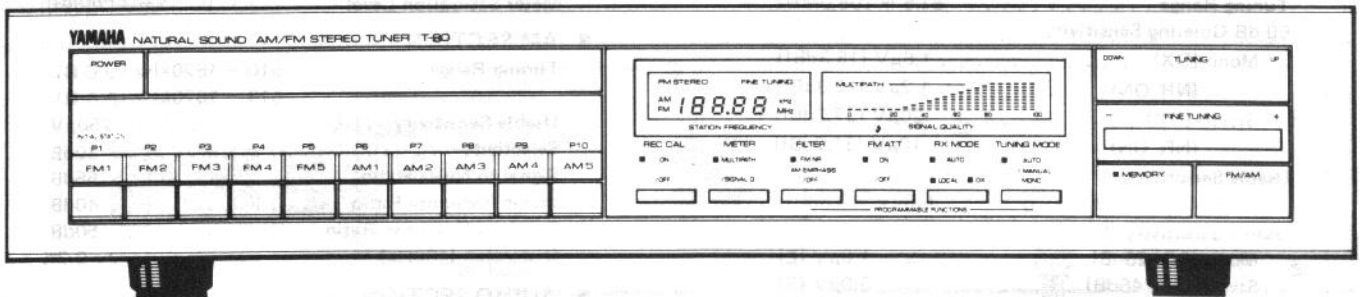


# STEREO TUNER

# T-80

# SERVICE MANUAL



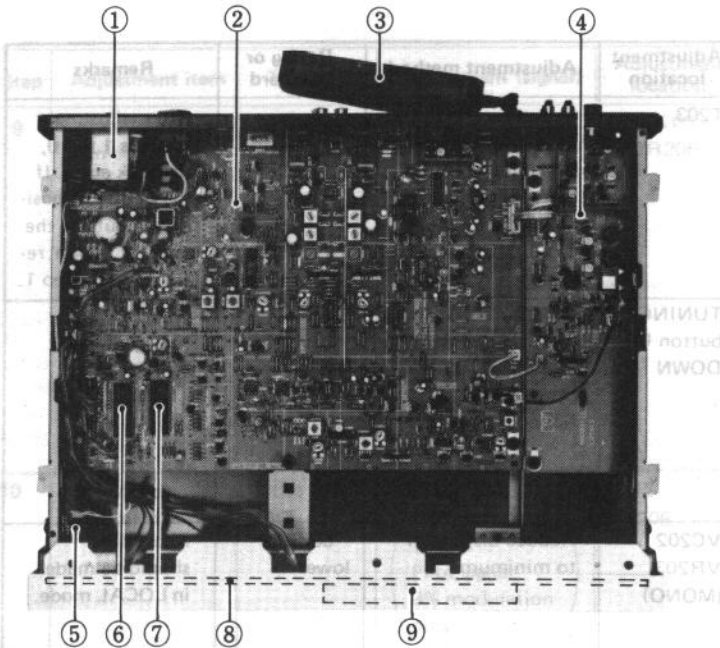
FRONT PANEL

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## INTERNAL VIEW



1. POWER TRANSFORMER  
 U. S. & Canadian models: GA67130  
 European model: GA67140  
 General model: GA67120  
 Australian model: GA67150
2. TUNER CIRCUIT BOARD
3. AM LOOP ANTENNA
4. FRONT END CIRCUIT BOARD
5. POWER SWITCH (SW203)
6. IC114: LC6502C-638
7. IC113: LC7210
8. KEYBOARD UNIT CIRCUIT BOARD
9. LED FREQUENCY & SIGNAL INDICATOR

## ADJUSTMENT

### 1. Before Adjustment

- 1) Start adjustment approximately 5 minutes after the power switch is pushed on in order to stabilize the operation of circuit.
- 2) Adjust the OSC coil and IFT using high-frequency or nonferrous screwdriver.
- 3) Adjust the FM section first. After that, adjust the AM section.
- 4) Set the switches to the following positions unless otherwise specified.  
 TUNING MODE . . . . . AUTO  
 REC CAL . . . . . OFF
- 5) Be sure to make adjustment after installing the bottom cover.
- 6) For connection with OUT PUT, use HIGH terminal.

### < Line Voltage Checkup >

Check to see if the specified voltage is provided across each terminal and E in the tuner circuit board.

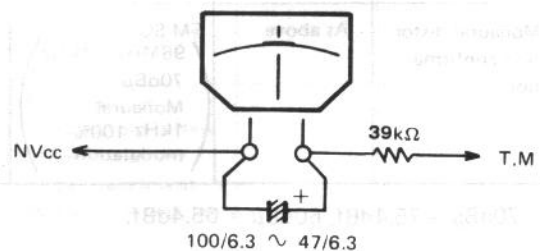
Terminal	Voltage	Measuring Instrument
+30	+30 ± 3V	DCVM
B1 (+7)	+7 ± 1V	
+5	+5.5 ± 0.5V	
B2 (+12)	+12.5 ± 0.5V	
B2 -12	-12.5 ± 0.5V	
B2 +7	+7 ± 0.5V	
B2 -7	-7 ± 0.5V	
FB	FM mode +12 ± 1V	
	AM mode +1V or lower	
AB	FM mode +1V or lower	
	AM mode +12 ± 1V	

### 2. Measuring Instruments Abbreviation

- FM SG . . . . . FM signal generator
- SSG . . . . . Stereo signal generator
- AM SG . . . . . AM signal generator
- OSC . . . . . Oscilloscope
- DIST M . . . . . Distortion meter
- FC . . . . . Frequency counter
- ACVM . . . . . AC voltmeter
- Center meter . . . . . Ji00036 or equivalent
- DCVM . . . . . DC voltmeter

### < FM Tuner Section >

- Use 19kHz L.P.F for OUTPUT L and R terminals and make auditory compensation. Then connect the oscilloscope, AC voltmeter and distortion meter.
- To check the optimum tuning point during adjustment, connect the auxiliary center meter (Ji00036 or equivalent, current sensitivity: 250µA) as shown in the figure.
- The accuracy of FM SG should be within ±1kHz.



