



No.4040

LA7282,7282M

VCR Audio Signal Recording/
Playback Processor

Overview

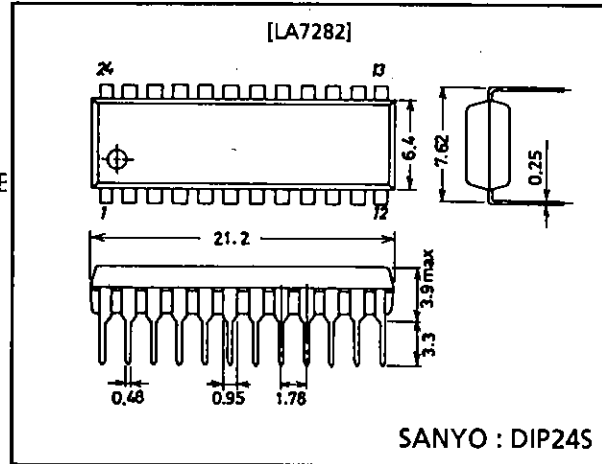
The LA7282 and 7282M are small package LSIs containing all functions necessary to record and playback VTR audio signal.

Features

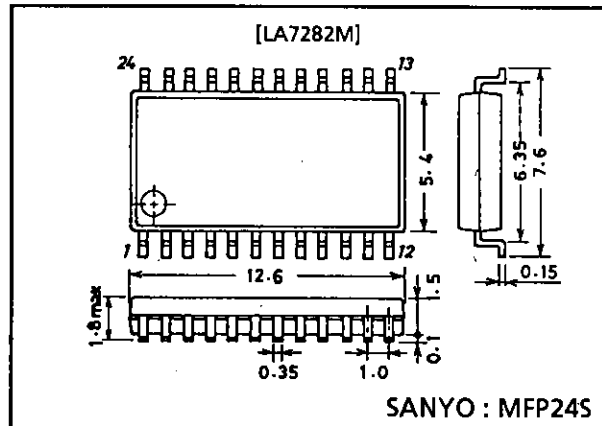
- Smaller package leaves large space for other components.
- Delete of In and Output electrolysis capacitor.
- Low capacitor (0.1 μ F) for the line amp inputs (PE IN and AUDIO IN)
- Non-Adjustment of PB Gain by less gain scatter

Package Dimensions

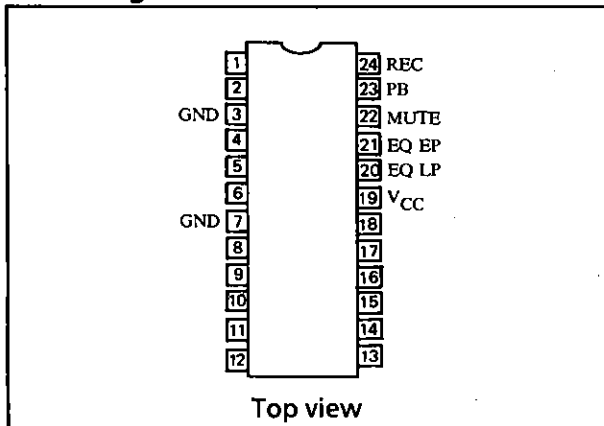
unit : mm
3067-DIP24S



unit : mm
3112-MFP24S



Pin Assignment



LA7282,7282M

Maximum Ratings at Ta = 25°C

| | | | | unit |
|-----------------------------|---------------------|---|-------------|------|
| Maximum Supply Voltage | V _{CC} max | | 14 | V |
| Pin 1 Input Voltage | V _{IN1} | Ta = 65°C, f = 80 kHz (sin), I _{LK} = 10 μA | 90 (±45) | Vp-p |
| Pin 1 Input Current | I _{IN1} | | ±1.5 | mA |
| Allowable Power Dissipation | Pd max | Ta ≤ 65°C, when mounted on the recommended PCB | 400 | mW |
| Operating Temperature | Topr | | -10 to +65 | °C |
| Storage Temperature | Tstg | | -55 to +125 | °C |

