

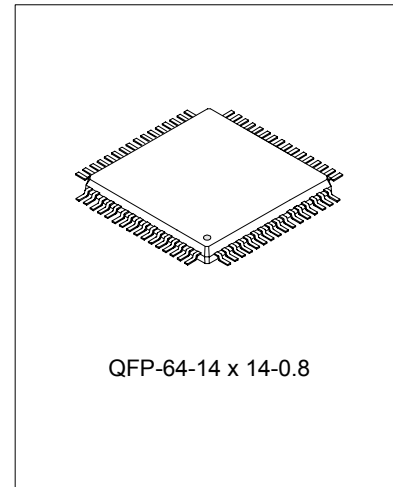
CD DIGITAL SERVO SIGNAL PROCESSOR WITH MCU (SLAVE MODE)

DESCRIPTION

SC9640P is a SLAVE chip for desktop audio system with low cost. It has agile functions and good performance with few external components.

FEATURES

- * Compatible with CD/CD-R/CD-RW
- * Support CD play /pause
- * Support CD previous track/next track
- * Support appointed music play directly
- * Support CD skip forward/skip backward
- * Support CD single music, and whole disk repeat play display.
- * Support CD random play display
- * Support program play for 20 music at most
- * Support browse play
- * Support A->B repeat reading
- * Support IDEX index
- * Support compatible manual and auto control CD tray..
- * Compatible with various chips(Free selecting by jumper)



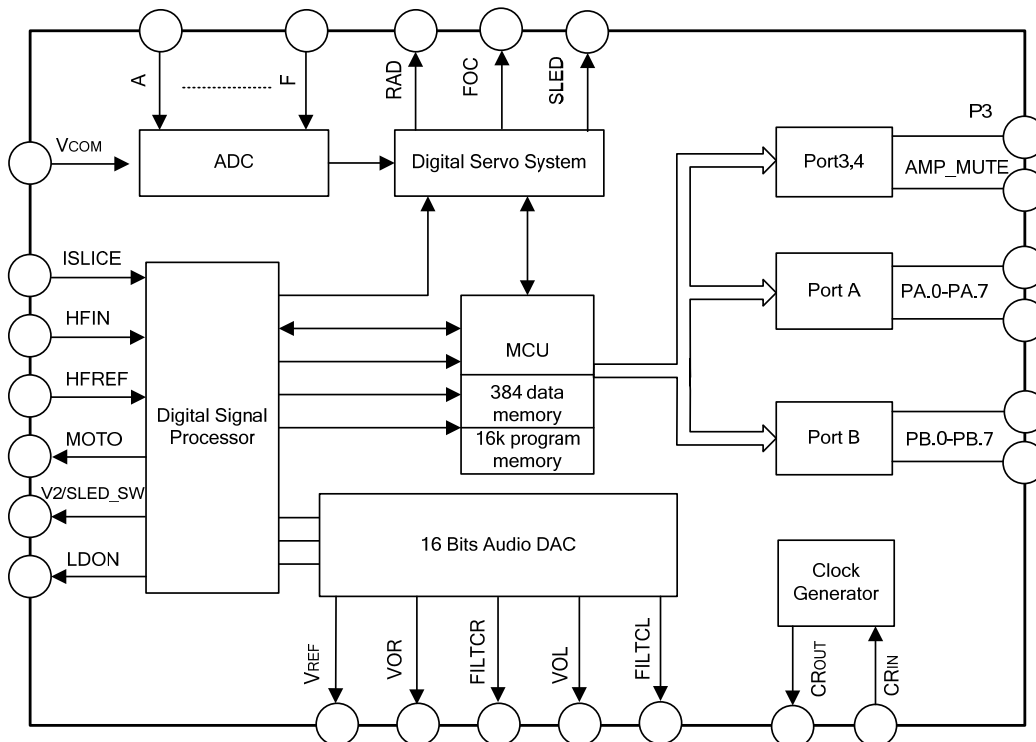
ORDERING INFORMATION

| Device | Package |
|---------|------------------|
| SC9640P | QFP-64-14X14-0.8 |

APPLICATIONS

- * Desktop CD audio

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS ($T_{amb}=25^{\circ}C$)

