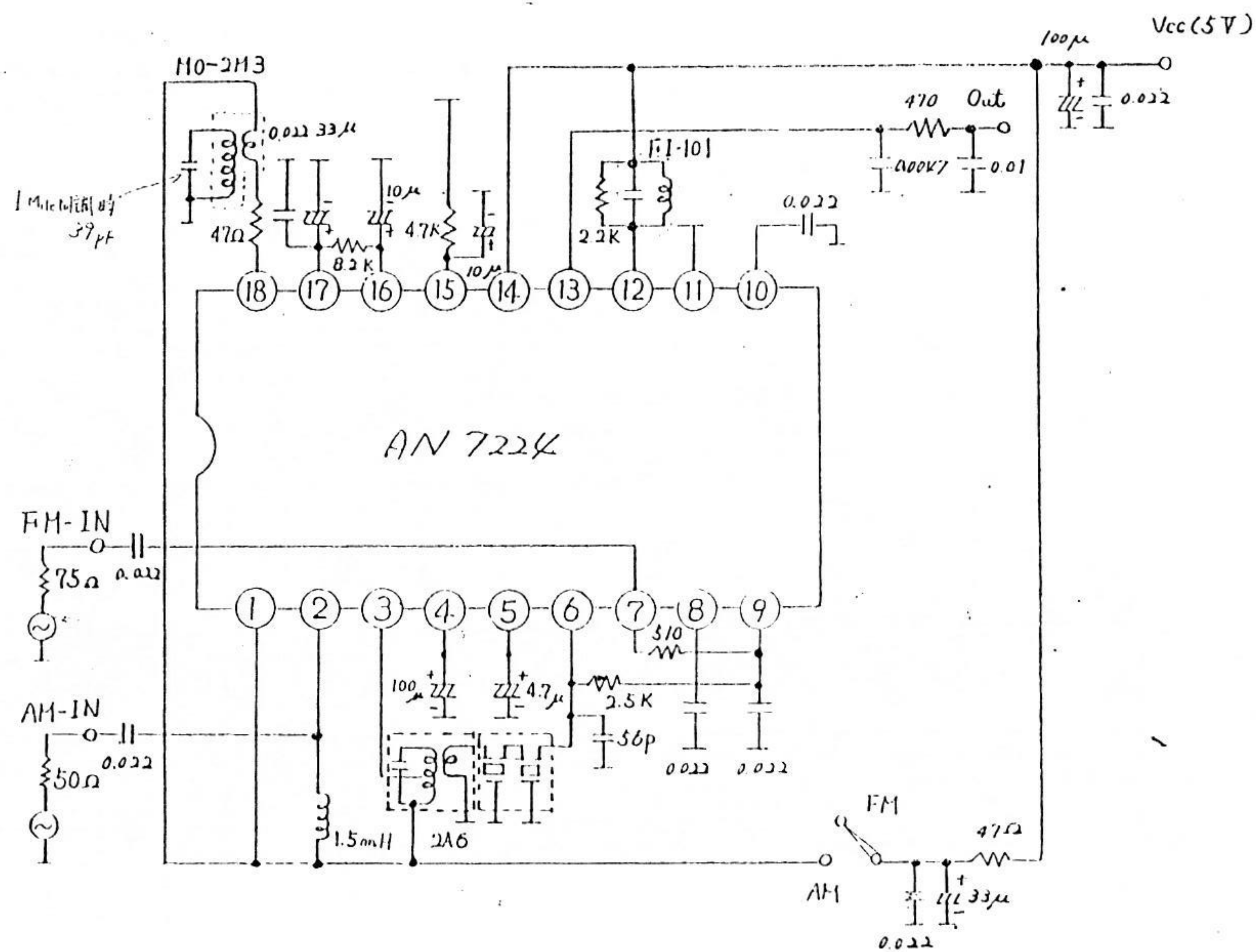
AN7224 試験回路

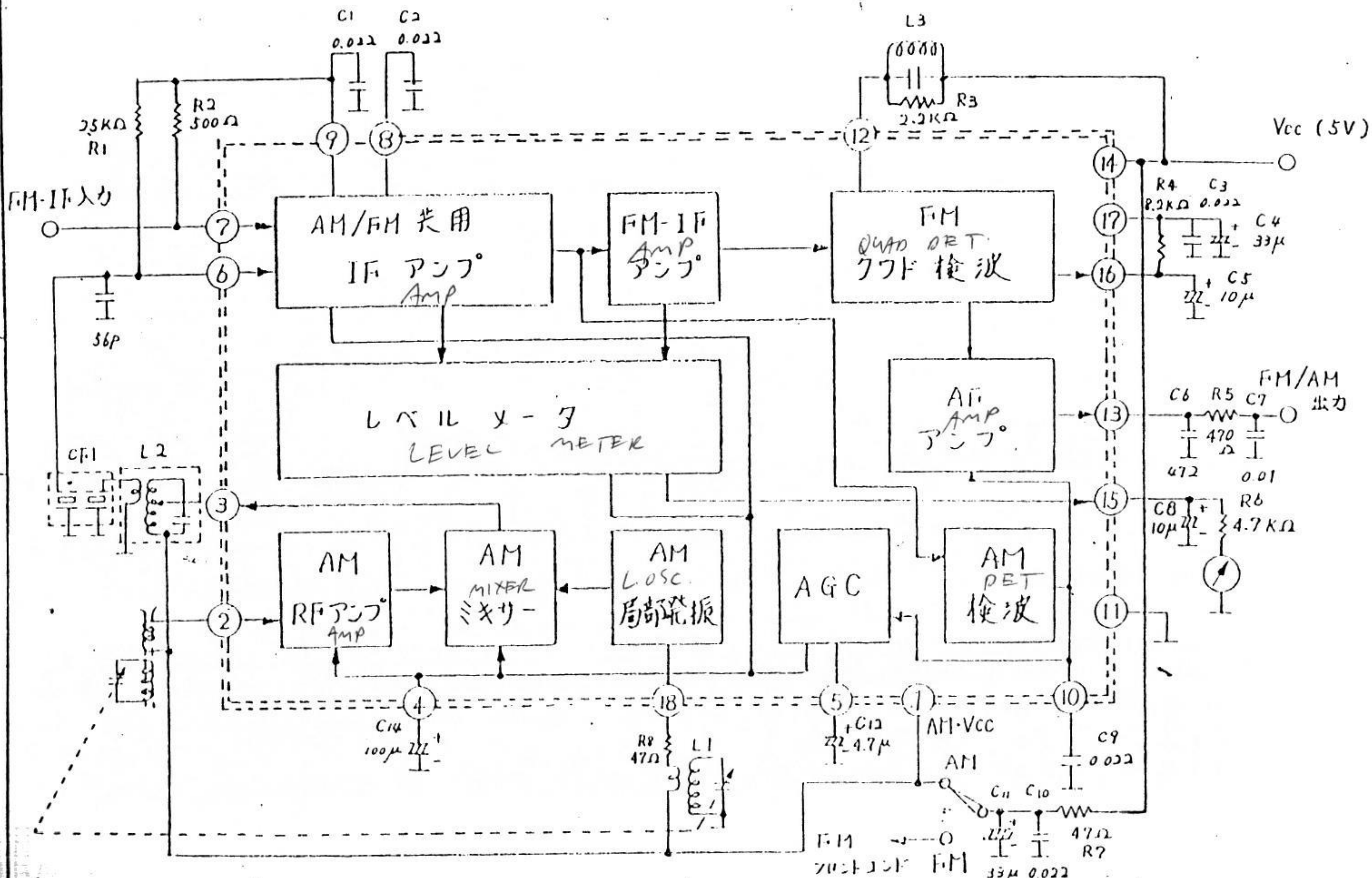


S57.3.17 S57.3.19

K. Yamasaki K. Yamasaki

7

3

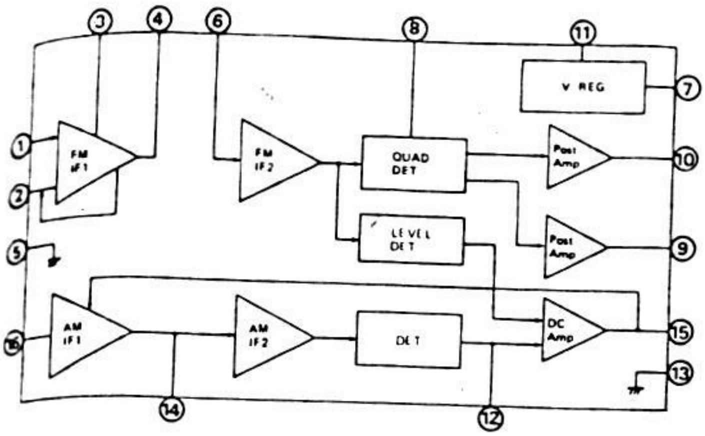


AN 7224 ブロックダイヤグラム

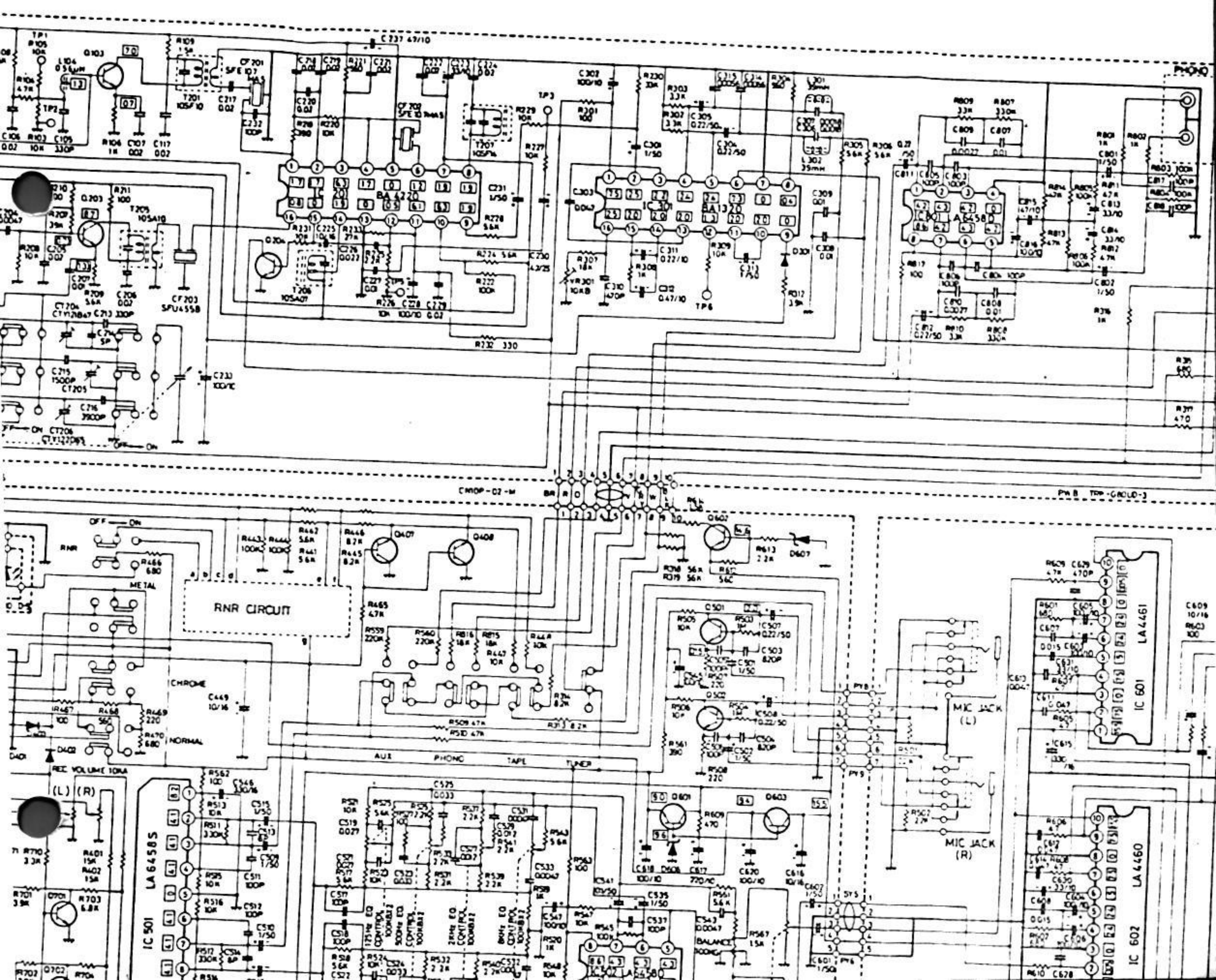
IC BLOCK DIAGRAM (1)

BA4220

BA4220 (FM/AM IF Amplifier, FM Quadrature Detector, AM Detector)

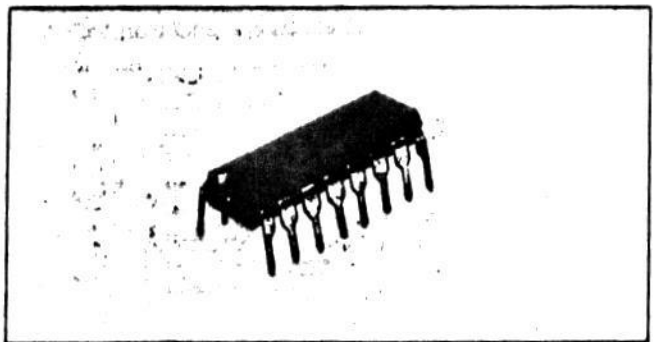


= HA12413



BA4220

ROHM



Dimensions (mm)

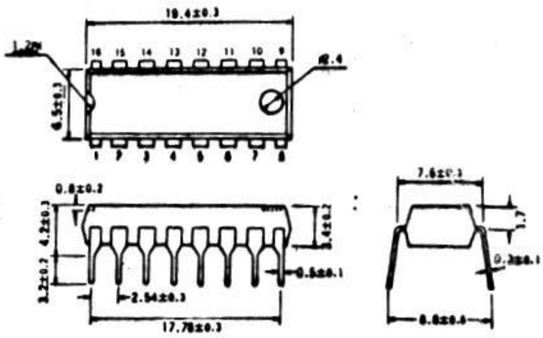


Fig. 1

The BA4220 is a monolithic integrated circuit developed for use as an AM/FM IF amplifier and detector for use in radio cassette combinations and home stereo equipment. It includes an AM/FM level meter circuit and an FM tuning meter circuit making it ideal for use as an IF system. Also, operating voltage range is wide, with stable operation at low voltages.

Features

1. Wide operating voltage range (V_{CC} = 3.0~14.0V)
2. Low current drain (typically 11.0mA for FM operation)
3. AM/FM level meter output
4. AFC output
5. High FM sensitivity
6. Low residual noise
7. High S/N ratio
8. Excellent AM: AGC characteristics

Applications

1. Radio cassette combinations
2. System components
3. Music centers
4. AM/FM radios