Operating Conditions at Ta = 25°C

| | | | | unit |
|----------------------------|--------------------|--|----------------|------|
| Recommended Supply Voltage | V _{CC} | | 12.0 | V |
| Operating Voltage Range | V _{CC} op | | 11.25 to 12.75 | V |

Operating Characteristics at Ta = 25°C, V_{CC} = 12 V, f = 1 kHz, OdBv = :1.0 Vrms

| | | | min | typ | max | unit |
|---|---------------------------------|---|------|-------|-----------------|-------|
| Current Dissipation (EE) | I _{CCE} | Quiescent | 8.0 | 12.0 | 17.0 | mA |
| Current Dissipation (PB) | I _{CCP} | Quiescent | 9.0 | 13.0 | 18.0 | mA |
| Current Dissipation (REC) | I _{CCR} | Quiescent | 7.0 | 10.0 | 14.0 | mA |
| Overall Gain at PB Mode [Equalizing Amp] | V _G PB | EQ IN-LINE OUT, V _O = -5 dBv | 59.0 | 59.5 | 60.0 | dB |
| Open Loop Voltage Gain | V _G OE | V _O = -5 dBv | 66.0 | 71.0 | | dB |
| Equivalent Input Noise Voltage | V _{NIE} | Rg = 2.2 kΩ, DIN Audio Filter | | 1.2 | 1.8 | μVrms |
| Input Impedance [Line Amp] | Z _{INE} | | | 130 | | kΩ |
| Voltage Gain (PB IN) | V _G LP | V _O = -5 dBv | 21.0 | 21.5 | 22.0 | dB |
| Voltage Gain (EE,REC IN) | V _G LR | V _O = -5 dBv | 21.0 | 21.5 | 22.0 | dB |
| Total Harmonic Distortion | THD _L | V _O = -5 dBv | | 0.3 | 0.5 | % |
| Output Noise Voltage | V _{NOL} | DIN Audio Filter | | -70.0 | -64.0 | dBv |
| Input Impedance (PB IN) | Z _{IN1} | | | 120 | | kΩ |
| Input Impedance (EE,REC IN) | Z _{IN2} | | | 120 | | kΩ |
| Maximum Output Voltage | V _{OML} | THD = 3% | 1.5 | 2.1 | | Vrms |
| Output Voltage at ALC | V _{OA} | V _{IN} = -28 dBv | -9.0 | -8.0 | -7.0 | dBv |
| ALC Effect | ALC | V _{IN} = -28 to -8 dBv | | 1.5 | 3.0 | dB |
| Total Harmonic Distortion at ALC | THD _A | V _{IN} = -28 dBv | | 0.25 | 0.6 | % |
| [Recording Amp] | | | | | | |
| Voltage Gain (open loop) | V _G OR | V _O = -5 dBv | 47.0 | 52.0 | | dB |
| Voltage Gain (closed loop) | V _G CR | V _O = -5 dBv | 12.5 | 13.0 | 13.5 | dB |
| Total Harmonic Distortion | THD _R | V _O = -5 dBv | | 0.1 | 0.3 | % |
| Input Impedance | Z _{INR} | | | 50 | | kΩ |
| Maximum Output Voltage | V _{OMR} | THD = 3% | 1.5 | 2.0 | | Vrms |
| [Muting Circuit] | | | | | | |
| On Voltage | V _{MON} | Pin 22, DC | 3.8 | | 6.0 | V |
| Off Voltage | V _{MOFF} | Pin 22, DC | 0 | | 1.0 | V |
| Mute Attenuation Level (PB,EE) | M _P , M _E | | 80.0 | 90.0 | | dB |
| Mute Attenuation Level (REC) | M _R | | 65.0 | 70.0 | | dB |
| [PB/EE Selector Circuit] | | | | | | |
| PB Mode Hold Voltage | V _{PP} | Pin 23, DC | 0 | | 1.0 | V |
| EE Mode Hold Voltage | V _{PE} | Pin 23, DC | 3.3 | | 6.0 | V |
| [REC/EE Selector Circuit] | | | | | | |
| REC Mode Hold Voltage | V _{RR} | Pin 24, DC | 3.3 | | V _{CC} | V |
| EE Mode Hold Voltage | V _{RE} | Pin 24, DC | 0 | | 1.0 | V |