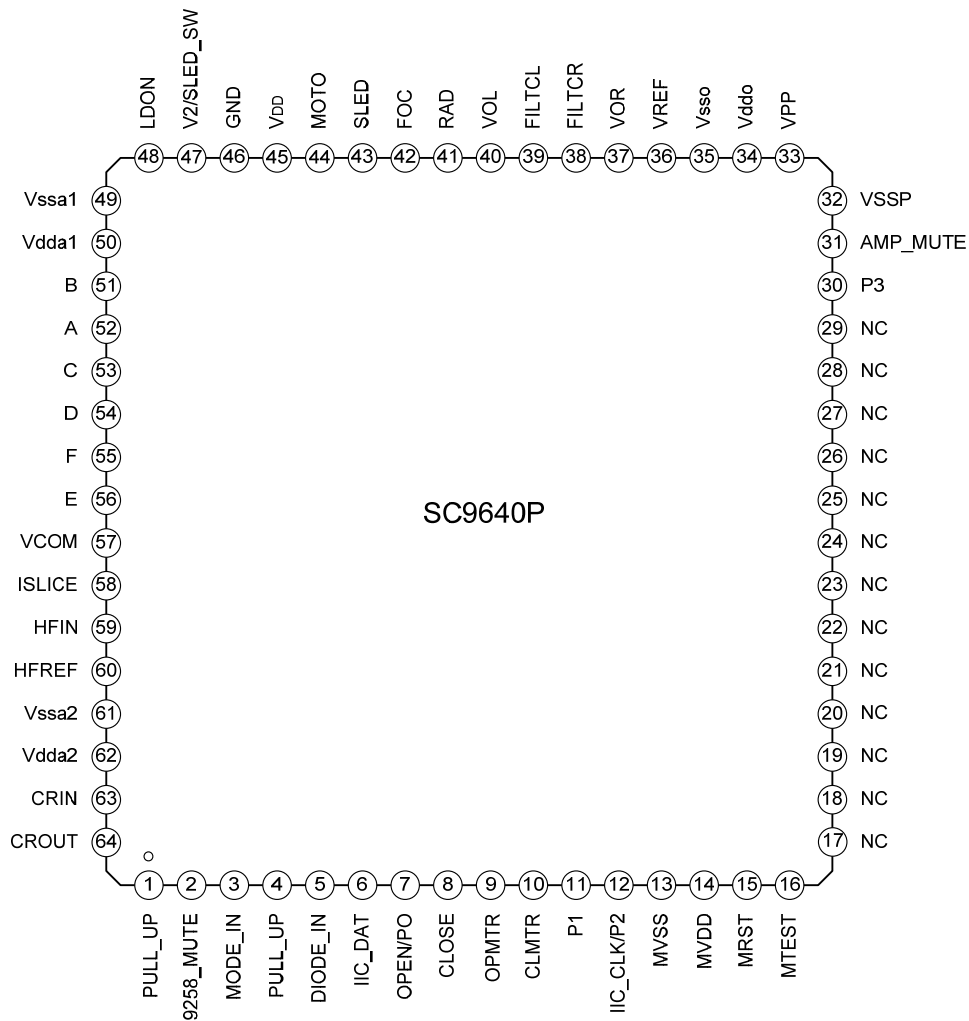
| Characteristics | Symbol | Ratings | Unit |
|-----------------------|--------|-----------------|-------------|
| Supply Voltage | VDD | -0.5 ~ +5.5 | V |
| Input Voltage On Pins | VIN | -0.5 ~VDD + 0.5 | V |
| Operating Temperature | Topr | -20 ~ +75 | $^{\circ}C$ |

ELECTRICAL CHARACTERISTICS ($V_{DD}=4.5\sim 5.5V$; $V_{SS}=0V$; $T_{amb}=-10\sim +50^{\circ}C$)

