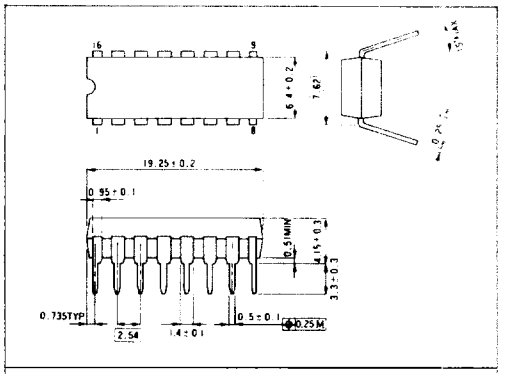
TA7678AP

VIDEO AND SOUND IF AMPLIFIER FOR COLOR AND MONOCHROME TV RECEIVERS

Unit: mm



JEDEC	—
TOSHIBA	DIP16-P-300A

For Bipolar Tuner

FUNCTION

PIF STAGE

. Three Controlled IF Amplifier Stages
. Video Demodulator Controlled by Picture Carrier
. Black Noise and White Noise Inverter
. Peak AGC
. DC Amplifier for RF AGC Output

SIF STAGE

. Three Controlled IF Amplifier Stages
. Quadrature Detector

FEATURE

PIF STAGE

. High Gain, Wide Band IF Amplifier : 50dB(Typ.) at 58MHz
. Gain Reduction with Excellent Stability : 55dB(Typ.) at 58MHz
. Excellent DG/DP Characteristics : DG 7% (Typ.), DP 3.5deg.(Typ.)
. Excellent S/N Characteristics Due to Delayed 3 Stage AGC Action.
. Fast AGC Action Due to Noise Inverter and Peak AGC.
. Switch Off the Video Part with VTR Switch.
. Dual Differential AFT Output.

SIF STAGE

. Excellent Limiter Characteristics.
. Excellent AM Rejection.
. Large Undistorted Audio Output Voltage with Quadrature Detector.

