TA7417AP

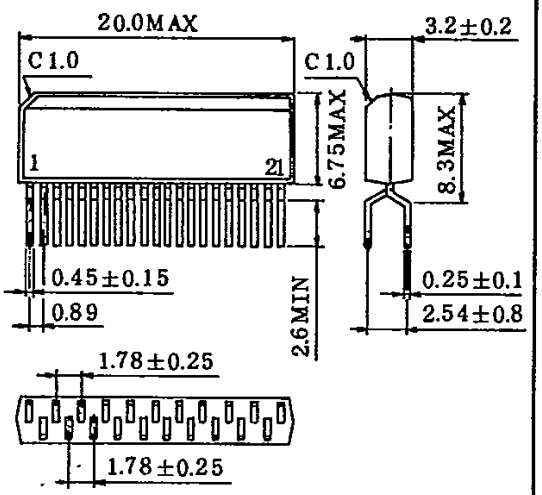
T-77-21

DUAL PRE AMPLIFIER SYSTEM

The TA7417AP is a dual preamplifier system IC designed for radio cassette player of the low end class to the middle class.

- Recording Amp with ALC
- Play Back Amp
- Mic Amp with ALC
- Monitor Amp
- Built-in switch for selecting REC/PLAY
- Built-in switch for selecting TAPE input or RADIO(AUX) input
- Built-in Recording Bias Circuit Control terminal
- Following 4 modes can be carried out by external two switches combination.
  - Radio Recording
  - Mic Recording
  - Radio Play
  - Tape Play Back
- Few external parts
- Small package (ZIP-21)
- Operational supply voltage (recommended)
  V_{CC}=3.5~7V (Ta=25°C)

Unit in mm



Lead pitch is 1.78 and tolerance is ±0.25 against theoretical center of each lead obtained on the basis of No.1 lead for front lead and No.2 lead for rear lead.

JEDEC	—
TOSHIBA	Z21A-P

Weight : 0.94g

MAXIMUM RATINGS (Ta=25°C)

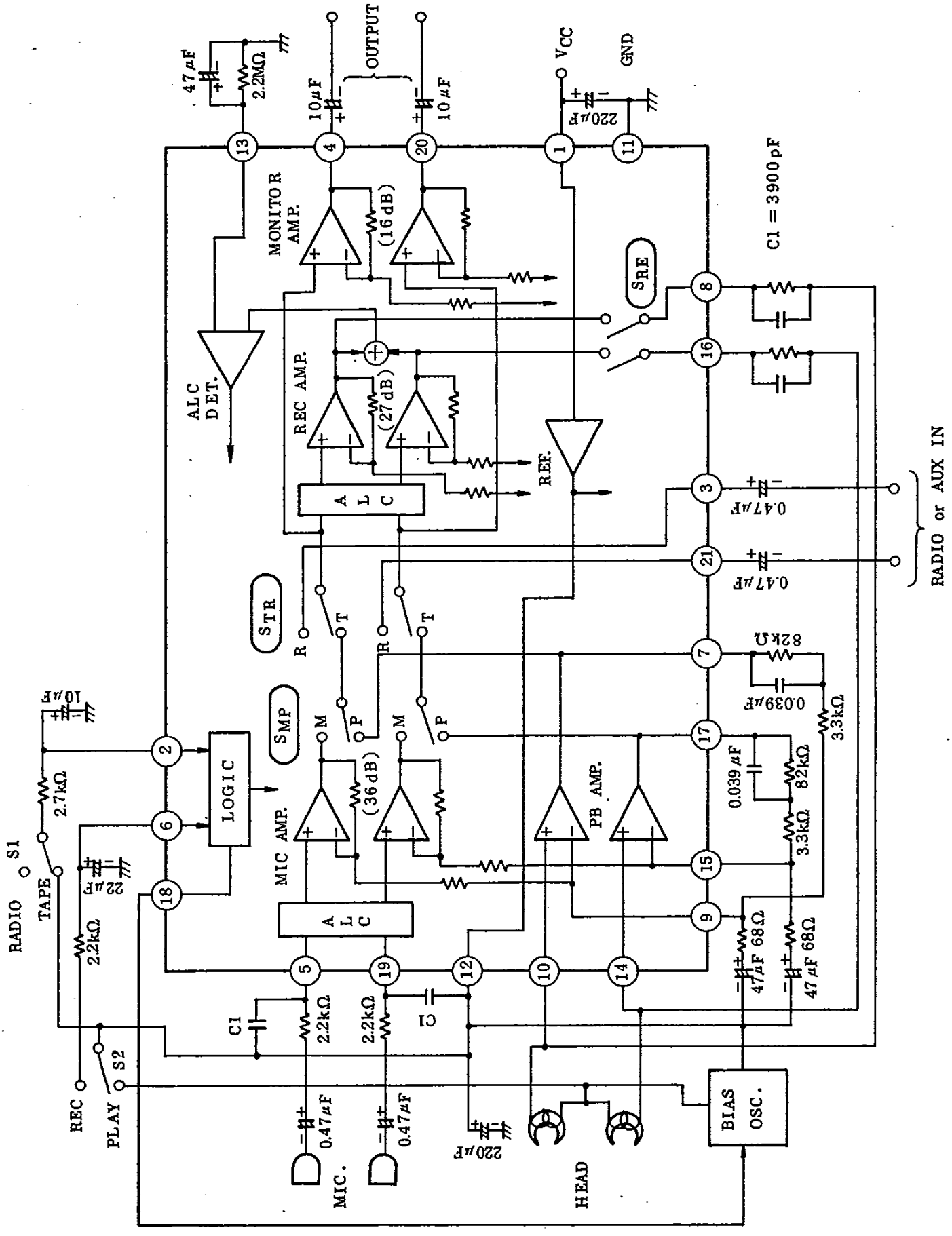
CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	8	V
Power Dissipation (Note)	P_D	750	mW
Operating Temperature	Topr	-25~75	°C
Storage Temperature	Tstg	-55~150	°C

Note: Derated above Ta=25°C in the proportion of 6mW/°C.