Block Diagram

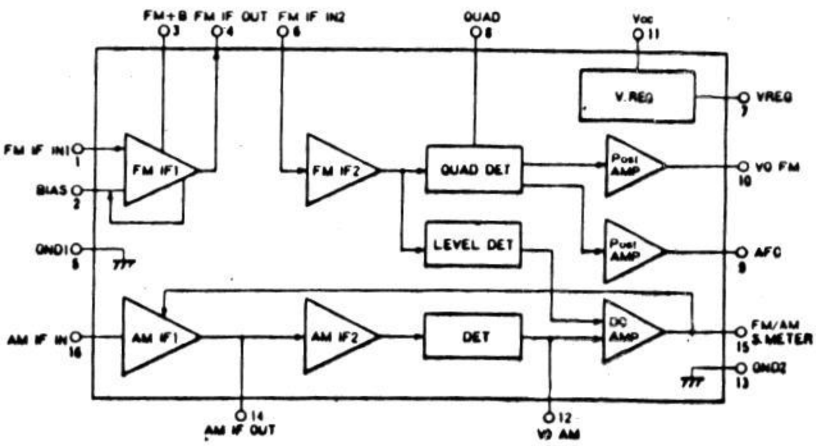


Fig. 2

Absolute Maximum Ratings (T_a = 25°C)

Parameter	Symbol	Limits	Unit
Supply voltage	V_{CC}	16	V
Power dissipation	P_d	550	mW
Operating temperature	T_{opr}	−25~+75	°C
Storage temperature	T_{stg}	−40~+125	°C

Electrical Characteristics (T_a = 25°C, V_{CC} = 6.0V)

FM: fc = 10.7MHz, fm = 1kHz, 100% MOD
AM: fc = 455kHz, fm = 1kHz, 30% MOD

	Parameter	Symbol	Min	Typ	Max	Unit	Conditions	Test circuit
FM	Supply current	I_{CC}	7.0	11	16.5	mA	Quiescent condition	Fig. 3
	Detector output	V_O (FM)	180	250	320	mVrms	V_{IN} = 100dBμ	Fig. 3
	Total harmonic distortion	THD	—	0.3	0.9	%	V_{IN} = 100dBμ	Fig. 3
	Limiting sensitivity	V_{IN} (lim)	—	33	38	dBμ	V_O = −3dB	Fig. 3
	Signal-to-noise ratio	S/N	72	80	—	dB	V_{IN} = 100dBμ	Fig. 3
	Residual noise	V_N	—	40	—	dB	V_{IN} = −10dBμ	Fig. 3
	Level meter voltage	V_M	—	2.4	—	V	V_{IN} = 100dBμ	Fig. 3
AM	Detector output	V_O (AM)	60	80	100	mVrms	V_{IN} = 74dBμ	Fig. 3
	Total harmonic distortion	THD	—	0.3	0.9	%	V_{IN} = 74dBμ	Fig. 3
	Maximum sensitivity	S_{IF}	34	40	—	dBμ	V_O = 10mV	Fig. 3
	Signal-to-noise ratio	S/N	45	55	—	dB	V_{IN} = 74dBμ	Fig. 3
	Level meter voltage	V_M	—	1.4	—	V	V_{IN} = 100dBμ	Fig. 3