Step	Adjustment item	Test point	Instrument (signal)	Adjustment location	Adjustment method	Rating or standard	Remarks
1	Discriminator balance adjustment	Across NVcc and TM	Auxiliary center meter	T203	In detuning state, adjust until the pointer of auxiliary center meter is positioned at zero (center).		After adjustment of steps 1 to 10, to check again. If the pointer is positioned outside the range of $\pm 1$ mm, re-adjust from step 1.
2	Tuning point set confirmation	300 $\Omega$ FM ANT  Across NVcc and TM	FM SG (98MHz $\pm$ 1kHz) 70dB $\mu$ Monaural 1kHz 100% modulation Auxiliary center meter	TUNING button UP, DOWN	Make sure that reception is made with the pointer of auxiliary center meter positioned at zero (center)		Tuning mode SW $\rightarrow$ AUTO
3	Monaural distortion adjustment	300 $\Omega$ FM ANT  OUTPUT L, R	FM SG (98MHz $\pm$ 1kHz) 70dB $\mu$ Monaural 100Hz 100% modulation DIST M, OSC L. P. F.	VC202 VR203 (MONO)	Reduce distortion to minimum.	-66dB or lower	Reception should be made in LOCAL mode.
4	VCO adjustment	300 $\Omega$ FM ANT  19KM (R197) + 12 (J150) 19K (C169)	FM SG (98MHz $\pm$ 1kHz) 70dB $\mu$ Nonmodulation  2.2M $\Omega$  FC	VR207 (VCO)	1. Connect 2.2M $\Omega$ resistor across R197 and J150 to force stereo mode. 2. Adjust until the frequency across terminals C169 and E becomes 19kHz $\pm$ 10Hz.	19kHz $\pm$ 10Hz	Stereo indicator light should come on.
5	PLL input phase adjustment	300 $\Omega$ FM ANT  OUTPUT L, R	FM SG (98MHz $\pm$ 1kHz) 70dB $\mu$ Stereo (L-R) 1kHz 100% non-modulation  OSC	T211 (SUB)	Increase output to maximum.		Remove FC and 2.2M $\Omega$ resistor.
6	Stereo distortion adjustment	300 $\Omega$ FM ANT  OUTPUT L, R	FM SG, SSG (98MHz $\pm$ 1kHz) 60dB $\mu$ Stereo L, R 1kHz 100% modulation  DISTM, OSC, LPF	L T201 VR201 R T202 VR202	Reduce distortion to minimum.	-56dB or lower	Reception should be made in LOCAL mode.
7	DX distortion adjustment	As above	60dB $\mu$	VC201	Reduce distortion to minimum.		Forced DX
8	Monaural distortion confirmation	As above	FM SG (98MHz $\pm$ 1kHz) 70dB $\mu$ Monaural 1kHz 100% modulation		Confirm that monaural distortion is minimum.	-50dB or lower	Reception should be made in LOCAL mode.

\*NOTE: 70dB $\mu$  = 75.4dBf, 60dB $\mu$  = 65.4dBf.

Step	Adjustment item	Test point	Instrument (signal)	Adjustment location	Adjustment method	Rating or standard	Remarks
9	Separation adjustment	300Ω FM ANT  OUTPUT L, R	FM SG, SSG (98MHz ± 1kHz) 70dBμ Stereo, L, R 1kHz 100% modulation	L VR205 R VR206	Provide stereo signal for R and L channels individually. • R channel alone: adjust OUTPUT Rch VR104 until output is increased to maximum. • R channel alone: adjust OUTPUT Lch VR103 until output is increased to maximum.	Separation: 40dB or higher	
10	Pilot cancel adjustment	300Ω FM ANT  OUTPUT L, R	FM SG, SSG (98MHz ± 1kHz) 70dBμ Pilot signal 9% modulation only  Remove LPF. OSC, ACVM	T212 VR208	Observe with oscilloscope and reduce 19kHz carrier leak level to minimum.	-56dB or lower	
11	Full-scale signal level indicator adjustment	300Ω FM ANT	FM SG, SSG (98MHz ± 1kHz) 70dBμ Stereo L, R 1kHz 30% modulation	VR210	Adjust so that all signal indicators light up.		Signal indicators should go off when detuned. Reception should be made in LOCAL mode. FMATT → OFF
12	Signal indicator/multipath switching confirmation	300Ω FM ANT	FM SG, SSG (98MHz ± 1kHz) 70dBμ Stereo L, R 1kHz 30% modulation	Signal indicator/multipath select switch	Make sure that when the select switch is pressed in the state of step 10, the MULTIPATH LED comes on and the indicator displays zero.		
13	Frequency display adjustment (FM IF offset adjustment)	300Ω FM ANT  TP(K4) TP(T6)	FM SG, SSG (98MHz ± 1kHz) 70dBμ Stereo L, R 1kHz 30% modulation  Short circuit	VR209	By shorting across terminals TP(K4) and TP(T6) the frequency display shifts 1 digit. Therefore, adjust so that 10kHz becomes 9 or 0.		After adjustment, open across TP(K4) and TP(T6).
14	Auto search reception confirmation	300Ω FM ANT	FM SG, SSG (98MHz ± 1kHz) 20dBμ Monaural 1kHz 100% modulation	TUNING UP, DOWN	Make sure that auto search reception is possible with the TUNING button.	Band edge: 76.0 - 90.0 MHz	TUNING MODE → AUTO During auto search, muting should be made.
15	FM ANT operation confirmation	As above	As above	FM ATT SW	Confirm by output waves that reception sensitivity is deteriorated with FM ATT on.		
16	FM noise filter operation confirmation	300Ω FM ANT	FM SG, SSG (98MHz ± 1kHz) 20dBμ Stereo L, R 10kHz 100% modulation	FM NR SW	Make sure that 10kHz output differs between when the FM NR switch is at ON and OFF position.		FM ATT → OFF

< AM Tuner Section >

- Connect the AM loop antenna to the AM ANT terminals.
- Connect the AM dummy used for adjustment to AM SG.
- The accuracy of AM SG should be within  $\pm 0.1\text{kHz}$ .

Step	Adjustment item	Test point	Instrument (signal)	Adjustment location	Adjustment method	Rating or standard	Remarks
0					By shorting across the terminals TP(K4) and TP(T6) in FM mode, AM 1,080kHz, FM 92.6 MHz and FM 98.0MHz are automatically stored into preset memories 8 to 10 respectively.		
1	Sensitivity confirmation	AM ANT  OUTPUT L or R	AM SG 630kHz $\pm 0.1\text{kHz}$ 1440kHz $\pm 0.1\text{kHz}$ 1080kHz $\pm 0.1\text{kHz}$ (400Hz 30% modulation)		Confirm sensitivity by checking to see if tuning is made at the standard values.	58dB $\mu$ or lower 58dB $\mu$ or lower 58dB $\mu$ or lower	When sensitivity is improper, adjust as described in steps (1) to (5).
2	Full-scale signal level indicator adjustment	AM ANT	AM SG (1080kHz $\pm 0.1\text{kHz}$ ) 90dB $\mu$ 400Hz 30% modulation	VR204	Adjust so that all signal indicators light up when tuned.		When VR210 has been turned after adjustment, re-adjust VR204.
3	Auto research reception confirmation	AM ANT	AM SG (1080kHz $\pm 0.1\text{kHz}$ ) 60dB $\mu$ 400Hz 30% modulation	TUNING button UP, DOWN	Make sure that auto search reception can be made with the TUNING button for both UP and DOWN operations.		TUNING MODE SW $\rightarrow$ AUTO