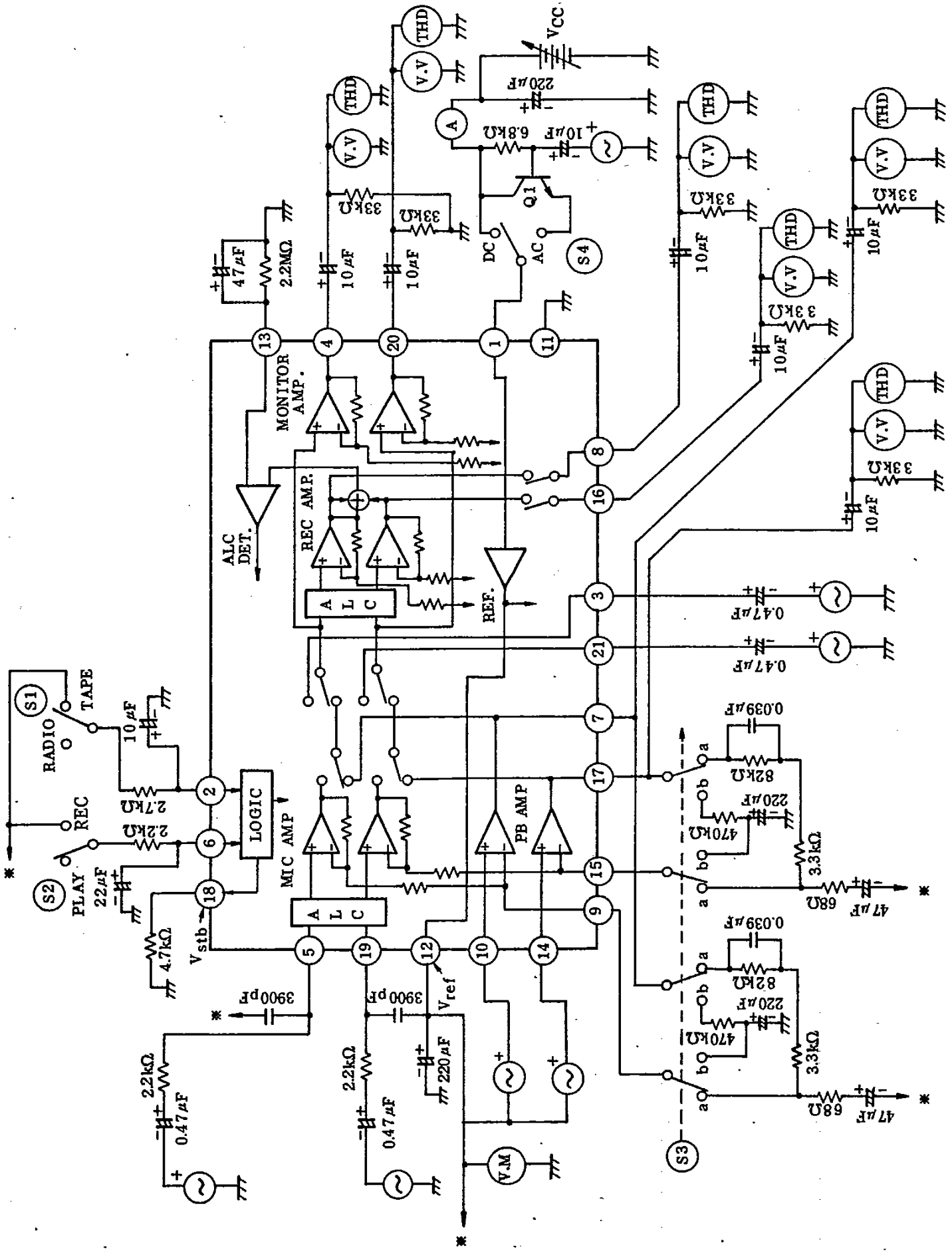
ELECTRICAL CHARACTERISTICS (Unless otherwise specified, Ta=25°C, V_{CC}=5V, f=1kHz)

	CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current		I_{CC1}	S1=RADIO, S2=PLAY	-	11	16	mA
		I_{CC2}	S1=RADIO, S2=REC	-	14	19	
		I_{CC3}	S1=TAPE, S2=PLAY	-	11	16	
		I_{CC4}	S1=TAPE, S2=REC	-	10	15	
Reference Voltage		V_{ref}		1.8	2.0	2.3	V
MONITOR AMP	Voltage Gain	G_{v1}	Vin=-50dBV	14	16	18	dB
	Maximum Output Voltage	V_{omax1}	THD=1%	-	1.3	-	Vrms
	Output Noise Voltage	V_{no1}	BW=5~30kHz	-	15	-	μVrms
	Total Harmonic Distortion	THD1	V_{out}=-10dBV, BW=400~30kHz	-	0.06	-	%
	Cross Talk	CT1	V_{out}=0dBV, BW=400~30kHz	-	-66	-	dB
	Ripple Rejection Ratio	RR1	V_{ripple}=-20dBV, f=100Hz	-	-50	-	dB
PLAY BACK AMP	Voltage Gain	G_{v2}	Vin=-50dBV	35	38	41	dB
	Open Loop Voltage Gain	G_{vo2}	Vin=-90dBV	-	78	-	dB
	Maximum Output Voltage	V_{omax2}	THD=1%	-	1.3	-	Vrms
	Output Noise Voltage	V_{no2}	BW=5~30kHz	-	80	160	μVrms
	Total Harmonic Distortion	THD2	V_{out}=-10dBV, BW=400~30kHz	-	0.02	-	%
	Cross Talk	CT2	V_{out}=0dBV, BW=400~30kHz	-	-77	-	dB
	Ripple Rejection Ratio	RR2	V_{ripple}=-20dBV, f=100Hz	-	-42	-	dB
REC AMP	Voltage Gain	Gv3	Vin=-50dBV	24	27	30	dB
	Output Noise Voltage	Vno3	BW=5~30kHz	-	160	-	μVrms
	Total Harmonic Distortion	THD3	Vout=-10dBV, BW=400~30kHz	-	0.04	-	%
	Cross Talk	CT3	Vout=-10dBV, BW=400~30kHz	-	-71	-	dB
	Ripple Rejection	RR3	Vripple=-20dBV, f=100Hz	-	-42	-	dB
	ALC1	ALC31	Vin=-25dBV, Dual OP.	-6	-2	2	dBV
	ALC2	ALC32	Vin=-15dBV, Dual OP.	-	-1	-	dBV
	ALC3	ALC33	Vin=-5dBV, Dual OP.	-	-1	-	dBV
MIC AMP+REC AMP	Voltage Gain	Gv4	Vin=-80dBV	-	63	-	dB
	Output Noise Voltage	Vno4	BW=5~30kHz	-	3.5	5.6	mVrms
	Total Harmonic Distortion	THD4	Vout=-10dBV, BW=400~30kHz	-	0.7	-	%
	Cross Talk	CT4	Vout=-10dBV, BW=400~30kHz	-	-43	-	dB
	Ripple Rejection Ratio	RR4	Vripple=-20dBV, f=100Hz	-	-28	-	dB
	ALC1	ALC41	Vin=-60dBV, Dual OP.	-6	-2	2	dBV
	ALC2	ALC42	Vin=-40dBV, Dual OP.	-	-1	-	dBV
	ALC3	ALC43	Vin=-15dBV, Dual OP.	-4	-1	2	dBV