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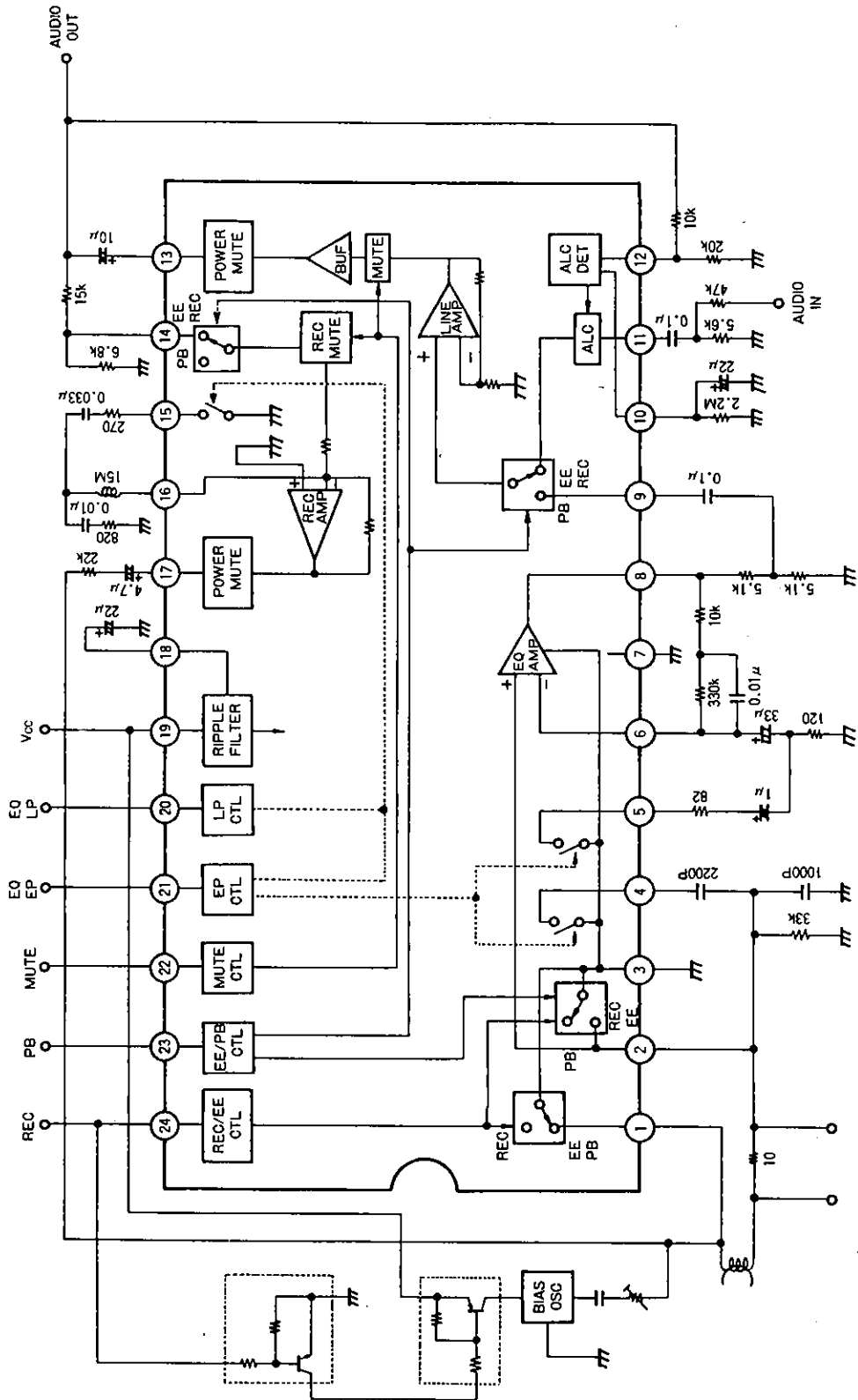
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| | | | min | typ | max | unit |
|------------------------------|------------|---|-----|-----|----------|----------|
| [Equalizer Selector Circuit] | | | | | | |
| Switch On Voltage | V_{EON} | Pin 20, 21, DC | 3.5 | | 6.0 | V |
| Switch Off Voltage | V_{EOFF} | Pin 20, 21, DC | 0 | | 0.8 | V |
| [Head Selector Switch] | | | | | | |
| Pin 1 On Resistance | R_{ON1} | $I_1 = \pm 1 \text{ mA}$ | | 15 | 30 | Ω |
| Pin 2 On Resistance | R_{ON2} | $I_2 = \pm 1 \text{ mA}$ | | 5 | 10 | Ω |
| Pin 1 Input Voltage | V_{IN1} | $T_a = 65^\circ\text{C}, f = 80 \text{ kHz (sin)}, I_{LK} = 10 \mu\text{A}$ | | | ± 45 | V |