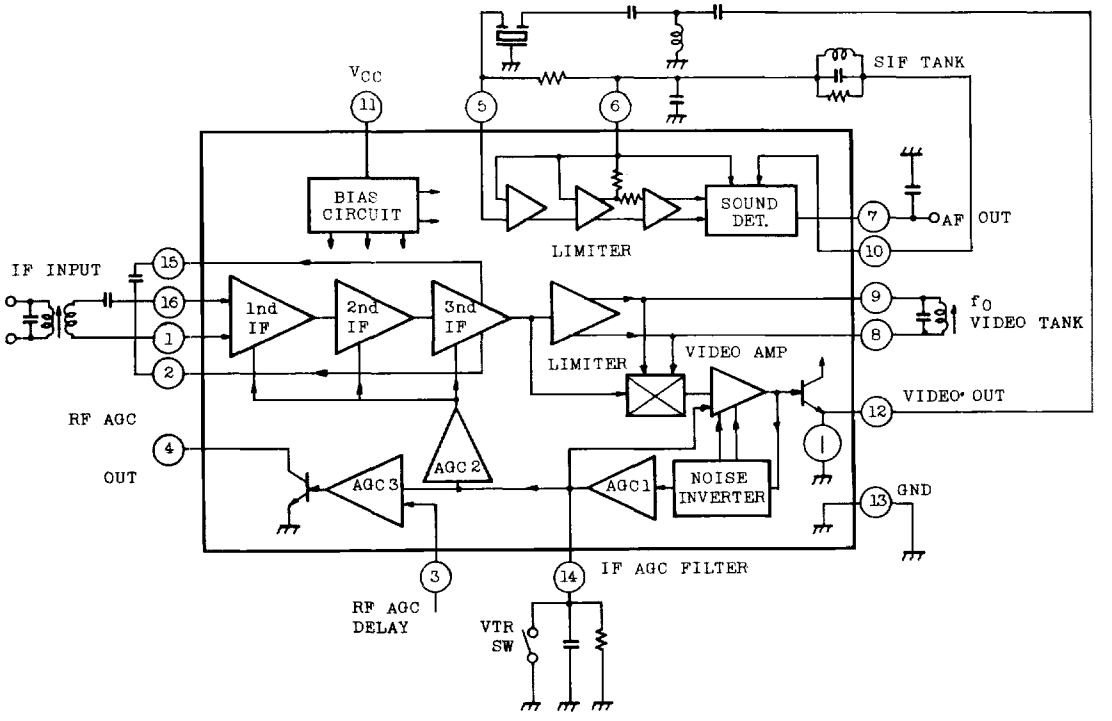
TA7678AP

MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage	(Pin 11)	V_{CC}	15	V
Open Loop Voltage	(Pin 4)	V_4	15	V
Video DC Output Current	(Pin 12)	I_{12}	6	mA
Power Dissipation	(note)	P_D	1.4	W
Ambient Temperature		Ta	-20~65	°C
Storage Temperature		T_{stg}	-55~150	°C

Note: Derated above Ta=25°C in the proportion of 11.2mW/°C.

BLOCK DIAGRAM



TA7678AP

ELECTRICAL CHARACTERISTICS

PIF STAGE (Ta=25°C, V_{CC}=12V, f_P=58.75MHz, f_S=54.25MHz)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Recommended Supply Voltage	V_{CC} (V_{11})	-	-	10.8	12.0	13.2	V
Supply Current	I_{CC} (I_{11})	1	S1:ON, S3:2, S5:2 S4:1	35	50	65	mA
VIDEO DC Output Voltage	V_{12}	1	S1:OFF, S3:2, S5:2 S4:1	5.2	5.5	5.8	V
Terminal Voltage 5	V_5	1	S1:ON, S3:2, S5:2 S4:1	3.5	4.4	5.3	V
Terminal Voltage 7	V_7	1	S1:ON, S3:2, S5:2 S4:1	4.8	6.0	7.2	V
RF AGC Residual Output Voltage	V_4 SAT	1	S1:OFF, S3:2, S5:2 S4:1	-	-	0.5	V
RF AGC Leak Current	I_4 LEAK	1	S1:OFF, S3:1, S5:1 S4:1	-	-	1	μA
Video Sensitivity	v_i PIN1-16	2	(Note 1)	60	150	250	μV_{rms}
AGC Range	ΔA (IF)	2	(Note 2)	60	64	-	dB
Sync Tip Level Voltage	V_{SYNC} (V_{12})	2	(Note 3)	2.3	2.5	2.7	V
Maximum IF Input Voltage	$v_{IN\ MAX}$ PIF	2	(Note 4)	100	120	-	mV_{rms}
White Noise Threshold	$V_{W\ TH}$ (V_{12})	2	(Note 5)	5.8	6.2	6.6	V
White Noise Clamp Level	$V_{W\ CL}$ (V_{12})	2	(Note 5)	3.7	4.1	4.5	V
Black Noise Threshold	$V_{B\ TH}$ (V_{12})	2	(Note 5)	1.4	1.6	1.8	V

TA7678AP

PIF STAGE

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Black Noise Clamp Level	$V_{B\ CL}$ (V_{12})	2	(Note 5)	2.9	3.3	3.7	V
Video Frequency Response	f_{BW}	3	(Note 6)	4.5	5.5	-	MHz
Suppression of Carrier	C_L	4	(Note 7)	40	50	-	dB
Suppression of 2nd Carrier	I_{2nd}	4	(Note 8)	40	50	-	dB
Suppression of Sound Carrier/Color Subcarrier	I_{920}	4	(Note 9)	33	38	-	dB
Differential Phase	DP	5	(Note 10)	-	3.5	5	deg
Differential Gain	DG	5	(Note 10)	-	7	10	%
PIF Input Impedance	$R_{IN(PIF)}$	6	(Note 11)	1.5	3.0	6.0	kΩ
	$C_{IN(PIF)}$			-	3.0	10.0	pF
Max. Available Current	$I_{4\ MAX}$	1	(Note 12)	7.0	-	-	mA
RF AGC Delay Point Range	$V_{IN\ DELAY}$	2	(Note 13)	5.0	7.0	9.0	V
VIDEO Output Level	v_{OUT}	2	(Note 14)	2.25	2.5	2.75	V
SIF Output Voltage	S_{OUT}	3	(Note 15)	200	400	600	mV_{rms}