BLOCK DIAGRAM



TEST CIRCUIT

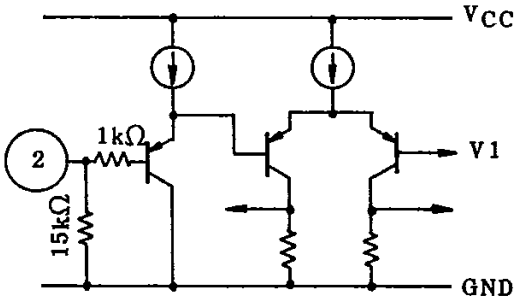
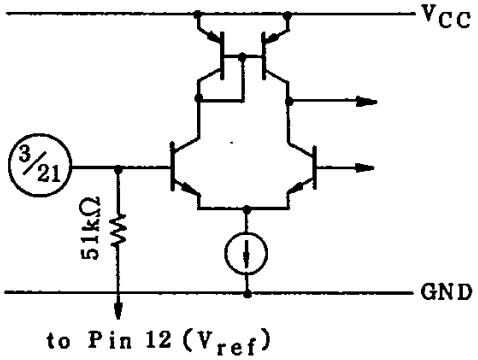
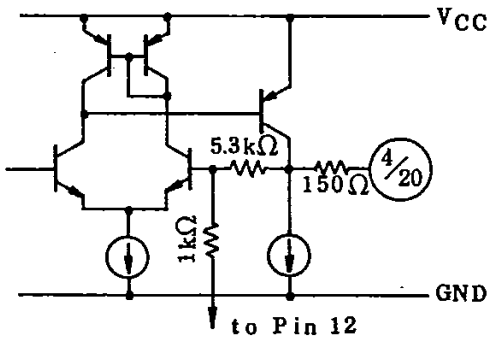
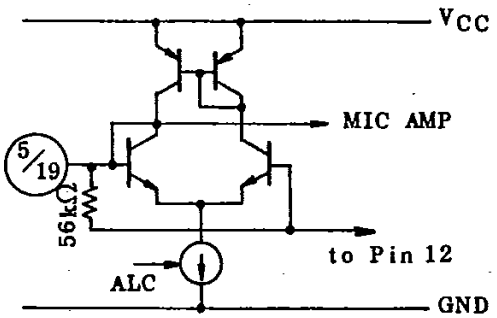


TEST METHOD (cf TEST CIRCUIT)

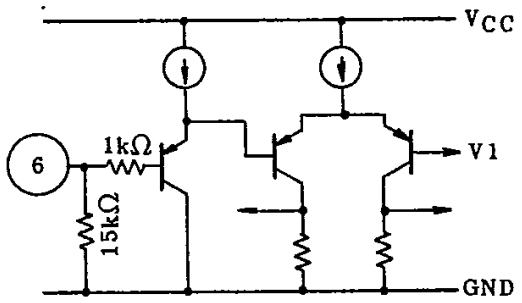
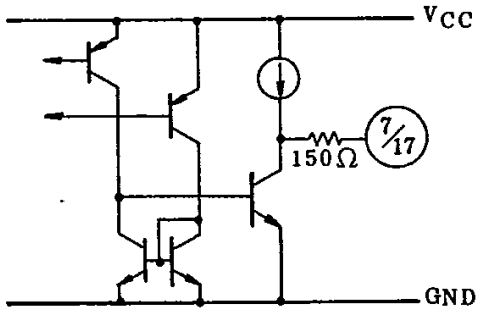
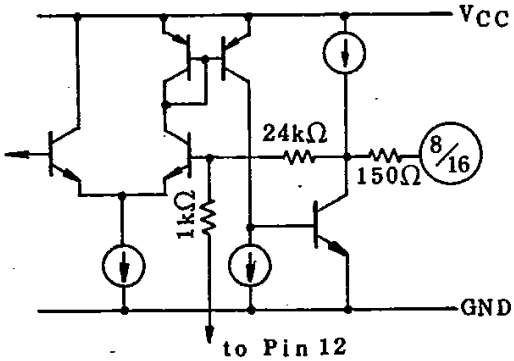
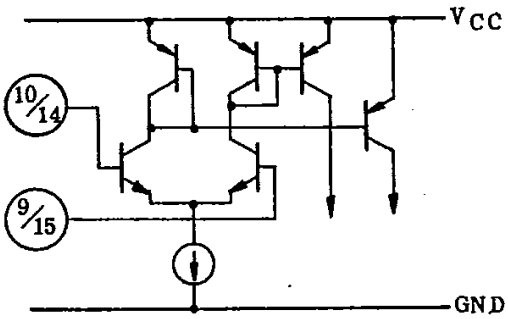
SYMBOL	S1	S2	S3	S4
I_{CC1}	RADIO	PLAY	a	DC
I_{CC2}	RADIO	REC	↓	↓
I_{CC3}	TAPE	PLAY	↓	↓
I_{CC4}	TAPE	REC	↓	↓
V_{ref}	-	-	↓	↓
G_{v1}	RADIO	REC	a	DC
$V_{o\ max1}$	↓	↓	↓	↓
V_{no1}	↓	↓	↓	↓
THD1	↓	↓	↓	↓
CT1	↓	↓	↓	↓
RR1	RADIO	REC	a	AC
G_{vo2}	TAPE	PLAY	b	DC
G_{v2}	TAPE	PLAY	a	DC
$V_{o\ max2}$	↓	↓	↓	↓
V_{no2}	↓	↓	↓	↓
THD2	↓	↓	↓	↓
CT2	↓	↓	↓	↓
RR2	TAPE	PLAY	a	AC

SYMBOL	S1	S2	S3	S4
G_{V3}	RADIO	REC	a	DC
V_{no3}	↓	↓	↓	↓
THD3	↓	↓	↓	↓
CT3	↓	↓	↓	↓
RR3	RADIO	REC	a	AC
ALC31	RADIO	REC	a	DC
ALC32	↓	↓	↓	↓
ALC33	↓	↓	↓	↓
G_{V4}	TAPE	REC	a	DC
V_{no4}	↓	↓	↓	↓
THD4	↓	↓	↓	↓
CT4	↓	↓	↓	↓
RR4	TAPE	REC	a	AC
ALC41	TAPE	REC	a	DC
ALC42	↓	↓	↓	↓
ALC43	↓	↓	↓	↓

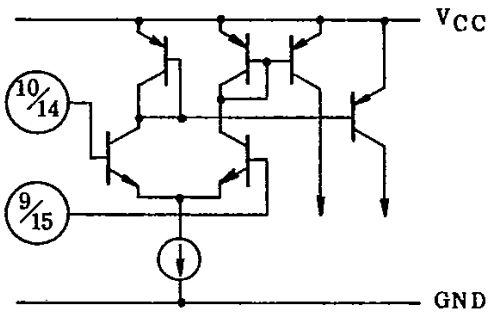
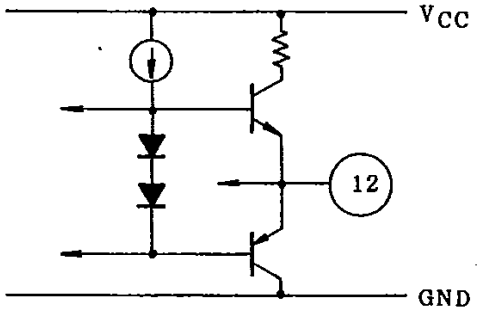
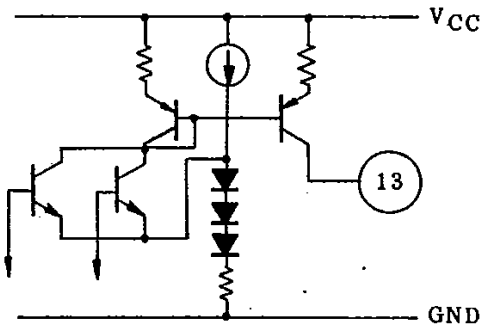
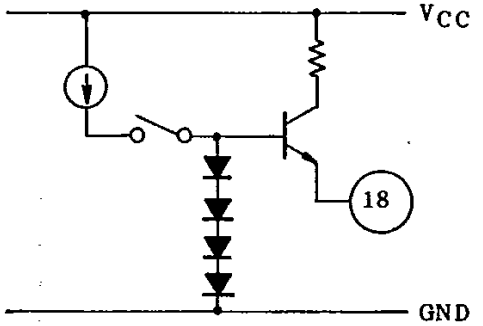
DESCRIPTION OF EACH TERMINAL