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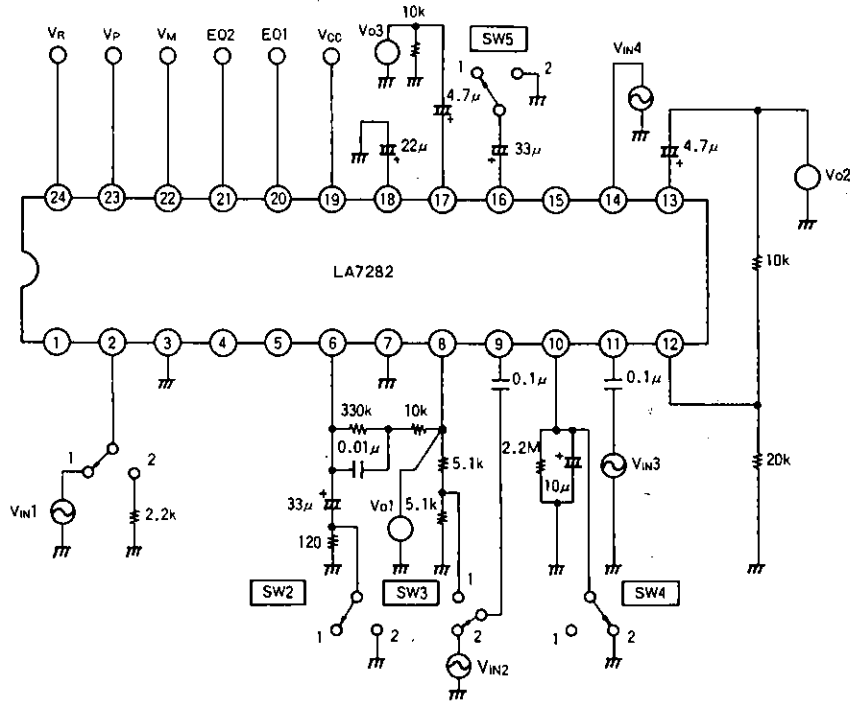
Block Diagram



Unit (resistance : Ω, capacitance : F)

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Test Circuit

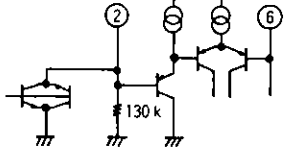
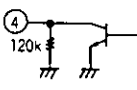
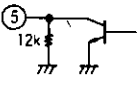
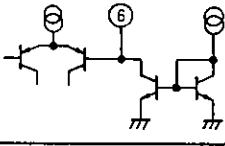
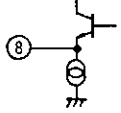
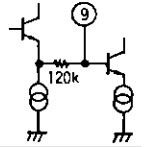
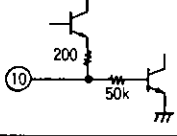
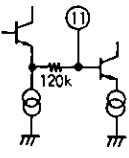
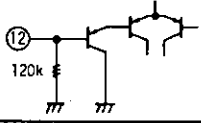
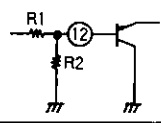
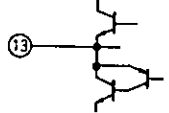


Unit (resistance : Ω, capacitance : F)