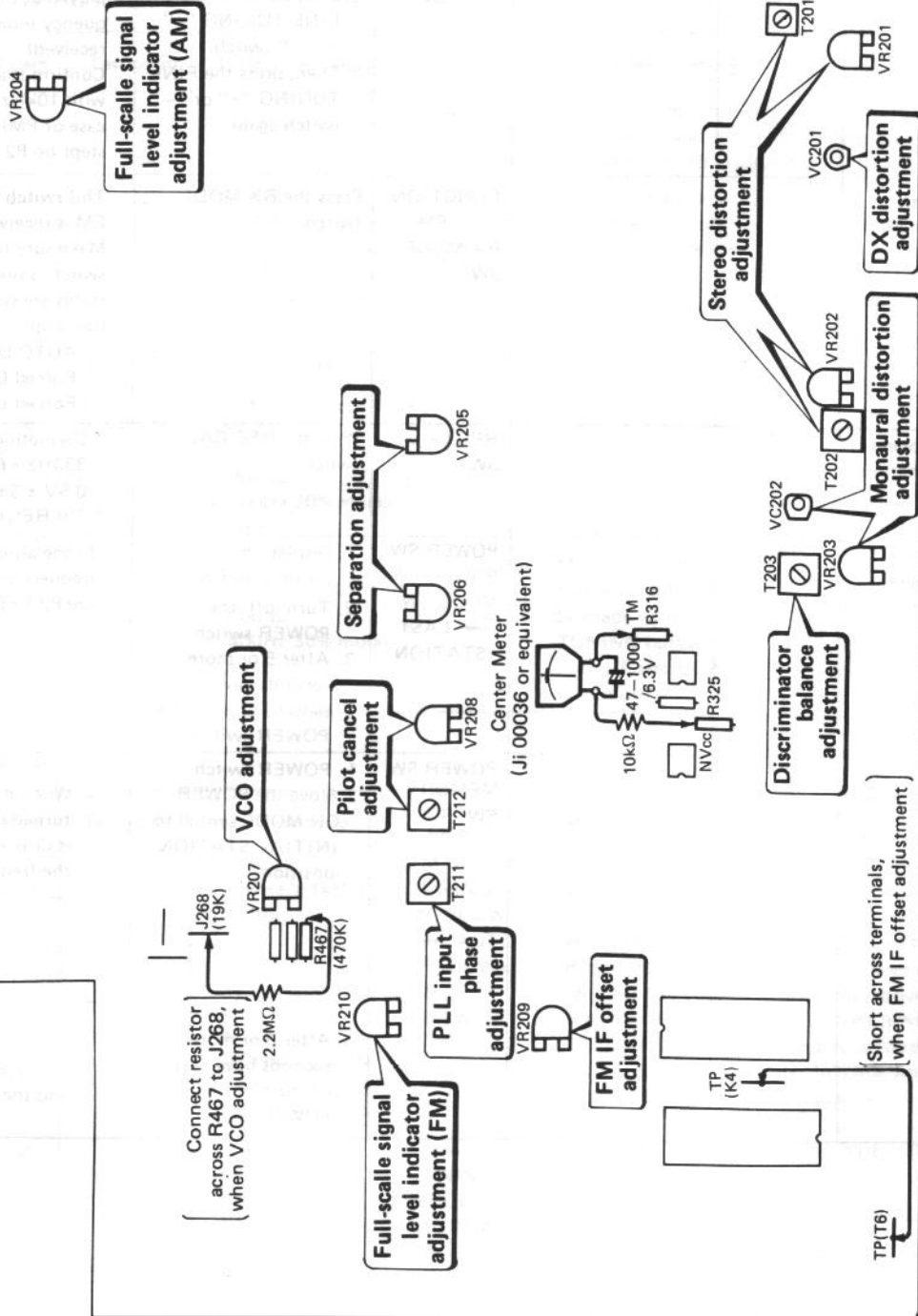
< Digital Control Section >

Step	Adjustment item	Test point	Instrument (signal)	Adjustment location	Adjustment method	Rating or standard	Remarks
1	Preset memory confirmation	300 $\Omega$ FM ANT  AM ANT	FM SG (98MHz $\pm 1\text{kHz}$ ) 70dB $\mu$  AM SG (1080kHz $\pm 0.1\text{kHz}$ ) 400Hz 30% modulation	FM, AM SW TUNING MODE SW $\rightarrow$ AUTO UP, DOWN SW CH SW	1. Receive FM98MHz and store into CH1. 2. Receive AM1080kHz and store into CH2. 3. Press CH1 and CH2 switches and confirm that 98MHz and 1080kHz are displayed, respectively.	1. After tuning, press the MEMORY button, and while the MEMORY indicator is on, press the PRESET button P1. The MEMORY indicator goes off, and when the indicator above the PRESET button P1 lights up, the FM frequency is stored. 2. In the same way, store the AM frequency.	
2	TUNING mode manual/mono operation confirmation			FM AM SW TUNING MODE SW UP, DOWN SW	1. Move the TUNING MODE switch to MAN'L/MONO position. 2. Confirm that manual search reception can be made with the TUNING button for UP and DOWN operations. Also confirm that when FM is received, forced monaural is selected.	The TUNING MODE LED turns off.  The FM STEREO LED turns off.	

Step	Adjustment item	Test point	Instrument (signal)	Adjustment location	Adjustment method	Rating or standard	Remarks
3	Fine tuning operation confirmation			FINE, TUNING +, -SW	<ol style="list-style-type: none"> <li>1. Display the frequencies in P1 and P2.</li> <li>2. Press either of the FINE TUNING "+" or "-" switch.</li> <li>3. Then, press the FINE TUNING "+" or "-" switch again.</li> </ol>		<p>The FINE TUNING LED turns on. At this time, "0" is displayed at the 10kHz area of frequency indicator. (When FM is received).</p> <p>Confirm that search is made with 10kHz steps on P1 (in case of FM) and with 1kHz steps on P2 (in case of AM).</p>
4	RM mode operation confirmation			FUNCTION FM RX MODE SW	Press the RX MODE switch.		<p>This switch function only when FM is received.</p> <p>Make sure that each time the switch is pressed, the following 3 states are switched and each LED lights up.</p> <p>( AUTO DX → )  ( Forced DX → )  ( Forced LOCAL → )</p>
5	REC CAL operation confirmation			REC CAL SW	Press the REC CAL switch.		<p>* Oscillating output 333Hz ± 66Hz 0.5V ± 3dB</p> <p>* The REC CAL LED should flicker.</p>
6	Last channel memory operation confirmation			POWER SW POWER ON MODE SW → LAST STATION	<ol style="list-style-type: none"> <li>1. Display the frequencies in P2.</li> <li>2. Turn off the POWER switch.</li> <li>3. After 5 or more seconds have passed, turn on the POWER switch.</li> </ol>		In the aforementioned state, the frequency in P2 is displayed and the P2 LED turns on.
7	Initial station set function confirmation			POWER SW MEMORY SW	<ol style="list-style-type: none"> <li>1. POWER switch.</li> <li>2. Move the POWER ON MODE switch to INITIAL STATION position.</li> <li>3. After 5 or more seconds have passed, turn on the POWER switch</li> </ol>		<p>→ When the POWER switch is turned on, the frequency in P1 is displayed without respect to the frequency which is displayed before the POWER switch is turned off. Therefore, before turning off the POWER switch, display a frequency which has been set in other than P1.</p> <p>At this time, confirm that the frequency in P1 is displayed and also the P1 LED turns on.</p>