| Characteristics | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---------------------------------------|-----------|--|---------|--------|------|------------|
| Supply Voltage | VDD | | 4.5 | 5.0 | 5.5 | V |
| Supply Current | IDD | 5V(When CD is working) | — | 50 | — | mA |
| RFIN Input Signal | VRFIN | | — | 1 | — | V |
| Reference Voltage | Vlr | | — | 0.5VDD | — | |
| Photo-electricity signal bias input | Vcom | | — | 2.5 | — | V |
| Input Current Of Central Diode B | IDB | | 0 | — | 9 | μA |
| Input Current Of Central Diode A | IDA | | 0 | — | 9 | μA |
| Input Current Of Central Diode C | IDC | | 0 | — | 9 | μA |
| Input Current Of Central Diode D | IDD | | 0 | — | 9 | μA |
| Input Current Of Satellite Diode F | IRF | | 0 | — | 4.5 | μA |
| Input Current Of Satellite Diode E | IRE | | 0 | — | 4.5 | μA |
| Low-level Input Current at Port PA. | IIL(A) | | — | 10 | — | mA |
| High-level Output Current at Port PA. | IOH(A) | | — | 5 | — | mA |
| Low-level Input Current at Port PB. | IIL(B) | | — | 10 | — | mA |
| High-level Output Current at Port PB. | IOH(B) | | — | 5 | — | mA |
| LDON Low-level Input Current | ILDON | | 0 | — | 2 | mA |
| Load Resistance DAC | RL | Left channel is the same as the right. | 5 | — | — | K Ω |
| Full-Scale DAC Output Voltage | VFS | 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 the low level. | 0 | 1 | — | mA |
| FOC Output Current | IFOC | High level is the same as the low level. | 0 | 1 | — | mA |
| SLED Current | ISLED | High level is the same as the low level. | 0 | 1 | — | mA |
| MOTO Output Current | IMOTO | High level is the same as the low level. | 0 | 5 | 10 | mA |
| Low Level Output Driving Voltage | VOLDRIVE1 | RAD,FOC,SELD | 0 | — | 0.4 | V |
| High Level Output Driving Voltage | VOHDRIVE1 | RAD,FOC,SELD | VDD-0.4 | — | VDD | V |
| Moto Low Level Output Voltage | VOLmoto | | 0 | — | 1.0 | V |
| Moto High Level Output Voltage | VOHmoto | | VDD-1 | — | VDD | V |

| Characteristics | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|-----------|-------------------|------|--------|-------|------|
| RAD, FOC, SLED, MOTO Output 3-State Leakage Current | IZODRIVE | RAD,FOC,SELD,MOTO | -10 | 0 | +10 | μA |
| Total harmonic distortion and Noise-To-Signal Ratio | S/N_DA | | 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 |
| | | 68KHz | 35 | - | - | dB |
| 69 to 88KHz | 40 | - | - | dB | | |
| OSC Frequency | Fsystem | | — | 8.4672 | — | MHz |

PIN CONFIGURATIONS



PIN DESCRIPTION

| Pin No. | Pin Name | I/O | Function description | Remark |
|---------|------------|-----|---|---|
| 1 | PULL_UP | I | - | Connect pull-up resistor |
| 2 | 9258_MUTE | O | 9258 mute output When CD stops, close the 9258 driver | |
| 3 | MODE_IN | ADI | 2.5V~3.5V selects as SLAVE mode | |
| 4 | PULL_UP | I | - | Connect pull-up resistor |
| 5 | DIODE_IN | I | Jumper selection input | |
| 6 | IIC_DAT | I/O | SLAVE mode IIC data bus | |
| 7 | OPEN/P0 | I | The CD tray opens input pin which is low active. This pin is used as the jumper selecting output at the same time. | Note: manual tray should be connected to the ground |
| 8 | CLOSE | I | The CD tray closes input pin which is low active. | |
| 9 | OPMTR | O | CD tray driver output. | |
| 10 | CLMTR | O | CD tray driver output. | |
| 11 | P1 | O | This pin is used as the pick up head selecting output at the same time. | |
| 12 | IIC_CLK/P2 | I | SLAVE mode IIC clock line This pin is used as the pick up head selecting output at the same time. | |
| 13 | MVSS | - | MCU ground | |
| 14 | MVDD | - | +5V | |
| 15 | MRST | I | MCU reset, low level reset | |
| 16 | MTEST | I | MCU test pin | Connect to the ground |
| 17 | NC | - | No connection | |
| 18 | NC | - | No connection | |
| 19 | NC | - | No connection | |
| 20 | NC | - | No connection | |
| 21 | NC | - | No connection | |
| 22 | NC | - | No connection | |
| 23 | NC | - | No connection | |
| 24 | NC | - | No connection | |
| 25 | NC | - | No connection | |
| 26 | NC | - | No connection | |
| 27 | NC | - | No connection | |
| 28 | NC | - | No connection | |