SIF STAGE

Input Limiting Voltage	$V_{IN(LIM)}$	8	(Note 16)	-	200	400	μV_{rms}
AM Rejection Ratio	AMR	8	(Note 17) $R_L=\infty$ $R_D=\infty$	40	45	-	dB
Recovered Output Voltage	V_{OD}	8	(Note 18) $R_L=\infty$ $R_D=\infty$	0.5	0.75	-	V_{rms}
Total Harmonic Distortion	THD	8	(Note 18) $R_L=\infty$ $R_D=\infty$	-	1.0	2.0	%
Max. Audio Output Voltage	$V_{O\ M}$	8	(Note 19)	4.0	-	-	Vp-p
SIF Input Impedance	$R_{IN(SIF)}$	7		10.0	20.0	30.0	kΩ
	$C_{IN(SIF)}$			-	3.0	10.0	pF
Audio Output Impedance	$R_{O(AF)}$	9	(Note 20)	10.0	15.0	20.0	kΩ

TA7678AP

Note 1) V_{AGC} (TP14 EXT. Applying Voltage)=11.5V
PIF IN ; f=58.75MHz 1kHz 30% AM modulation.
Adjust PIF Input Level v_i so that the detected output of TP12C with high impedance probe will be 0.8Vp-p and measure the Input Level.

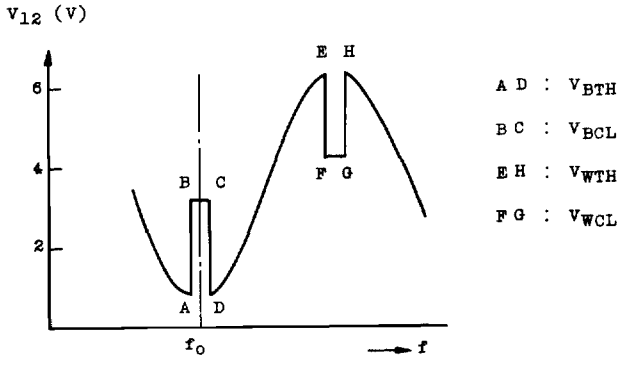
Note 2) V_{AGC}=4V
Measure PIF Input Level v_i' same as NOTE 1

$$A = 20\log \frac{v_i'}{v_i} \quad (dB)$$

Note 3) PIF IN ; f=58.75MHz CW 15mV_{rms}
Measure DC level of TP12A

Note 4) PIF IN ; f=58.75MHz APL 100%, 87.5% AM modulation.
TP14:open
(1) Adjust PIF Input Level 50mVp-p and measure the detected output level v_{01p-p}
(2) Then increase the Input Level so that the detected output level will be $1.1 \times v_{01p-p}$ and measure the Input Level.

Note 5) V_{AGC}=8V
PIF IN ; f=58.75MHz±10MHz Variable or Sweep 15mV_{rms} Measure DC level of TP12A.