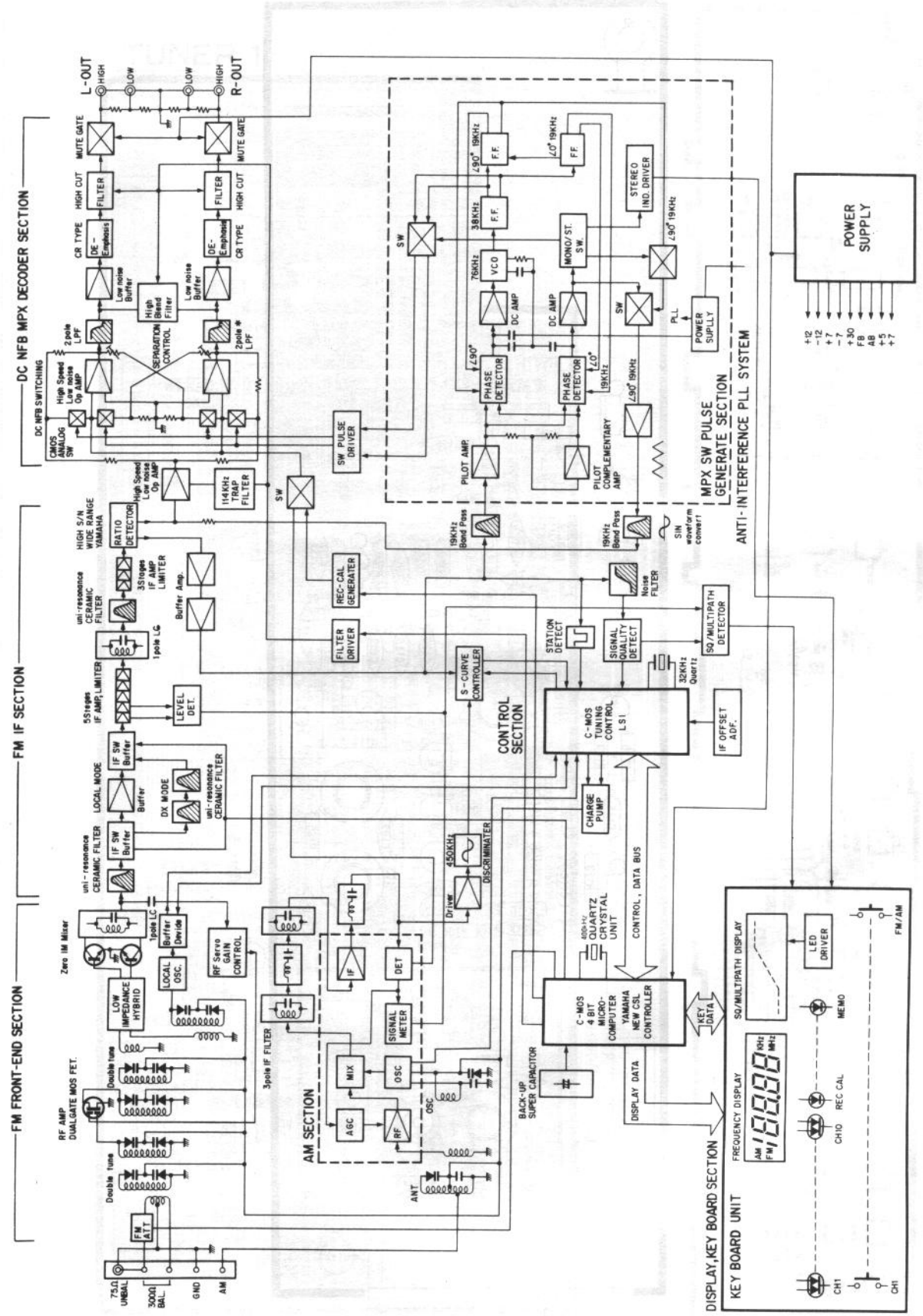
TEST POINTS

TUNER CIRCUIT BOARD



PRINTED CIRCUIT BOARD (Pattern Side)

