INTEGRATED CIRCUIT

TECHNICAL DATA

TA7675AP, TA7678AP

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT

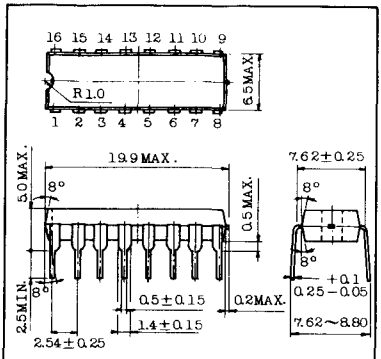
SILICON MONOLITHIC

VIDEO AND SOUND IF AMPLIFIER FOR COLOR AND MONOCHROME TV RECEIVERS

TA7675AP for FET Tuner

TA7678AP for Bipolar Tuner

Unit in mm



Lead pitch is 2.54 and tolerance is ±0.25 against theoretical center of each lead that is obtained on the basis of No. 1 and No. 16 leads.

JEDEC	—
TOSHIBA	5-22E

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 3.5 deg.(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

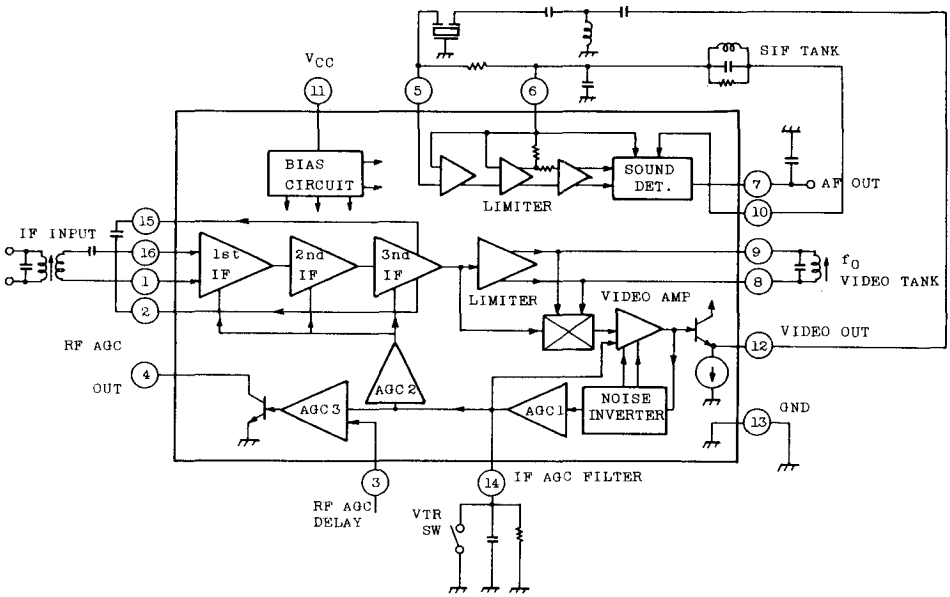
- Excellent Limiter Characteristics.
- Excellent AM Rejection.
- Large Undistorted Audio Output Voltage with Quadrature Detector.

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	Tstg	-55 ~ 150	°C

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

BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS

PIF STAGE (Ta=25°C, V_{CC}=12V, fp=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	S_1:ON, S_3:2, S_5:2 S_4:1(TA7678AP) 2(TA7675AP)	35	50	65	mA
VIDEO DC Output Voltage	V_{12}	1	S_1:OFF, S_3:2, S_5:2 S_4:1(TA7678AP) 2(TA7675AP)	5.2	5.5	5.8	V
Terminal Voltage 5	V_5	1	S_1:ON, S_3:2, S_5:2 S_4:1(TA7678AP) 2(TA7675AP)	3.5	4.4	5.3	V
Terminal Voltage 7	V_7	1	S_1:ON, S_3:2, S_5:2 S_4:1(TA7678AP) 2(TA7675AP)	4.8	6.0	7.2	V
RF AGC Residual Output Voltage	$V_{4\ SAT}$	1	S_1:OFF, S_3:2, S_5:2 S_4:1(TA7678AP) 2(TA7675AP)	-	-	0.5	V
RF AGC Leak Current	$I_{4\ LEAK}$	1	S_1:OFF, S_3:1, S_5:1 S_4:1(TA7675AP) 2(TA7678AP)	-	-	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

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	CL	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)	TA7675AP	0.3	-	-	mA
				TA7678AP	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	SOUT	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	-	-	V_{p-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	15	20	kΩ

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 $0.8V_{p-p}$ and measure the Input Level.

