

No. 4750

LA7286

VCR Audio Signal Recording and Playback Processor

Functions

- · Equalizer amplifier
- · Line amplifier
- · Recording amplifier
- · Recording bias current automatic adjustment circuit
- · Ripple filter
- Mute
- ALC
- · Recording/playback switch
- SP, LP, EP switch
- Tape head switch

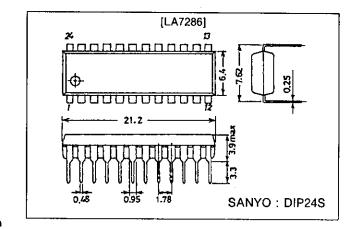
Features

- No adjustment of recording bias current required (due to adoption of automatic adjustment circuit).
- Recording bias oscillation circuit power supply switch on chip.
- · Eliminates need for choke coil for recording equalizer.
- Playback amplifier equivalent input noise voltage: $1.0~\mu Vrms$.
- Reduced capacitance (3.3 μF) of ALC detection capacitor.
- · High withstand voltage head switch on chip.
- Supply voltage: 9 V and 12 V operation.

Package Dimensions

unit: mm

3067-DIP24S



Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V _{CC} max		14	V
Pin 2 input voltages	V _{IN} 2	DC	±65	Vp-p
Pln 2 input current	I _{IN} 2		±1.5	mA
Allowable power dissipation	Pdmax	Ta ≤ 65°C	500	mW
Operating temperature	Topr		-10 to +65	ొ
Storage temperature	Tstg		-55 to +150	ື

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	v _{cc}		9, 12	٧
Operating supply voltage range	V _{CC} op		8.5 to 12.5	V

Operating Characteristics at Ta = 25 $^{\circ}$ C, $V_{\rm CC}$ = 12 V, f = 1 kHz, 0 dBV : 1.0 Vrms