Note 6) V_{AGC}=8V (GR ≈ 30dB)

SG_1 ; 58.75MHz CW

SG_2 ; 58.65~40MHz Variable

(1) Setting output of SG_1 so that DC level of TP12A will be 4.0V

(2) Setting output of SG_2 (58.65MHz) so that AC level of TP12A will be 0.5Vp-p

(3) Decreasing Frequency of SG_2 until AC level of TP12A will be 0.35Vp-p (-3dB of 0.5Vp-p) then read f_{SG2}=F

f_{BW}=58.75-F MHz

Note 7) SG_1 ; 58.75MHz, 1kHz 80% AM modulation 100mV_{rms}

SG_2, SG_3 ; OFF

Setting V_{AGC} so that output AC level of TP12A will be 2.7Vp-p

Measure CL of TP12A after setting to 0% AM of SG_1

Note 8) Measure I_{2nd} of TP12A same as NOTE 9

Note 9) V_{AGC}=8V

SG_1 ; 58.75MHz (P; Picture) 100mV_{rms}

SG_2 ; 54.25MHz (S; Sound) 32mV_{rms}(-10dB of SG_1)

SG_3 ; 55.17MHz (C; Chroma) 32mV_{rms}(-10dB of SG_1)

(1) Setting V_{AGC} so that the output tip level (lower) of TP12A will be 3.0V DC

(2) Measure the level difference (dB) between c-level and 920kHz level

Note 10) V_{AGC}=8V

PIF IN ; f=58.75MHz Video Signal (ramp) 87.5% AM 100mVp-p

Setting ATT so that the sync tip level of TP12A will be 2.5V DC

Measure DP and DG.

Note 11) V_{AGC}=5V, f=58.75MHz

Measure R_{IN}, C_{IN}

Note 12) S_1:ON, S_3:2, S_5:1

S_4:1 for TA7675AP

2 for TA7678AP

Note 13) TP14:Open

PIF IN ; 58.75MHz CW 20mV_{rms}

(1) Adjust the voltage of terminal 3 so that the voltage of terminal 4 will be 6.0V DC

(2) Measure the terminal voltage 3

Note 14) TP14:Open

PIF IN ; 58.75MHz 100% APL 87.5% AM modulation Signal Amplitude 50Vp-p

Measure detected output voltage (White peak to sync Tip)

Note 15) TP14:Open

SG_1 ; 58.75MHz CW 100mV_{rms}

SG_2 ; 54.25MHz CW 25mV_{rms}

Measure SIF (4.5MHz) output voltage at TP12A

Note 16) SIF IN ; f=4.5MHz FM f_{MOD}=400Hz Δf=±25kHz

(1) Adjust SIF Input Level 100mVp-p and measure the detected output level v_{OS}

(2) Then decrease the Input Level so that the detected output level will be 3dB down of V_{OD} and measure the Input Level