Test Circuit

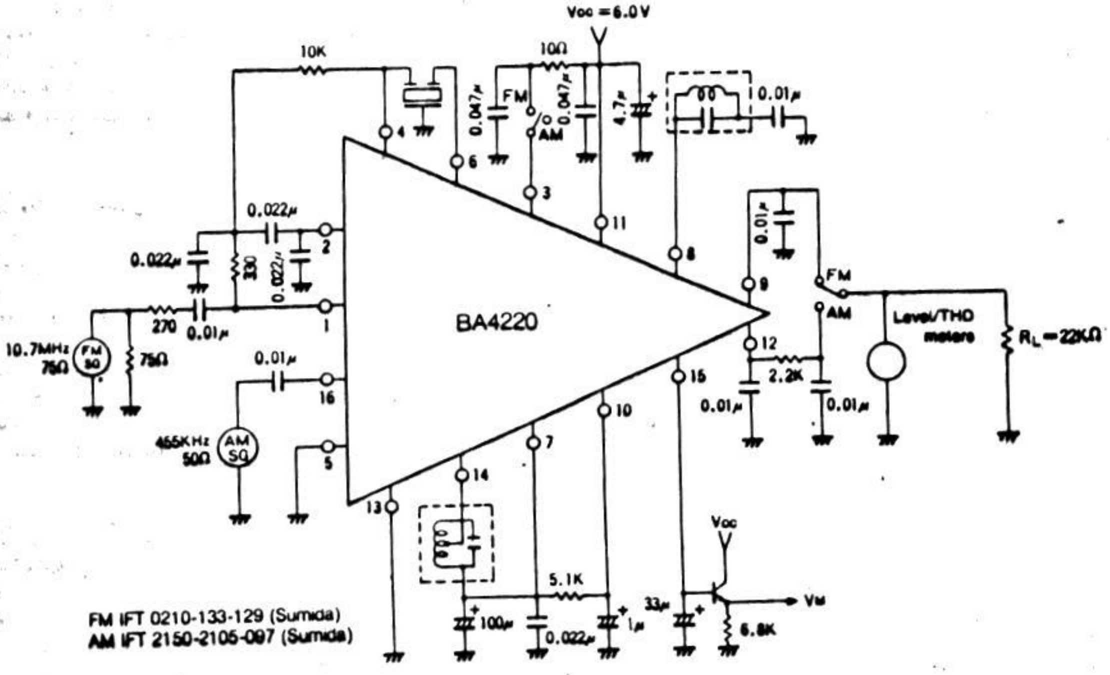


Fig. 3

TA7303P
KIA7303P

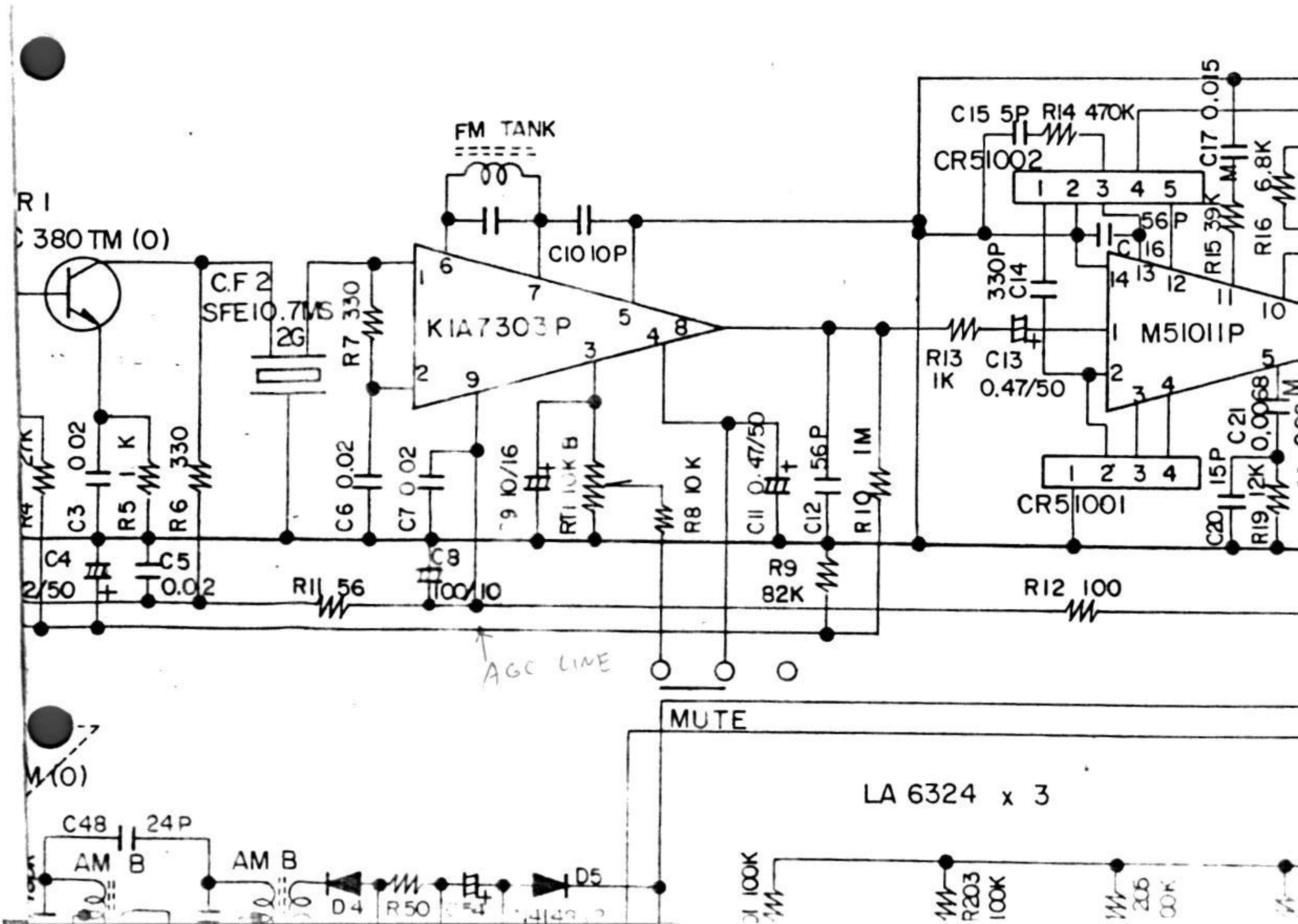
FM IF AMP/DETECTO

ADD 360-150-110

MX3002
MRC540

MX3002

HEMATIC DIAGRAM



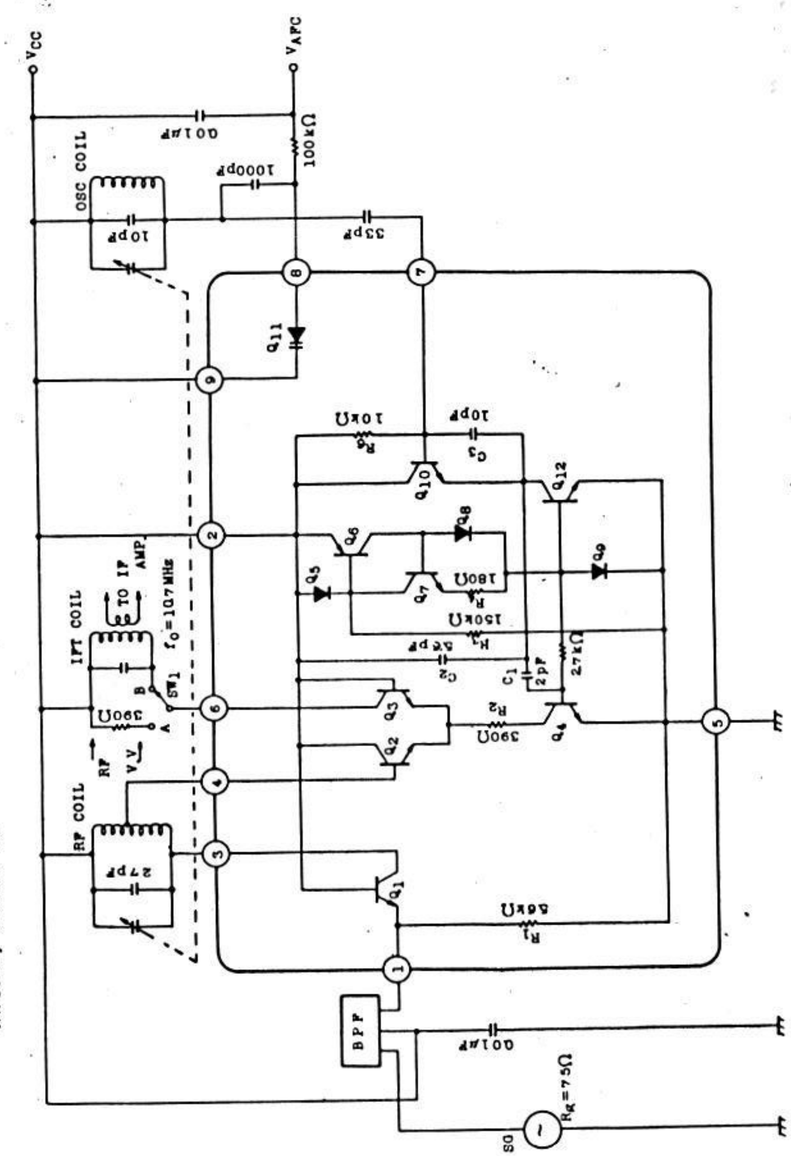
ELECTRICAL CHARACTERISTICS

(Unless otherwise specified V_{CC}=4V, Ta=25°C)