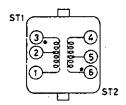
Equivalent input noise voltage [Line amplifier] Voltage gain (PB Input) Voltage gain (LINE input) Total harmonic distortion Output noise voltage	ICCE ICCP ICCR VGOE VNIE VGLP VGLR THDL	No signal No signal No signal $V_{O} = -6 \text{ dBV}$ Rg = 620 Ω , DIN Audio filter $V_{O} = -6 \text{ dBV}$	9.5 8.5 8.5 58.4 21.0 21.0	12.0 11.0 10.5 64.4 1.0	14.5 13.5 12.5	MA mA mA dB μVrms
Current consumption (REC) [Equalizer amplifier] Open-circuit voltage gain Equivalent input noise voltage [Line amplifier] Voltage gain (PB Input) Voltage gain (LINE input) Total harmonic distortion Output noise voltage	I _{CCP} I _{CCR} VG _{OE} V _{NIE} VG _{LP} VG _{LR} THD _L	No signal $V_{Q} = -6 \text{ dBV}$ $Rg = 620 \Omega, \text{ DIN Audio filter}$ $V_{Q} = -6 \text{ dBV}$ $V_{Q} = -6 \text{ dBV}$	58.4 21.0	10.5 64.4 1.0	12.5	mA dB
[Equalizer amplifier] Open-circuit voltage galn Equivalent input noise voltage [Line amplifier] Voltage gain (PB Input) Voltage gain (LINE input) Total harmonic distortion Output noise voltage	VG _{OE} VNIE VG _{LP} VG _{LR} THD _L	$V_{Q} = -6 \text{ dBV}$ $Rg = 620 \Omega$, DIN Audio filter $V_{Q} = -6 \text{ dBV}$ $V_{Q} = -6 \text{ dBV}$	58.4 21.0	64.4		dB
Open-circuit voltage gain Equivalent input noise voltage [Line amplifier] Voltage gain (PB Input) Voltage gain (LINE input) Total harmonic distortion Output noise voltage	VG _{OE} V _{NIE} VG _{LP} VG _{LR} THD _L	Rg = 620 Ω , DIN Audio filter $V_{O} = -6 \text{ dBV}$ $V_{O} = -6 \text{ dBV}$	21.0	1.0	1.8	dB
Equivalent input noise voltage [Line amplifier] Voltage gain (PB Input) Voltage gain (LINE input) Total harmonic distortion Output noise voltage	V _{NIE} VG _{LP} VG _{LR} THD _L	Rg = 620 Ω , DIN Audio filter $V_{O} = -6 \text{ dBV}$ $V_{O} = -6 \text{ dBV}$	21.0	1.0	1.8	
Equivalent input noise voltage [Line amplifier] Voltage gain (PB Input) Voltage gain (LINE input) Total harmonic distortion Output noise voltage	V _{NIE} VG _{LP} VG _{LR} THD _L	Rg = 620 Ω , DIN Audio filter $V_{O} = -6 \text{ dBV}$ $V_{O} = -6 \text{ dBV}$	+		1.8	μVrms
Voltage gain (PB Input) Voltage gain (LINE input) Total harmonic distortion Output noise voltage	VG _{LP} VG _{LR} THD _L	$V_{O} = -6 \text{ dBV}$	+	21.5		
Voltage gain (LINE input) Total harmonic distortion Output noise voltage	VG _{LR} THD _L	$V_{O} = -6 \text{ dBV}$	+	21.5		
Total harmonic distortion Output noise voltage	THDL	$V_{O} = -6 \text{ dBV}$	21.0		22.0	đВ
Output noise voltage				21.5	22.0	₫B
	V _{NOL}	1.0 - 0.051	1	0.05	0.3	%
		Rg = 1 kΩ, DIN Audio filter		-80.0	-74.0	dBV
Maximum output voltage	V _{OML}	THD = 1%	1.7	2.5		Vrms
Output voltage when ALC is on	VOA	V _{IN} = -26 dBV	-7.0	-6.0	-5.0	dBV
ALC effect	ALC	V _{IN} = -26 dBV to -6 dBV	1	1	3	ďΒ
Distortion when ALC is on	THDA	V _{IN} = -26 dBV		0.05	0.6	%
[Recording amplifier]			•			
Voltage gain	VG _{CR}	$V_O = -6 \text{ dBV}$	13.5	14.0	14.5	dΒ
Total harmonic distortion	THDR	$V_O = -6 \text{ dBV}$		0.05	0.3	%
Maximum output voltage	V _{OMB}	THD = 1%	1.7	2.5		Vrms
[Mute circuit]						
On voltage	V _{MON}	Pin 22 DC voltage	2.5		6.0	V
Off voltage	V _{MOFF}	Pin 22 DC voltage	0	:-	1.5	V
	M _P , M _E		80	90		ď₿
[EP, LP, SP switch circuit]						
EP mode hold voltage	V _{EE}	Pin 21 DC voltage	3.6		6.0	V.
LP mode hold voltage	V _{EL}	Pin 21 DC voltage	1.8		2.6	٧
SP mode hold voltage	V _{ES} .	Pin 21 DC voltage	0		1	V
[EE, PB switch circuit]						
EE mode hold voltage	V _{LL}	Pin 23 DC voltage	3		6	V
PB mode hold voltage	V _{LP}	Pin 23 DC voltage	0		1	٧
[REC, EE switch circuit]						
REC mode hold voltage	V _{RR}	Pin 24 DC voltage	3		6	V·
EE mode hold voltage	V _{RE}	Pin 24 DC voltage	0		1	٧
[Switch]			•	•		
Pin 2 on resistance	R _{ON} 2	12 = ±1 mA		10	25	Ω
Pin 2 input voltage	V _{IN} 2	Ta = 65°C, f = 80 kHz (sin), I_{LK} = 10 μ A			±45	٧
[Recording blas current automatic ad					·····	
Recording bias current	IB	The conditions for using each head assume the	220	245	270	μΑ
Pin 1 output control range	V _{CTL}	specifications shown below.	2.5	4.0	6.0	٧

Head Coil Specifications

(1) Application circuit 1 (erase head series type)

• R/P Head	58 kΩ (typ)	+15%	(f = 70kHz)
• AE Head	34 Ω (typ)	-15% +25%	(f = 70kHz)
• FE Head	80 Ω (typ)	-25% +20%	(f = 70kHz)
		-10%	

