

## KA8401

## LINEAR INTEGRATED CIRCUIT

SWITCHLESS RECORDING/  
PLAY BACK AMPLIFIER

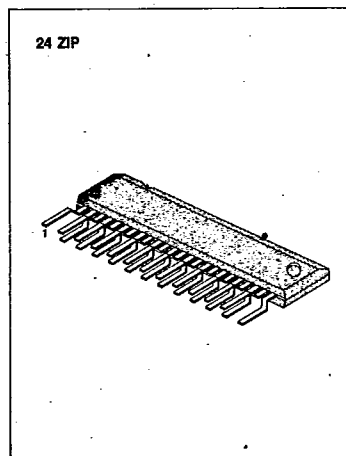
The KA8401 is a monolithic integrated circuit in a 16-lead zigzag in-line plastic package (shrink type). It consists of playback equalizer amplifier, recording/play back switch, line amplifier, ALC circuit with detector, recording amplifier and logic control circuit can control REC/EE and PB/EE line muting independently.

## FUNCTIONS

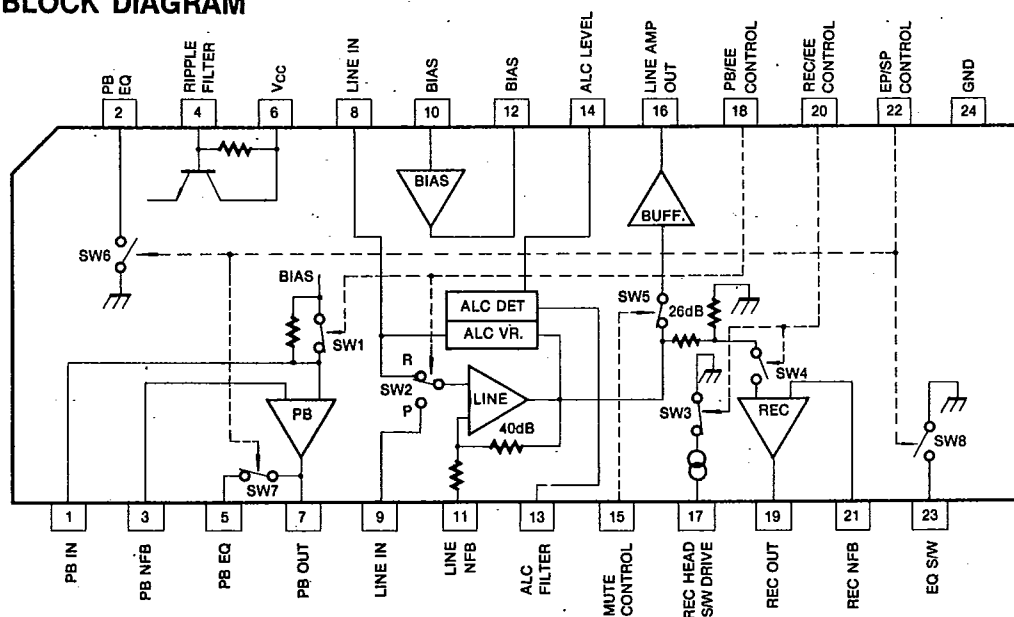
- Play Back EQ Amp.
- Recording/Play Back SW.
- Line Amp. & ALC Circuit with Detector.
- Recording Amp. & Logic Control Circuit.

## FEATURES

- High level ALC  $V_R$  utilization provides a good S/N ratio & distortion factor
- The ALC level can be set according to the external resistance
- Extremely low POP noise during supply ON/OFF switching
- Extremely low shock noise during control system switching
- Few external parts required
- Wide operating supply voltage (4.5 ~ 12V)



## BLOCK DIAGRAM



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## ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristics	Symbol	Value	Unit
Maximum Supply Voltage	V <sub>CC</sub>	13	V
Power Dissipation	P <sub>D</sub>	400*	mW
Operating Temperature	T <sub>opr</sub>	-10 ~ +65	°C
Storage Temperature	T <sub>stg</sub>	-55 ~ +125	°C

Note: Derated above Ta = 25°C in the proportion of 4mW/°C

## ELECTRICAL CHARACTERISTIC

(Ta = 25°C, V<sub>CC</sub> = 5V, f = 1KHz, unless otherwise specified)

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Current	I <sub>CC1</sub>	No Signal SP mode	—	5.0	9.2	mA
Supply Current	I <sub>CC2</sub>	No Signal SP mode	—	8.0	14.1	mA