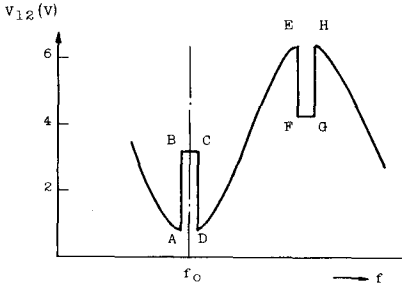
Note 2) V_{AGC}=4V
Measure PIF Input Level v_i' same as NOTE 1

$$\Delta A = 20 \log \frac{v_i'}{v_i} \quad [dB]$$

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 $50mV_{p-p}$ 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.



AD V_{BTH}
BC V_{BCL}
EH V_{WTH}
FG V_{WCL}

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 $0.5V_{p-p}$
(3) Decreasing Frequency of SG_2 until AC level of TP12A will be $0.35V_{p-p}$ (-3dB of $0.5V_{p-p}$) then read f_{SG_2}=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 $2.7V_{p-p}$
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 $100mV_{p-p}$
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 50mV_{p-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 100mV_{p-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_{OS} and measure the Input Level

Note 17) SIF IN ; f=4.5MHz FM : f_{MOD}=400Hz Δf=±25kHz
AM 30%
Input Level v_{IN_S}=100dBμ

Note 18) SIF IN ; f=4.5MHz FM : f_{MOD}=400Hz Δf=±25kHz
Input Level v_{IN_S}=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_{IN_S} =80dBμ
(1) Measure the detected output voltage v_{OA} with R_X=∞
(2) Then, adjust R_X so that the detected output voltage will be $\frac{v_{OA}}{2}$ and measure R_X.

Fig. 1 DC TEST CIRCUIT

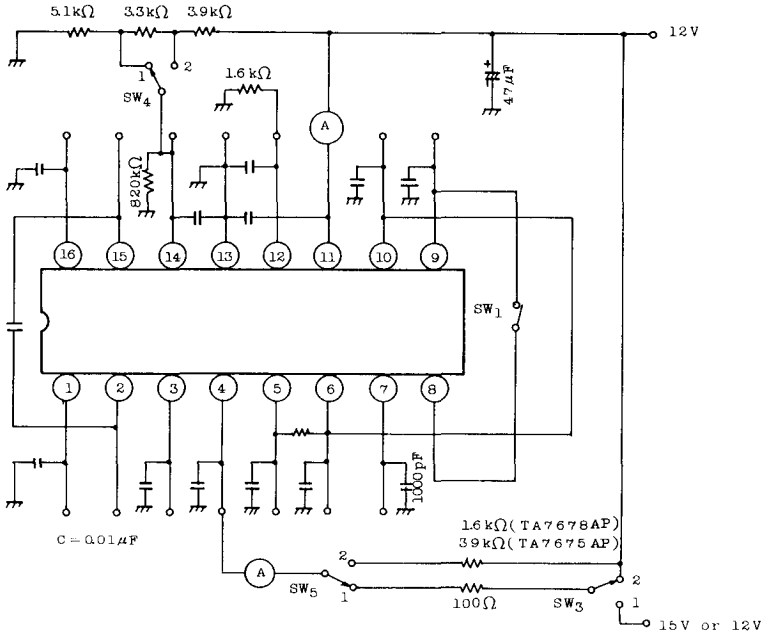
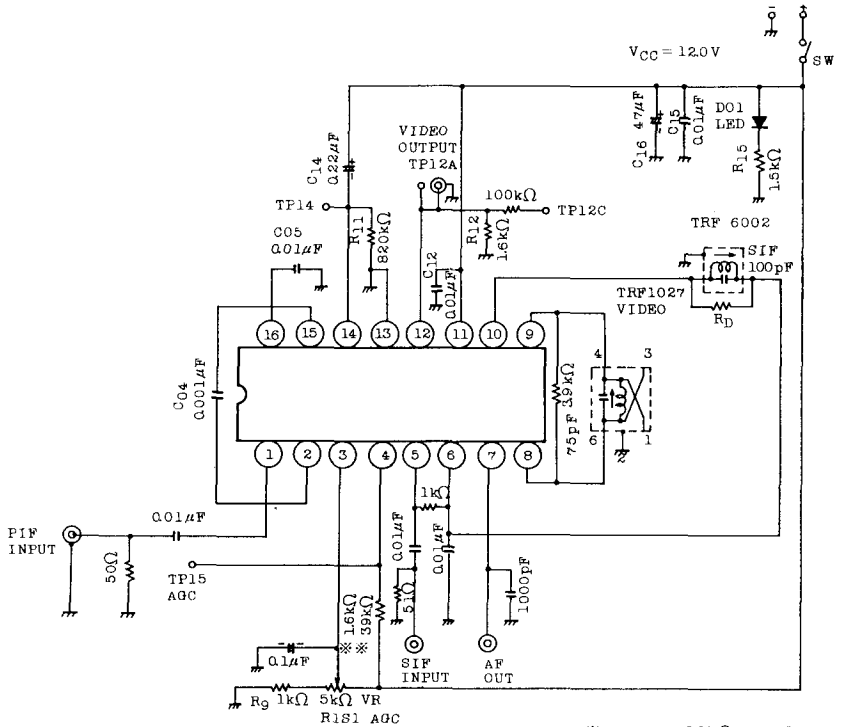