• OSC Coil: Model name 7QM3, Prototype No. C-14290, Tokyo Parts Ind. Co., Ltd. Tel = 0270-25-1191

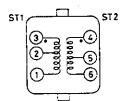


Pin No.	3 to 2	2 to 1	6 to 5	5 to 4
Wire type	2UEW 0.09	+	Į	ţ
Total number of coils	32T	20T	180T	25T

(2) Application circuit 2 (erase head parallel type)

• R/P Head	58 kΩ (typ)	+10%	$(f = 70kH_z)$
• AE Head	180 Ω (typ)	-20% +25%	$(f = 70kH_z)$
• FE Head	80 Ω (typ)	-5% +20% -20%	$(f = 70kH_z)$

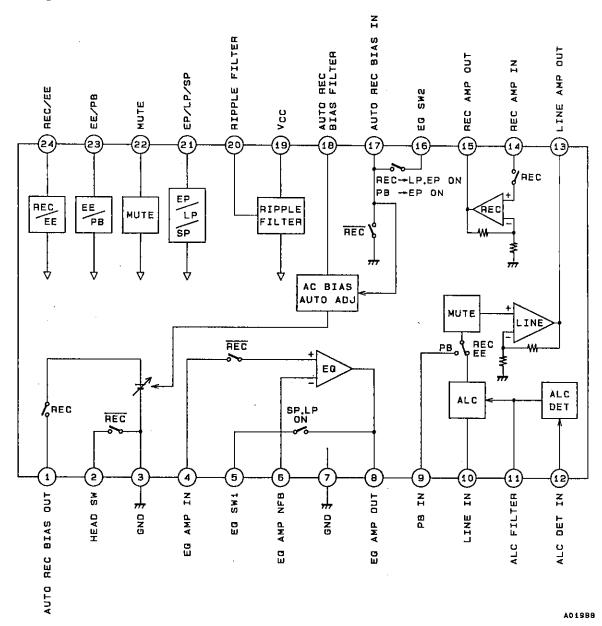
• OSC Coil:Model name 7QM3, Prototype No. C-14284, Tokyo Parts Ind. Co., Ltd.

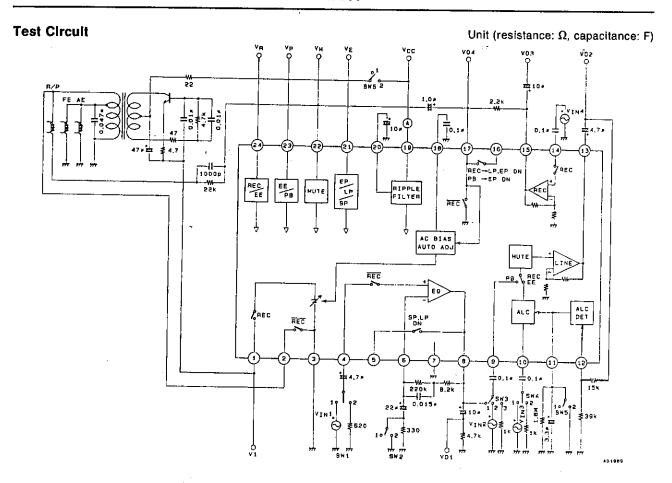


Pin No.	3 to 2	2 to 1	4 to 5	5 to 6
Wire type	2UEW 0.10	←	1	1
Total number of coils	15T	25T	110T	30T

^{*} The head specifications are as agreed upon by Alps Electric and Sanyo.