# BLOCK DIAGRAM



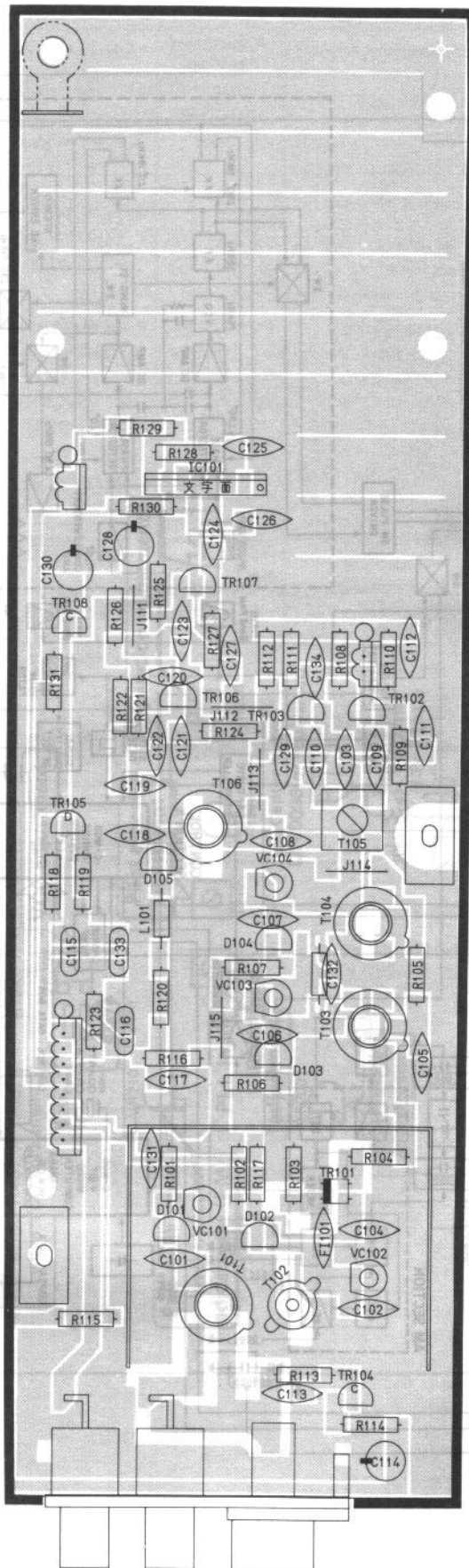


# PRINTED CIRCUIT BOARD (Pattern Side)

BLOCK DIAGRAM

## FRONT END CIRCUIT BOARD

1  
2  
3  
4  
5  
6  
7



1

# TUNER CIRCUIT BOARD

## TUNER 1

2

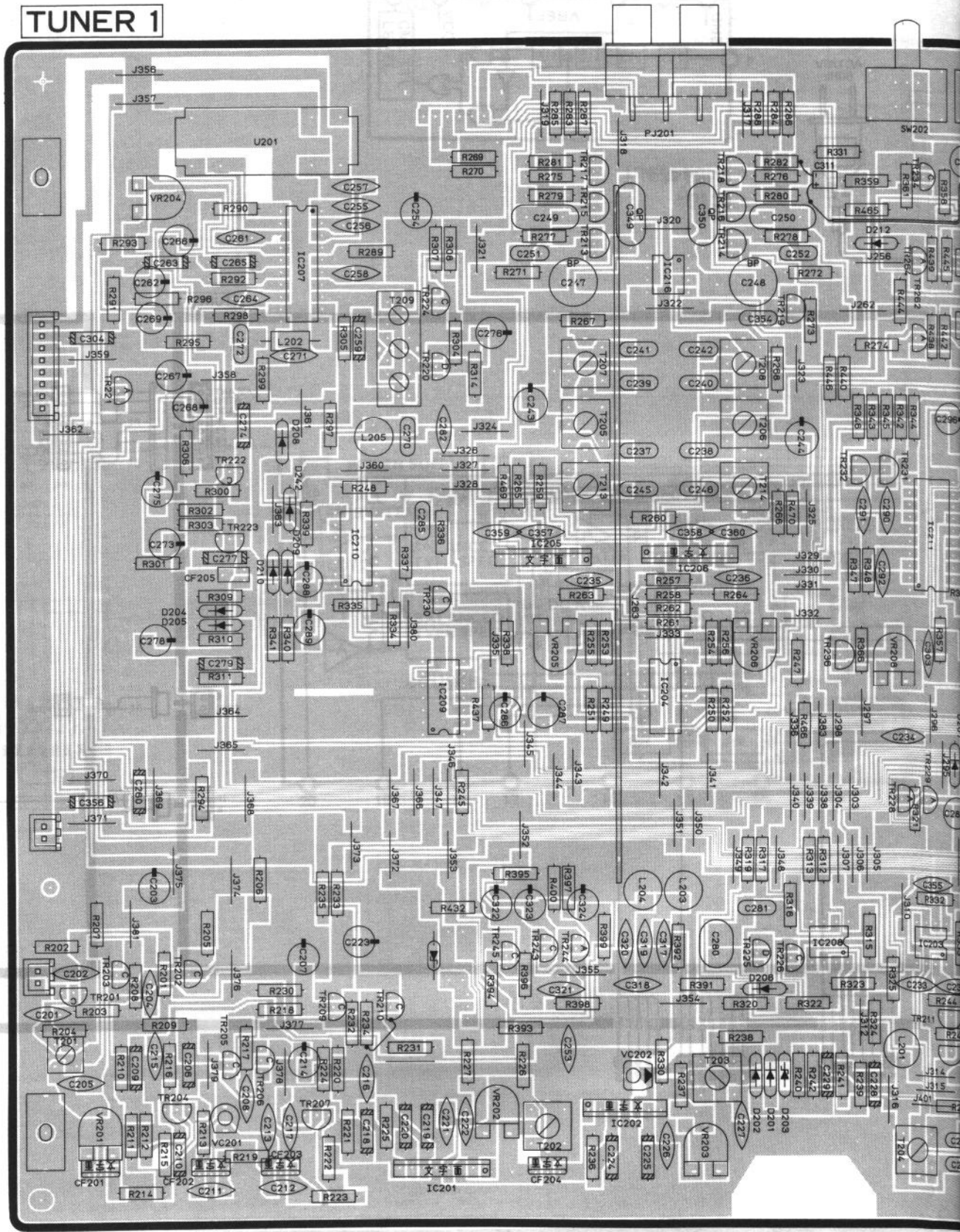
3

4

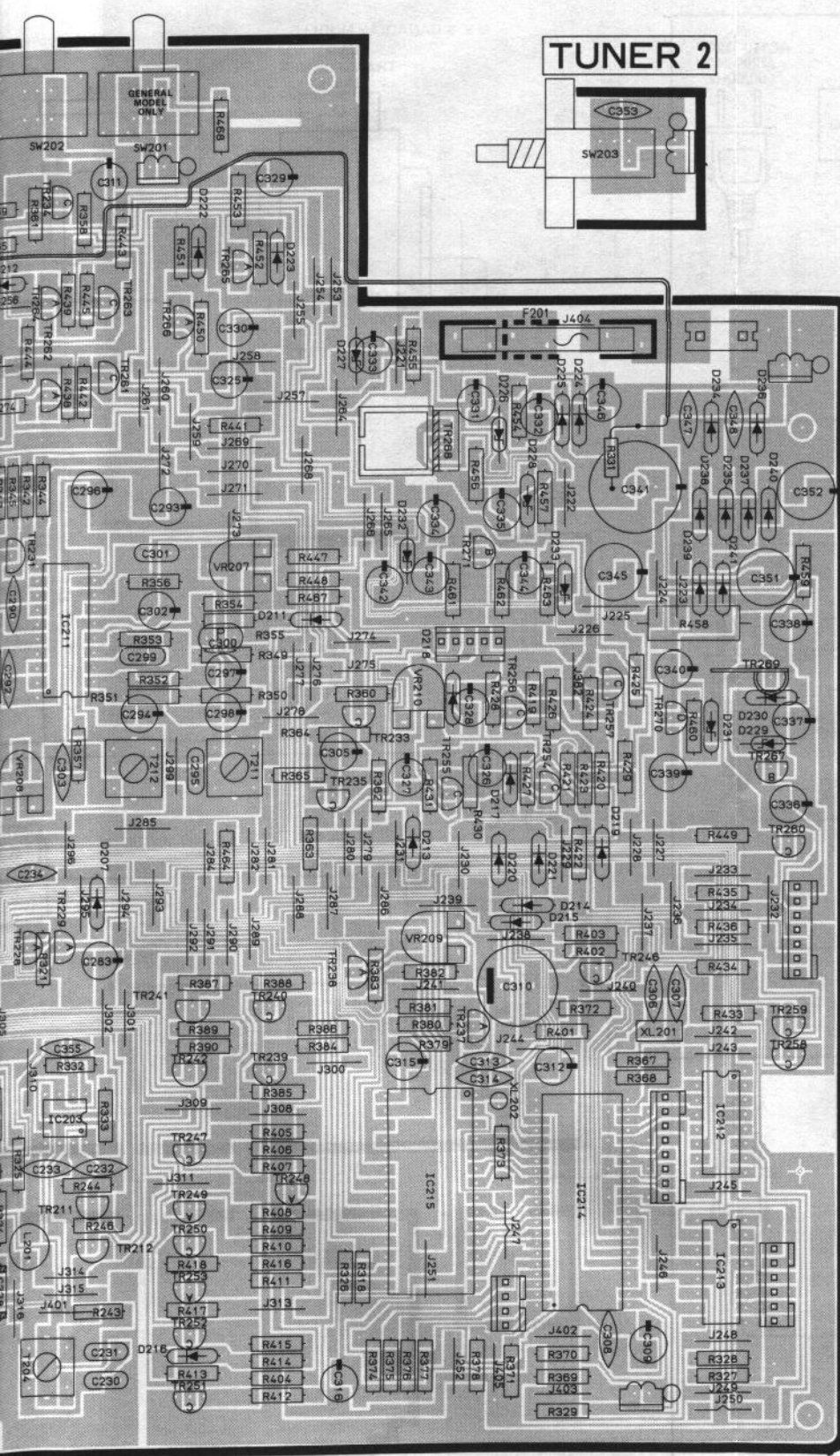