## (Line Amp)

Recording Input Gain	G <sub>VEE</sub>	V <sub>IN</sub> = -25dBV, ALC OFF	15.0	16.7	18.4	dB
Total Harmonic Distortion	THD <sub>EE</sub>	V <sub>IN</sub> = -25dBV, ALC OFF	—	0.06	0.2	%
Residual Noise	V <sub>NOL</sub>	R <sub>G</sub> = 5.6KΩ	—	-76	-68	dBV
Input Impedance	Z <sub>INP</sub>	P.B Input	—	30	—	KΩ
Input Impedance	Z <sub>INR</sub>	REC input	—	30	—	KΩ
Maximum Output Level	V <sub>OML</sub>	THD = 1%	0.75	1.1	—	V <sub>rms</sub>
ALC Level	V <sub>OA</sub>	V <sub>IN</sub> = -15dBV, ALC ON	0.47	0.58	0.71	V <sub>rms</sub>
ALC Total Harmonic Distortion	THD <sub>A</sub>	V <sub>IN</sub> = -15dBV, ALC ON	—	0.06	0.2	%
ALC Distortion for Large Input	ΔTHD <sub>A</sub>	V <sub>IN</sub> = +10dBV, ALC ON	—	0.15	0.3	%

## (REC AMP)

Overall Recording Gain	G <sub>VR</sub>	V <sub>IN</sub> = -25dBV, ALC OFF	16.3	18.0	19.7	dB
Open Loop Recording Gain	G <sub>VOR</sub>	V <sub>IN</sub> = -65dBV, ALC OFF	72	79	—	dB
Total Harmonic Distortion	THD <sub>R</sub>	V <sub>IN</sub> = -25dBV, ALC OFF	—	0.06	0.2	%
Maximum Recording Output	V <sub>OMR</sub>	THD = 1%	0.85	1.2	—	V <sub>rms</sub>

## (PB EQ AMP)

Open Loop Playback Gain	G <sub>VOPB</sub>	V <sub>IN</sub> = -40dBV	64	71	—	dB
Total Harmonic Distortion	THD <sub>PB</sub>	V <sub>IN</sub> = -10dBV	—	0.02	0.15	%
PB EQ Input Noise	V <sub>NIPB</sub>	R <sub>G</sub> = 620Ω	—	-122	-114	dBV
Input Impedance	Z <sub>INPB</sub>		—	120	—	KΩ
PB Overall Gain	G <sub>VP</sub>	V <sub>IN</sub> = -25dBV	74.3	78.5	82.7	dB

## (PB/EE S/W MODE)

EE Mode Sustain Voltage	V <sub>1BL</sub>		0	—	0.8	V
PB Mode Sustain Voltage	V <sub>1BH</sub>		3.6	—	V <sub>CC</sub>	V
Head S/W Impedance	Z <sub>SW1</sub>		—	5	15	Ω

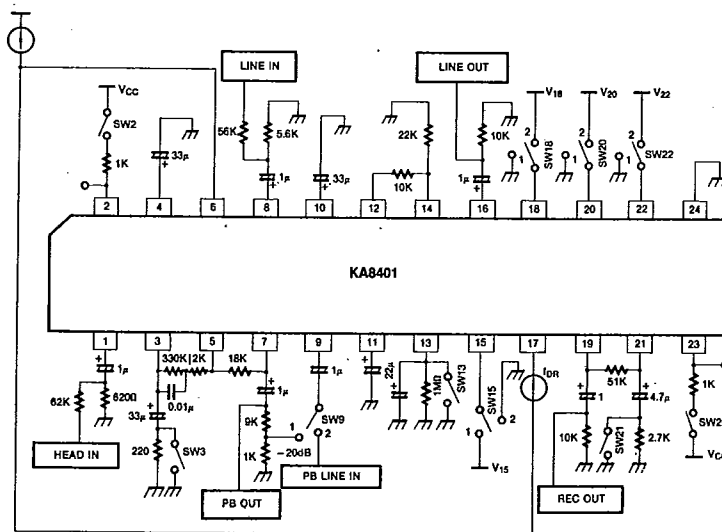
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**ELECTRICAL CHARACTERISTIC (Continued)**

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
(MUTE/MUTE S/W Mode)						
MUTE Mode Sustain Voltage	$V_{15L}$		0	—	1.5	V
MUTE Mode Sustain Voltage	$V_{15H}$		3.6	—	$V_{CC}$	V
MUTE Level	$V_{MU}$		—	-100	-60	dBV
(REC/EE S/W Mode)						
EE Mode Sustain Voltage	$V_{20L}$		0	—	1.7	V
REC Mode Sustain Voltage	$V_{20H}$		3.6	—	$V_{CC}$	V
Drive Sink Current	$I_{SW17}$		80	200	—	$\mu A$
(EQ S/W Mode)						
SP Mode Sustain Voltage	$V_{22L}$		0	—	1.0	V
EP Mode Sustain Voltage	$V_{22H}$		3.6	—	$V_{CC}$	V
SW2 Impedance	$Z_{SW2}$		—	6	30	$\Omega$
SW5 Impedance	$Z_{SW5}$		—	12	60	$\Omega$
SW23 Impedance	$Z_{SW23}$		—	6	30	$\Omega$
(AFR S/W Mode)						
PB Mode Sustain Voltage	$V_{20L}$		0	—	0.5	V
REC Mode Sustain Voltage	$V_{20H}$		3.6	—	$V_{CC}$	V