Block Diagram



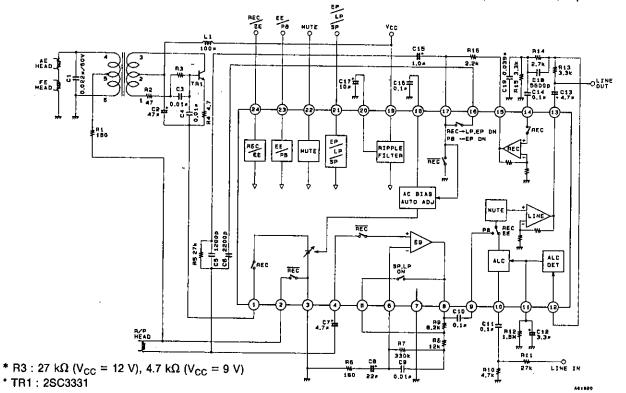


Switch Operation Table

Test item (symbol)	SW1	SW2	SW3	SW4	SW5	SW6	V _M	V _P	V _R	Input	Measure:
1 _{CCE}	2	1	3	2	2	1	GND	5 V	GND	_	10
[†] CCP	2	1	3	2	2	1	GND	GND	GND	_	lo
I _{CCR}	2	1	3	2	2	1	GND	5 V	5 V		lo
VG _{OE}	1	2	3	2	2	1	GND	GND	GND	V _{IN} 1	V _O 1
V _{INE}	2	1	3	2	2	1	GND	GND	GND	_	V _O 1
VG _{LP} , THD _L , V _{MOL}	2	1	2	2	2	1	GND	GND	GND	V _{IN} 2	V _O 2
VG _{LR}	2	1	3	1	2	1	GND	5 V	GND	V _{IN} 3	V _O 2
V _{ONL}	2	1	3	2	2	1	GND	5 V	GND	_	V _O 2
V _{OA} , ALC, THD _A	2	1	3	1	1	1	GND	5 V	GND	V _{IN} 3	V _O 2
VG _R , THD _R , V _{MOR}	2	1	3	2	2	1	GND	5 V	5 V	V _{IN} 4	V _O 3
M _P	1	1	1	2	2	1	5 V	GND	GND	V _{IN} 1	V _O 2
ME	2	1	3	1	2	1	5 V	5 V	GND	V _{IN} 3	V _O 2
V _{BIA\$}	2	1	3	2	2	2	GND	5 V	5 V	_	V _O 4
V _{CTL}	2	1	3	2	2	2	GND	5 V	5 V		V1

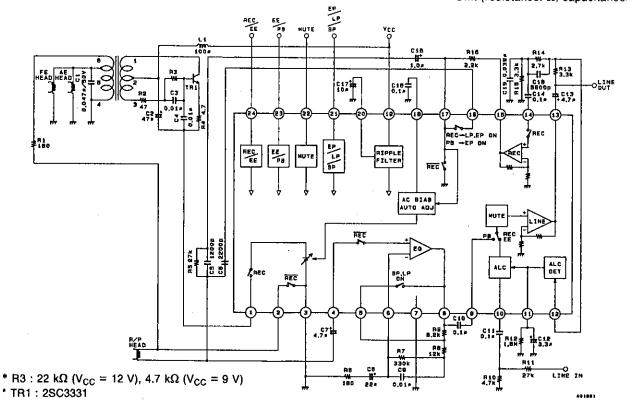
Sample Application Circuit: Erase head series type

Unit (resistance: Ω , capacitance: F)



Sample Application Circuit: Erase head parallel type

Unit (resistance: Ω, capacitance: F)



Pin Functions

Unit (resistance: Ω)

Din No	F	Ojiit (resistance, 12)	
Pin No.	Function name	Internal circuit for pin	Description of function
1	Recording blas automatic control output	6.8k A01992	EE, PB → off REC → control voltage
2	Head switch (high withstand voltage)		EE, PB \rightarrow on REC \rightarrow off On resistance \rightarrow 10 Ω (typ) Withstand voltage when off \rightarrow \pm 45 V (I = 80 kHz)
3	GND		GND for pin 2 head switch and Equalizer Amplifier only
4	EQ AMP input	120k A01993	Input impedance for playback signal input from head → 120 kΩ (typ)
5	EQ switch 1	5 B m A01994	Switches the Playback Equalizer Amplifier high-region frequency voltage gain. LP, SP \rightarrow on EP \rightarrow off On resistance \rightarrow 20 Ω (typ)
6	EQ AMP NFB	A01985	Equalizer Amplifier negative feedback pin
7	GND		GND for all circuit blocks except the pln 2 head switch and Equalizer Amplifier

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Unit (resistance: Ω)