5

6

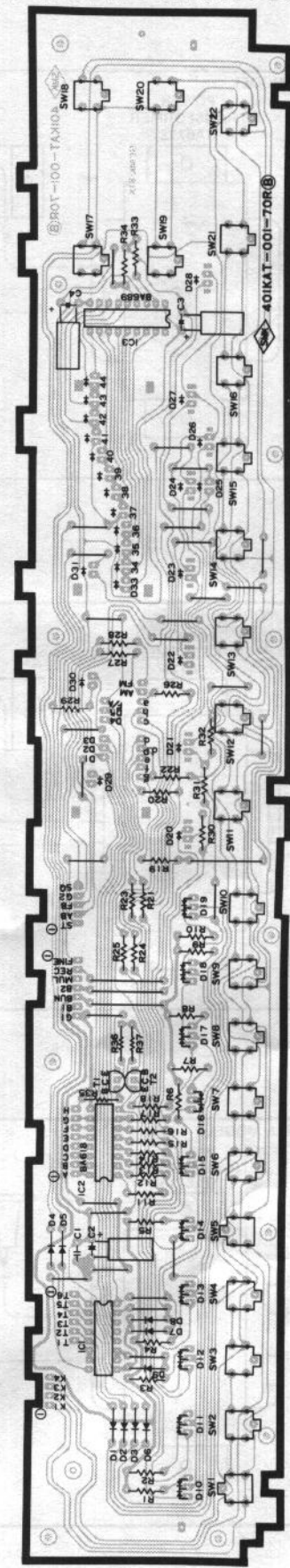
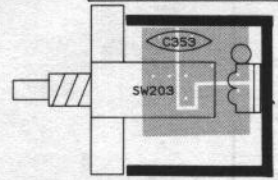
7



# KEYBOARD CIRCUIT BOARD



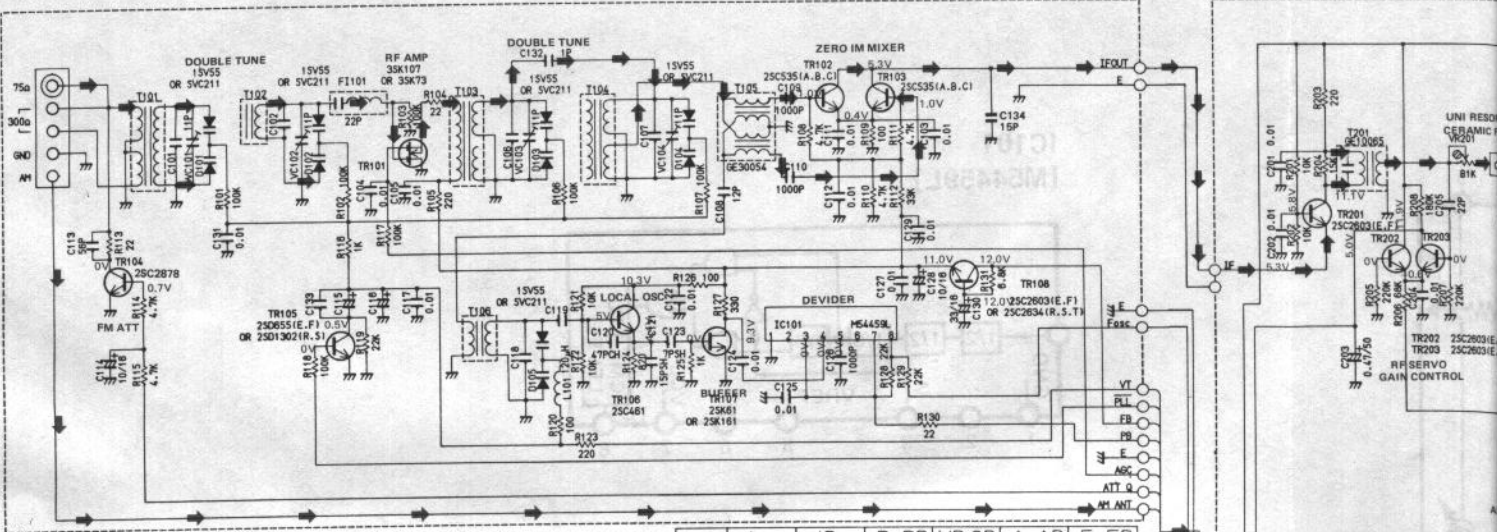
## TUNER 2



# SCHEMATIC DIAGRAM

1

2



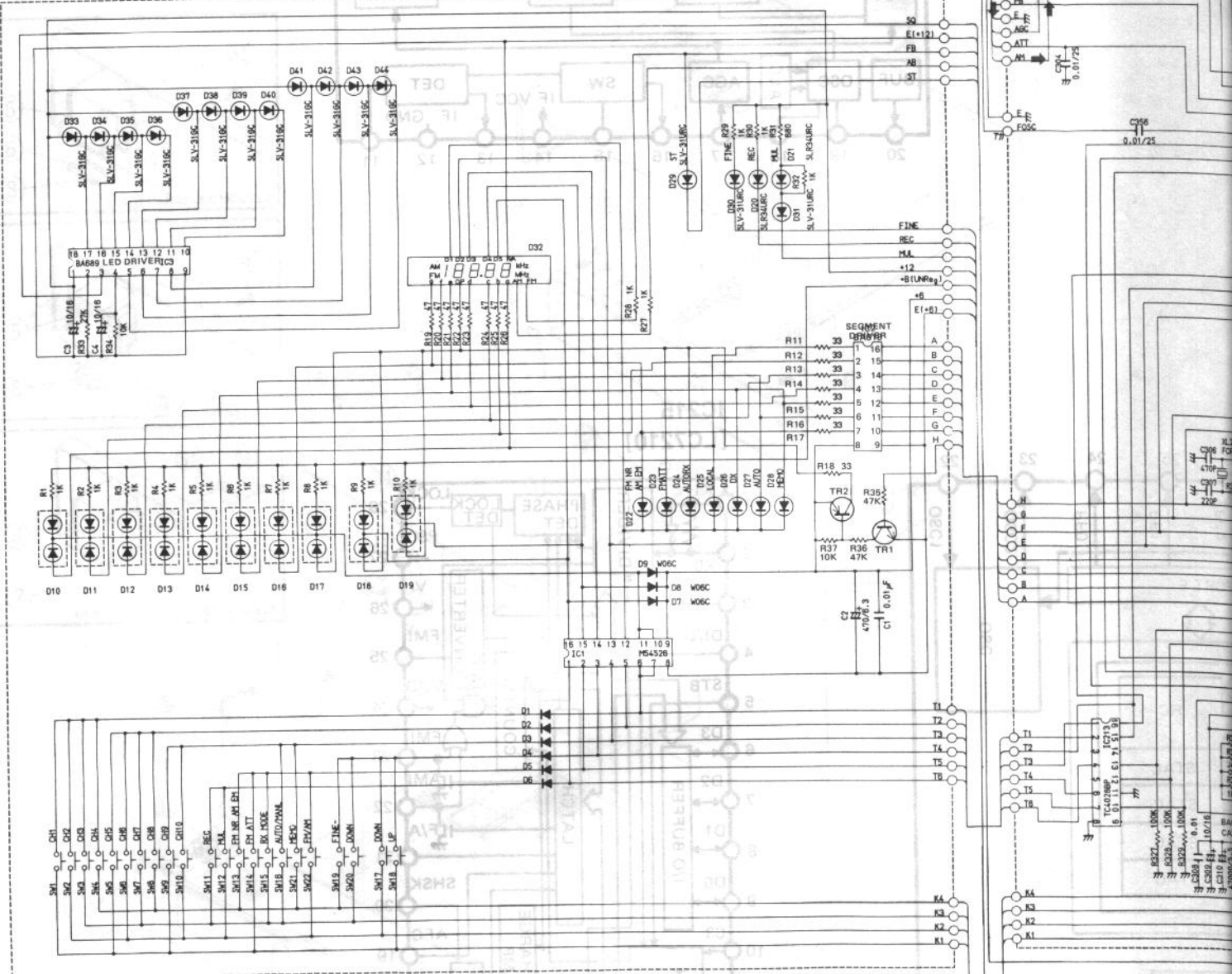
最終部品番号	欠番
R	131
DI	105
Tr	108
C	133
VC	104
L	101