| Pin No. | Pin Name | I/O | Function description | Remark |
|---------|------------|-----|---|---------------------------|
| 29 | NC | - | No connection | |
| 30 | P3 | O | Connect to the diode to power on auto play. | |
| 31 | AMP_MUTE | O | Power amplifier mute output, high active | |
| 32 | VSSP | - | MCU ground | |
| 33 | VPP | - | Voltage supply of testing module | No connection |
| 34 | Vddo | - | DAC power supply | |
| 35 | Vsso | - | DAC ground | |
| 36 | VREF | O | Internal reference voltage output | Typical value 0.5 Vdd |
| 37 | VOR | O | DAC right channel audio output | |
| 38 | FILTCR | I | DAC right channel filter capacitor | |
| 39 | FILTCL | I | DAC left channel filter capacitor | |
| 40 | VOL | O | DAC left channel audio output | |
| 41 | RAD | O | Tracking drive output | |
| 42 | FOC | O | Focus drive output | |
| 43 | SLED | O | Sled drive output | |
| 44 | MOTO | O | Spindle drive output | |
| 45 | VDD | - | Servo Supply Voltage | |
| 46 | GND | - | Servo Ground, I/O ground | |
| 47 | V2/SLED_SW | I | Sledge motor position monitor signal input | Built-in pull up resistor |
| 48 | LDON | O | Laser control signal output | |
| 49 | Vssal | - | Analog Ground of Servo Module ADC. | |
| 50 | Vdda1 | - | Analog Supply Voltage of Servo Module ADC. | |
| 51 | B | I | Central diode current signal input B | |
| 52 | A | I | Central diode current signal input A | |
| 53 | C | I | Central diode current signal input C | |
| 54 | D | I | Central diode current signal input D | |
| 55 | F | I | Satellite diode current signal input F | |
| 56 | E | I | Satellite diode current signal input E | |
| 57 | VCOM | I | Photo-electricity signal bias input | |
| 58 | ISLICE | O | Data signal feed-back current output | |
| 59 | HFIN | I | CD data pick up signal input | |
| 60 | HFREF | I | Reference signal | |
| 61 | Vssa2 | - | Analog ground of Servo module HF and the PLL. | |

| Pin No. | Pin Name | I/O | Function description | Remark |
|---------|----------|-----|---|--------|
| 62 | Vdda2 | - | Analog power supply of Servo module HF and the PLL. | |
| 63 | CRIN | I | 8.4672MHz input | |
| 64 | CROUT | O | 8.4672MHz output | |

FUNCTION DESCRIPTION

1. Jumper

Detail function description

| Flag | Function description | | |
|-------------------------|--|--|--------------------------|
| P1(PIN11)/ P2(PIN12) | Pickup selection | | |
| | P1 | P2 | Function |
| | 0 | 0 | SANYO DA11 |
| | 0 | 1 | SONY KSS213C、SAMSUNG B31 |
| | 1 | 0 | Jianghai GM9350H |
| | 1 | 1 | Jianghai GM9350 |
| P3(PIN30) | Auto play selection(Clock CD selection) | | |
| | P3 | Function | |
| | 0 | Stop after power on complete reading the toc | |
| | 1 | Play the first music after power on complete reading the toc | |

Note: 1 denotes the jumper diode is connected

2. SLAVE agreement description

The agreement format is the same with IIC:

Control command format

START→55H+ACK→COMMAND+ACK→STOP;

State information format

START→AAH+ACK→DATA1+ACK+.....+DATAn+ACK→STOP;

Agreement description

ACK format: The host will set DATA bus high at the falling edge of CLK, and judge the state of DATA bus at the rising edge of CLK. Then it will set DATA low if its state is high and exit if its state is low.

Data format: Sending interval of the control command is longer than 30ms; State information must be received continuously with interval time longer than 50ms.