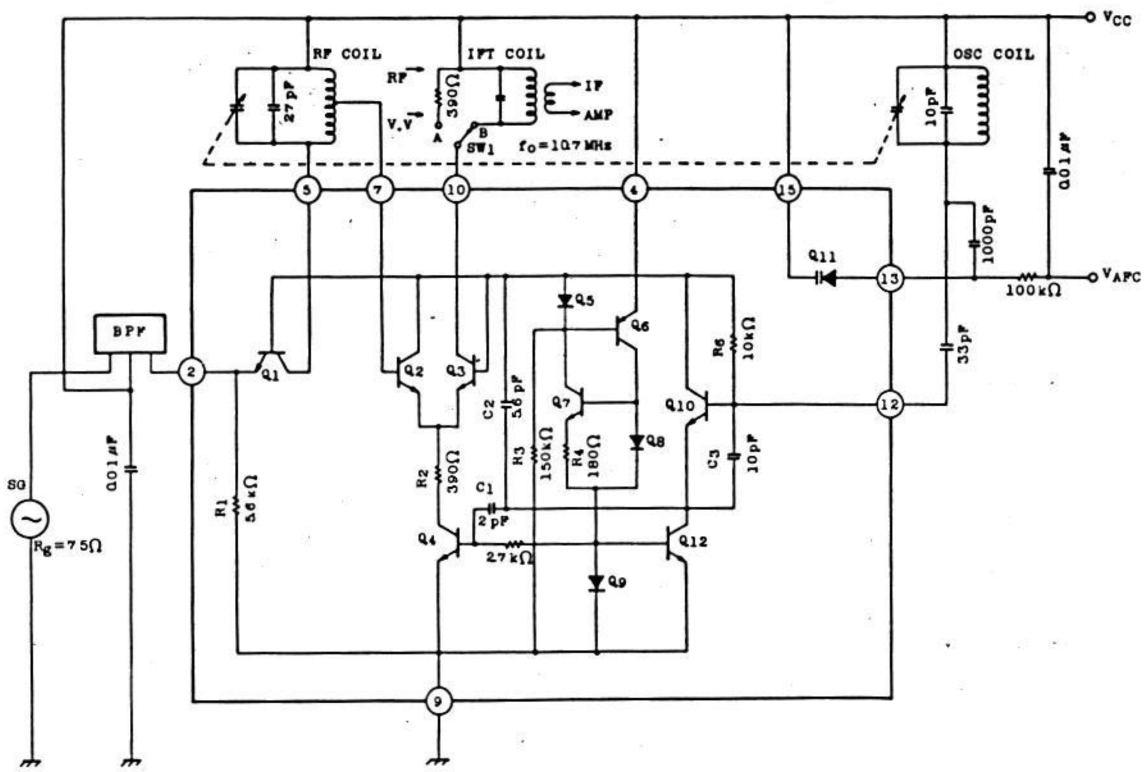
CHARACTERISTIC		SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current		I_{CC}	1	V_{IN}=0	-	2.5	4	mA
Local OSC Voltage		V_{OSC}	1	SW_1=A, f_{osc}=60MHz	40	75	200	mV_{rms}
Conversion Gain		G_C	2	f=83MHz	-	20	-	dB
Recovered Output Voltage		V_{OD}	2	f=83MHz, ΔF=±22.5kHz dev. V_{IN}=12dBμV	40	60	-	mV_{rms}
Capacitance of AFC Diode		C_{AFC}	3	V_{AFC}=1V	-	3.8	-	pF
Q of AFC Diode		Q	3	V_{AFC}=1V	-	100	-	-
Capacitance V_{AFC} Dependance		K	3	$K=\frac{C(V_{AFC}=1V)-C(V_{AFC}=3V)}{C(V_{AFC}=3V)}$	-	0.23	-	-
3 Pin Impedance	Parallel Output Resistance	r_{op3}	3	f=83MHz	-	24	-	kΩ
	Parallel Output Capacitance	c_{op3}	3		-	3	-	pF
4 Pin Impedance	Parallel Input Resistance	r_{ip4}	3		-	20	-	kΩ
	Parallel Input Capacitance	c_{ip4}	3		-	3.2	-	pF
6 Pin Impedance	Parallel Output Resistance	r_{op6}	3	f=10.7MHz	-	44	-	kΩ
	Parallel Output Capacitance	c_{op6}	3		-	3.7	-	pF
Local OSC Stop Voltage		V_{stp}	1	SW_1=A, f_{osc}=60MHz	-	1.5	-	V

EQUIVALENT CIRCUIT AND TEST CIRCUIT (1)