Pin No.	Function name	Unit (resistance: 12)	
FIII NO.	runction name	Internal circuit for pin	Description of function
8	EQ AMP output	A01895	Output impedance $ ightarrow$ 50 Ω (typ)
9	LINE AMP PB input	9 120k ₹ A01997	Inputs the playback signal from the Equalizer Amplifier. Because the input impedance is as high as 120 k Ω , a 0.1 μ F ceramic capacitor can be used for the coupling capacitor on pin 9.
10	LINE AMP LINE input	VREF 120K 120K A01998	Inputs EE and REC signals. R1 R2 AC 1999 The reference input is set by resistors R1 and R2. The amplifier gain is fixed at 21.5 dB. In addition, because the input impedance is as high as 120 kΩ, a 0.1 μF ceramic
11	ALC FILTER	11 = 200 A02000	capacitor can be used for the coupling capacitor on pin 10. Wave detection is performed when connected to GND through a capacitor. In addition, the attack and recovery time is set by the C and R time constants.
12	ALC Input wave detection	12-A02001	Inputs the Line Amplifier output signal. The ALC level is set by the resistors R1 and R2.

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Unit (resistance: Ω)

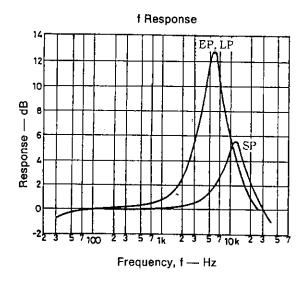
	T _	Unit (resistance: 12)	
Pin No.	Function name	Internal circuit for pin	Description of function
13	LINE AMP output	13 A02303	Output inpedance $ ightarrow$ 50 Ω (typ)
14	REC AMP Input	120k A02004	Inputs the recording signal from Line Amplifier. AD2CO5 The recording current is set by the resistors R1 and R2. In addition, because the input impedance Is as high as 120 kΩ, a 0.1 μF ceramic capacitor can be used for the coupling capacitor on pin 14.
15	REC AMP output	15 A02005	Output impedance $ ightarrow$ 50 Ω (typ)
16	EQ switch 2	15 17 A02007	Switches the high-region peaking frequency during recording and playback. REC PB EP On On LP On Off SP Off Off On resistance → 30 Ω (typ)
17	Recording bias automatic control input and PB switch.	VREF A02008	EE, PB \rightarrow on REC \rightarrow off On resistance \rightarrow 20 Ω (typ)

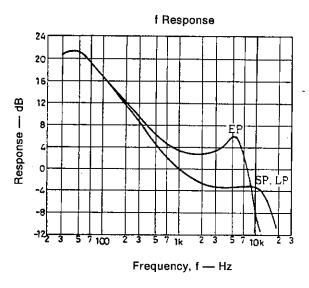
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Unit (resistance: Ω)

Pin No.	Function name	Internal circuit for pin	Description of function
	T director righte	internal circuit for pin	Description of function
18	Recording bias automatic control filter	A02009	Wave detection is performed when connected to GND through a capacitor.
19	Supply voltage (V _{CC})		V _{CC} max = 14 V V _{CC} = 8.5 V to 12.5 V
20	Ripple filter	Power supply of each circuit block	Ripple rejection is performed when connected to GND through an electrolytic capacitor for the filter.
21	EP/LP/SP Control	21 W 100k A02011	When the voltage on pin 21 is 3.6 V to 6.0 V: EP; when 1.8 V to 2.6 V: LP; when 0 V to 1.0 V: SP Switch On Pin Number REC PB EP 16 16 LP 16, 5 5 5 5
22	MUTE Control	10k 22 WH 100k 100k	When the voltage on pin 22 is 2.5 V to 6.0 V: MUTE on; when 0 V to 1.5 V: MUTE off
23	EE/PB Control	10k 23 W	When the voltage on pin 23 is 3.0 V to 6.0 V: EE; when 0 V to 1.0 V: PB
24	REC/EE Control	10k 100k A02014	When the voltage on pin 24 is 3.0 V to 6.0 V: REC; when 0V to 1.0 V: EE However, REC mode is entered only when the voltage on pin 23 is 3.0 V to 6.0 V.





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