TERMINAL No.	TERMINAL NAME	FUNCTION	EQUIVALENT CIRCUIT
1	V_{CC}	V_{CC}	——
2	TAPE/RADIO SW	Change over switch for tape mode and radio mode. Tape mode: Tape play MIC REC Radio mode: Radio play Radio REC	
3/21	RADIO (AUX) IN	Radio or Aux. input	
4/20	MONITOR OUT	Monitor Amp output	
5/19	MIC IN	MIC Amp input	

DESCRIPTION OF EACH TERMINAL

TERMINAL No.	TERMINAL NAME	FUNCTION	EQUIVALENT CIRCUIT
6	REC/PLAY SW	Change over switch for REC mode and play mode REC mode : MIC REC Radio REC Play mode: Tape play Radio play	
7/17	TAPE OUT	Tape play back Amp (PB AMP) output	
8/16	REC OUT	Recording Amp output	
9/15	PB NF	Tape play back Amp (PB AMP) NF	

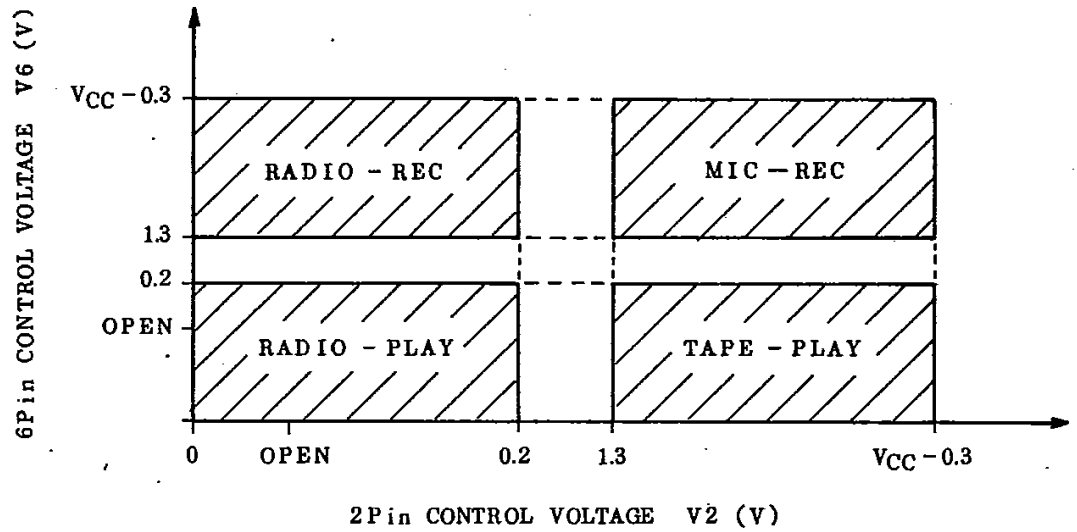
DESCRIPTION OF EACH TERMINAL

TERMINAL No.	TERMINAL NAME	FUNCTION	EQUIVALENT CIRCUIT
10/14	TAPE IN	Tape play back Amp (PB AMP) input	
11	GND	GND	—
12	REFERENCE	Reference voltage terminal	
13	AGC T.C	Automatic level control (ALC) time constant terminal	
18	V_{stb}	Recording bias circuit control signal output	

OPERATION MODE BY EXTERNAL SWITCHES (S1,S2) COMBINATION

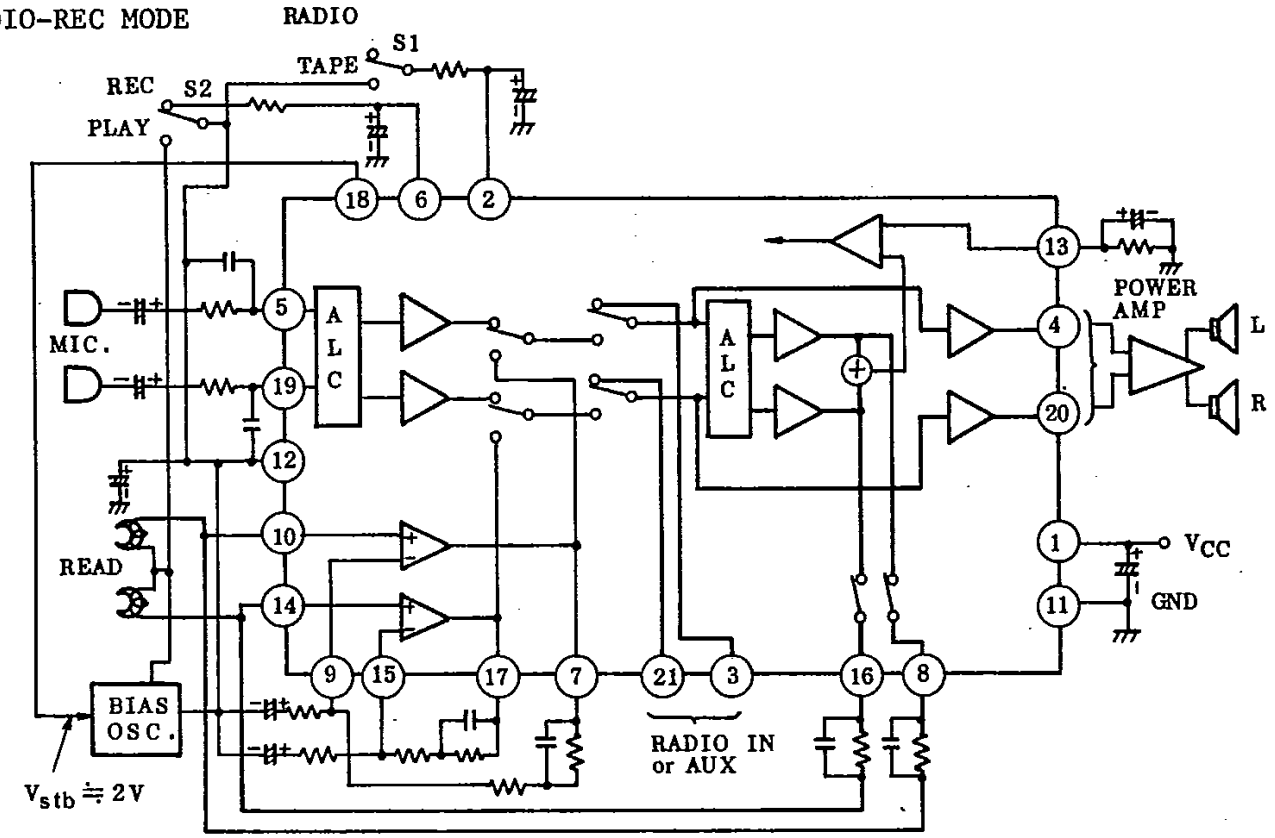
CIRCUIT BLOCK \ S2 / S1	S2 = REC		S2 = PLAY	
	S1=RADIO	S1=TAPE	S1=RADIO	S1=TAPE
MIC AMP	ON	ON	OFF	OFF
PB AMP	OFF	OFF	ON	ON
REC AMP	ON	ON	OFF	OFF
MONITOR AMP	ON	OFF	ON	ON
S_{MP}	M	M	P	P
S_{TR}	R	T	R	T
S_{RE}	ON	ON	OFF	OFF
OPERATION MODE	RADIO RECORDING	MIC RECORDING	RADIO PLAY	TAPE PLAY BACK