TA7335P, TA7335P-LB

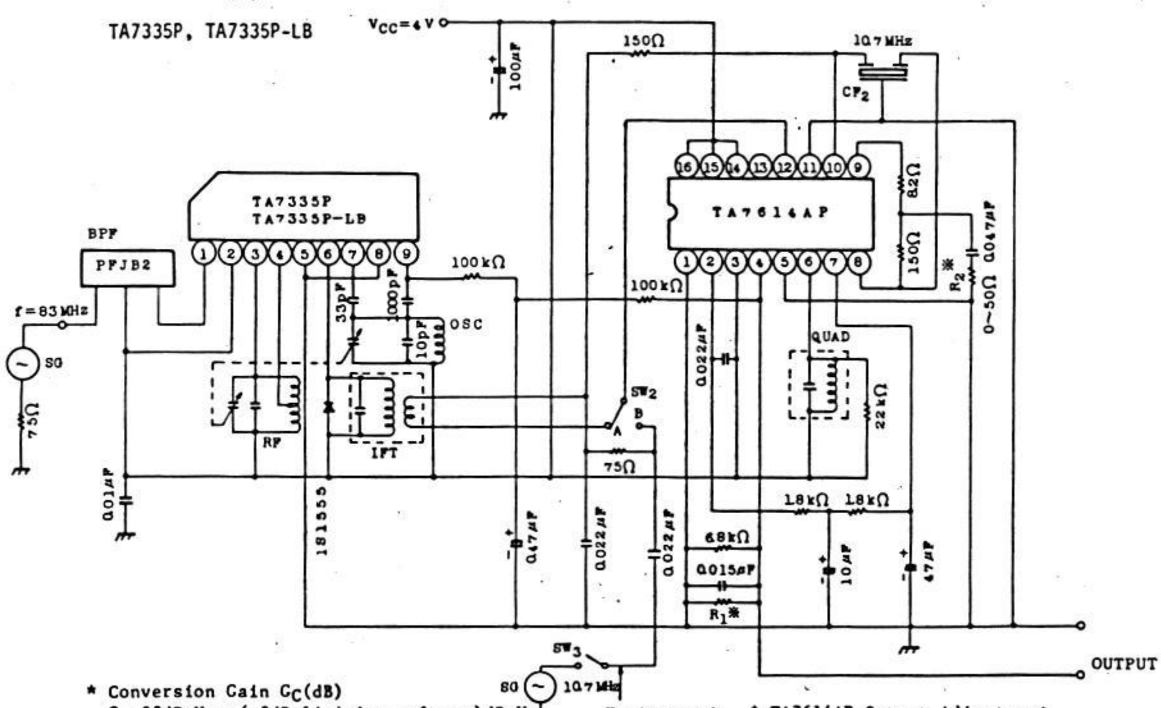


TA7335F



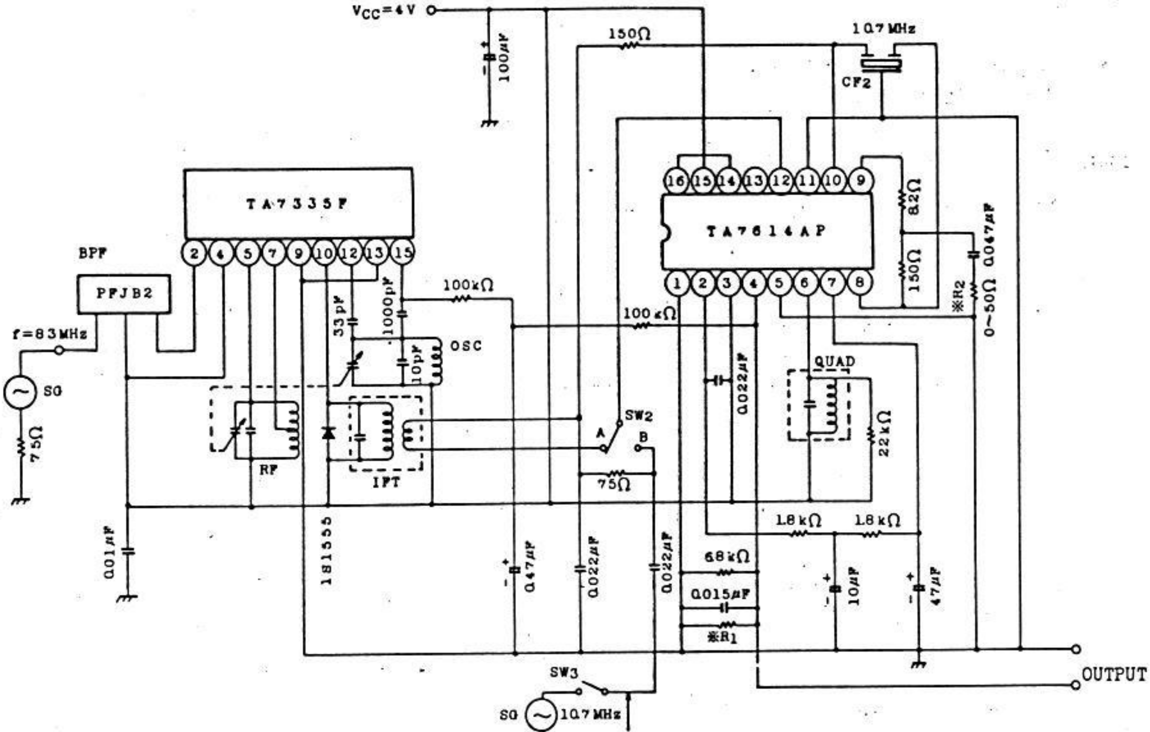
TEST CIRCUIT (2)

TA7335P, TA7335P-LB



* Conversion Gain G_C(dB)
  G_C=28dBμV − (−3dB limiting voltage)dBμV
* TA7614AP Gain Adjustment
  R_2 is adjusted to provide the following gain.
  −3dB limiting voltage=28dBμV
  at SW_2=B, SW_3=ON
* TA7614AP Output Adjustment
  R_1 is adjusted to provide the following recovered output voltage V_{OD}.
  V_{OD}=60mV_{rms}
  at f=10.7MHz, ΔF=±22.5kHz dev.
  V_{IN}=80dBμV

TA7335F



* Conversion Gain G_C(dB)
G_C=28dBμV − (−3dB limiting voltage)dBμV

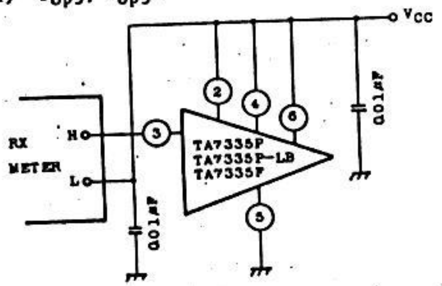
* TA7614AP Gain Adjustment
R_2 is adjusted to provide the following gain.
−3dB limiting Voltage=28dBμV
at SW_2=B, SW_3=ON

* TA7614AP Output Adjustment
R_1 is adjusted to provide the following recovered output voltage V_{OD}.
V_{OD}=60mV_{rms}
at f=10.7MHz, ΔF=±22.5kHz dev.
V_{IN}=80dBμV

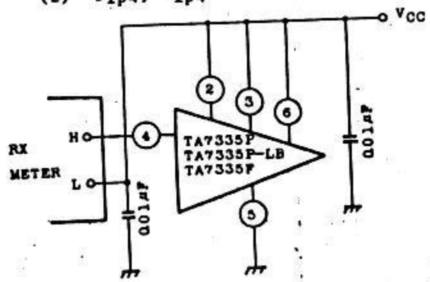
TEST CIRCUIT 3

INPUT, OUTPUT IMPEDANCE, K

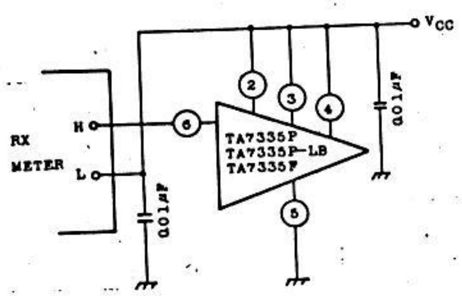
(1) r_{op3}, c_{op3}



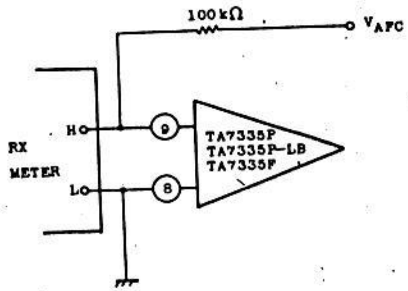
(2) r_{ip4}, c_{ip4}



(3) r_{op6}, c_{op6}



(4) C_{AFC}, K



K (Capacitance V_{AFC} dependance) is defined by following equation

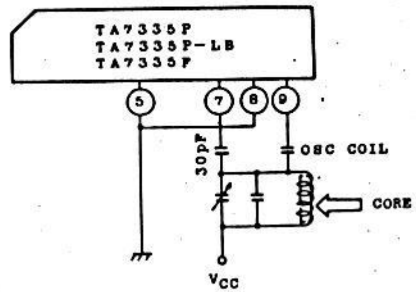
$$K = \frac{C(V_{AFC}=1V) - C(V_{AFC}=3V)}{C(V_{AFC}=3V)}$$

CONTRASTIVE A TABLE

ITEM \ PIN No.	A	B	C	D	E	F	G
TA7335P/P-LB	2	3	4	5	6	8	9
TA7335F	4	5	7	9	10	13	15

APPLICATION PRECAUTION

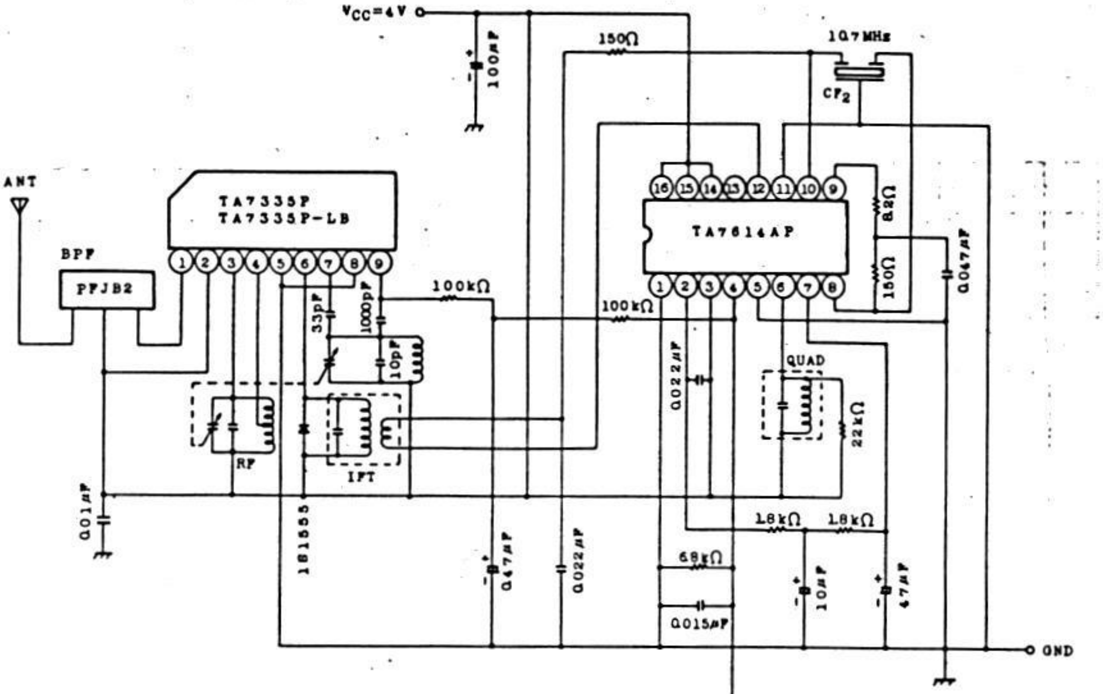
(1) A core of local oscillation coil must be ferrite. If you use aluminium or brass core in stead of ferrite core, Qo becomes so small that there is a case of oscillation stop at low frequency.



(2) A capacitance between oscillation coil and ⑦ pin of IC is recommended to be more than 30pF. When this capacitance is so small, oscillation level at low frequency is small.

