Service Manual

ATS-404

CONTENTS

SPECIFICATION

FM

TEST ITEM	CONDITION	NORMAL	LIMIT	UNIT
Tuning Range	Min.	87.5	±0.05	MHz
	Max.	108	±0.05	
Intermediate Frequency		10.7	±0.05	MHz
Max. Sensitivity	90 MHz		20	dBμ
	98 MHz		20	
	106 MHz		20	
Usable Sensitivity	90 MHz	20	26	dBμ
	98 MHz	20	26	
	106 MHz	20	26	
Image Rejection	106 MHz	30	24	dB
I.F. Rejection	90 MHz	55	50	dB
3dB Limiting (10 mV)	98 MHz	18	24	dBμ
Min. Output		3	5	mV
Tuning Indication Sensitivity		22	26	dBμ
Stereo Indicator Sensitivity		16	22	dBμ
Stereo Separation		26	20	dB
S/N Ratio		50	40	dB
Current Consumption		60	80	mA
AM Suppression		40	35	dB
Frequency Response)			150	Hz
-3 dB w/50μS			6.3	kHz
Output Power 75k DeV.			350	mW
		350	285	
T.H.D. 75 kHz		1	3	%
Overload Capacity		106	100	dBμ
TONE. ACTION	MUSIC		+5	dB
	NEWS		-5	dB
Lowest Battery Voltage	98 MHz	4.0	4.2	V

Supply Voltage : DC 6 V	R.O. : 50 mW	Load : 8 ohm	Modulation : 1kHz/22.5 kHz Dev.

SW1

TEST ITEM	CONDITION	NORMAL	LIMIT	UNIT
Tuning Range	Min.	2.30	±0.05	kHz
	Max.	7.35	±0.05	
Max. Sensitivity	3.2 MHz		28	dBμ
	4.75 MHz		24	
	7.1 MHz		24	
Usable Sensitivity	3.2 MHz	28	34	dBμ
	4.75 MHz	24	30	
	7.1 MHz	24	30	
Image Rejection	7.1 MHz	14	8	dB
S/N Ration	4.75 MHz	45	40	dB
Overload Capacity	4.75 MHz	80	70	dBμ
Tuning Indication Sensitivity	4.75 MHz	24	30	dBμ
Auto. Scan.	4.75 MHz	24	30	dBμ

Supply Voltage : DC 6 V	R.O. : 50 mW	Load : 8 ohm	Modulation : 1kHz/30%

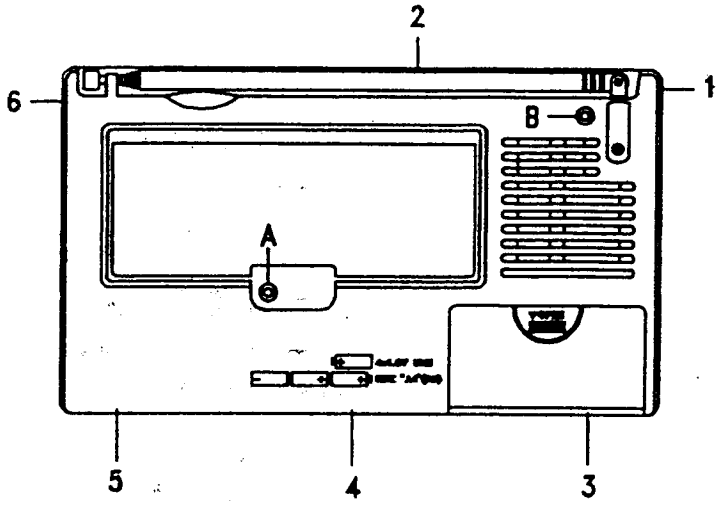
MW

TEST ITEM	CONDITION	NORMAL	LIMIT	UNIT
Tuning Range	Min.	531	±3.5	kHz
	Max.	1602	±3.5	kHz
Intermediate Frequency	Min.	455	±3.5	kHz
Max. Sensitivity	603 kHz	54	60	dBμ/m
	999 kHz	54	60	
	1404 kHz	54	60	
Usable Sensitivity	603 kHz	60	66	dBμ/m
	999 kHz	60	66	
	1404 kHz	60	66	
Image Rejection	1404kHz	32	26	dB
I.F. Rejection	603 kHz	36	30	dB
Selectivity (±10 kHz)	999 kHz	60	50	dB
Bandwidth (-6 dB)			6-11	kHz
T. H. D. 30% Mod.		2	4	%
Lowest Battery Voltage		4.0	4.2	V
Auto.Scan.Stop.Sens.		60	66	dBμ/m
S/N Ratio		40	35	dB
Current Consumption		60	80	mA
Frequency Response (-6dB)		150	250	Hz
		2.4	2	kHz
Output Power 80% Mod.			350	mW
		350	285	
Overload Capacity			106	dBμ/m
A.G.C. F.O.M.		42	36	dB
Whistle Modulation	2 IF / 3 IF	4	10	%
Supply Voltage : DC 6 V	R.O. : 50 mW	Load : 8 ohm	Modulation : 1kHz/30%	

SW2

TEST ITEM	CONDITION	NORMAL	LIMIT	UNIT
Tuning Range	Min.	7.355	±0.05	kHz
	Max.	26.1	±0.05	
Max. Sensitivity	9.4 MHz		30	dBμ
	15.1 MHz		24	
	21.45 MHz		20	
Usable Sensitivity	9.4 MHz	30	36	dBμ
	15.1 MHz	24	30	
	21.45 MHz	20	26	
Image Rejection	21.45 MHz	12	6	dB
S/N Ration	15.1 MHz	40	34	dB
Overload Capacity	15.1 MHz	80	70	dBμ
A.G.C.F.O.M	15.1 MHz	60	50	dB
Tuning Indication Sensitivity	15.1 MHz	24	30	dBμ
Auto. Scan.	15.1 MHz	24	30	dBμ
Supply Voltage : DC 6 V	R.O. : 50 mW	Load : 8 ohm	Modulation : 1kHz/30%	

DISASSEMBLY INSTRUCTIONS



TO REMOVE BACK COVER

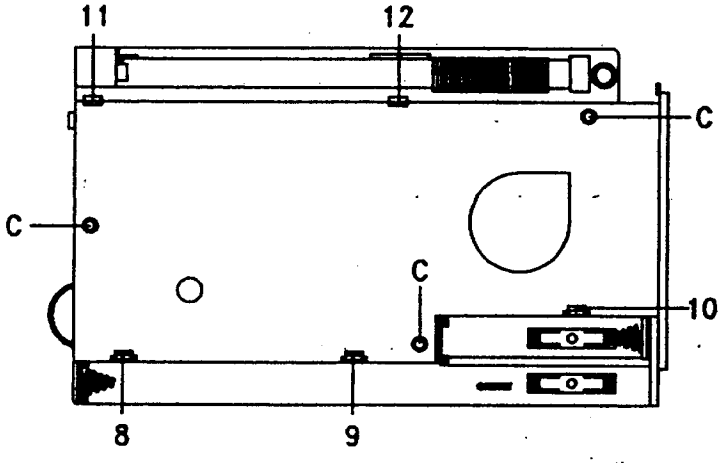
a. Unscrew 2 PTP screws A(2.6x16) ,B(2.6x28) & release back cover from hooks 1~6.

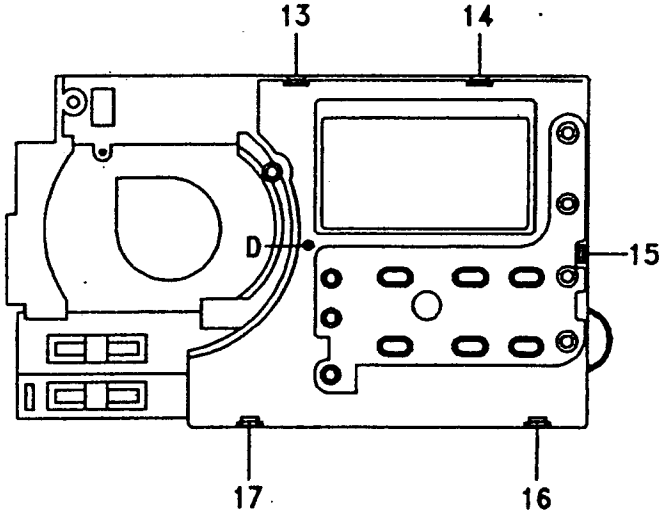
b. Separate Front and Rear Cabinet.

TO REMOVE MAIN PCB

a. Unscrew 3 PTP screws C(2x6).

b. Release Main PCB from hooks 8~12 to remove it.



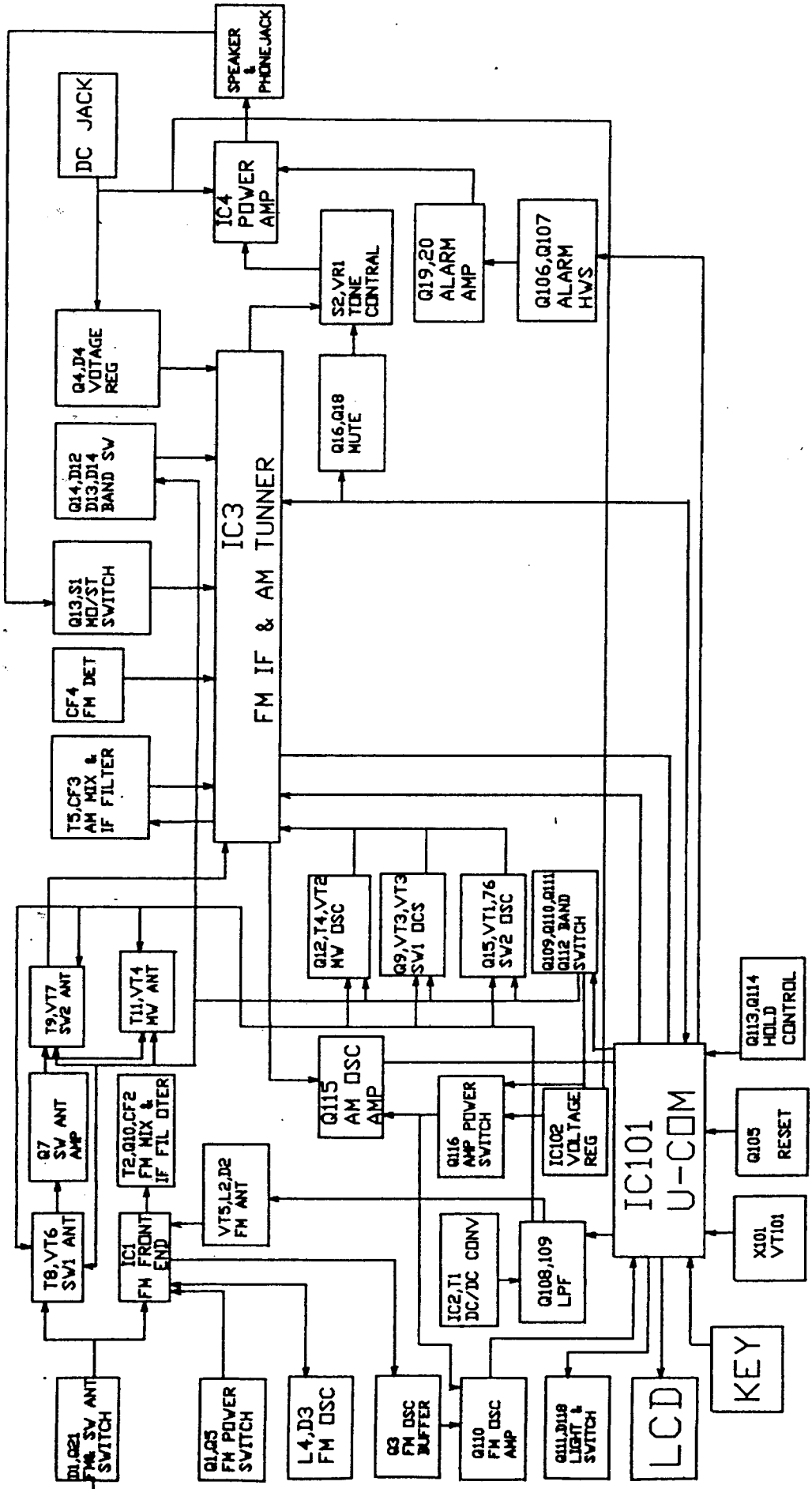


TO REMOVE CONTROL PCB

a. Unscrew 1 PTF screw D(2x6).

b. Release Control PCB from hooks 13~17 to remove it.