**TEST CIRCUIT**



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## CONTROL MODE TABLE

Mode	Control				SW								ALC
	REC/EE	PB/EE	MUTE	EP/SP	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	
EE	L	L	L	—	ON	R	ON	OFF	ON	—	—	—	ON
EE MUTE	L	L	H	—	ON	R	ON	OFF	OFF	—	—	—	ON
REC	H	L	L	—	ON	R	OFF	ON	ON	—	—	—	ON
REC MUTE	H	L	H	—	ON	R	OFF	ON	OFF	—	—	—	ON
PB	L	H	L	—	OFF	P	ON	OFF	ON	—	—	—	OFF
PB MUTE	L	H	H	—	OFF	P	ON	OFF	OFF	—	—	—	OFF
AFR	H	H	L	—	ON	R	OFF	ON	ON	—	—	—	ON
AFR MUTE	H	H	H	—	ON	R	OFF	ON	OFF	—	—	—	ON
EP	—	—	—	H	—	—	—	—	—	ON	OFF	ON	—
SP	—	—	—	L	—	—	—	—	—	OFF	ON	OFF	—

## CONTROL MODE FUNCTION

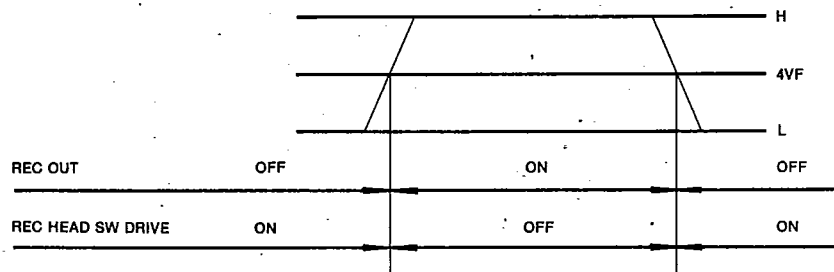
Mode	Function
PB/EE Control	PB: High                      EE: Low REC/EE Input selection from line amp input ALC ON/OFF PB head switch ON/OFF
REC/EE Control	REC: High                      EE: Low REC amp output ON/OFF REC head switch ON/OFF (This mode is prior to PB/EE control mode and is able to correspond AFR mode)
MUTE Control	MUTE ON: High                      MUTE OFF: Low Line amp switch ON/OFF (ALC loop, this mode is able to control REC amp independantly)
EQ SW Control	EP: High                      SP: Low Each EQ switch/switch ON/OFF



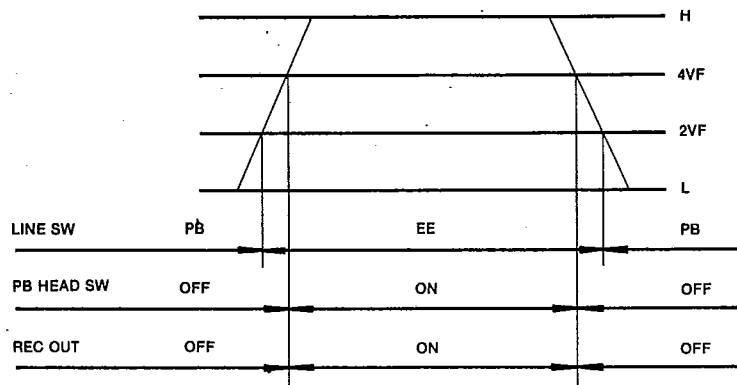
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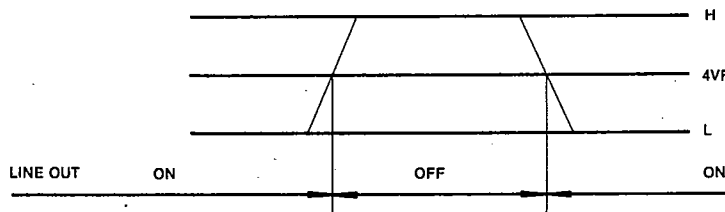
2. REC/EE Control: 20 Pin (PB/EE: "L")



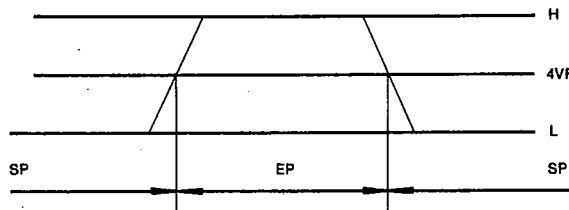
3. AFR/PB Control: 20 Pin (PB/EE: "H")



4. MUTE Control



5. EP/SP Control



NOTE: VF  $\approx$  6.8V