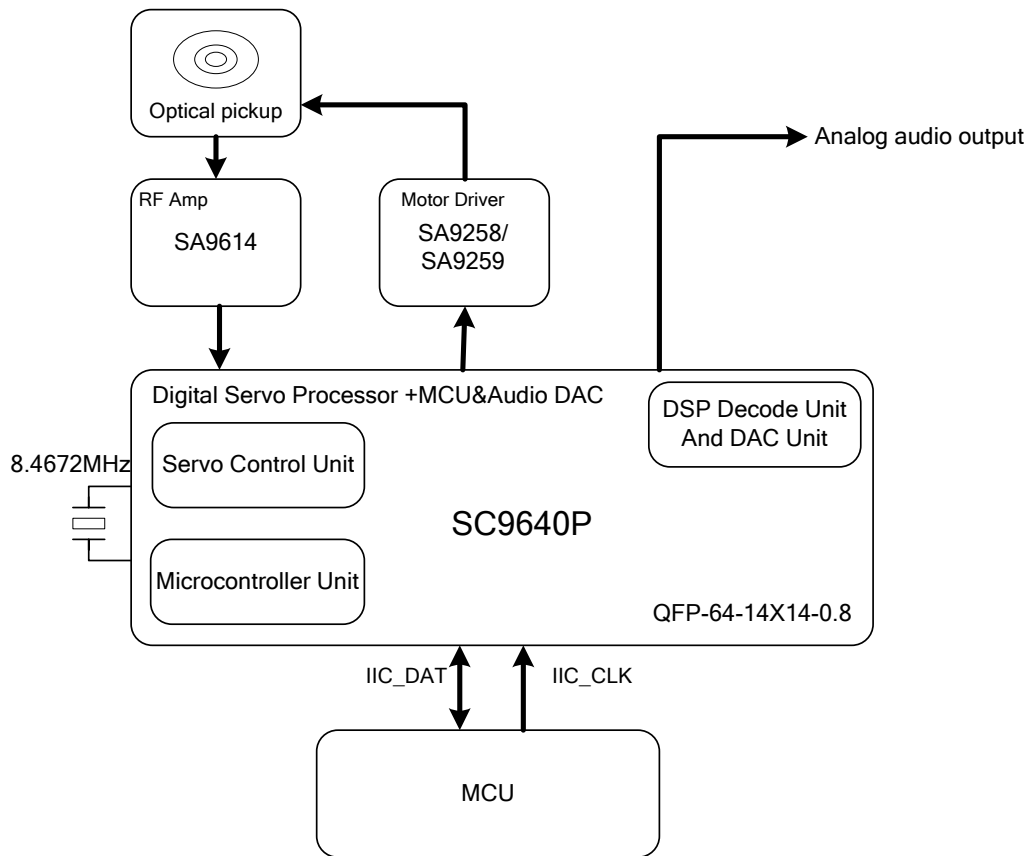
3. Control command

| Address | Parameter | Meanings |
|-----------|------------|--|
| 0X55 | 0X00 | idle Exit directly, no need to response |
| | 0X01 | Stop |
| | 0X02 | Play Resume |
| | 0X03 | Pause |
| | 0X04 | - |
| | 0X05 | Next/Up |
| | 0X06 | Previous/Down |
| | 0X07 | Fast Forward |
| | 0X08 | Fast Rewind |
| | 0X09 | FAST OFF (Cancel fast forward/backward) |
| | 0X0A | Random Off |
| | 0X0B | Random |
| | 0X0C | Repeat Off |
| | 0X0D | Repeat 1 |
| | 0X0E | Repeat All |
| | 0X0F | Memory |
| | 0X 10 | Intro |
| | 0X 11 | Intro off |
| | 0X12 | Door in |
| | 0X13 | Door out |
| | 0x14 | Door open/close |
| | 0X15~0X1F | Unused |
| | 0X20~0X2A | 0~9 |
| | 0X2B | +10 |
| | 0X 2C | Set start point A of repeat reading |
| | 0X2E | Cancel repeat reading |
| | 0X2F | INDEX++ |
| | 0X30 | INDEX-- |
| | 0X31~0X4F | Open INDEX browse play: (Play time of each INDEX is from 6S to 30S corresponding to the commands from 0X31 to 0X4F) |
| | 0X50 | Stop INDEX browse play |
| | 0X51~0X80 | Unused |
| | 0X 81~0XE3 | Play the appointed music(1~99) Format: BIT7=1; BIT0~6=music no.; |
| 0XE4~0XFF | Unused | |
| 0X66 | 0X81~0XE3 | Play the appointed INDEX(1~99) Format: BIT7=1;BIT0~6=INDEX 号; |