BLOCK DIAGRAM



ALIGNMENT INSTRUCTIONS

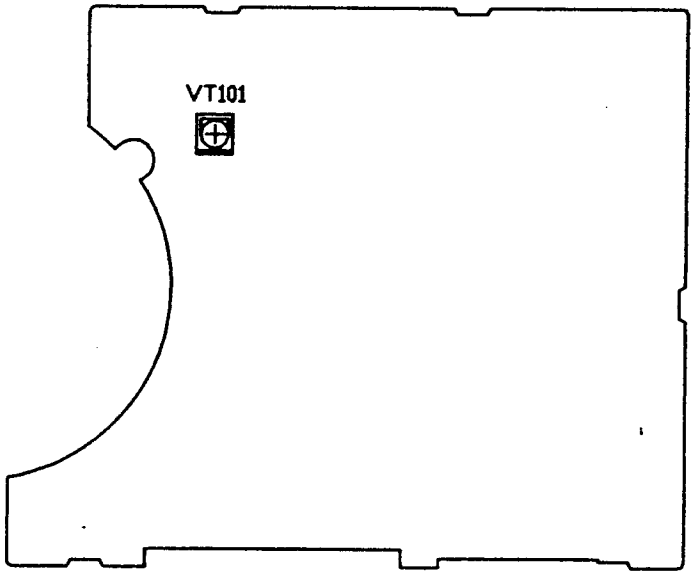
(1) ALIGNMENT FOR CLOCK TIME ACCURACY

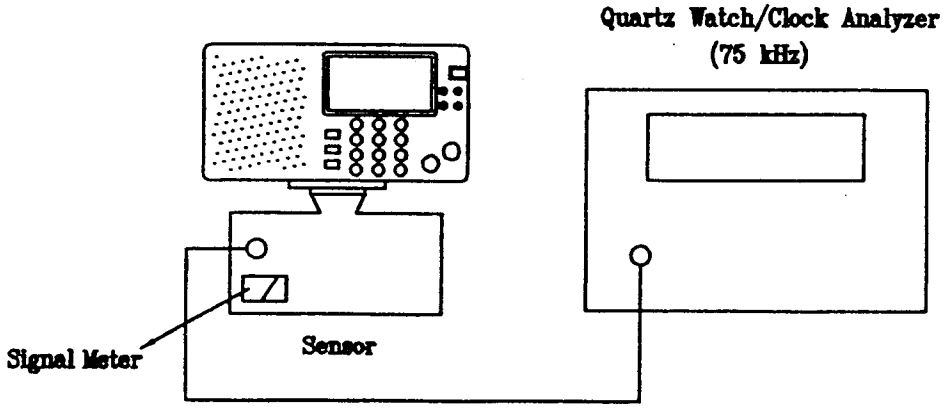
a. Required Instruments
Frequency Counter

b. Alignment Procedure

Mode	Adjustment	Procedure
	VT101	(1) Set the power switch of the radio OFF. (2) Put the PCB-C x101 of the set near the sensor of Quartz Watch/Clock Analyzer and move the Watch/Clock Analyzer. (3) Adjust VT101 to reach the range of zero error(±7.7PPM or ±20 sec/month)

c. Instrument Connection





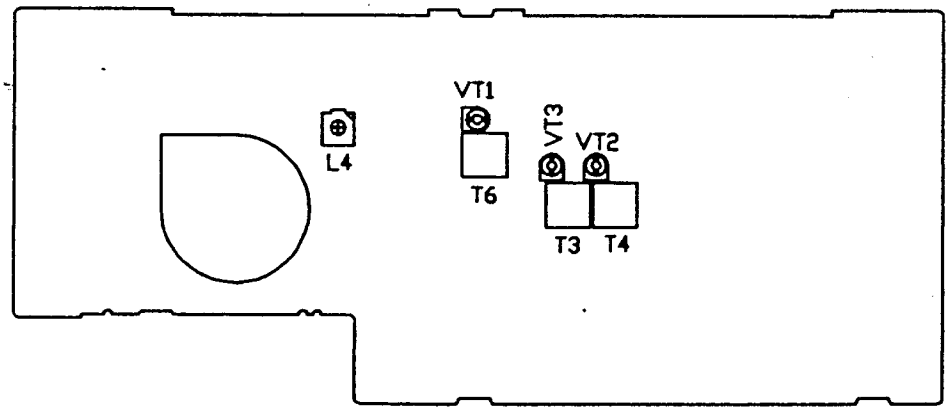
(2) ALIGNMENT FOR TUNING CAPACITOR VOLTAGE RANGE

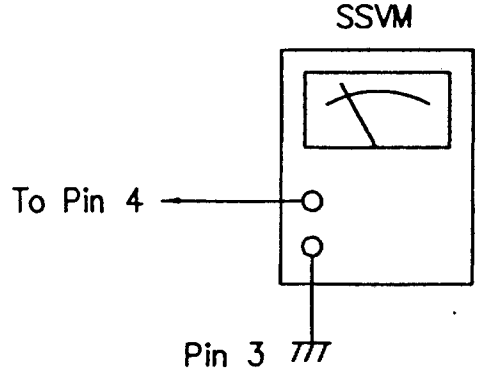
a. Required Instruments
Signal Generator
SSVM

b. Alignment Procedure

Mode	Adjustment	Procedure
		(1) Set the power switch to ON. (2) Connect a SSVM to pin 4.
FM	L4	(1) Tune FM to 108 MHz. (2) Adjust L4 to have a reading of 8.2V on the SSVM.
MW	T4 VT2	(1) Tune AM to 520 kHz. (2) Adjust T4 to have a reading of 1.2V on the SSVM. (3) Tune AM to 1710 kHz. (4) Adjust VT2 to have a reading of 8.2V on the SSVM. (5) Repeat Step 1-4.
SW1	T3 VT3	(1) Tune SW1 to 2.3 MHz. (2) Adjust T3 to have a reading of 1.2V on the SSVM. (3) Tune LW to 7.35 MHz. (4) Adjust VT3 to have a reading of 9.0V on the SSVM. (5) Repeat Step 1-4.
SW2	T6 VT1	(1) Tune SW1 to 7.355 MHz. (2) Adjust T6 to have a reading of 1.0V on the SSVM. (3) Tune LW to 26.1 MHz. (4) Adjust VT1 to have a reading of 9.0V on the SSVM. (5) Repeat Step 1-4.

c. Instrument Connection





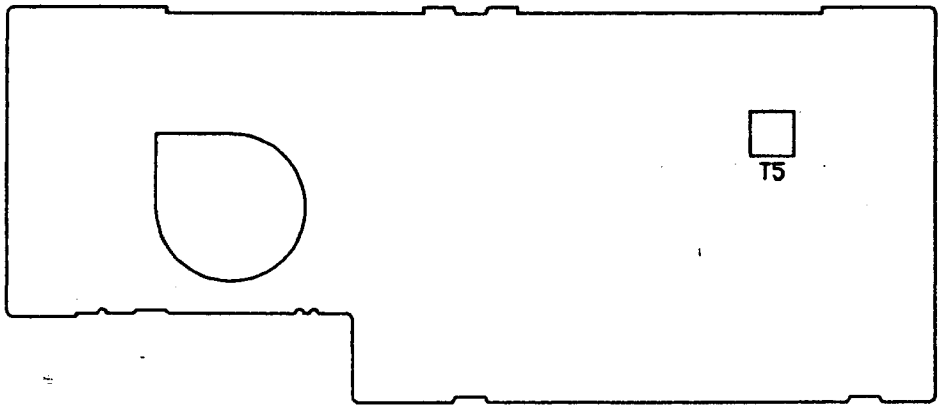
(3) ALIGNMENT FOR AM IF

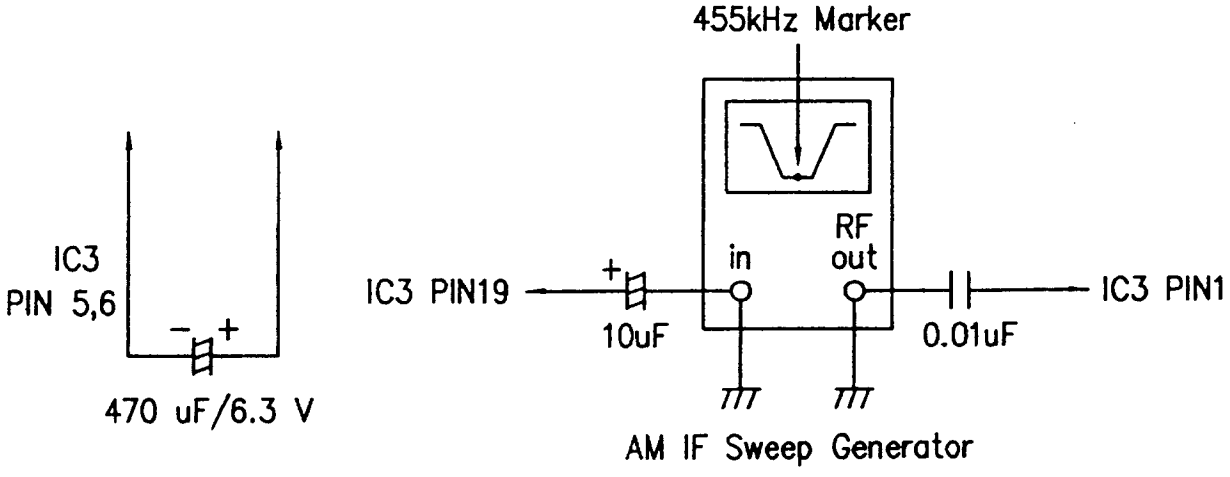
a. Required Instruments
AM IF Sweep Generator with Scope

b. Alignment Procedure

Mode	Adjustment	Procedure
AM	T5	(1) Set the power switch to the ON position. (2) Connect the input terminal of the AM IF sweep generator in series with a 10 μF capacitor to the IC3 pin 19. (3) Connect the RF output terminal of the AM IF sweep generator in series with a capacitor 0.01 μF capacitor to the IC3 pin 1. (4) Connect a 470 μF/6.3V capacitor to IC2 pin 5 and 6. (5) Adjust T5 to have a maximum output with a marker frequency of 455kHz on the sweep scope.

c. Instrument Connection





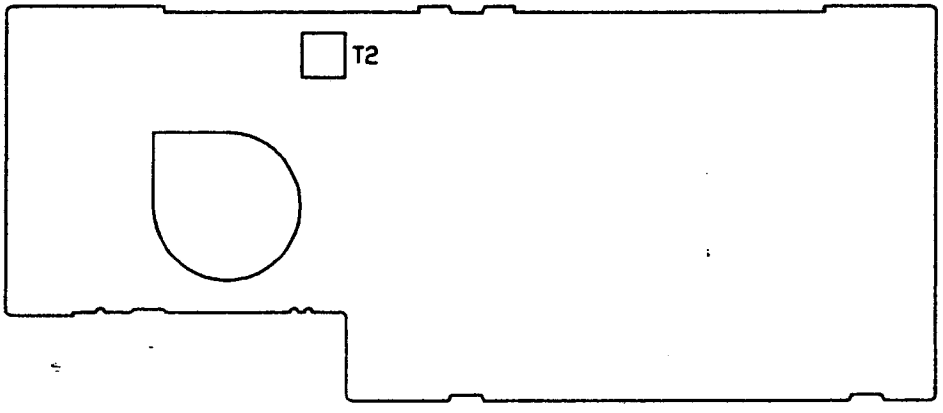
(4) ALIGNMENT FOR FM IF

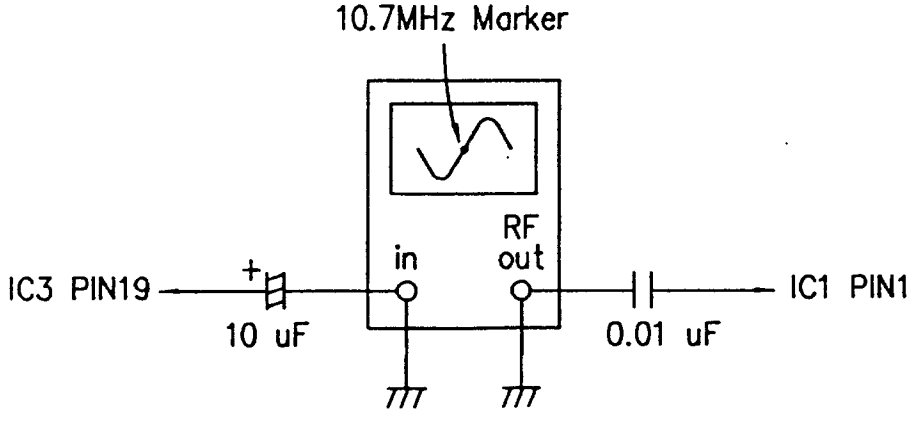
a. Required Instruments
FM RF Signal Generator With Scope

b. Alignment Procedure

Mode	Adjustment	Procedure
FM	T2	(1) Set the power switch to ON position. (2) Connect the input of the FM IF sweep generator in series with a 10 μF capacitor to the IC3 pin 19. (3) Connect the RF output of the FM IF sweep generator to the IC1 pin 1. (4) Adjust T2 for maximum output and best symmetrical S-curve with respect to the center marker frequency of 10.7 MHz.