APPLICATION CIRCUIT

TA7335P, TA7335P-LB

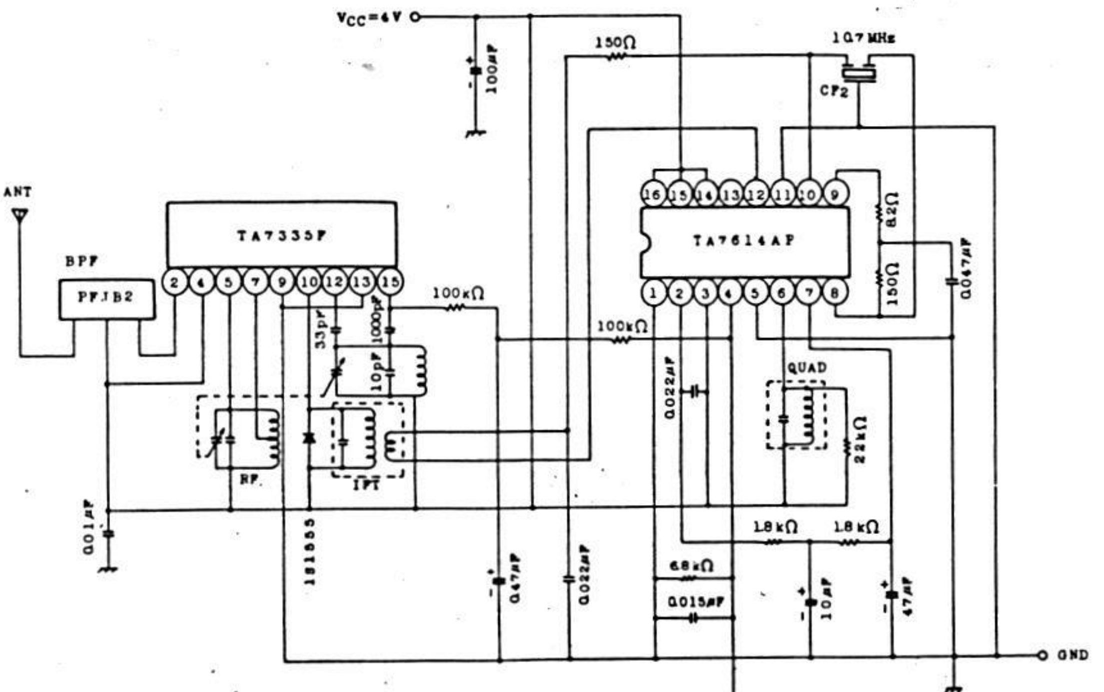


OUTPUT

There is another application note of this IC.
When you actually estimate this IC and design circuits, please request us it.

APPLICATION CIRCUIT

TA7335F



INPUT

There is another application note of this IC.
When you actually estimate this IC and design circuits, please request us it.

TA7358P

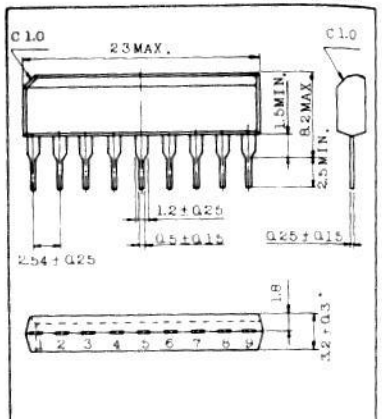
東芝バイポーラ形リニア集積回路
シリコン モノリシック

FMフロントエンド用

TA7358Pは FMフロントエンド用として開発されたICです。
従来のフロントエンド用ICと比べて減電圧特性，強入力特性，スプリアス特性および不要輻射を改善しています。
また，NSAプロセス(Nitride Self-Aligned Process)を採用することによりローノイズとなっています。

- 動作電源電圧範囲
  : V_{CC}=1.6〜6.0V
- 局部発振停止電圧 : V_{CC}=0.9V（標準）
- ローノイズです。
- ダブルバランスミキサーを採用し，二信号特性等を改善しています。
- 不要輻射が少ない。
- ミキサー出力にクランプダイオード内蔵

単位：mm



リードのピッチは2.54，公差は糸1のリードを基準にして得られる各リードの理論中心に対して±0.25です。

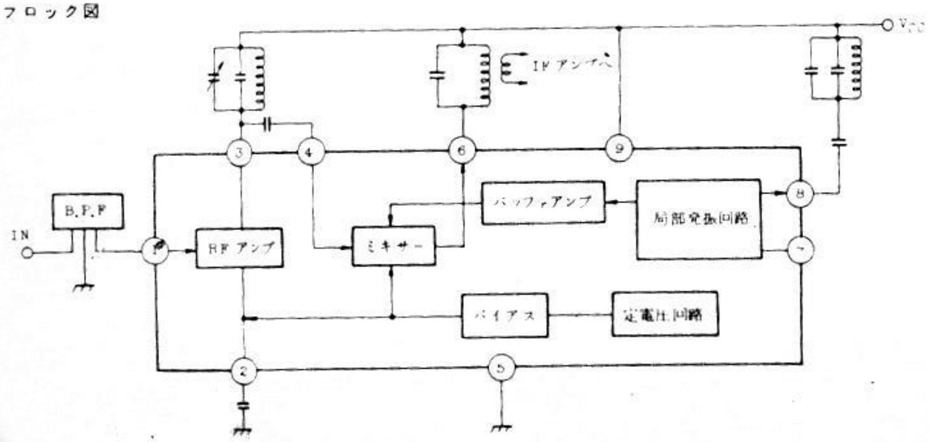
JEITA(EIAJ)C	—
東芝	5-23B

最大定格 (Ta=25℃)

項目	記号	定格	単位
電源電圧	V_{CC}	8	V
消費電力 (注)	P_D	500	mW
動作温度	T_{opr}	−25〜75	℃
保存温度	T_{stg}	−55〜150	℃

(注) 25℃以上で使用する場合，1℃につき4mW減じて考える。

フロック図

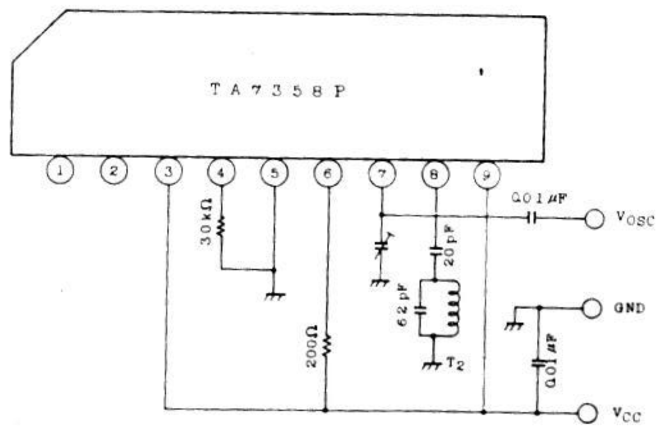


電気的特性 (V_{CC}=5V, f=83MHz, f_m=1kHz, Δf=22.5kHz dev., Ta=25℃)

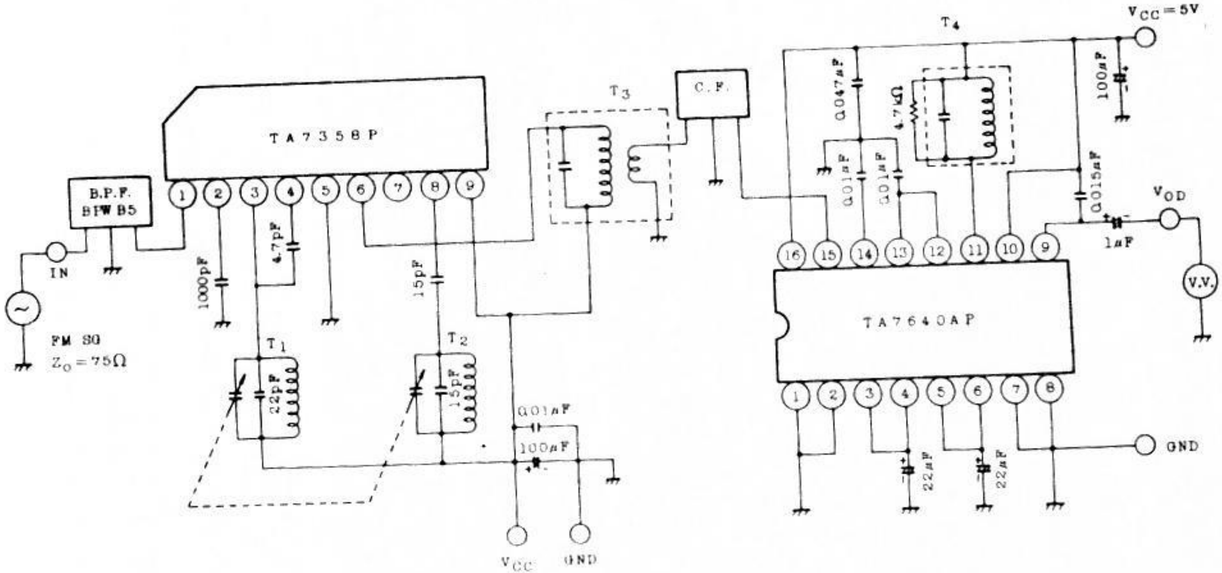
項目		記号	測定回路	測定条件	最小	標準	最大	単位
電源電流		I_{CC}	2	V_{IN}=0	—	5.2	8.0	mA
−3dBリミッティング感度		$V_{IN(lim)}$	2		—	3.0	7.0	dBμ
実用感度		Q_S	2		—	11.0	—	dBμ
変換利得		G_C	—		—	31	—	dB
局部発振電圧		V_{OSC}	1	f_{OSC}=60MHz	150	230	350	mVrms
1ピン入力インピーダンス	並列入力抵抗	r_{ip1}	3	f=83MHz	—	57	—	Ω
	並列入力容量	c_{ip1}			—	(注)	—	pF
3ピン出力インピーダンス	並列出力抵抗	r_{op3}	3		—	25	—	kΩ
	並列出力容量	c_{op3}			—	2.0	—	pF
4ピン入力インピーダンス	並列入力抵抗	r_{ip4}	3		—	2.7	—	kΩ
	並列入力容量	c_{ip4}			—	3.3	—	pF
6ピン出力インピーダンス	並列出力抵抗	r_{op6}	3	f=10.7MHz	—	100	—	kΩ
	並列出力容量	c_{op6}			—	4.8	—	pF
発振停止電圧		V_{stop}	1		—	0.9	1.3	V