	J	JB	R, RB	UB, CB	A, AB	E, EB
T101	6E10068	6E10068	6E10069	6E10069	6E10069	6E10069
T102	6E30057	6E30057	6E10071	6E10071	6E10071	6E10071
T103	6E30058	6E30058	6E30059	6E30059	6E30059	6E30059
T104	6E30058	6E30058	6E30059	6E30059	6E30059	6E30059
T106	6E10067	6E10067	6E10070	6E10070	6E10070	6E10070
C101	7PQH	7PQH				
C102	7PQH	7PQH				
C106	7PQH	7PQH				
C107	7PQH	7PQH				
C115	+N 2.2/50		+N 2.2/50	+N 2.2/50	+N 2.2/50	+N 2.2/50
C118	+N 1/50		+N 1/50	+N 1/50	+N 1/50	+N 1/50
C118	7PWH	7PWH				
C119	7PSH	7PSH	1SPSH	1SPSH	1SPSH	1SPSH
C133						

(NOTE)  
 \* All voltages measured with a 10 MΩ/V DC electric volt meter, under no-signal condition.  
 FUNCTION - FM TUNING MODE - AUTO  
 RX MODE - AUTO LOCAL REC CAL - OFF  
 The voltages are measured at FM reception mode. Only the voltages at ( ) are at AM reception mode.  
 \* Schematic Diagram is subject to change without notice.