c. Instrument Connection





FM IF Sweep Generator

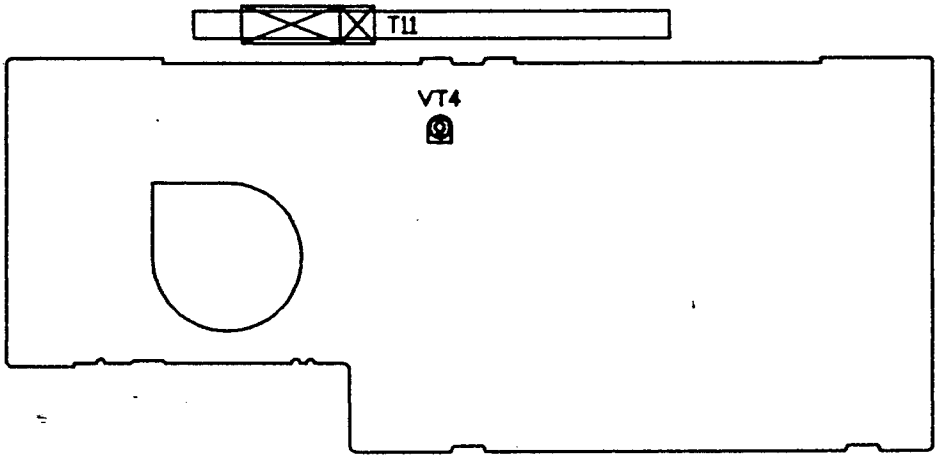
(5) ALIGNMENT FOR AM SENSITIVITY

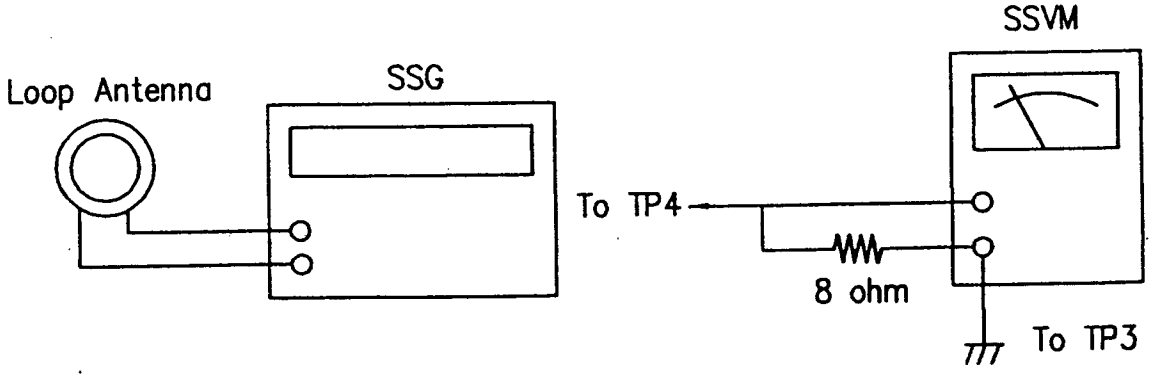
a. Required Instruments
Signal Generator
SSVM
Frequency Counter
Loop Antenna

b. Alignment Procedure

Mode	Adjustment	Procedure
AM	T11 VT4	(1) Set the power switch to ON position. (2) Connect a SSVM to the speaker. (3) Connect a signal generator to the loop antenna. (4) Set AM to 600 kHz (or 603 kHz). (5) Adjust T4 for maximum audio output. (6) Set AM to 1400 kHz (or 1404 kHz). (7) Adjust VT4 for a maximum audio output. (8) Repeat Steps 4-7 until maximum audio output is reached.

c. Instrument Connection





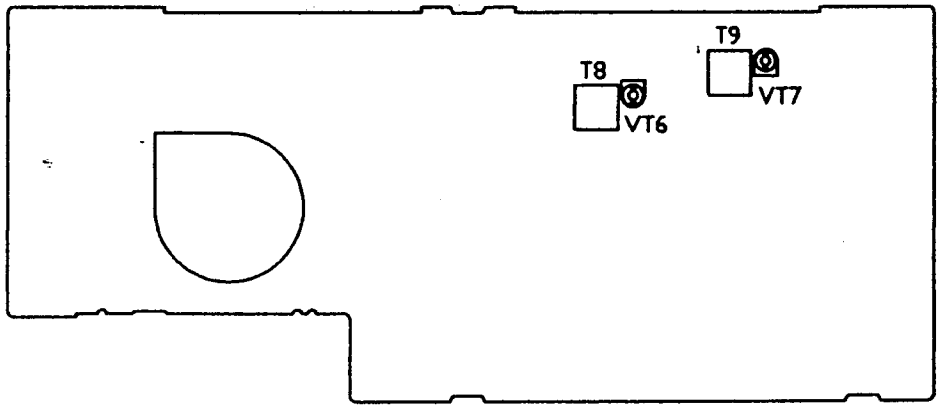
(6) ALIGNMENT FOR SW SENSITIVITY

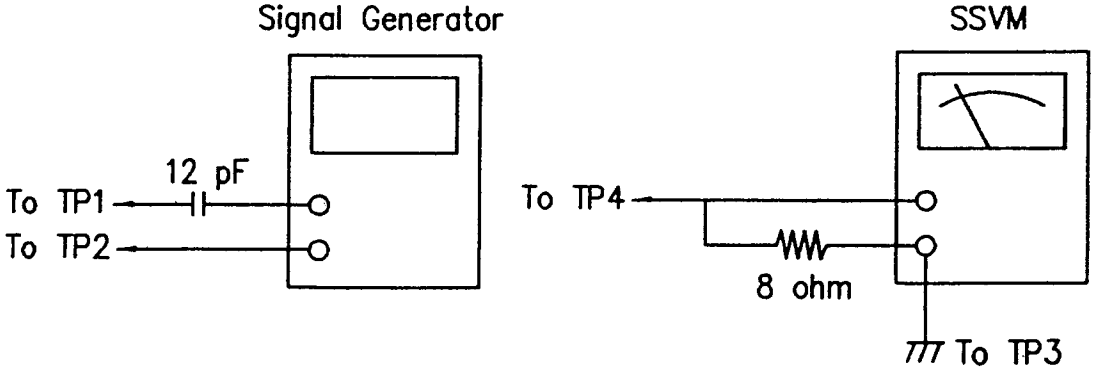
a. Required Instruments
Signal Generator
SSVM

b. Alignment Procedure

Mode	Adjustment	Procedure
SW1	T8 VT6	(1) Set the power switch to ON position. (2) Connect a SSVM to the speaker.(TP4) (3) Connect the output of the FM signal generator in series with a 12pF capacitor to the test point (TP1). (4) Set SW1 to 3.2 MHz. (5) Adjust T8 for maximum audio output. (6) Set SW1 to 7.1 MHz. (7) Adjust VT6 for maximum audio output. (8) Repeat Steps 4-7 until maximum audio output is reached.
SW2	T9 VT7	(1) Set the power switch to ON position. (2) Connect a SSVM to the speaker.(TP4) (3) Connect the output of the FM signal generator in series with a 12pF capacitor to the test point (TP1). (4) Set SW1 to 9.4 MHz. (5) Adjust T9 for maximum audio output. (6) Set SW1 to 21.45 MHz. (7) Adjust VT7 for maximum audio output. (8) Repeat Steps 4-7 until maximum audio output is reached.

c. Instrument Connection





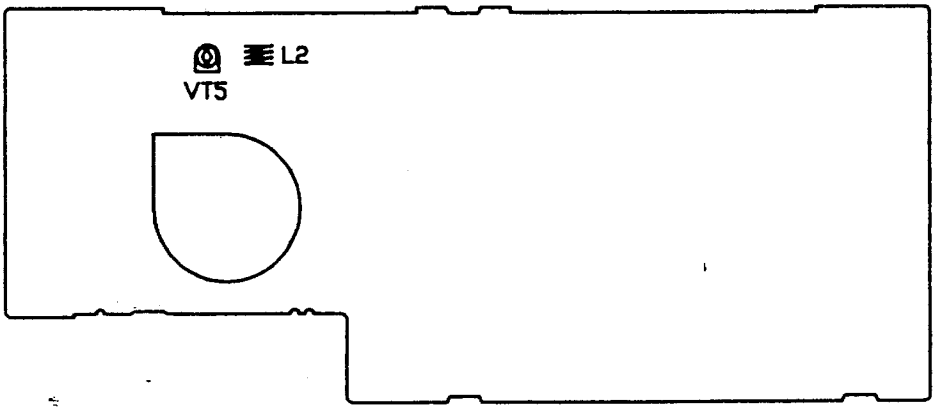
(7) ALIGNMENT FOR FM SENSITIVITY

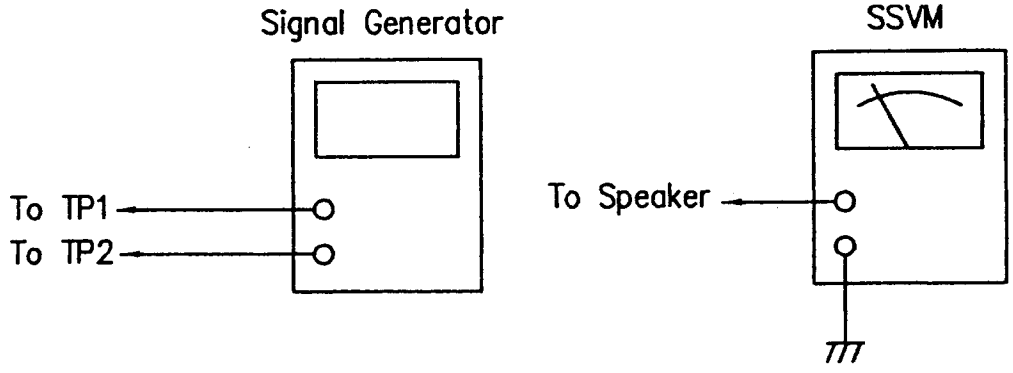
a. Required Instruments
Signal Generator
SSVM

b. Alignment Procedure

Mode	Adjustment	Procedure
FM	L2 VT5	(1) Set the power switch to ON position. (2) Connect a SSVM to the speaker. (3) Connect the output of the FM signal generator to the test point. (4) Set FM to 90 MHz. (5) Adjust L2 for maximum audio output. (6) Set FM to 106 MHz. (7) Adjust VT5 for a maximum audio output. (8) Repeat Steps 4-7 until the best sensitivity on these two frequencies is normal..