Note 17) SIF IN ; f=4.5MHz FM : f_{MOD}=400Hz Δf=±25kHz

AM 30%

Input Level v_{INS}=100dBμ

Note 18) SIF IN ; f=4.5MHz FM : f_{MOD}=400Hz Δf=±25kHz

Input Level v_{INS}=80dBμ

Note 19) SIF IN ; f=4.4~4.6MHz Variable or Sweep

Measure the output DC voltage change

Note 20) SIF IN ; f=4.5MHz FM : f_{MOD}=400Hz Δf=±25kHz

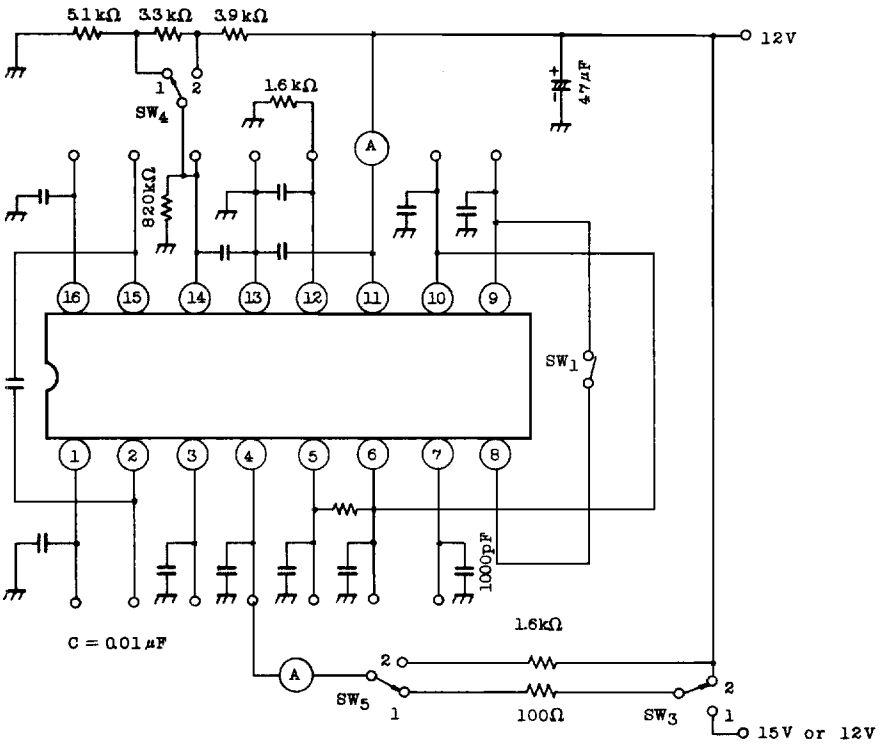
Input Level v_{INS}=80dBμ

(1) Measure the detected output voltage V_{OI} with R_X=∞

(2) Then, adjust R_X so that the detected output voltage will be $\frac{V_{OI}}{2}$ and measure R_X.