CONTROL SWITCH TERMINAL (2,6pin) THRESHOLD VOLTAGE

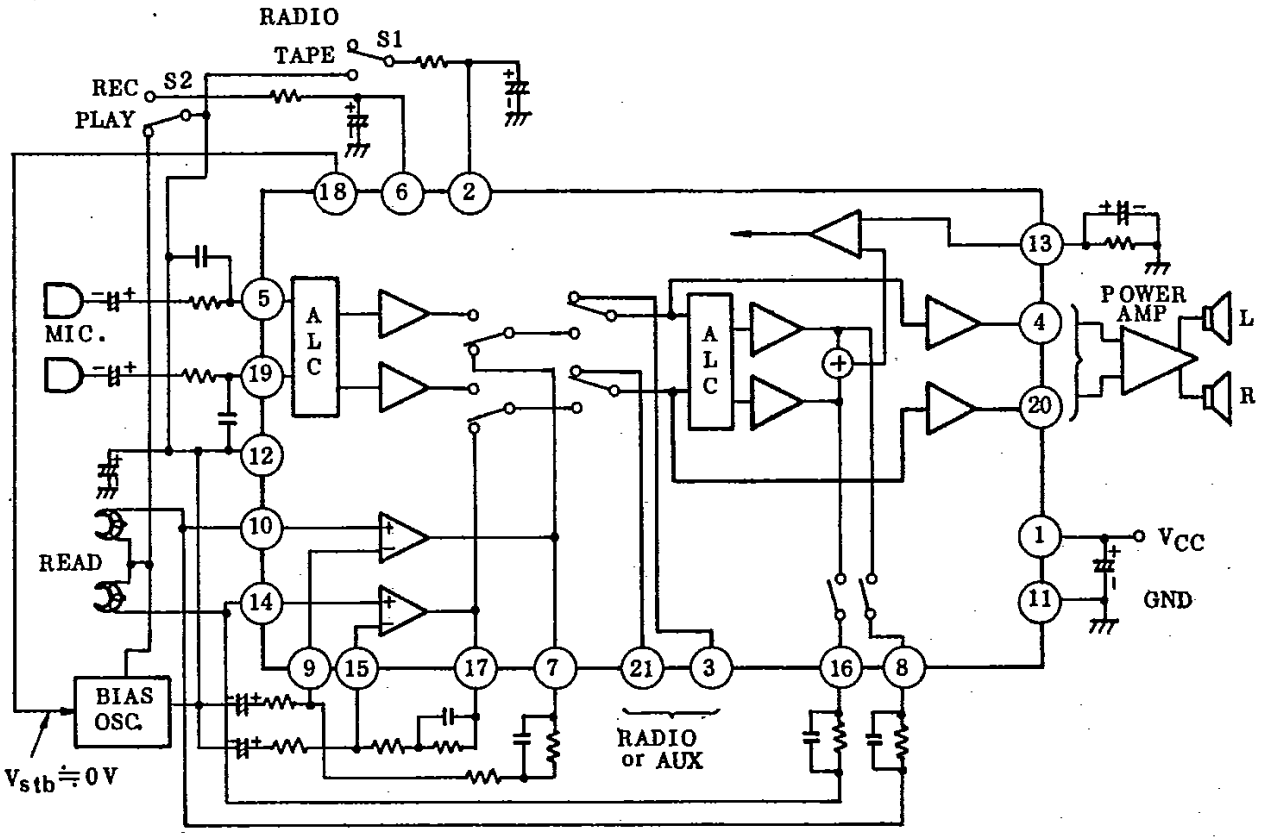


OPERATION IN EACH MODE

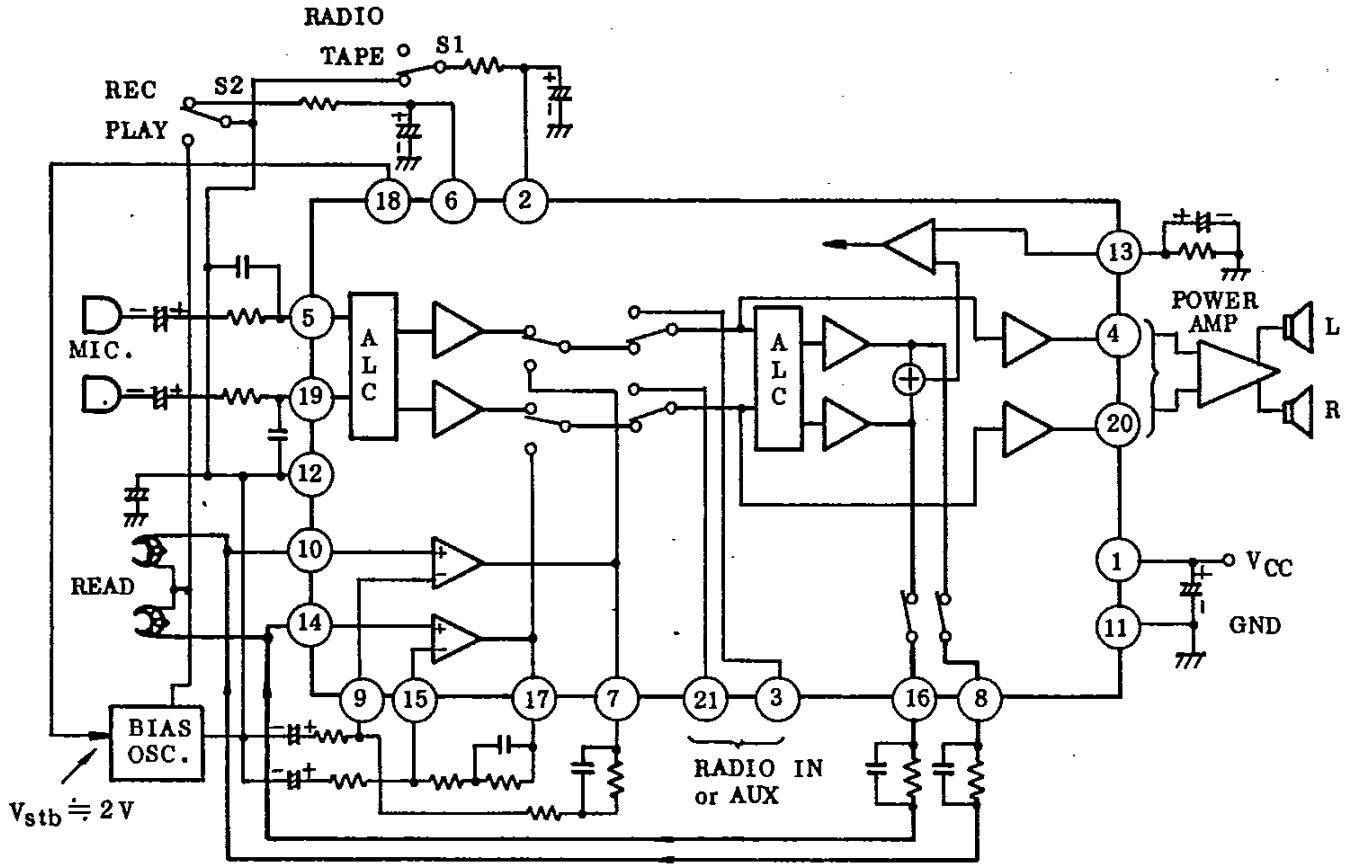
(1) RADIO-REC MODE



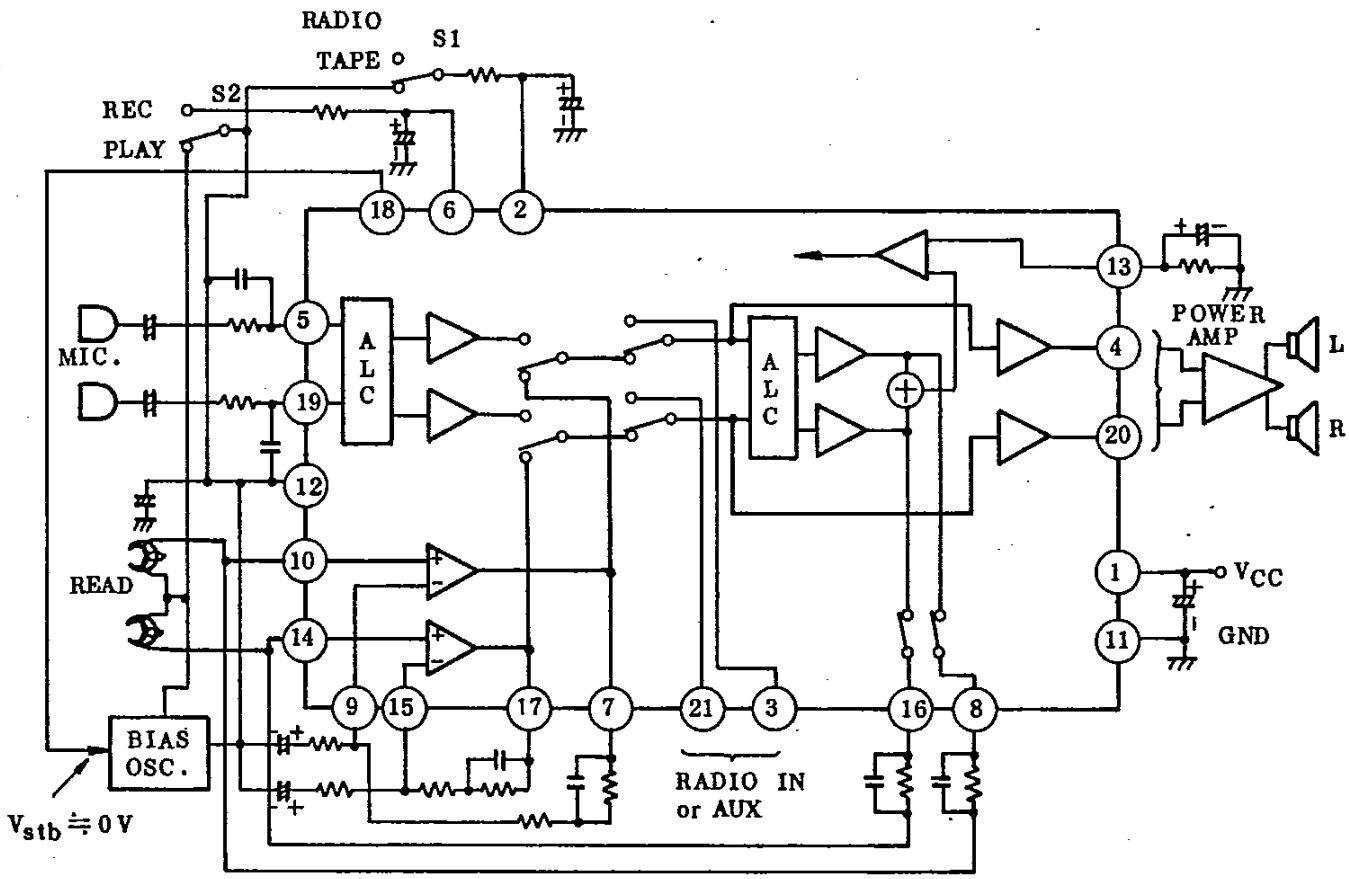
(2) RADIO-PLAY MODE



(3) MIC-REC MODE



(4) TAPE-PLAY MODE



DESCRIPTION OF BIAS OSC. CONTROL TERMINAL (⑱ pin).

The equivalent circuit of ⑱ pin is shown in Fig. 1.
When this IC is in the REC MODE (RADIO REC or MIC REC), the switch Sa is in the "ON" state and the DC voltage 2.05V(Typ.) appears in this terminal.
The output current value of this terminal should be under 300μA.