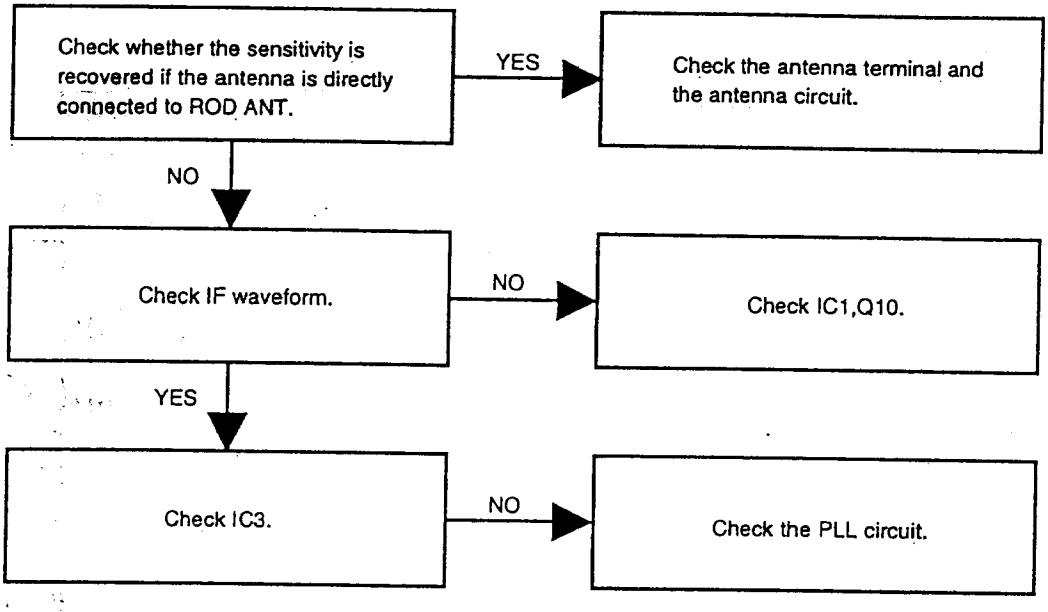
c. Instrument Connection



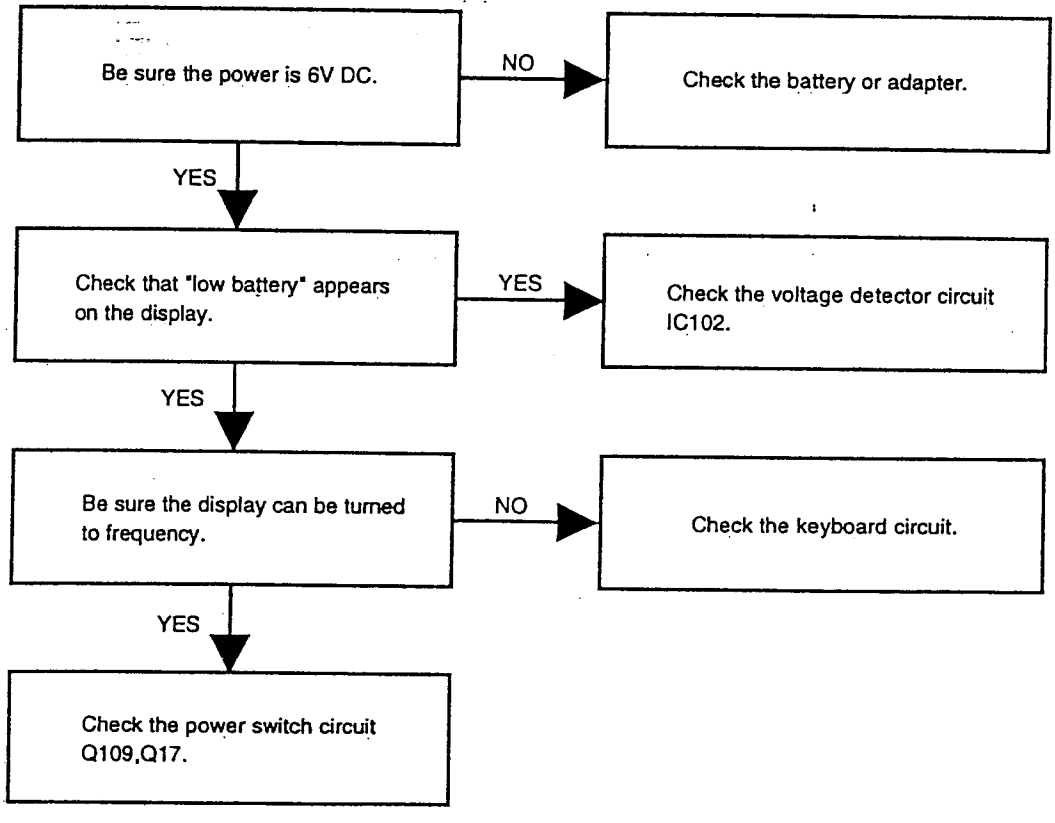


TROUBLESHOOTING

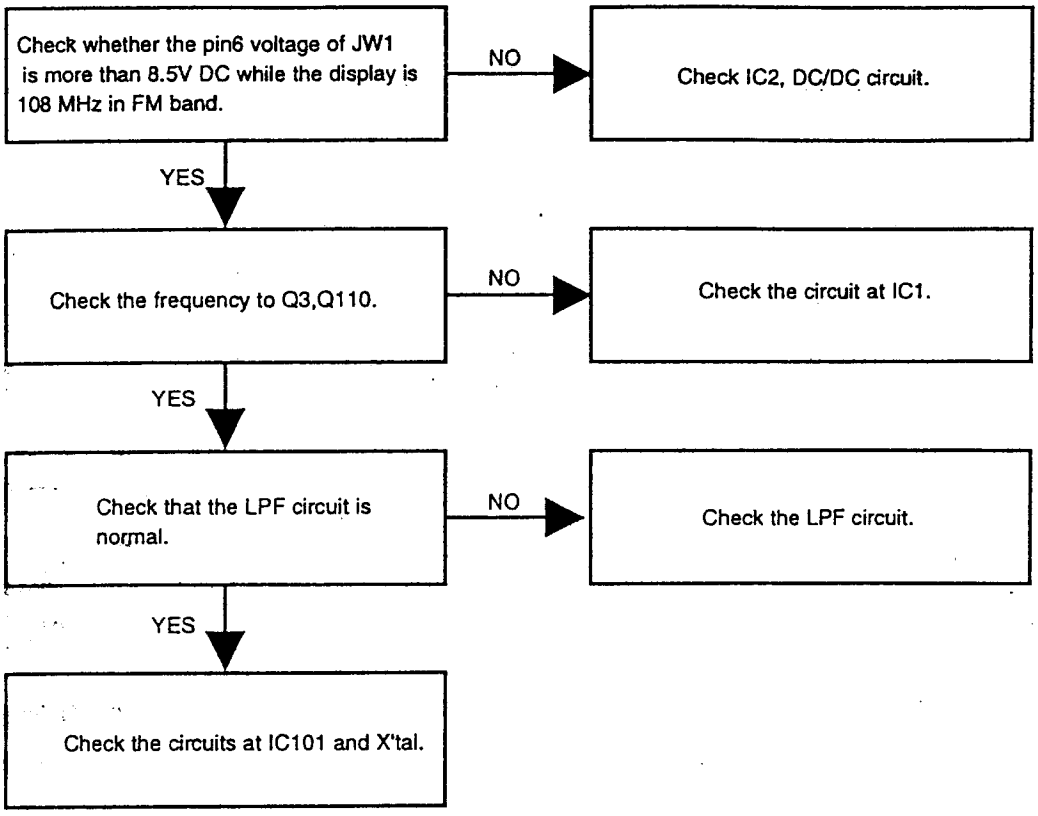
1. Weak sensitivity on FM broadcast band