<Switch Setting Table>

| Parameter (Symbol) | SW1 | SW2 | SW3 | SW4 | SW5 | V _M | V _P | V _R | Input | Measurement |
|---|-----|-----|-----|-----|-----|----------------|----------------|----------------|------------------|-----------------|
| I _{CCE} | 2 | 1 | 1 | 2 | 1 | GND | 5V | GND | - | A |
| I _{CCP} | 2 | 1 | 1 | 2 | 1 | GND | GND | GND | - | A |
| I _{CCR} | 2 | 1 | 1 | 2 | 1 | GND | 5V | 5V | - | A |
| V _{G_{PB}} | 1 | 1 | 1 | 2 | 1 | GND | GND | GND | V _{IN1} | V _{O2} |
| V _{G_{OE}} | 1 | 2 | 2 | 2 | 1 | GND | GND | GND | V _{IN1} | V _{O1} |
| V _{NIE} | 2 | 1 | 2 | 2 | 1 | GND | GND | GND | - | V _{O1} |
| V _{G_{LP}} , THD _L , V _{OML} | 2 | 1 | 2 | 2 | 1 | GND | GND | GND | V _{IN2} | V _{O2} |
| V _{G_{LR}} | 2 | 1 | 1 | 2 | 1 | GND | 5V | GND | V _{IN3} | V _{O2} |
| V _{NOL} | 2 | 1 | 2 | 2 | 1 | GND | 5V | GND | - | V _{O2} |
| V _{O_A} , ALC, THD _A | 2 | 1 | 2 | 1 | 1 | GND | 5V | GND | V _{IN3} | V _{O2} |
| V _{G_{OR}} | 2 | 1 | 2 | 2 | 2 | GND | 5V | GND | V _{IN4} | V _{O3} |
| V _{G_{CR}} , THD _R , V _{OMR} | 2 | 1 | 2 | 2 | 1 | GND | 5V | GND | V _{IN4} | V _{O3} |
| M _P | 1 | 1 | 1 | 2 | 1 | 5V | GND | GND | V _{IN1} | V _{O2} |
| M _R | 2 | 1 | 1 | 2 | 1 | 5V | 5V | GND | V _{IN4} | V _{O3} |
| M _E | 2 | 1 | 2 | 2 | 1 | 5V | 5V | GND | V _{IN2} | V _{O2} |

Pin Functions

| Pin No. | Function | Terminal Circuit | Description |
|---------|--------------------------------|---|---|
| 1 | Head Switch 1 (High voltage) | | EE, PB: on; REC: off On resistance: 10 Ω, typ. With stand voltage during off: ±45 V (f = 80 kHz) |
| 2 | EQ AMP Input and Head Switch 2 |  | Input playback signal to the head. Input impedance: 130 kΩ, typ. EE, REC: on; PB: off Switch on resistance: 5 Ω, typ. |
| 3 | GND | | An exclusive GND for pin 1 head switch 1, EQ AMP and playback EP switch |
| 4 | EP Switch 1 |  | Sets the tape head resonant frequency. On resistance: 15 Ω, typ. Input impedance: 120 kΩ, typ. (playback EP mode) |
| 5 | EP Switch 2 |  | Increases the voltage gain at higher frequencies by reducing negative feedback amount of the PB EQ AMP. On resistance: 15 Ω, typ. Input impedance: 12 kΩ, typ. (playback EP mode) |
| 6 | EQ AMP NFB |  | Input of negative feedback of the EQ AMP to establish desired equalizing characteristics. |
| 7 | GND | | Common return for all circuits except for EQ AMP and head switch 1. |
| 8 | EQ AMP Output |  | |
| 9 | LINE AMP PB Input |  | Input PB signal to the EQ AMP. The input impedance of pin 9 is high (120 kΩ) and requires a small coupling capacitor of 0.1 μF. |
| 10 | ALC FILTER |  | Connecting this pin to GND through a capacitor enables detection. The RC time constant sets attack recovery time. |
| 11 | LINE AMP Audio Input |  | Input EE, REC signal. Select value of R ₁ and R ₂ so that the reference input is at the shoulder of the ALC. The amp gain should be set for 21.5 dB. The input impedance of pin 11 is high (120 kΩ) and requires a small coupling capacitor of 0.1 μF. |
| 12 | ALC Detect Input |  |  Accepts the output signal of LINE amp. The ALC level is determined by the voltage divider consisting of R ₁ and R ₂ . |
| 13 | LINE AMP Output |  | Output impedance: 50 Ω, typ. |