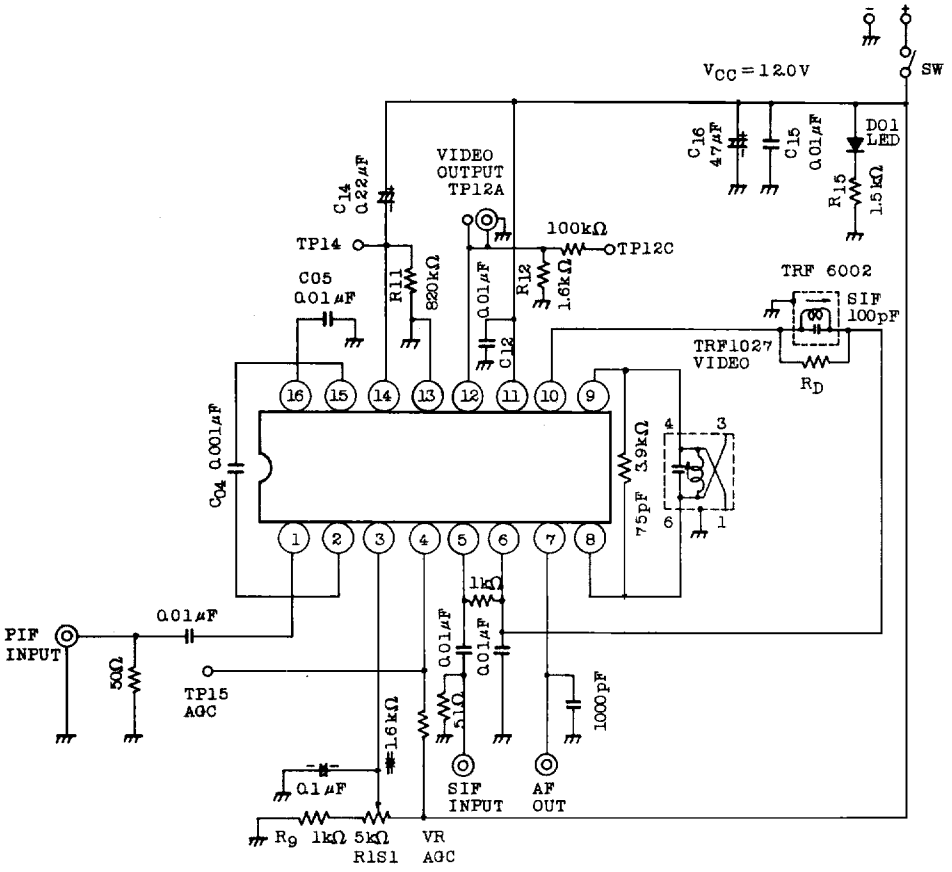
TA7678AP

Fig. 1 DC TEST CIRCUIT



TA7678AP

Fig. 2 AC TEST CIRCUIT



TA7678AP

Fig. 3 VIDEO FREQUENCY RESPONSE & SIF OUTPUT VOLTAGE TEST CIRCUIT

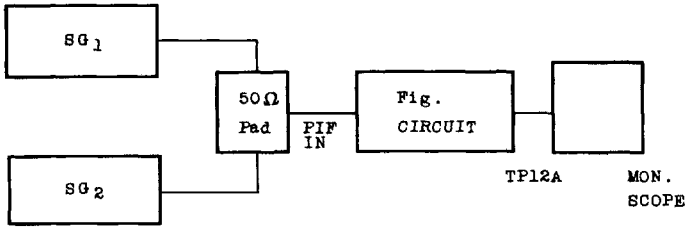


Fig. 4 INTER MODULATION TEST CIRCUIT

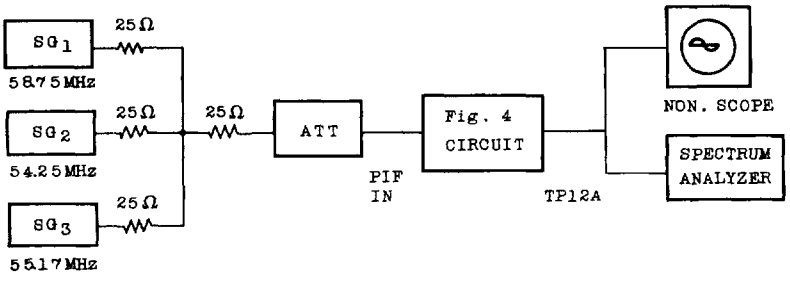
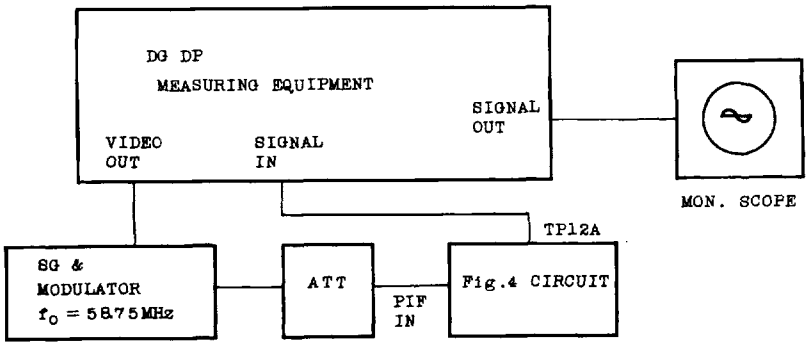