(注) 測定不可

測定回路 1

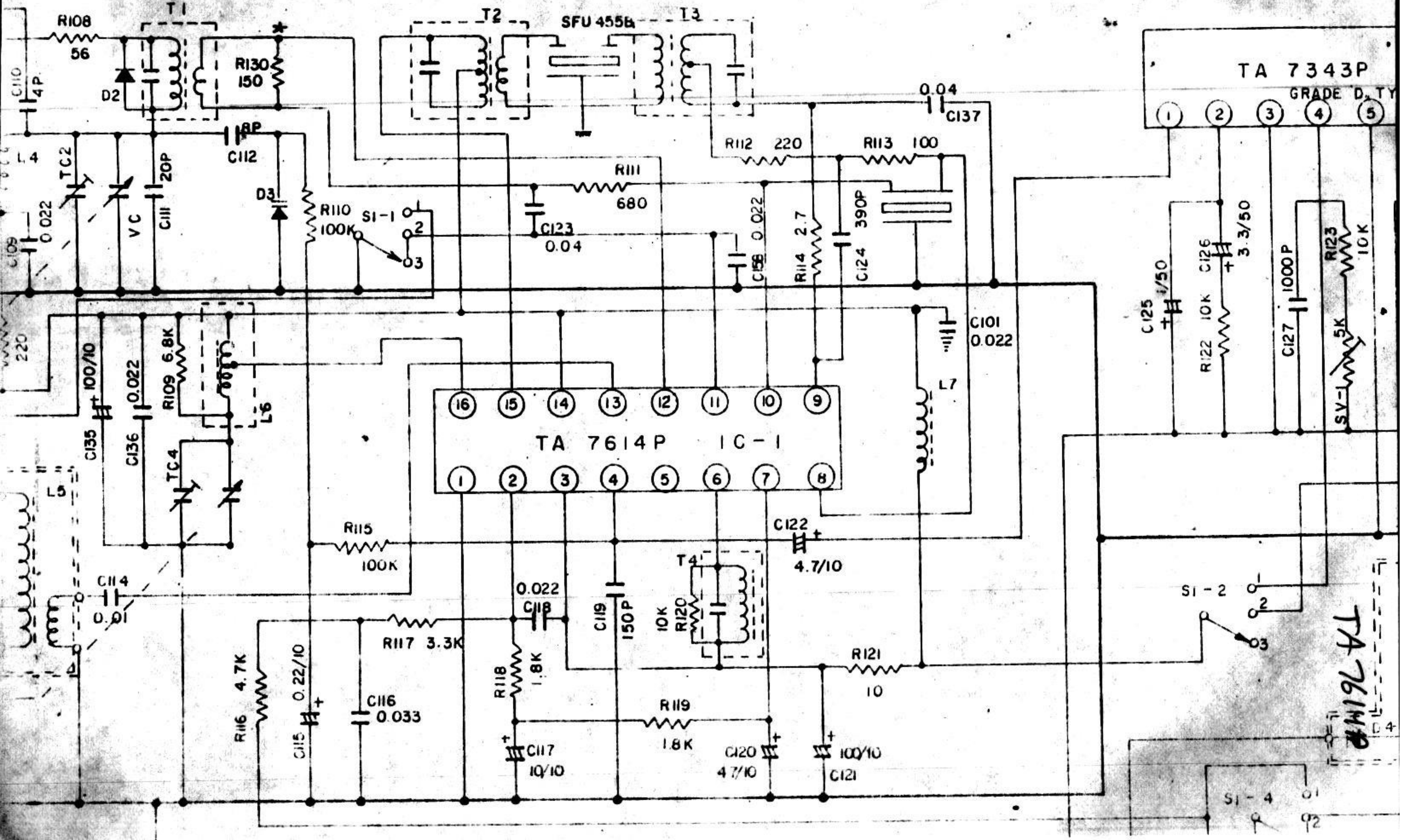


測定回路　2

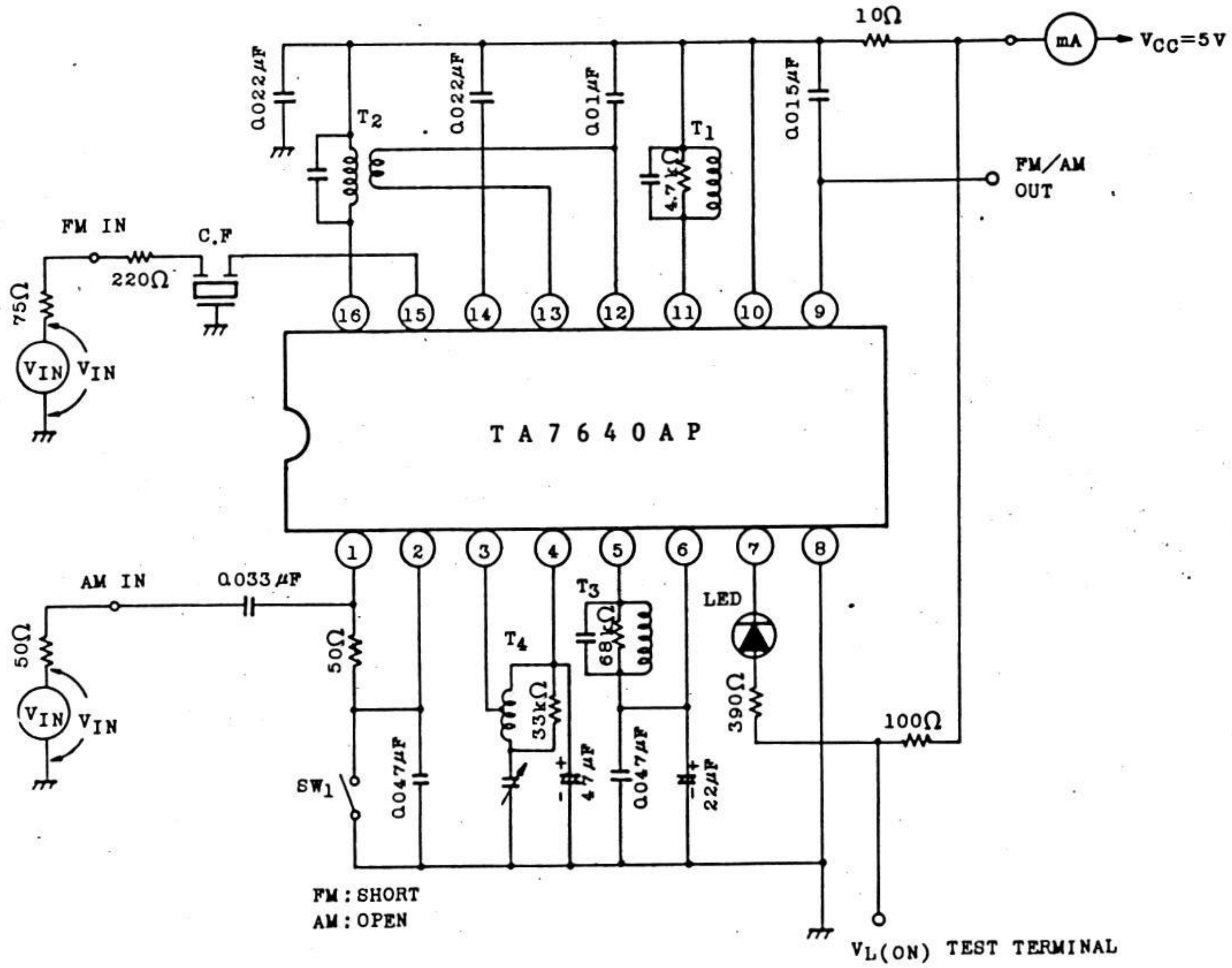

TA7358P
TA7640AP
B.P.F.
BFW B5
IN
FM SG
$Z_0 = 75\Omega$
1000pF
4.7pF
15pF
22pF
T1
T2
T3
T4
C.F.
0.01μF
100μF
VCC
GND
VCC = 5V
0.047μF
4.7kΩ
0.01μF
0.015μF
1μF
VOD
V.V.
22μF
GND