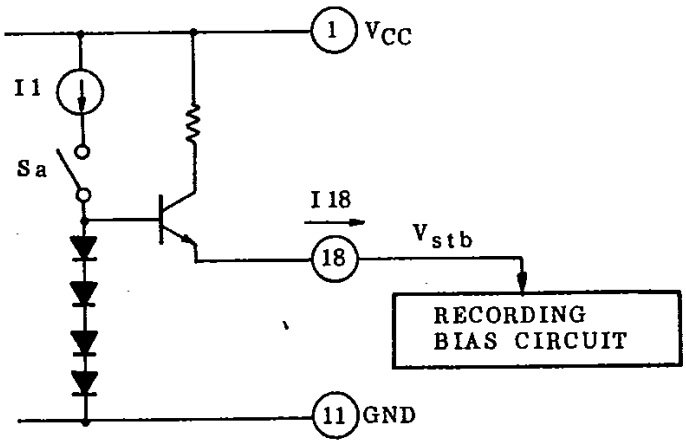
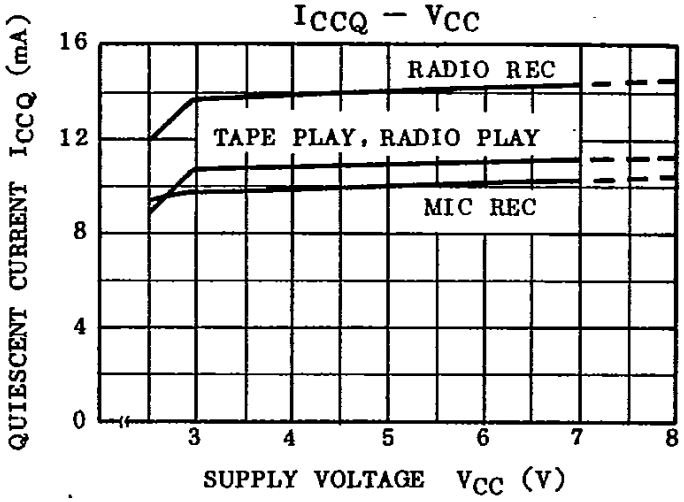
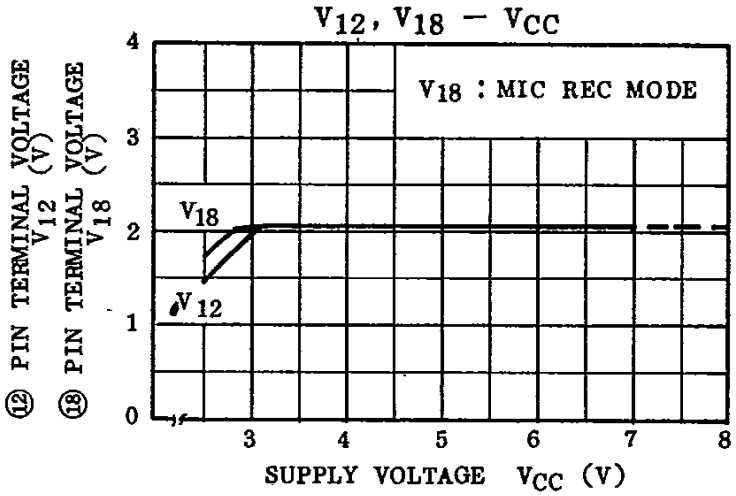


