40	1b	2b
LEDc	39	1c	2c
LEDd	38	1d	2d
LEDe	37	1e	2e
LEDf	36	1f	2f
LEDg	35	1g	2g
LEDh	34	1h	2h

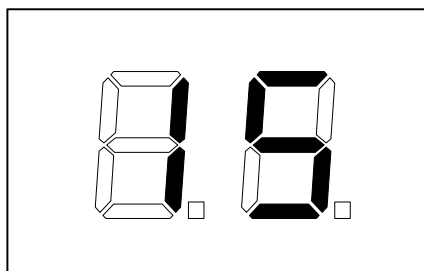


2. CD INITIALIZE DISPLAY

If the CD play closed, and DOOR_SW detect the low level, then the system begin to initialize, and read the TOC signal.

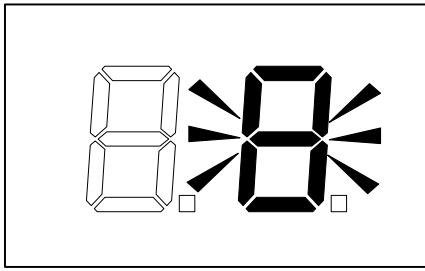


Read TOC

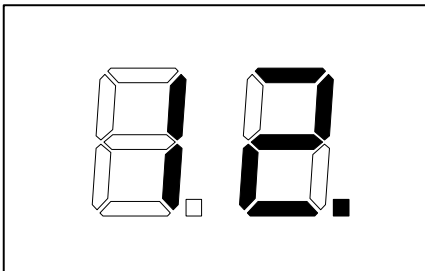


Display the maximum track number after read TOC.

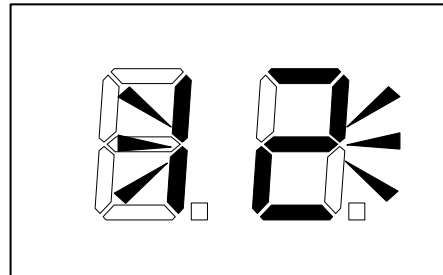
3. DISPLAY CD PLAY MODE



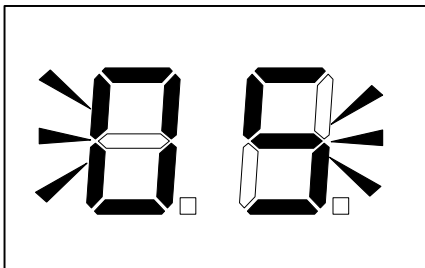
Select track



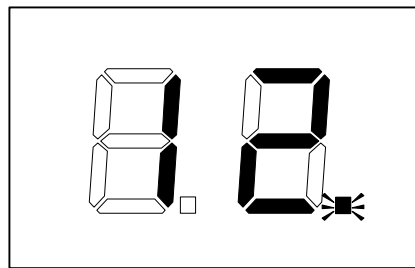
Play display, the indicator light PLAY turn on.



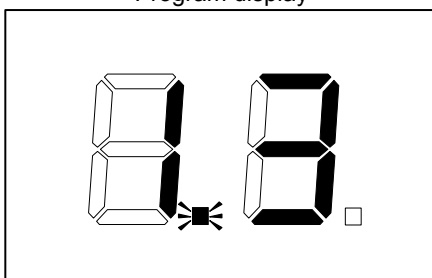
Pause display, the track number flash,
and the indicator light turn off.



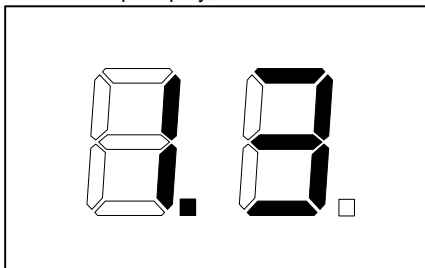
Program display



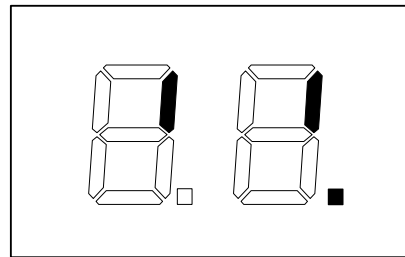
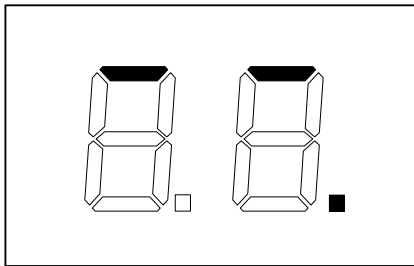
Program play, the indicator light turn on.