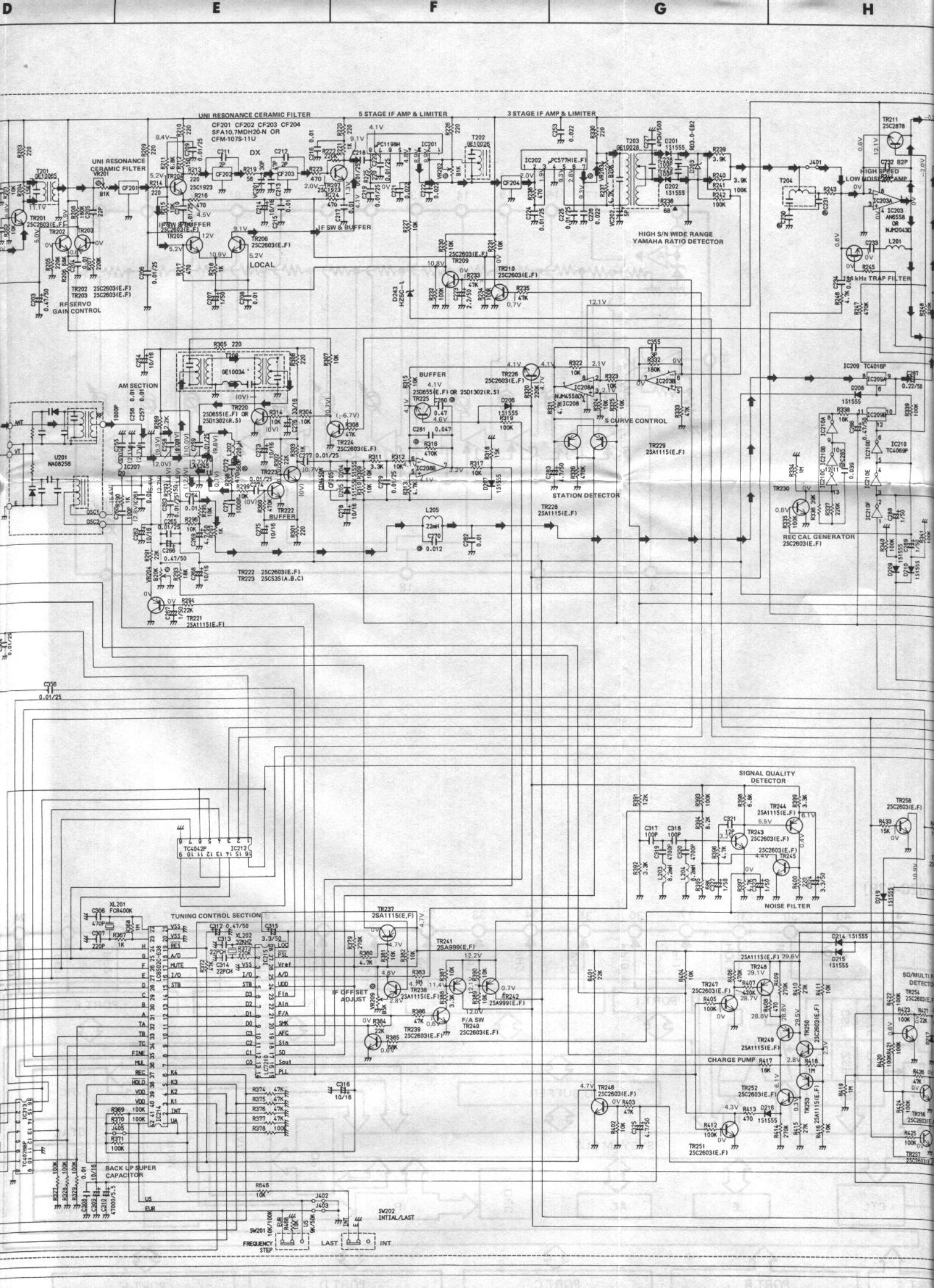
3

4

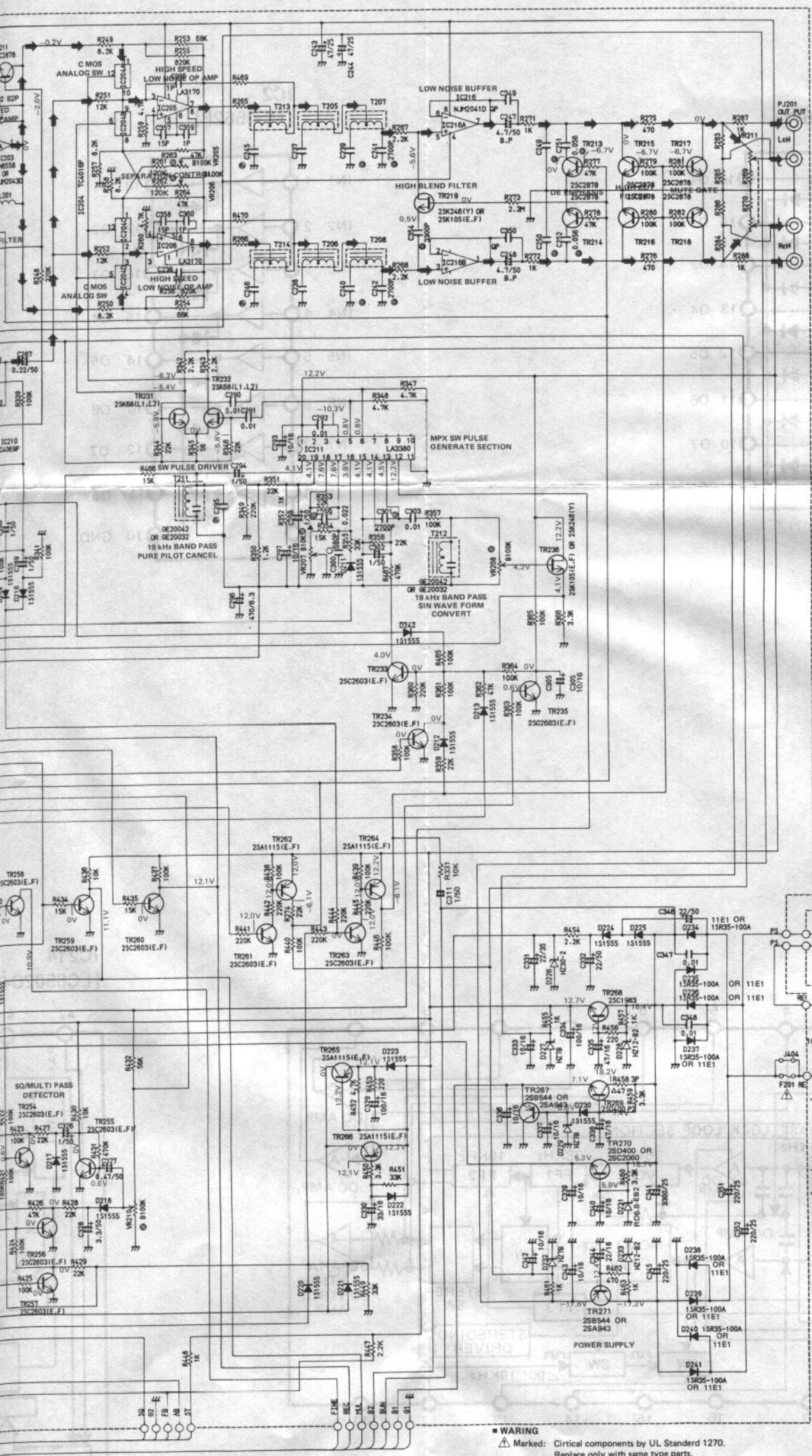


5

6



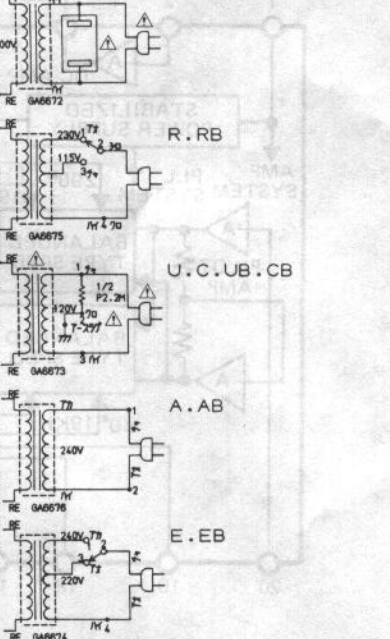
IC BLOCK DIAGRAM



	J	JB	R.RB	U.C	UB.CB	A.AB	E.EB
J401	Set	Set	Set	Set	Set		
J402	Set	Set					
J403	Set	Set		Set			
J404	Set	Set	Set				
J405							Set
PJ201	LB40104	LB40125	LB40104	LB40104	LB40104	LB40104	LB40104
TR212						OR 25K105(E.F.)	
T204							GE20048
T205	GE20028	GE20029	GE20026	GE20026	GE20026	GE20026	GE20026
T206	GE20028	GE20029	GE20026	GE20026	GE20026	GE20026	GE20026
T207	GE20027	GE20030	GE20027	GE20027	GE20027	GE20027	GE20027
T208	GE20027	GE20030	GE20027	GE20027	GE20027	GE20027	GE20027
T213							GE20028
T214							GE20028
L201	22mH	22mH	22mH	22mH	22mH		
C230							680P
C231							330P
C233	82P	82P	82P	82P	82P		
C237	680P	1500P	680P	680P	680P		680P
C238	680P	1500P	680P	680P	680P		680P
C239	2200P	2700P	2200P	2200P	2200P		2200P
C240	2200P	2700P	2200P	2200P	2200P		2200P
C245	470P						
C248	470P						
C249	0.058	0.058	0.082	0.082	0.058		0.058
C250	0.058	0.058	0.082	0.082	0.058		0.058
C295							680P
C349							100V GP
C350							100V GP
R488			10K				
R243							2.2K
R244	10K	10K	10K	10K	10K		27K
R245	2.2K	2.2K	2.2K	2.2K	2.2K		
R265			4.7K				
R266			4.7K				
R268			1K				
R270			1K				
R283	4.7K		4.7K	4.7K	4.7K		4.7K
R284	4.7K		4.7K	4.7K	4.7K		4.7K
R285	4.7K		4.7K	4.7K	4.7K		4.7K
R286	4.7K		4.7K	4.7K	4.7K		4.7K
R489	4.7K		4.7K	4.7K	4.7K		4.7K
R470	4.7K		4.7K	4.7K	4.7K		4.7K
VR211			100B				
SW201			KA60128				
F201				1.0A250V T1.0A250V			

	FINAL REF NO.	
R	470	R454 R331
C	360	C284 C305 C311
D	242	
VR	211	
CF	205	
Tr	271	TR227
T	214	T210

	INTERCHANGEABLE
Tr	MPN 25C2603(E.F.) or 25C2634(R.S.T) PMP 25A1115(E.F.) or 25A1127(R.S.T) EXCEPT TR241, 242
D1	151555 or 152473 EXCEPT D201, 202



WARNING  
 ⚠ Marked: Critical components by UL Standard 1270.  
 Replace only with same type parts.