Unit (resistance : Ω)

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| Pin No. | Function | Terminal Circuit | Description | | | | | | | | | | | | | | | | | | | | | | | | |
|----------|-----------------------------|------------------|--|---------|----------|--|----------|--|----------|---------|----------|---------|---------|---|---|---|---|---------|---|---|---|---|----------|---|---|---|---|
| 14 | REC AMP Input | | Input recording signal from LINE AMP. Input current is set by the divider consisting of R_1 and R_2 . Pin 14 requires no coupling capacitor since REC AMP is to operate at zero level and as inverting amp. | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | LP Switch | | Sets the high peaking point to the frequency suitable for LP. On resistance: 15 Ω typ. Input impedance: 60 k Ω typ. | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | REC AMP NFB | | Connecting an L, C, R network to this pin causes a peaking frequency to rise. | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | REC AMP Output | | Output impedance: 40 Ω typ. | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | Ripple Filter | | Connecting an electrolytic capacitor across this pin and GND smoothes ripples. | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | Supply Voltage (V_{CC}) | | $V_{CC} = 15$ V max $V_{CC} = 11.25 - 12.75$ V typ. | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | LP Control | | Applying 3.5 V DC or more (6.0 V max.) to this pin turns on LP switch (pin 15). The switch turns off at 0.8 V or below. | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | EP Control | | Applying 3.5 V DC or more (6.0 V max.) to this pin turns on EP switch (pin 4,5) and LP switch (pin 15). The switches turn off at 0.8 V or below. | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | MUTE Control | | Applying 3.8 V DC or more (6.0 V max.) to this pin turns on mute circuit. The mute is disabled at 1.0 V or below. [Control mode] | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Mode</th> <th colspan="2">MUTE 「L」</th> <th colspan="2">MUTE 「H」</th> </tr> <tr> <th>LINE AMP</th> <th>REC AMP</th> <th>LINE AMP</th> <th>REC AMP</th> </tr> </thead> <tbody> <tr> <td>PB Mode</td> <td style="text-align: center;">○</td> <td style="text-align: center;">×</td> <td style="text-align: center;">×</td> <td style="text-align: center;">×</td> </tr> <tr> <td>EE Mode</td> <td style="text-align: center;">○</td> <td style="text-align: center;">○</td> <td style="text-align: center;">×</td> <td style="text-align: center;">×</td> </tr> <tr> <td>REC Mode</td> <td style="text-align: center;">○</td> <td style="text-align: center;">○</td> <td style="text-align: center;">○</td> <td style="text-align: center;">×</td> </tr> </tbody> </table> <p style="text-align: center;">[O: Pass signal, x: Block signal]</p> | Mode | MUTE 「L」 | | MUTE 「H」 | | LINE AMP | REC AMP | LINE AMP | REC AMP | PB Mode | ○ | × | × | × | EE Mode | ○ | ○ | × | × | REC Mode | ○ | ○ | ○ | × |
| Mode | MUTE 「L」 | | MUTE 「H」 | | | | | | | | | | | | | | | | | | | | | | | | |
| | LINE AMP | REC AMP | LINE AMP | REC AMP | | | | | | | | | | | | | | | | | | | | | | | |
| PB Mode | ○ | × | × | × | | | | | | | | | | | | | | | | | | | | | | | |
| EE Mode | ○ | ○ | × | × | | | | | | | | | | | | | | | | | | | | | | | |
| REC Mode | ○ | ○ | ○ | × | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | PB Control | | Applying 3.3 V DC or more (6.0 V max.) to this pin enters EE mode and 1.0 V or below PB mode. | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | REC Control | | Applying 3.0 V DC or more (up to V_{CC}) to this pin enters REC mode and 1.0 V or below EE mode. | | | | | | | | | | | | | | | | | | | | | | | | |

Unit (resistance : Ω)