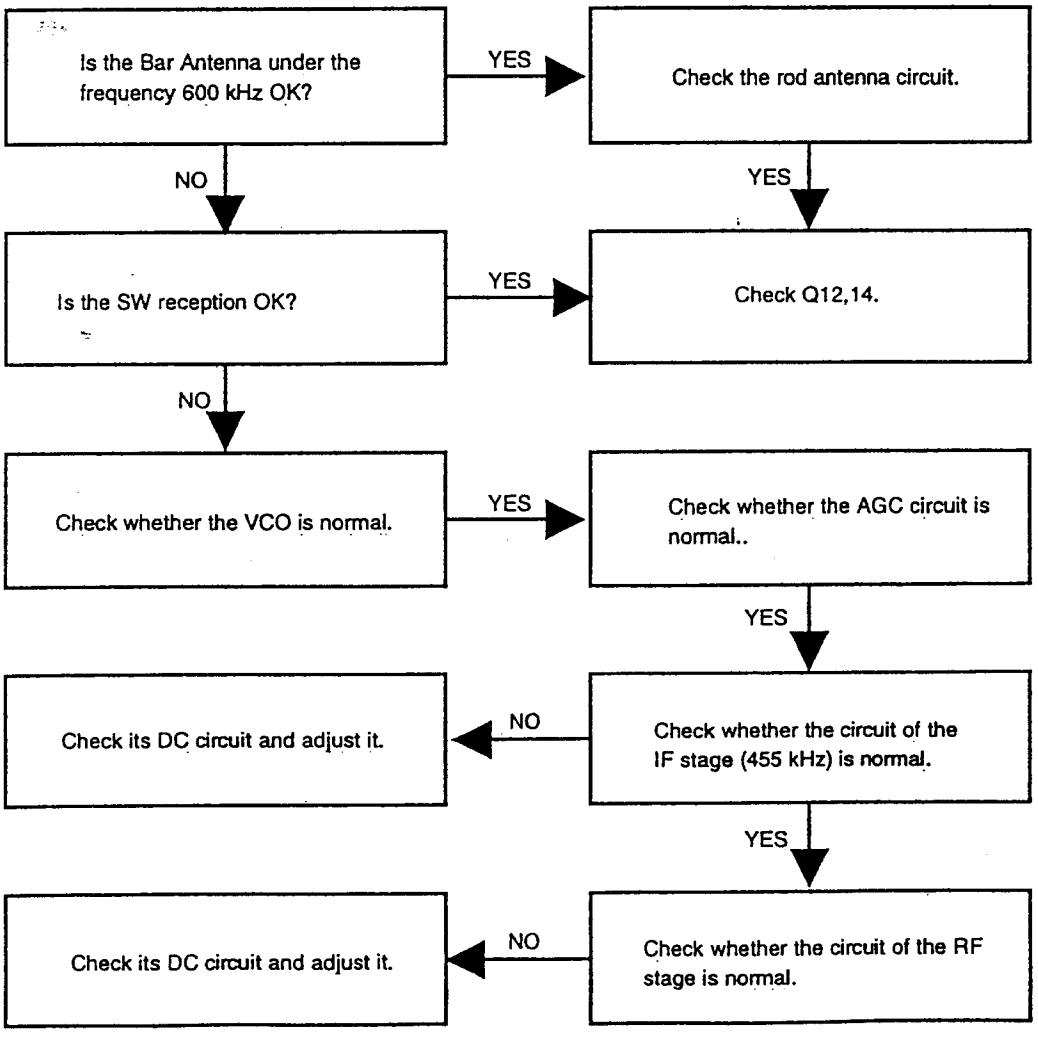
2. Power cannot be turned on



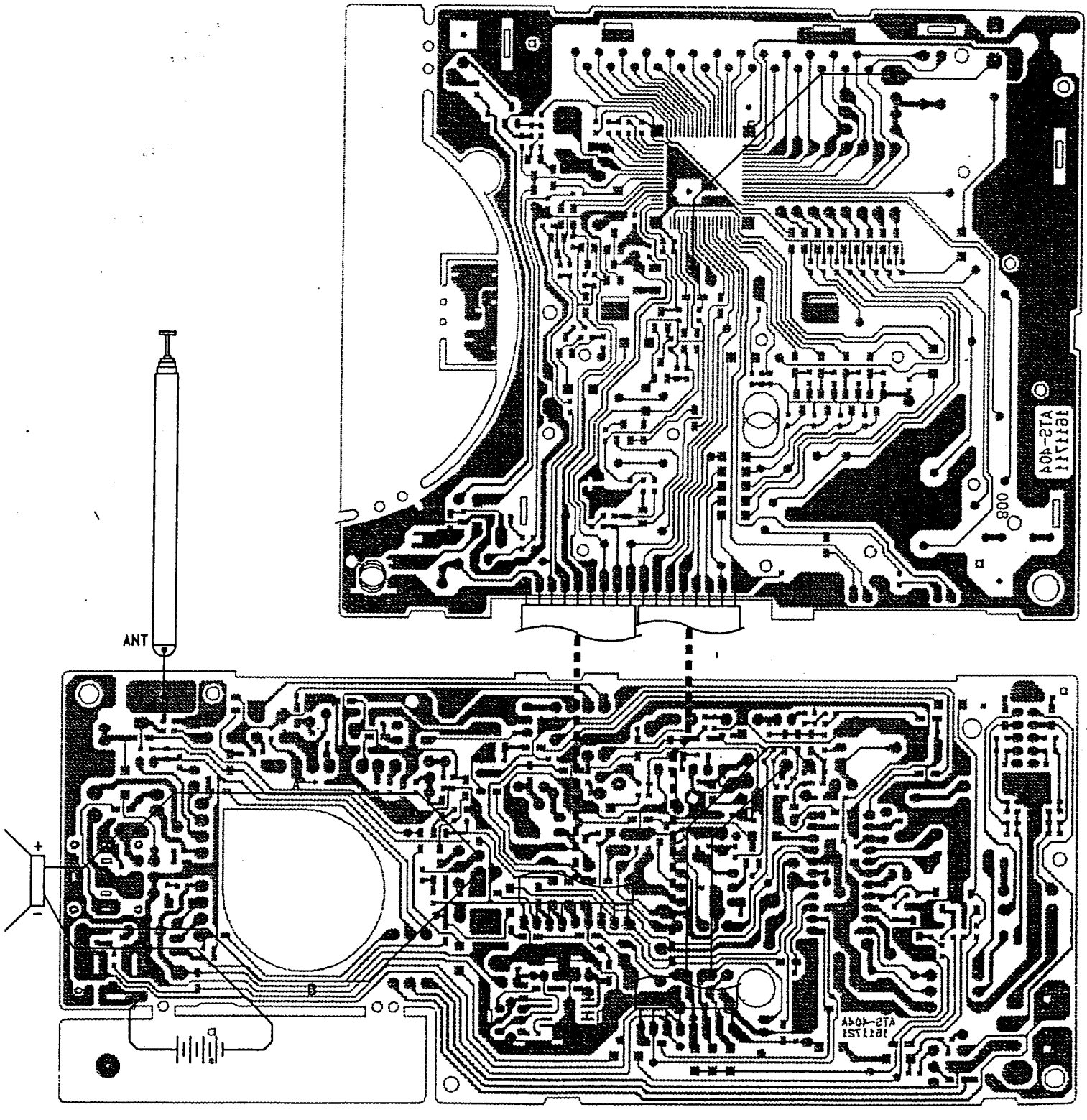
3. PLL does not work



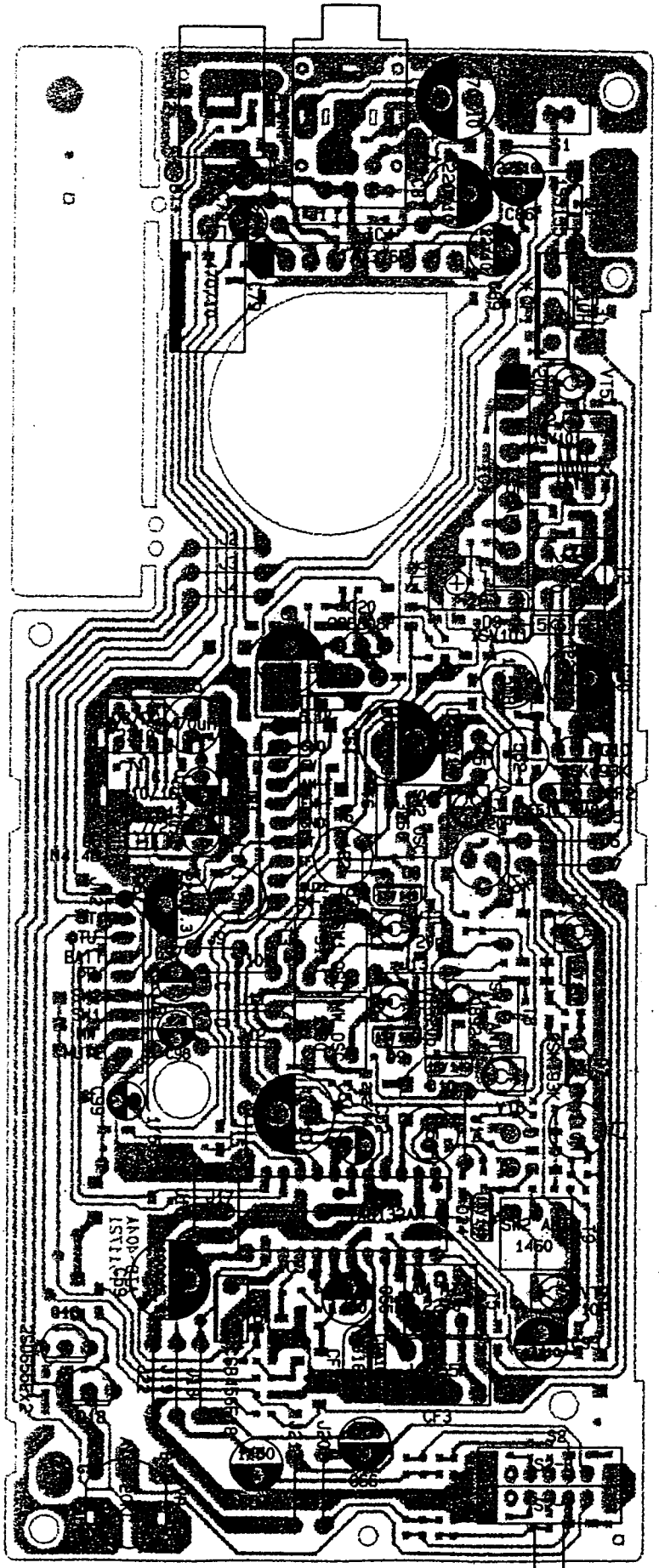
4. Weak sensitivity in AM broadcast band



WIRING DIAGRAM



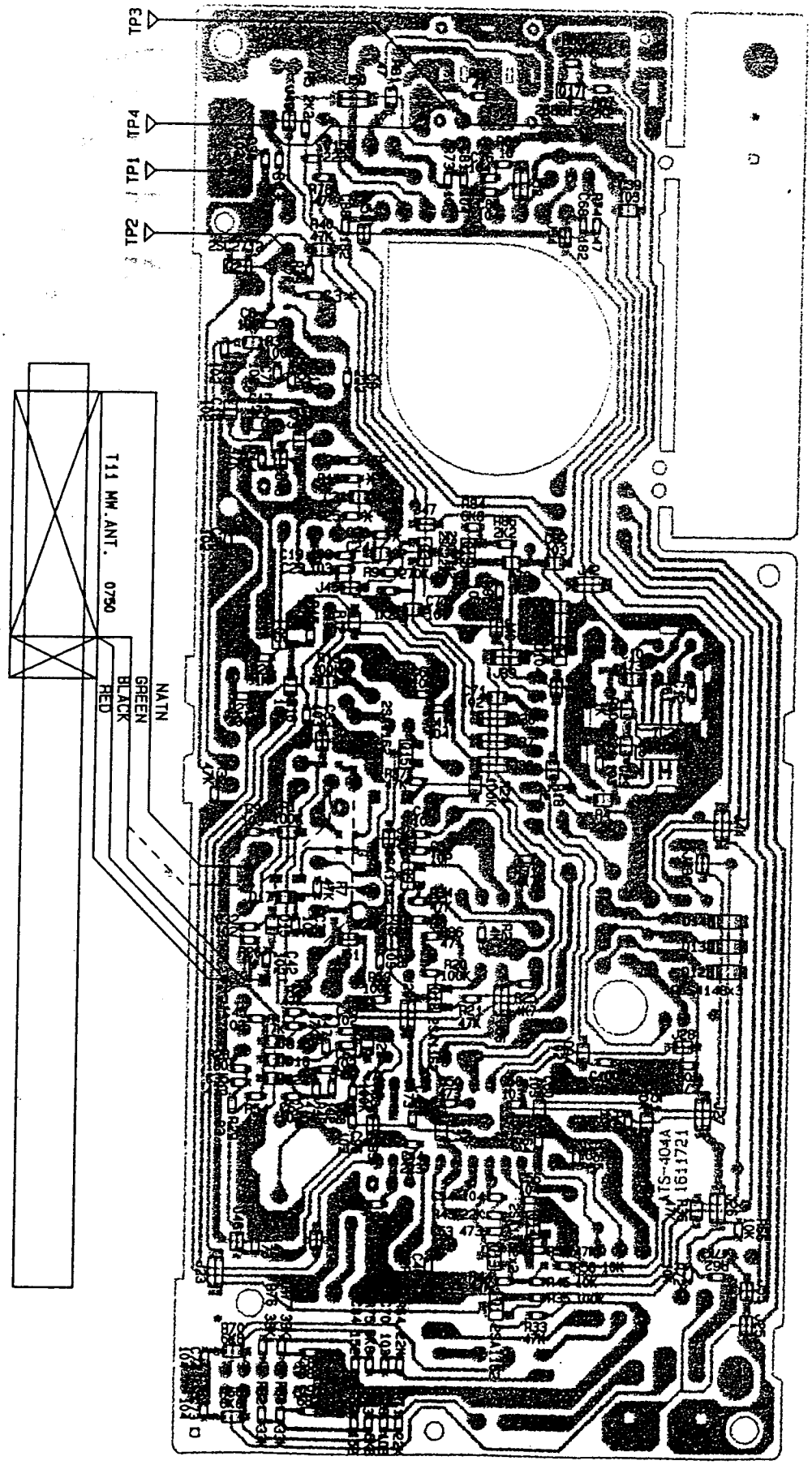
MAIN PCB TOP VIEW



	L4	CF1	L9
EUR	1122990	PFMB4	NO
JPN	1122900	PFMB8L	NO
ROBERS	1122990	PFMB4	47uH

*

MAIN PCB BOTTOM VIEW



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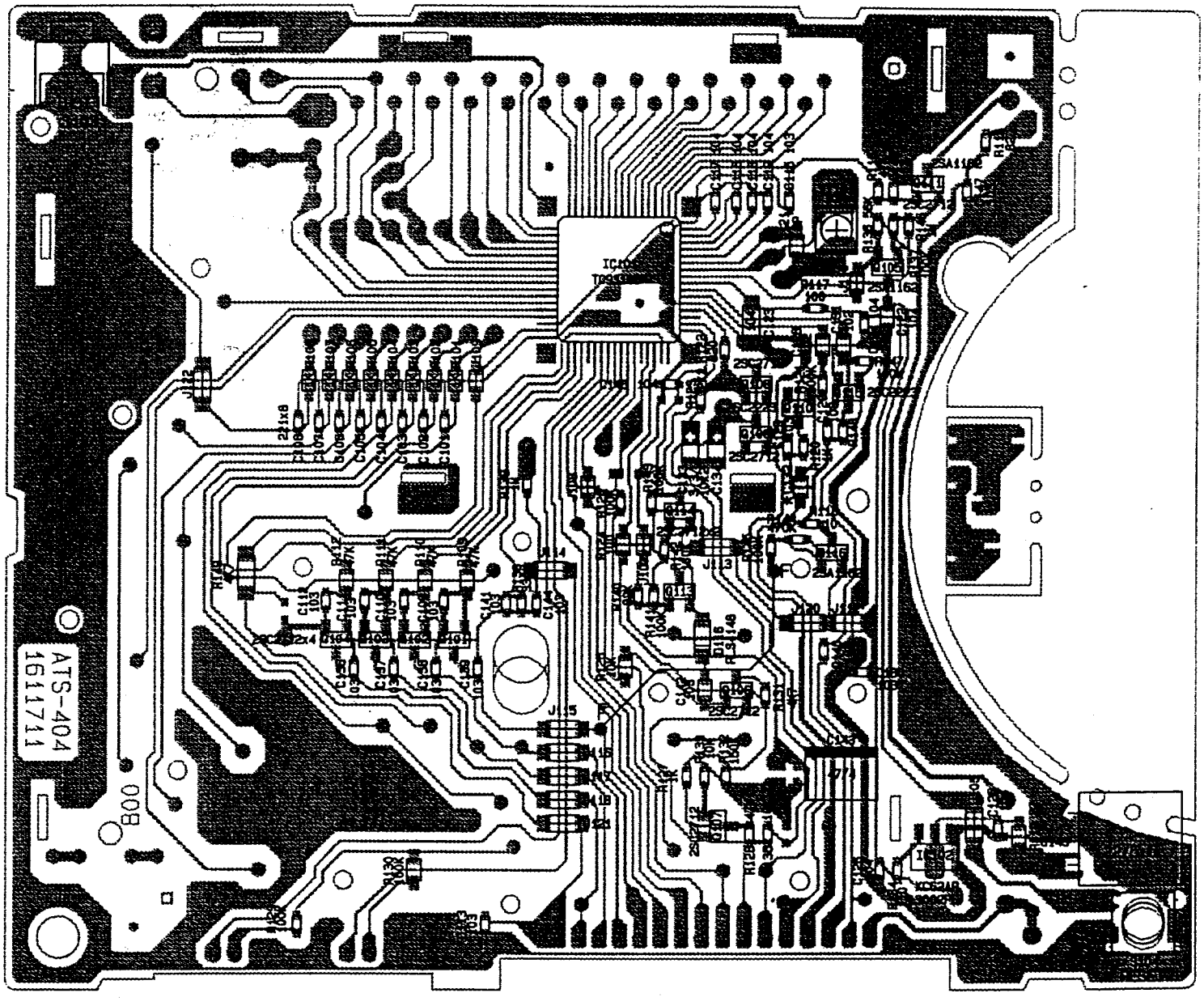
	C3	C4	C20	C25	R11	GREEN	G
EUR	20P	20P	18P	22P	22	——	NO
JPN	102	102	NO	101	0	——	NO
ROBERS	20P	20P	18P	22P	22	- - -	- - -