Fig. 1

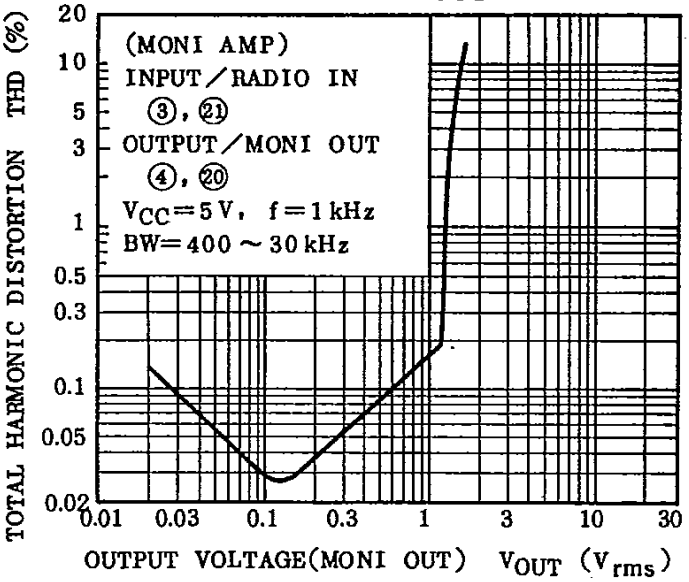
$I_{CCQ} - V_{CC}$



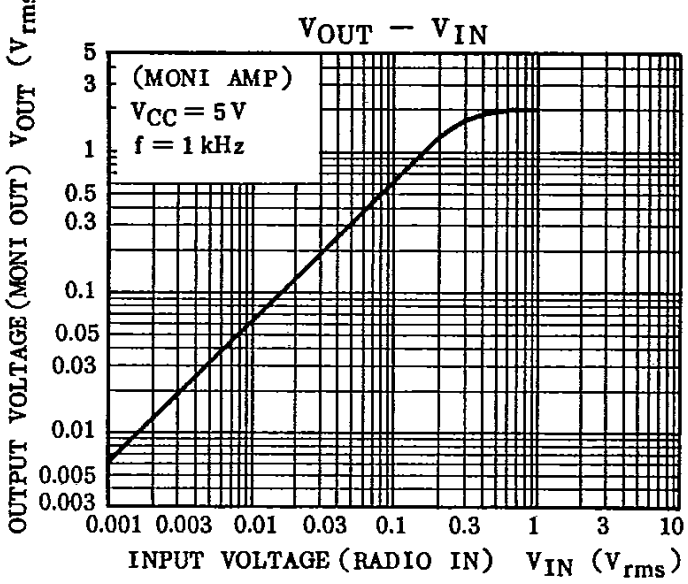
$V_{12}, V_{18} - V_{CC}$



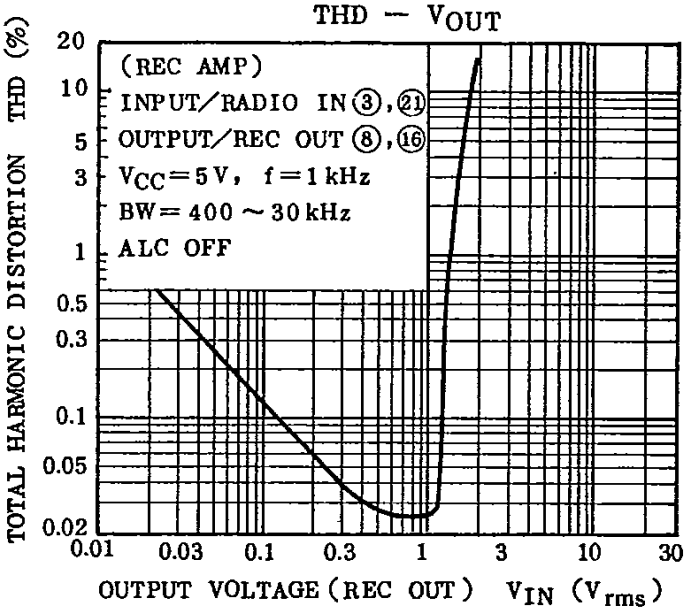
$THD - V_{OUT}$



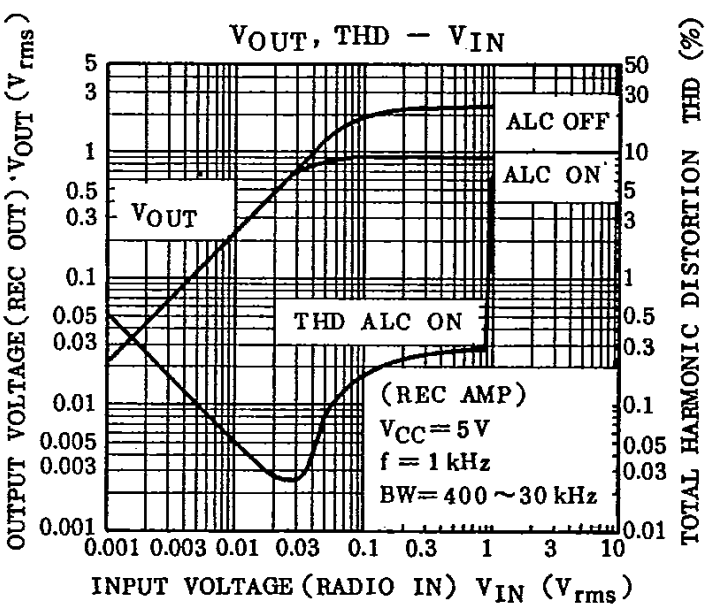
$V_{OUT} - V_{IN}$



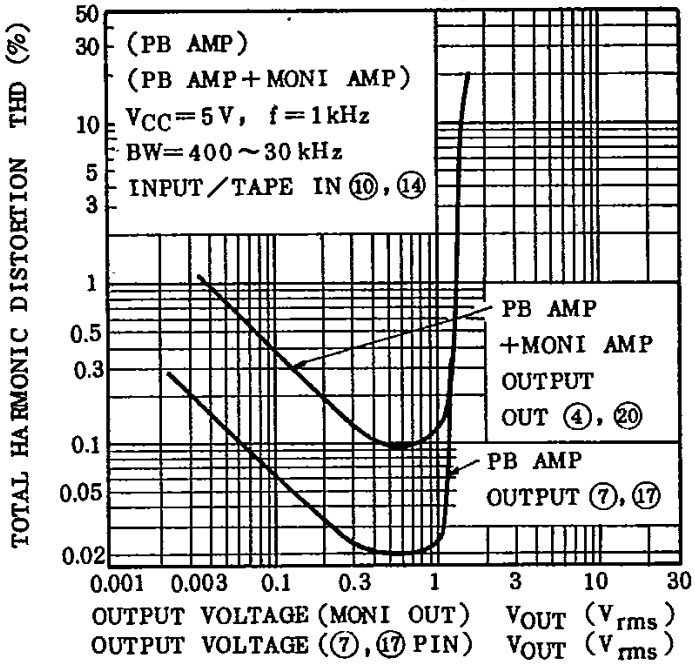