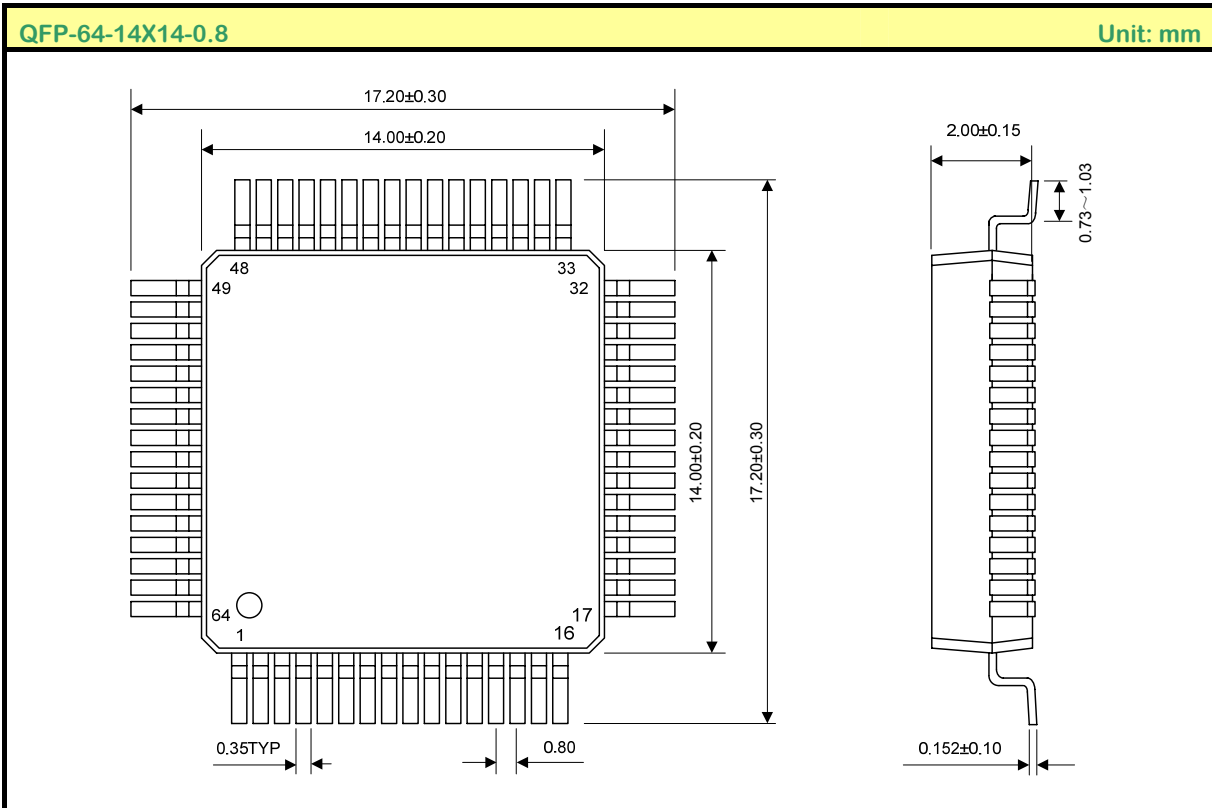
4. State information

| Address | Parameter | Meanings |
|---------|------------|--|
| 0XAA | 0X01(BIT0) | 1=Pause 0=Playing |
| | 0X01(BIT1) | 1=Playing 0=Stop |
| | 0X01(BIT2) | 1=repeat 0=no repeat |
| | 0X01(BIT3) | 1=repeat all 0=no repeat all |
| | 0X01(BIT4) | 1=Random 0=no Random |
| | 0X01(BIT5) | 1=Program active 0=Program invalid |
| | 0X01(BIT6) | 1=program mode 0=non program mode |
| | 0X01(BIT7) | 1=Fast forward/backward state 0=Non fast forward/backward state |
| | 0X02(BIT0) | 1=intro 0=no intro |
| 0XAA | 0X02(BIT1) | 1=CD Door opened 0=CD Door closed |
| | 0X02(BIT2) | 1=toc reading is completed 0=toc reading is not completed |
| | 0X02(BIT3) | 1=err 0= no err |
| | 0X02(BIT4) | 1=nodisc 0=no nodisc |
| | 0X02(BIT5) | Unused, reserved as extension |
| | 0X02(BIT6) | Unused, reserved as extension |
| | 0X02(BIT7) | Unused, reserved as extension |
| | 0X03 | The BCD stands for the music number |
| | 0X04 | The BCD stands for M of MSF |
| | 0X05 | The BCD stands for S of MSF |
| | 0X06 | The BCD stands for total music number |
| | 0X07 | The BCD stands for the minute of total time |
| | 0X08 | The BCD stands for the second of total time |
| | 0X09 | The BCD stands for current program unit |
| | 0X0A | The BCD stands for current program music |
| | 0X0B | The BCD stand for current INDEX number |
| 0X0C | Unused | |
| 0X0D | Unused | |

APPLICATION CIRCUIT



PACKAGE OUTLINE



MOS DEVICES OPERATE NOTES:

Electrostatic charges may exist in many things. Please take following preventive measures to prevent effectively the MOS electric circuit as a result of the damage which is caused by discharge:

- The operator must put on wrist strap which should be earthed to against electrostatic.
- Equipment cases should be earthed.
- All tools used during assembly, including soldering tools and solder baths, must be earthed.
- MOS devices should be packed in antistatic/conductive containers for transportation.

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