CONTROL PCB TOP VIEW



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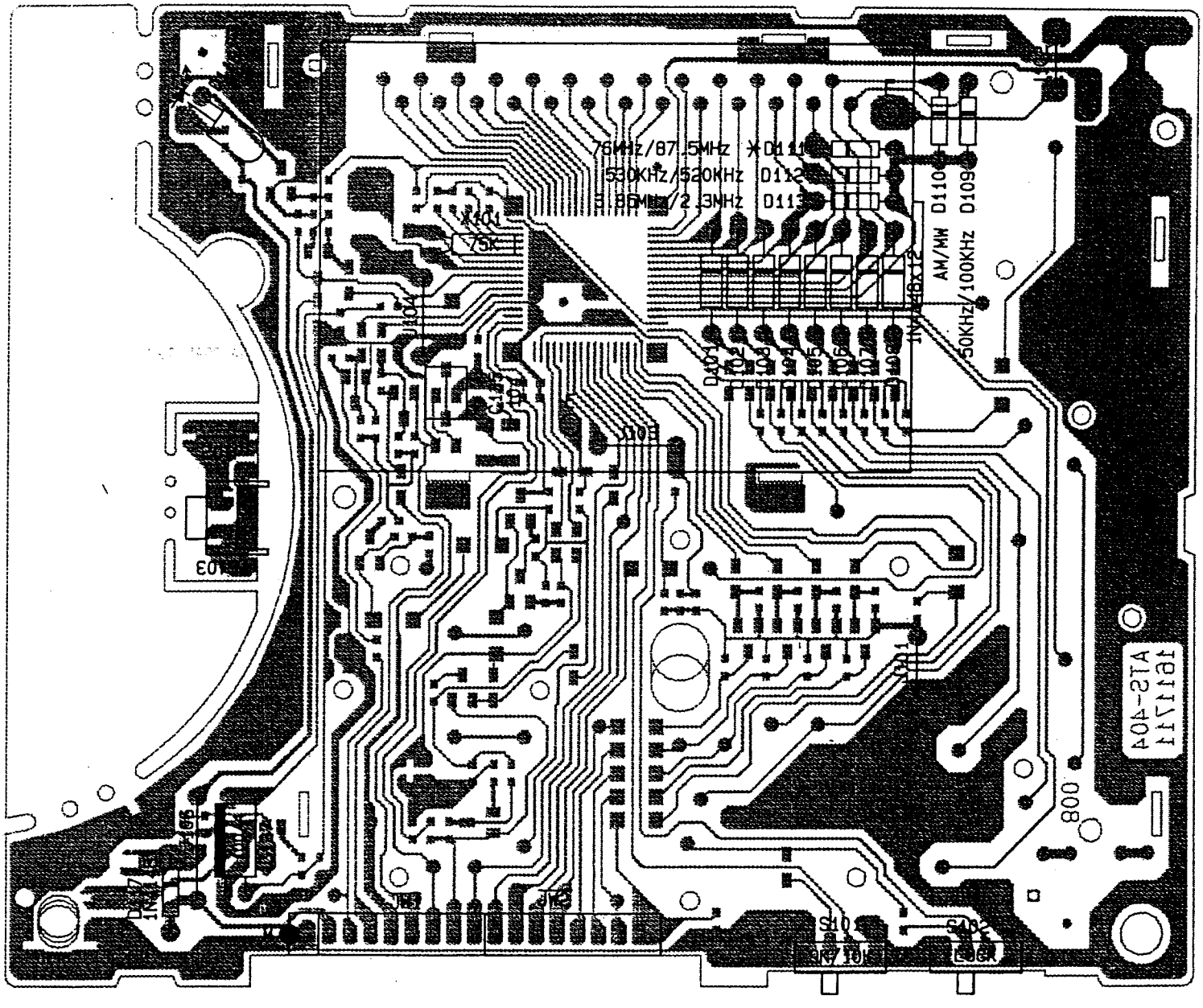
	C132
EUR	10P
JPN	102

CONTROL PCB BOTTOM VIEW



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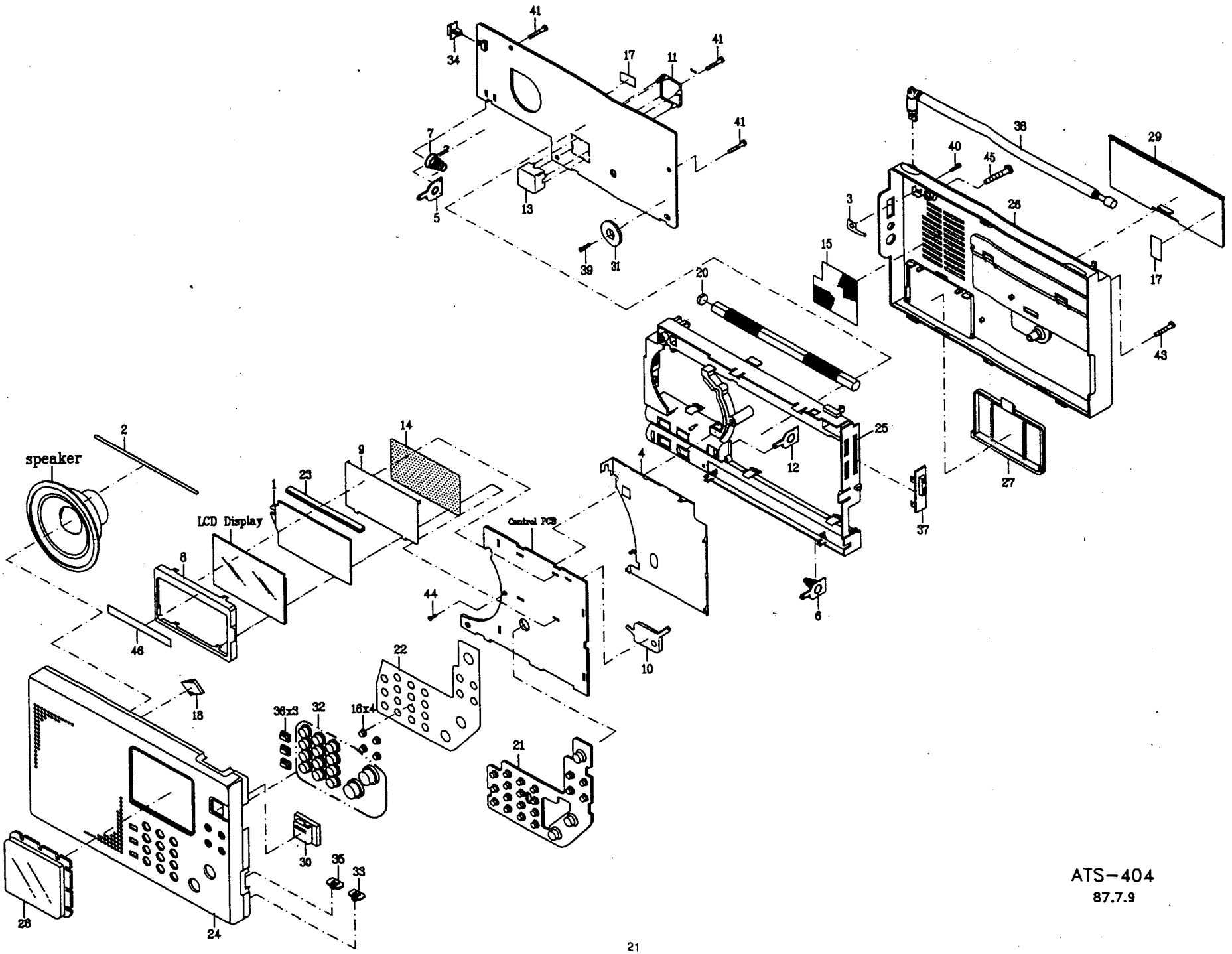
	D111
EUR	——
JPN	1N4148