The current track repeat play, the REPEAT indicator flash.



All the track repeat play, the REPEAT indicator turn on.



In random mode, display track number for 5 seconds, and display circulate light for 5 seconds.

Explanation of system operation according to application circuit:

1. If the Door SW input is “close” after resetting, the system starts the CD initialization and the display shows“- -”. If a disc is detected, the system will enter the stop mode and the display shows the total number of tracks. If the end of the tune of final track is reached, the system will go to stop mode and the display shows the total number of tracks.
(it can set auto play according to the AUTOP1 and AUTOP2).

2. Function Keys:

- 1) PLAY key: When the system is STOP mode, if the key PLAY is pressed, the track number of the purpose will be reached and played. If the PLAY key is pressed during the CD play mode, the system goes to the pause mode from the play mode. If the PLAY key is pressed during the CD pause mode, the system returns to the play mode.
- 2) STOP key: If STOP key is pressed during the CD play mode, the system stops the disc motor, and moves the pickup the most inside. In the stop mode, display shows the total number of tracks.
- 3) NEXT key: Use to select next track or fast forward play. While the key is holding continuously over 1 second during CD play mode, the current track is playing fast forward. Otherwise the system goes to next track.
- 4) PREV key: Use to reach back the tune head of the current track or select previous track of fast backward. If the key is pressed once, the system reaches back the tune head of current track. And the key is pressed twice in one second; the system goes to previous mode and goes to previous track. While the key is holding continuously over 1 second during CD play mode, the current track is playing fast backward.
- 5) PROG key: use to go to program mode and save any desired track up to 20 in any order.
- 6) REPEAT: If REPEAT key is pressed. The system changes the repeat mode cyclically from the no repeat mode the repeat-1 mode and then to repeat-all mode.
- 7) Random: If Random key is pressed during the stop mode, the system searches at random and plays it.

3. Display: 2 digits LED display.

- 1) If a disc isn't detected, the CD function will become ineffective and display shows” NO”.
- 2) Display shows“- -”during the CD initializing. (Flashing)
- 3) If STOP key is pressed during the CD initializing, the display shows“- -”. (no flashing)
- 4) The display shows “7” not “07”during playing track 8.
- 5) The display shows the flashing track number in pause mode.
- 6) When system is STOP mode, the display shows total number of tracks.

- 7) In program mode, the flashing display number is the register number and the no-flashing display number is the track number chosen to register.
- 8) REPEAT display is on for in repeat mode. It flashes in REPEAT ONE mode. It does not flash in REPEAT ALL mode.
- 9) Program/Play display is on for playing mode. It flashes for Program status and program playing.
- 10) The LED flashes from A to F during random play mode.
- 11) The display shows "0 0" when the door SW is opened.

4. Program Modes:

Any desired track up to 19 can be played in any order by program play.

- 12) If Program key is pressed during the CD Stop mode, the system goes to the program mode.
- 13) If Next or Previous key is pressed, the system chooses the track number which it wants to register.
- 14) If Play key is pressed during the system holding the program of more than one, it starts the program play. If Next or Previous key is pressed during the program play, the system skips to next or previous program.
- 15) If Stop key is pressed during the program play, the system stops the program play, and goes the stop mode. Until Stop key is pressed during the stop mode, the system keeps the contents of the program. If Stop key pressed during the program mode, the system removes the contents of the program, and cancels the program mode.

5. Random mode:

- 1) If Random key is pressed during the stop mode, the system searches at random and plays it.
- 2) The track will be play once only.
- 3) If whole track was finished during the random mode or if Stop key is pressed during the random mode, the system goes to the stop mode and cancels the random play mode.
- 4) When the PLAY key is paused, the STOP key, PROG/REPEAT key, REPEAT key is activate.
- 5) If the Next key is pressed during the random play mode, the system skips next at random. If Next key is pressed on the tune of the final track, the system searches next lap at random.
- 6) If previous key is pressed during the random play mode, the system searches the beginning of the current track, but doesn't skip track down.
- 7) While Next or Previous key is pressed more than 1 second, it enters fast forward mode or fast backward mode.
- 8) The LED display flashes from A to F in random play mode.