$THD - V_{OUT}$



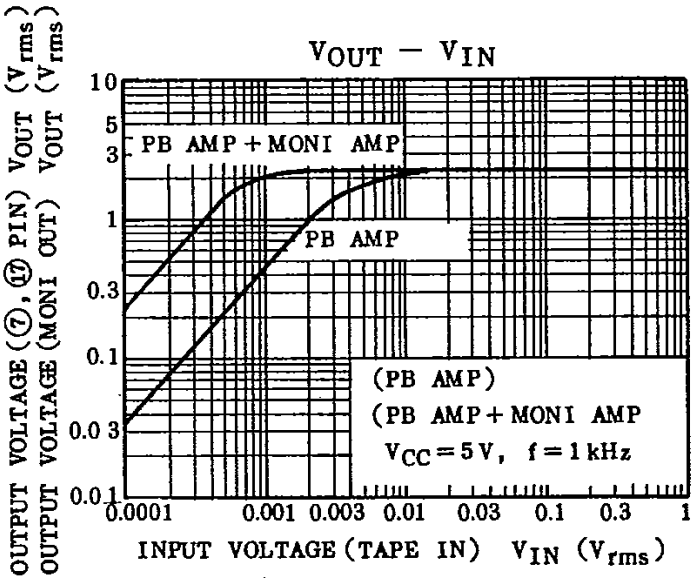
V_{OUT}, THD $- V_{IN}$



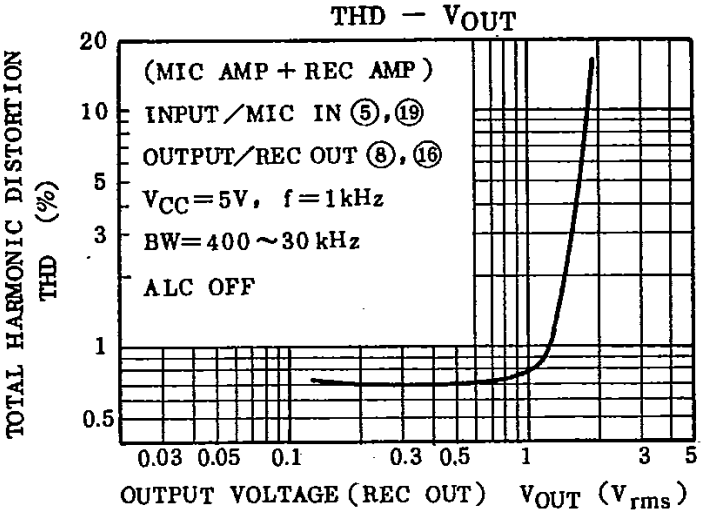
THD – V_{OUT}



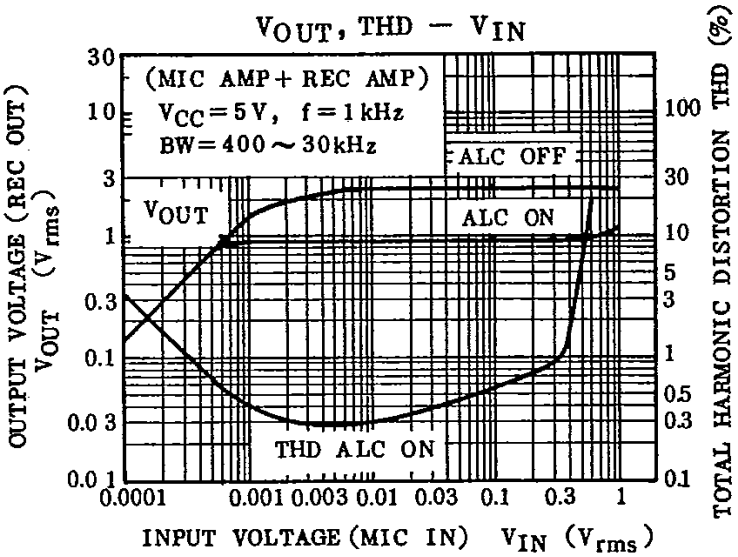
V_{OUT} – V_{IN}



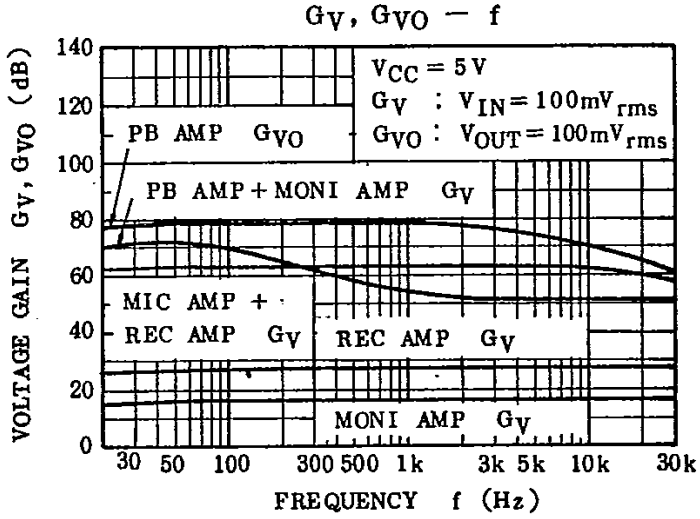
THD – V_{OUT}



V_{OUT}, THD – V_{IN}



G_V, G_{VO} – f



THD – f