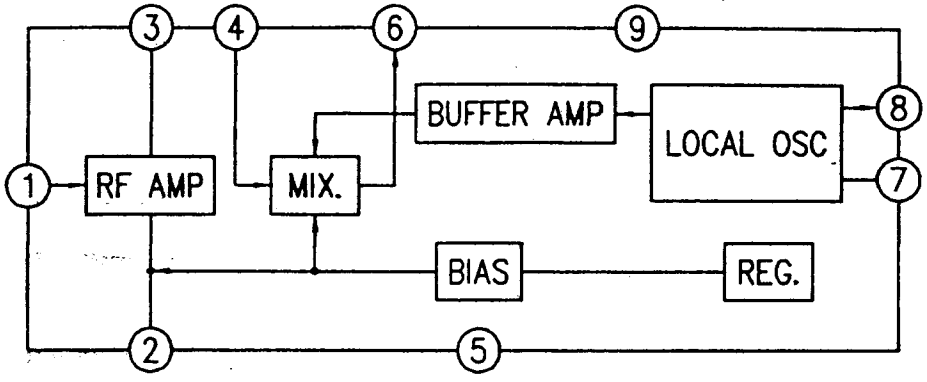
EXPLODED VIEW



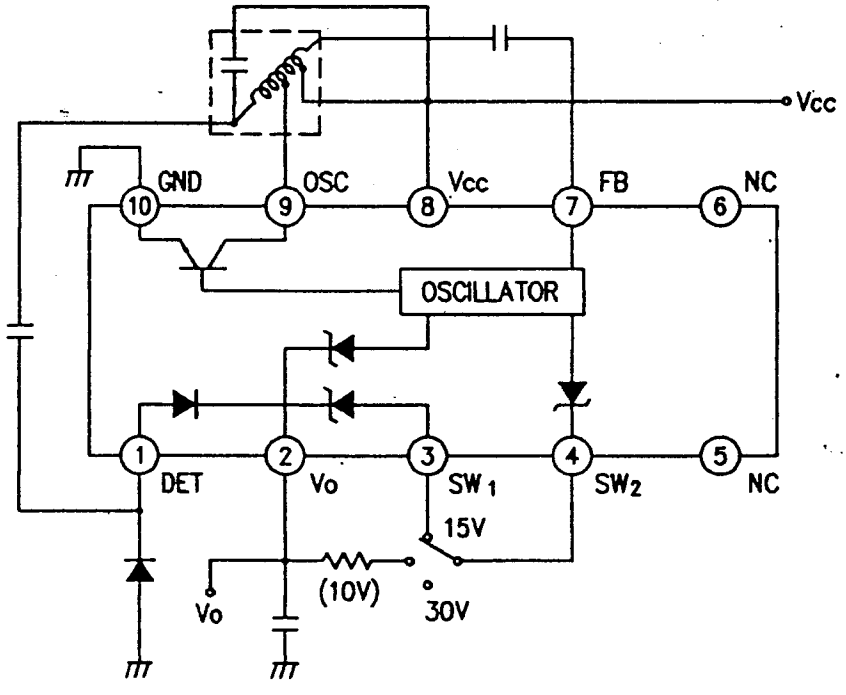
ATS-404
87.7.9

IC CIRCUIT BLOCK DIAGRAM

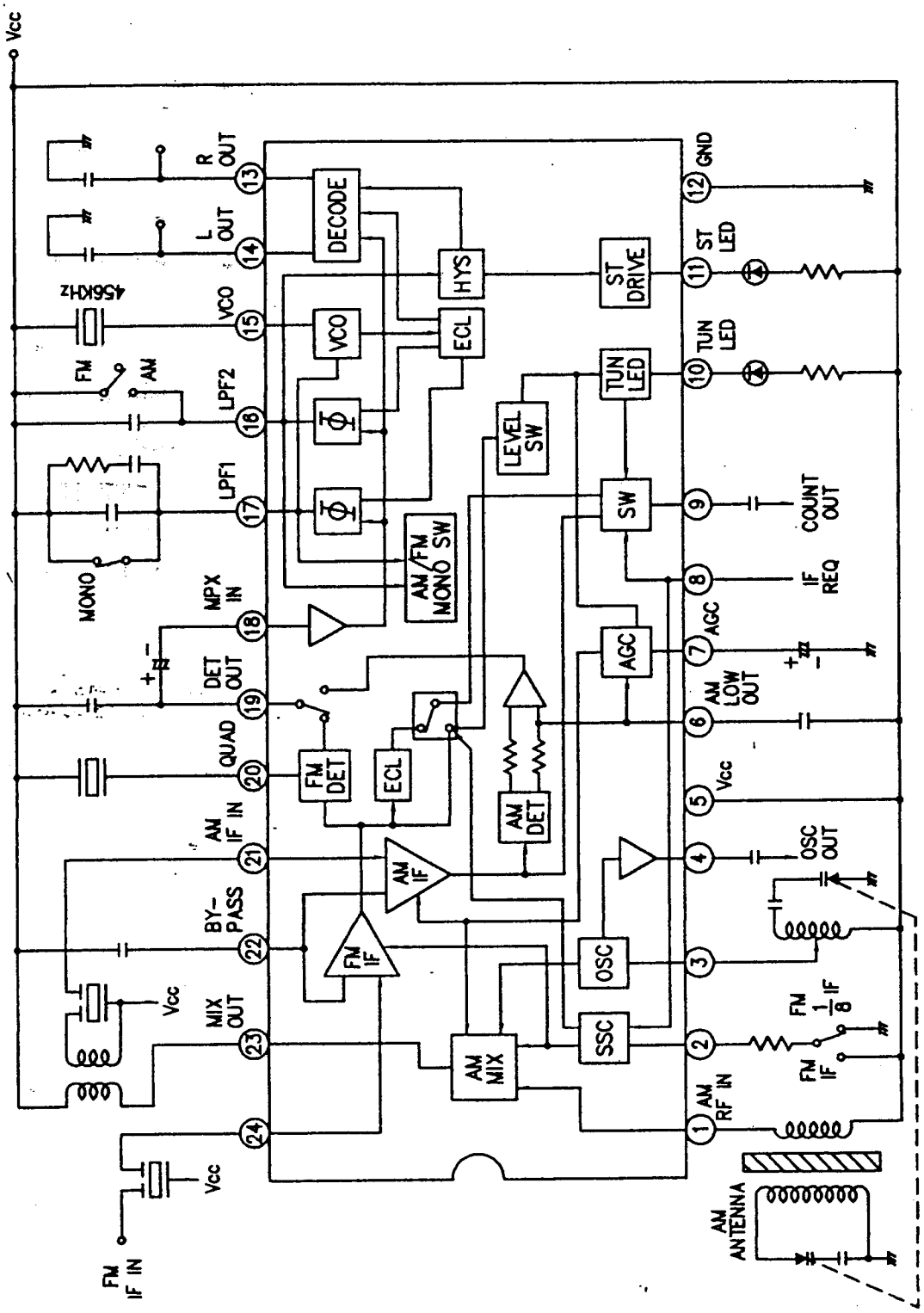
IC1-TA7358AP



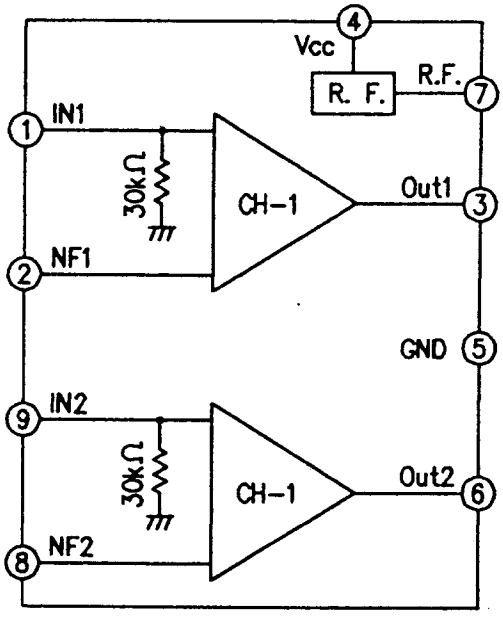
IC2-TA8126F



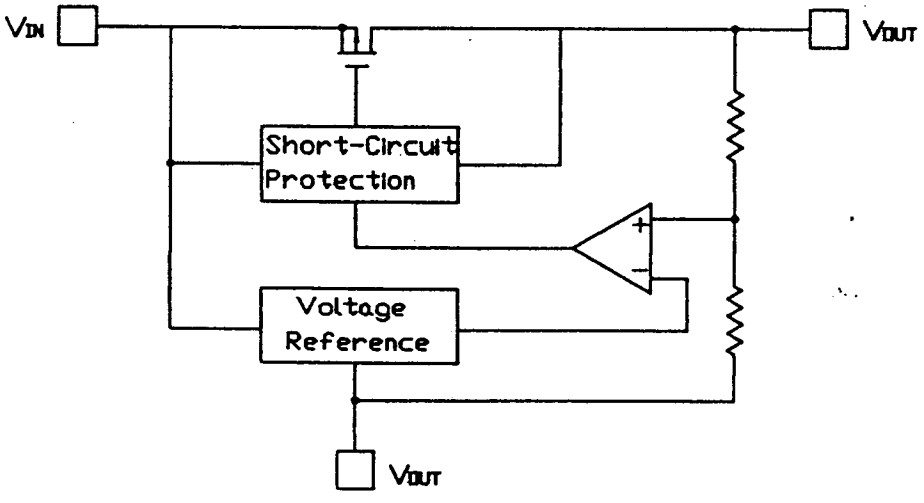
IC3-TA8132AN



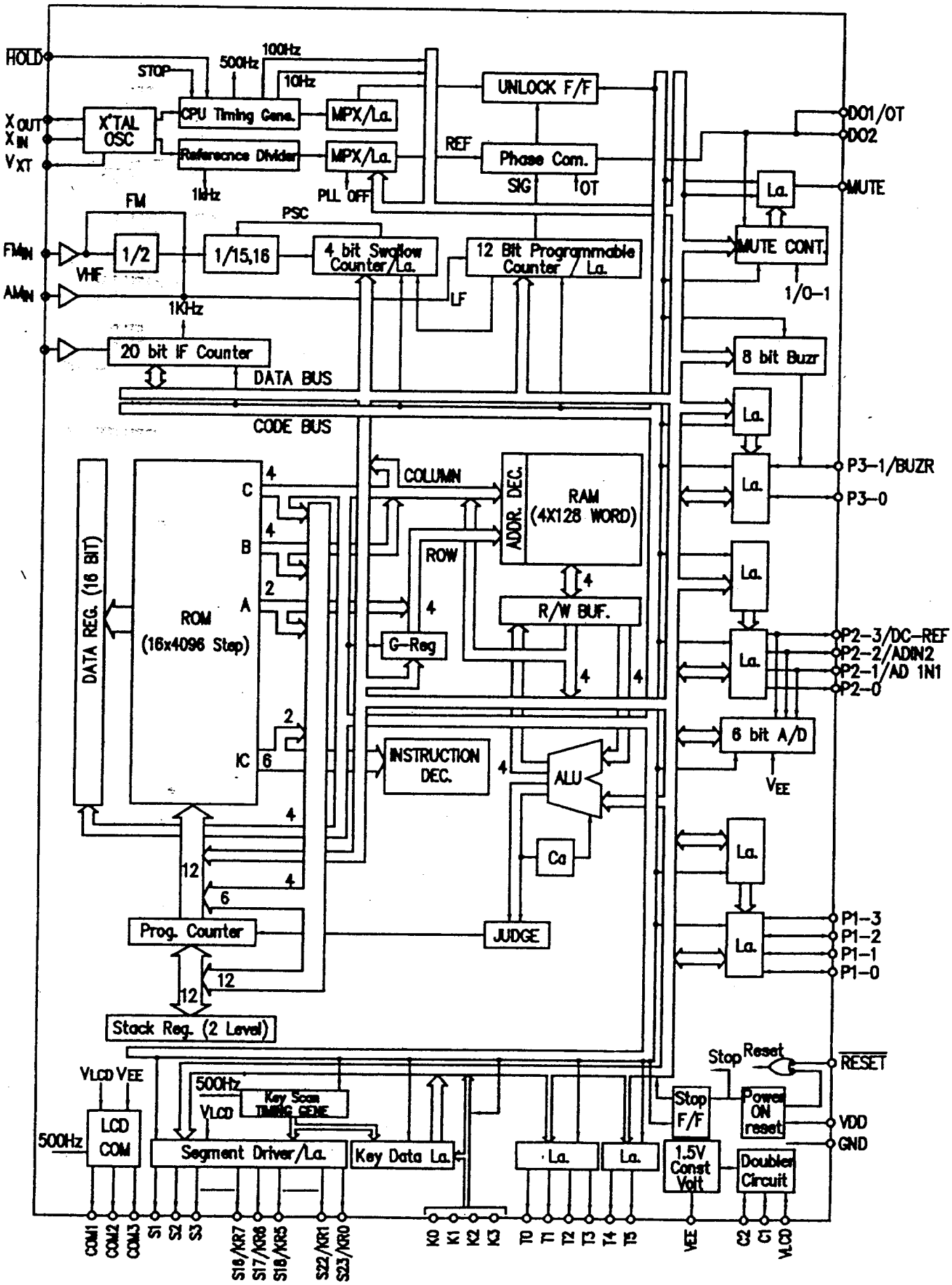
IC4-TA7376P



IC102-XC62AP3002PL



IC101-TC9318BF



ICS' & TRANSISTORS' VOLTAGE LIST

IC1-TA7358AP

PIN	FM	MW	SW
1	0.83	0	0
2	1.54	0.05	0.06
3	3.48	0.25	0
4	1.52	0.06	0.05
5	0	0	0
6	3.48	0.12	0
7	2.76	0.08	0.03
8	3.46	0.07	0
9	3.48	0.05	0

IC2-TA8126F

PIN	FM	MW	SW
1	8.19	8.21	8.20
2	15.67	15.66	15.66
3	8.19	8.19	8.19
4	8.19	8.19	8.19
5	0	0	0
6	0	0	0
7	1.12	1.12	1.12
8	5.89	5.85	5.85
9	5.87	5.8	5.8
10	0	0	0

IC3-TA8132AN

PIN	FM	MW	SW
1	3.62	3.79	3.79
2	0.98	0.97	0.88
3	3.40	3.77	3.69
4	3.63	3.43	3.43
5	3.63	3.79	3.79
6	3.63	3.17	3.17
7	0.44	0.28	0.27
8	0	0	0
9	3.62	3.79	3.79
10	3	3.43	3.18
11	3	3.43	3.18
12	0	0	0
13	0.99	0.99	0.99
14	1.01	1.02	1.02
15	3.0	3.56	3.56
16	3.31	3.79	3.78
17	3.62	3.79	3.78
18	0.63	0.63	0.63
19	1.0	1.28	1.28
20	2.74	3.64	3.62
21	3.62	3.79	3.78
22	3.44	3.05	3.05
23	3.63	3.79	379
24	3.62	3.79	3.79

IC4-TA7376P

PIN	FM	MW	SW
1	0	0	0
2	0.58	0.58	0.58
3	2.68	2.58	2.59
4	5.97	5.77	5.78
5	0	0	0
6	2.60	2.60	2.60
7	1.25	1.26	1.26
8	0.57	0.58	0.58
9	0	0	0