Fig. 5 DG, DP TEST CIRCUIT



APL=50%

ATT : ADJUST SYNC TIP LEVEL to DC2.5V

Fig. 6 PIF INPUT IMPEDANCE TEST CIRCUIT

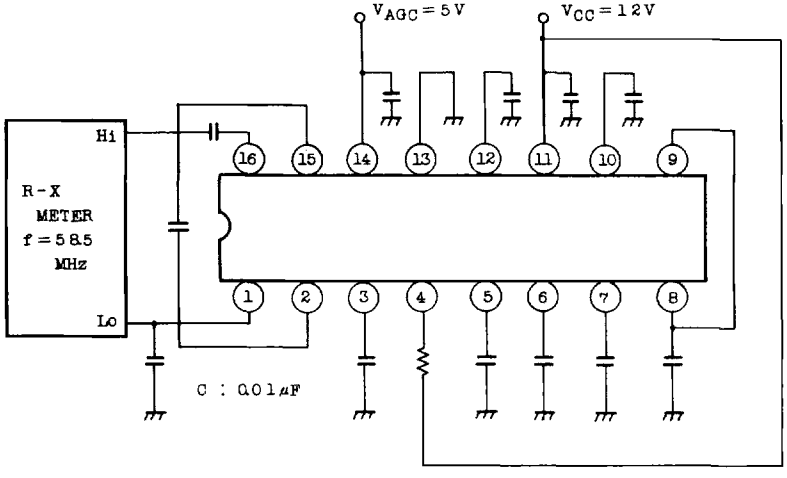


Fig. 7 SIF INPUT IMPEDANCE TEST CIRCUIT

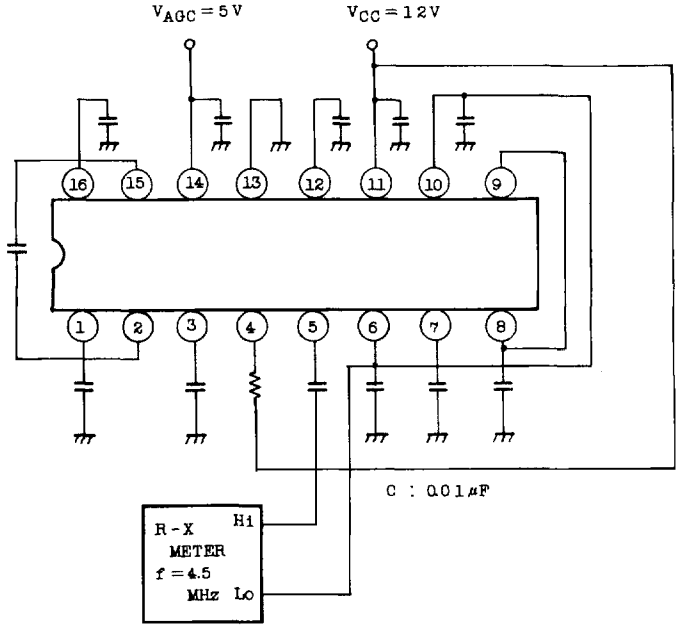


Fig. 8 $v_{IN(LIM)}$, AMR, V_{OD}, THD, V_{OM} TEST CIRCUIT

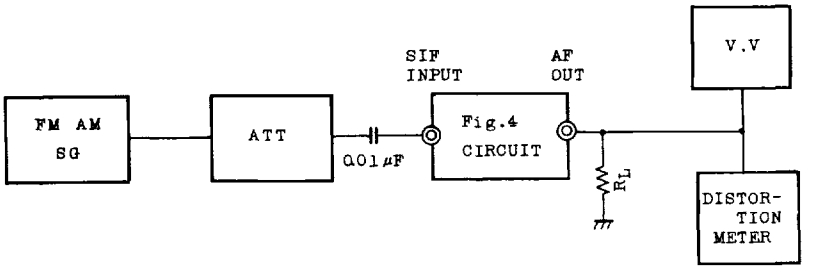
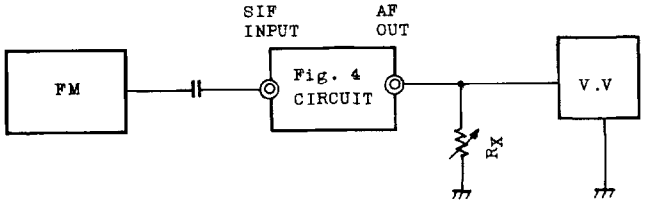


Fig. 9 AUDIO OUTPUT IMPEDANCE TEST CIRCUIT



TA7678AP

APPLICATION CIRCUIT