Fig. 2 AC TEST CIRCUIT



※ Note 39kΩ : TA7675AP
1.6kΩ : TA7678AP

Fig. 3 Video Frequency Response & SIF Output Voltage TEST CIRCUIT

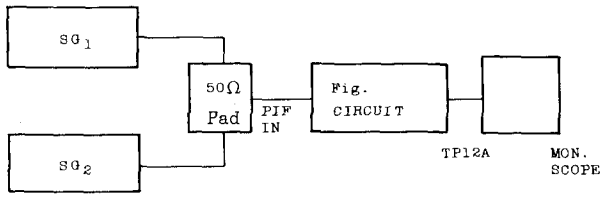


Fig. 4 Inter Modulation TEST CIRCUIT

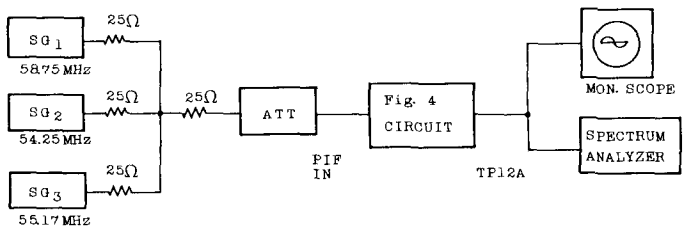
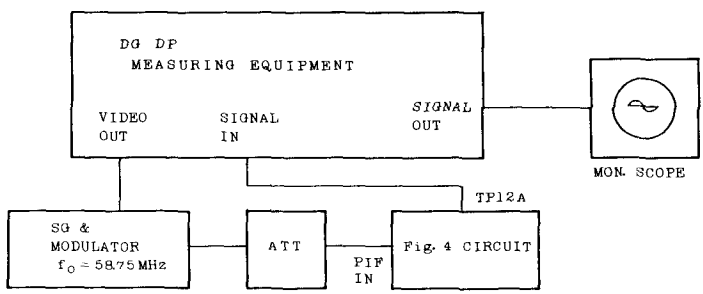