DH-602 SCHEMATIC DIAGRAM

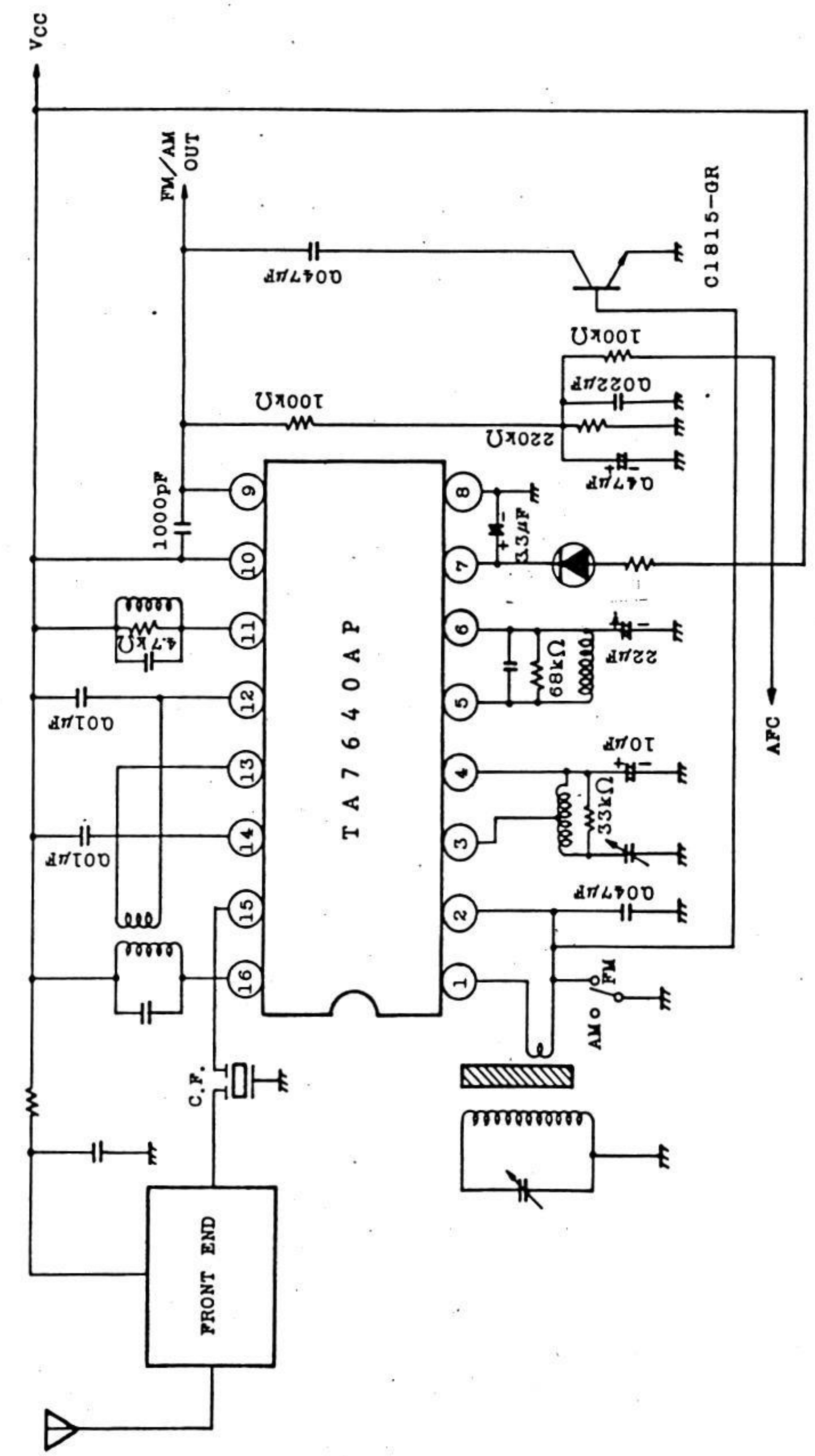
FM IF
Am IF



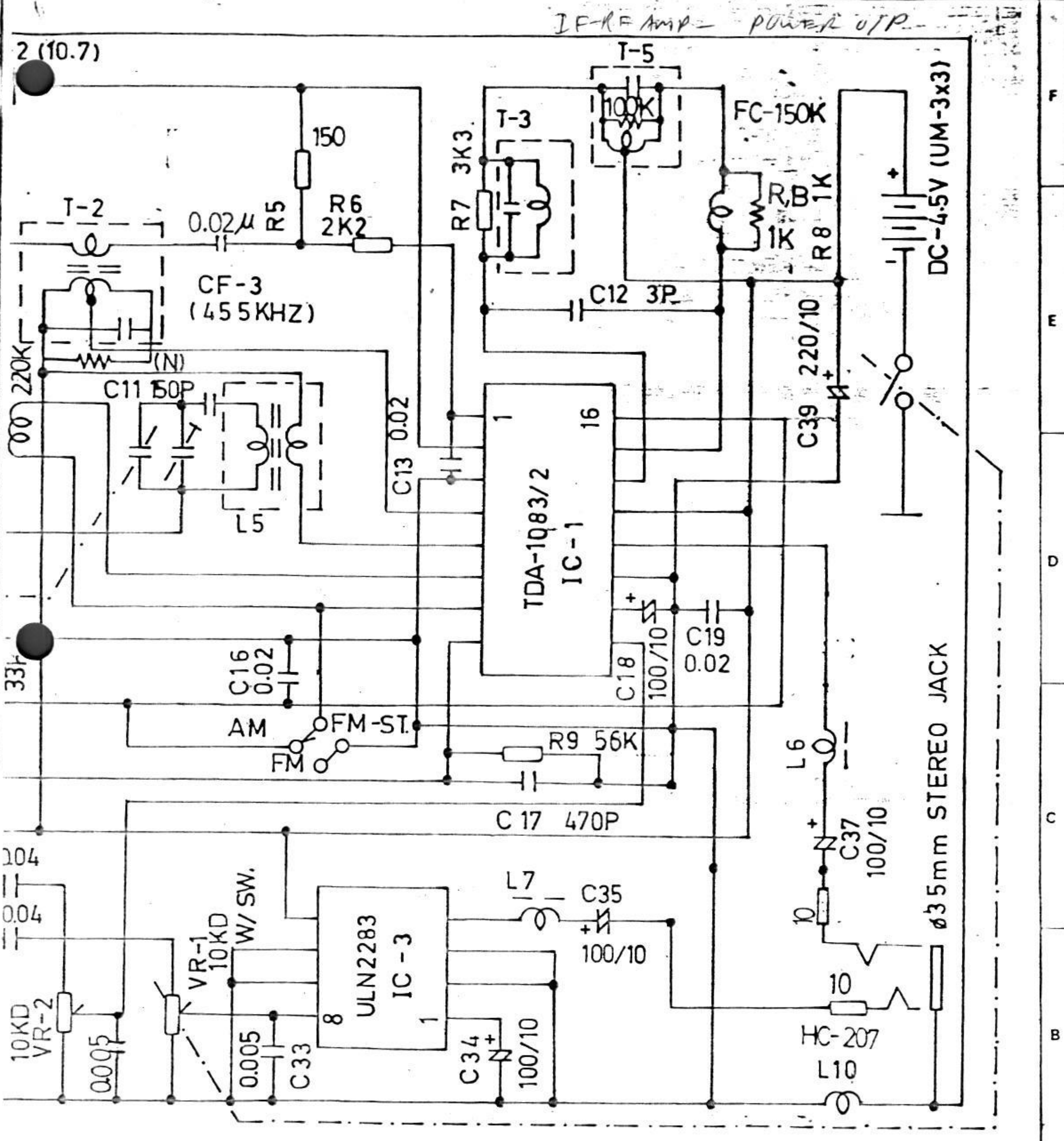
TEST CIRCUIT



APPLICATION CIRCUIT



PART NO. TDA1083



MB 887
M887
10 OHM
M887

Title CIRCUIT DIAGRAM			
Model No. WS-383		Unit 1	Scale
Dwg. No.		Part No.	
Dwn. by J. KWONG	Matl.		Tolerances Unless Stated
Chkd. by	Colour		Dec. ± Angle ±
Appd. by	Finish 27-2-1982		Sheet of