6. Fast forward/ fast backward:

- 1) While the Next or Previous key is holding continuously over 1 second during the CD play mode, the current track is playing FF/FB.
- 2) By leaving the Next or Previous key, the system cancels the FF or FB replay.
- 3) If the system reaches the tune head of the head track of the CD, it cancels the FB replay. And if it reaches the tune head of current track of the CD during the repeat 1 mode and program play mode, it cancels FB replay.
- 4) During FF replay, the system is the repetition regeneration of 6 [track], during the FB reply, the system

is the repetition regeneration of 7[track]. And 1[track] is 62[ms] interval.

- 5) During the FF or FB replay, the system has the attenuate level of -12[db].

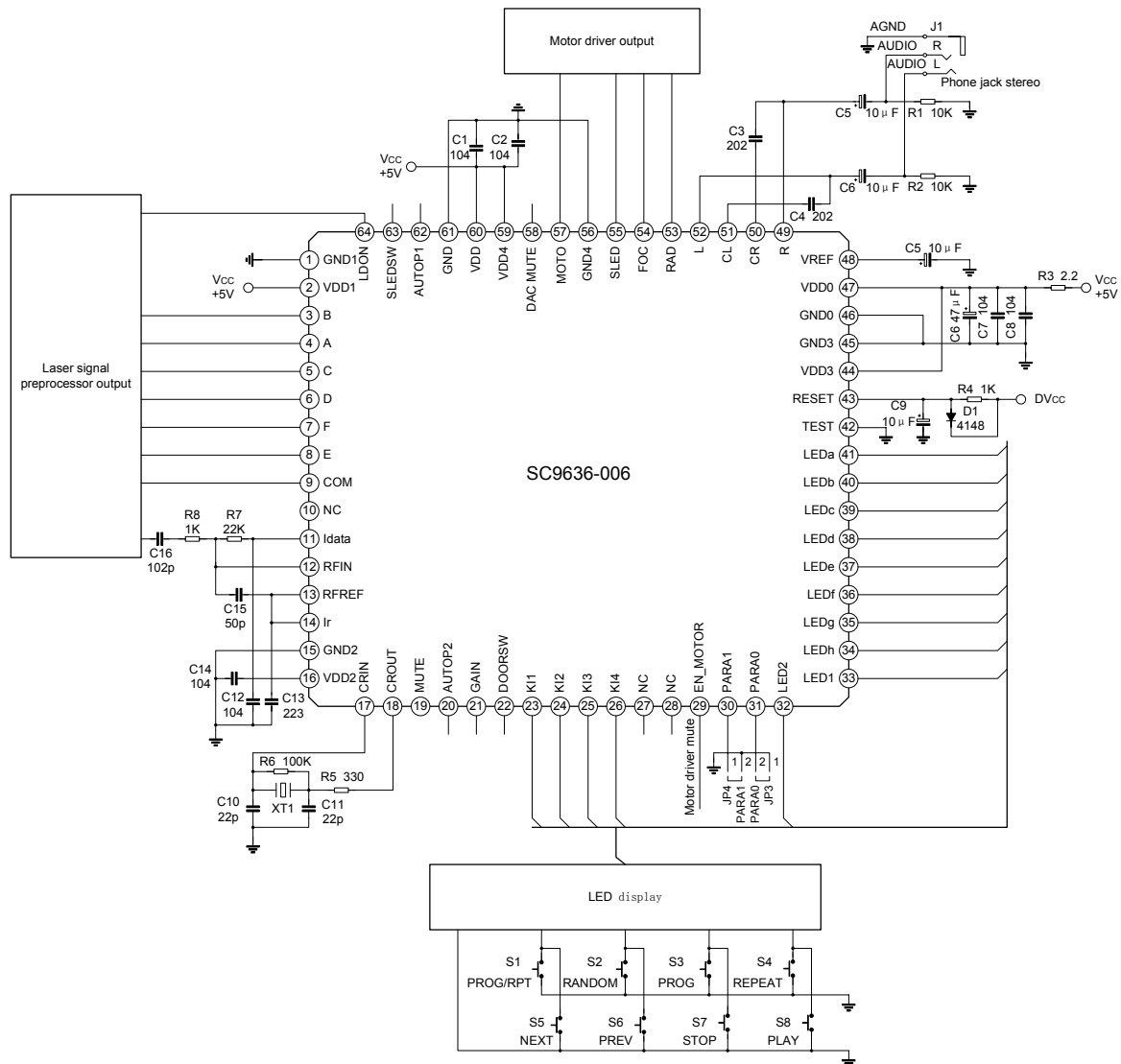
7. STOP mode:

- 1) If the Stop key is pressed during the CD play mode, the system stops the disc motor, and moves the pickup the most inside.
- 2) In the stop mode, display shows the total number o flacks.