Fig. 5 DG, DP TEST CIRCUIT



APL = 50%

ATT : ADJUST SYNC TIP LEVEL to DC2.5V

Fig. 6 PIF Input Impedance TEST CIRCUIT

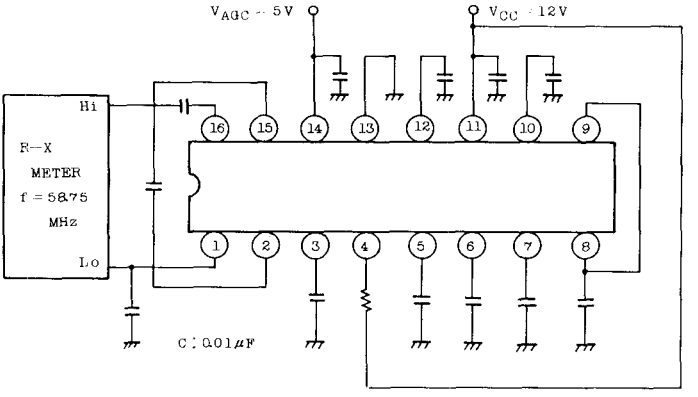


Fig. 7 SIF Input Impedance TEST CIRCUIT

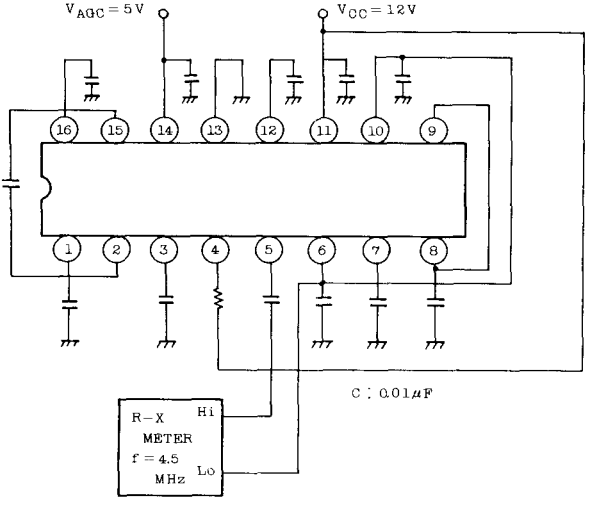


Fig. 8 $v_{IN(LIM)}$, AMR, V_{OD}, THD, V_{OM} TEST CIRCUIT

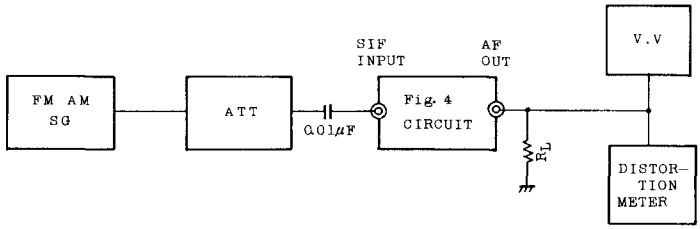
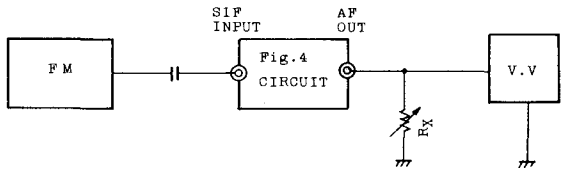
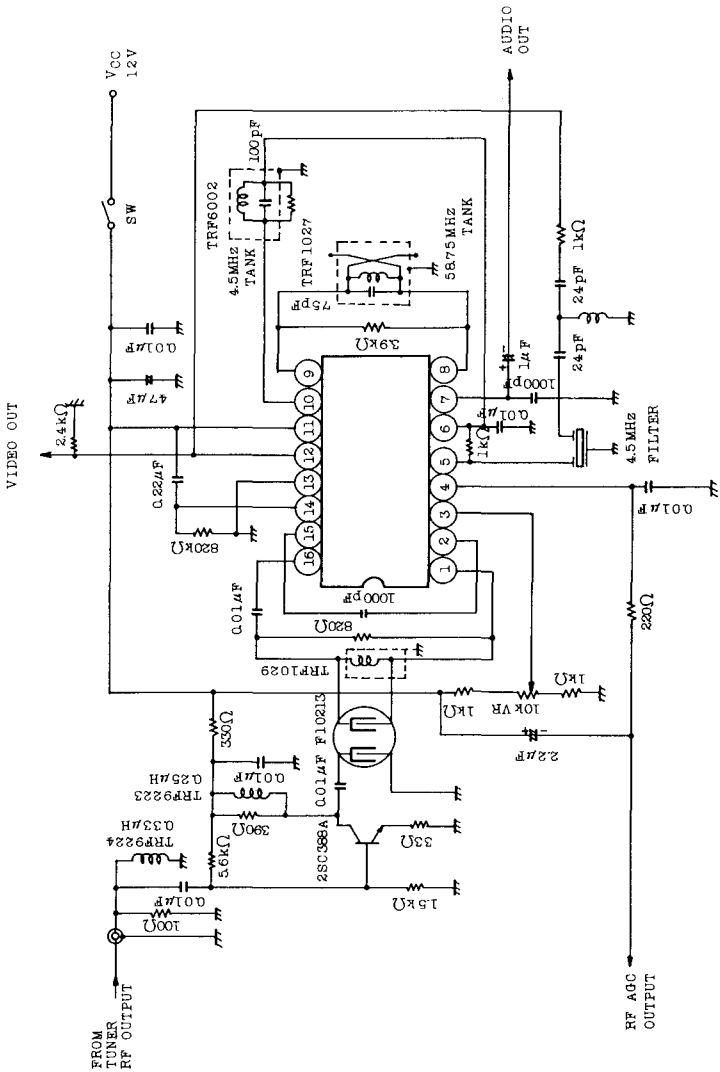


Fig. 9 Audio Output Impedance TEST CIRCUIT





TA7675AP, TA7678AP APPLICATION CIRCUIT