IC102-XC62AP3002PL

PIN	FM	MW	SW
1	0	0	0
2	5.2	5.29	5.15
3	3	3	3.01

IC101-TC9318BF

PIN	FM	MW	SW
1	1.5	1.5	1.5
2	1.5	1.5	1.5
3	1.5	1.5	1.5
4	1.5	1.5	1.5
5	1.5	1.5	1.5
6	1.5	1.5	1.5
7	1.5	1.5	1.5
8	1.5	1.5	1.5
9	1.5	1.5	1.5
10	1.5	1.5	1.5
11	1.5	1.5	1.5
12	1.5	1.5	1.5
13	1.5	1.5	1.5
14	1.5	1.5	1.5
15	1.5	1.5	1.5
16	1.5	1.5	1.5
17	1.5	1.5	1.5
18	1.5	1.5	1.5
19	1.54	1.54	1.54
20	1.54	1.54	1.54
21	1.54	1.54	1.54
22	1.54	1.54	1.54
23	1.54	1.54	1.54
24	1.54	1.54	1.54
25	1.54	1.54	1.54

PIN	FM	MW	SW
26	1.54	1.54	1.54
27	1.07	1.24	1.1
28	1.30	1.24	1.22
29	1.25	1.25	1.17
30	1.25	1.17	1.18
31	0	0	0
32	0	2.92	0
33	0	0	0
34	0	0	2.65
35	2.47	2.92	2.65
36	0	0	0
37	0	0	0
38	2.82	2.96	2.92
39	2.96	3.39	3.14
40	2.96	3.39	3.14
41	0.39	0	0
42	1.48	0.02	0.22
43	1.45	1.45	1.45
44	0.62	0.60	1.07
45	2.82	2.96	2.92
46	0	0	0
47	0	0	0
48	0	0	0
49	2.82	2.96	2.92
50	1.33	1.49	1.38

PIN	FM	MW	SW
51	1.17	1.33	0.53
52	1.09	1.09	1.08
53	0	0	0
54	1.31	0	0
55	0	1.21	0.78
56	2.48	2.94	2.66
57	2.48	0.22	2.66
58	0.22	0.23	0.23
59	0.50	0.40	0.47
60	1.42	1.42	1.42
61	3	3	3
62	0	0	0
63	2.24	2.26	2.26
64	1.5	1.5	1.5

PIN		MW	SW1	SW2	FM
Q1	C	3.81	3.81	3.81	2.41
	B	3.20	3.20	3.20	3.63
	E	3.81	3.81	3.81	3.65
Q3	C	0	0	0	3.51
	B	0	0	0	1.61
	E	0	0	0	0.90
Q4	C	5.95	5.96	5.96	5.94
	B	5.06	5.06	5.06	5.06
	E	4.42	4.42	4.42	4.41
Q5	C	0	0	0	3.51
	B	3.80	3.80	3.80	2.93
	E	3.81	3.81	3.81	3.57
Q7	C	-0.22	0	-0.22	0.16
	B	3.03	3.03	3.03	2.87
	E	0	0	0	0
Q9	C	3.80	3.79	3.76	3.34
	B	3.75	3.18	3.74	3.60
	E	3.81	3.80	3.80	3.65
Q10	C	2.87	2.87	2.86	2.76
	B	0	0	0	0
	E	0	0	0	0
Q12	C	3.80	3.79	3.76	3.35
	B	3.19	3.75	3.75	3.60
	E	3.81	3.81	3.80	3.65
Q13	C	3.81	3.81	3.81	3.65
	B	3.15	3.15	3.15	2.99
	E	3.82	3.81	3.81	3.65
Q14	C	3.81	3.81	3.81	3.35
	B	3.16	3.16	3.16	3.64
	E	3.81	3.81	3.81	3.65

PIN		MW	SW1	SW2	FM
Q15	C	3.79	3.79	3.76	3.34
	B	3.75	3.75	3.16	3.60
	E	3.81	3.81	3.80	3.65
Q16	C	0	0	0	0
	B	0	0	0	0
	E	0	0	0	0
Q17	C	5.96	5.96	5.96	5.95
	B	5.26	5.26	5.26	5.25
	E	6.00	6.00	6.00	5.99
Q18	C	0	0	0	0
	B	0	0	0	0
	E	0	0	0	0
Q19	C	6.04	5.85	6.06	5.61
	B	0	0	0	0
	E	0	0	0	0
Q20	C	6.02	6.02	6.02	6.00
	B	7.80	5.49	8.50	6.14
	E	0	0	0	0
Q21	C	2.25	2.26	3.79	0.07
	B	0	0	0	0.64
	E	0	0	0	0

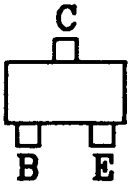
PIN		MW	SW1	SW2	FM
Q101	C	0.09	0.09	0.09	0.10
	B	0.66	0.66	0.66	0
	E	0	0	0	0.66
Q102	C	3.77	3.77	0	3.62
	B	0	0	0.62	0
	E	0	0	0	0
Q103	C	3.77	0	3.76	3.62
	B	0	0.62	0	0
	E	0	0	0	0
Q104	C	0.04	3.77	3.76	3.61
	B	0.62	0	0	0
	E	0	0	0	0
Q105	C	2.94	2.67	2.66	2.48
	B	2.37	2.11	2.10	1.93
	E	2.94	2.67	2.67	2.48
Q106	C	0	0	0	0
	B	0	0	0	0
	E	0	0	0	0
Q107	C	0	0	0	0
	B	0	0	0	0
	E	0	0	0	0
Q108	C	1.55	4.46	4.08	2.18
	B	1.09	1.08	1.08	1.09
	E	0.61	0.61	0	0.61
Q109	C	1.55	4.46	4.08	2.18
	B	0.61	0..61	0.61	0.61
	E	0	0	0	0
Q110	C	1.81	1.79	1.79	1.78
	B	0.73	0.72	0.72	0.72
	E	0	0	0	0

PIN		MW	SW1	SW2	FM
Q111	C	5.91	5.92	5.92	5.91
	B	0	0	0	0
	E	0	0	0	0
Q112	C	-3.3	-2.55	-5	-3.3
	B	5.95	5.95	5.94	5.94
	E	6	6	6V	6V
Q113	C	0.46	0.46	0.45	0.45
	B	0	1.0	0.98	0.98
	E	0.43	0.42	0.42	0.42
Q114	C	2.96	2.93	2.93	2.84
	B	0	0.46	0.46	0
	E	0	0.42	0.42	0
Q115	C	1.76	1.72	1.75	1.78
	B	0.5	0.64	0.65	0.72
	E	0	0	0	0
Q116	C	2.90	2.87	2.87	2.85
	B	2.33	2.31	2.31	2.29
	E	2.99	2.96	2.96	2.95

SEMICONDUCTOR LEAD LDENTIFICATIONS

Transistors

2SB606F

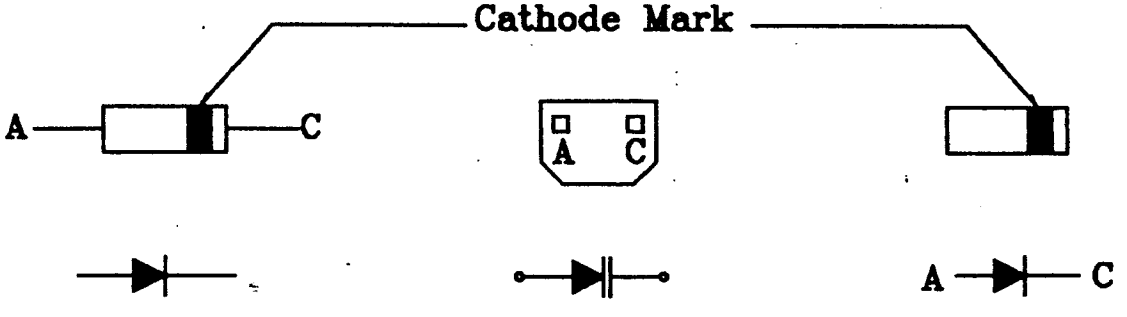


2SC2712GR
2SA1162GR
2SB815B6/B7
2SD1046X6/X7
2SC2223F13

2SK193K

(E:Emitter C:Collector B:Base S:Source G:Gate D:Drain)

Diodes



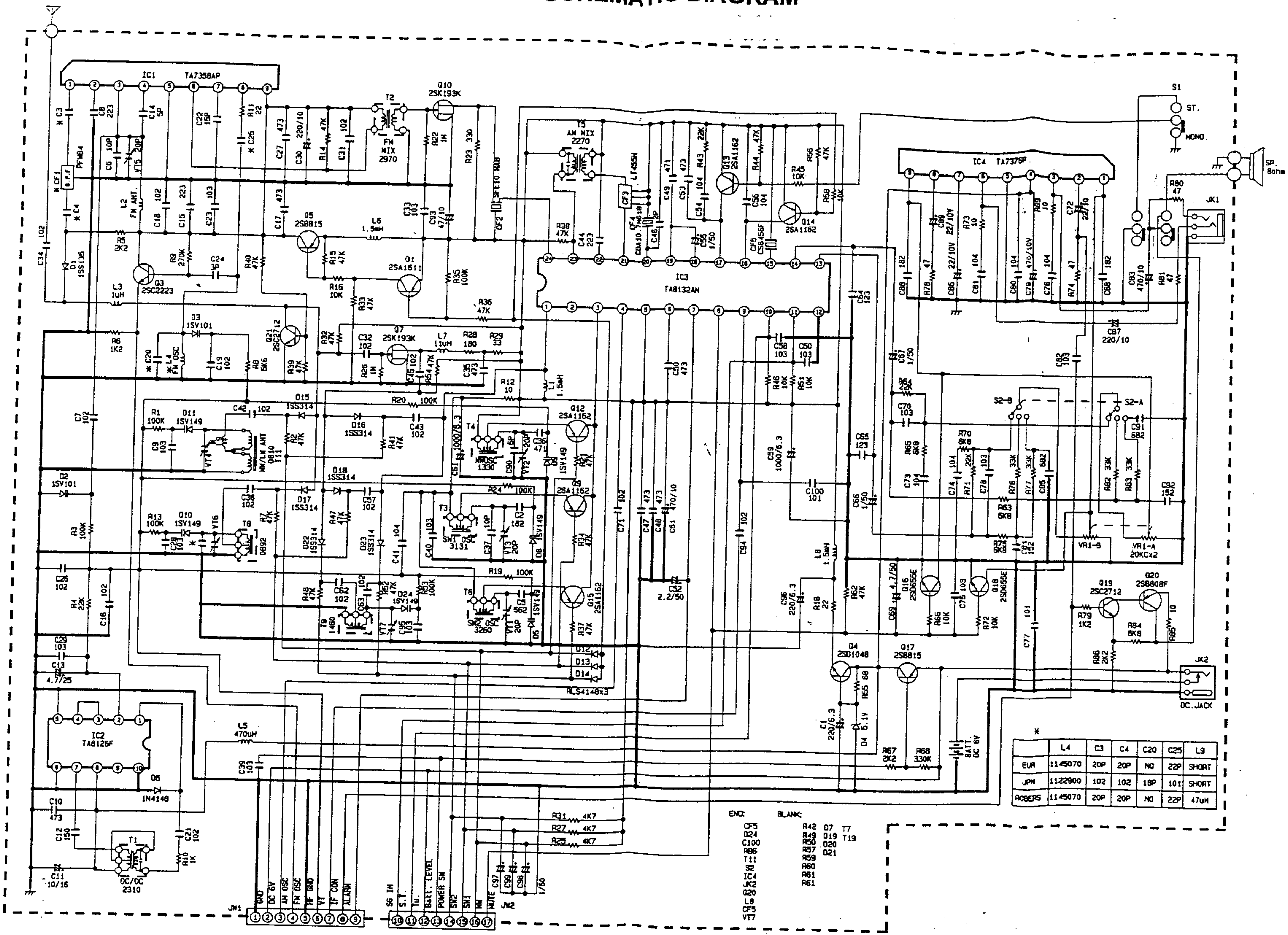
1SS314
1N4148
1N751
1SS135

1SV101
1SV149-B

RLS4148

(A:Anode C:Cathode)

SCHEMATIC DIAGRAM



*

	L4	C3	C4	C20	C25	L9
EUR	1145070	20P	20P	NO	22P	SHORT
JPN	1122900	102	102	18P	101	SHORT
ROBERS	1145070	20P	20P	NO	22P	47uH

SCHEMATIC DIAGRAM