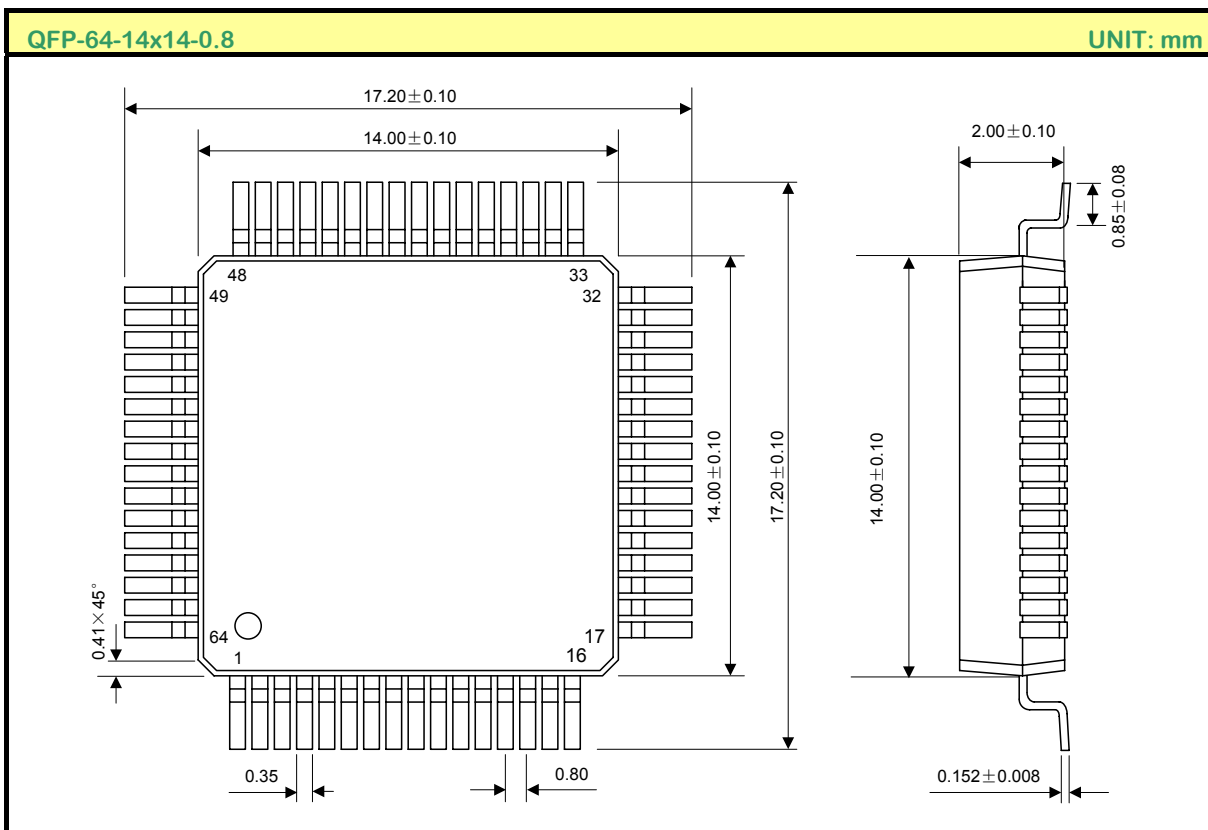
Pickup select pins: PARA1, PARA0.

PARA1	PARA0	Pickup and mechanism matching
1	1	SONY KSS-213C, KSS-213V; Samsung B31(SOH-AAN)
1	0	Sanyo DA11(SF-P101N, KPC-S4594V)
0	1	Thomson TCP11TM2X
0	0	Jianghai GM9350

TYPICAL APPLICATION CIRCUIT



PACKAGE OUTLINE



HANDLING MOS DEVICES:

Electrostatic charges can exist in many things. All of our MOS devices are internally protected against electrostatic discharge but they can be damaged if the following precautions are not taken:

- Persons at a work bench should be earthed via a wrist strap.
- Equipment cases should be earthed.
- All tools used during assembly, including soldering tools and solder baths, must be earthed.
- MOS devices should be packed for dispatch in antistatic/conductive containers.

Note: Silan reserves the right to make changes without notice in this specification for the improvement of the design and performance. Silan will supply the best possible product for customers.