ORDER NO. AD9005134C2

Service Manual

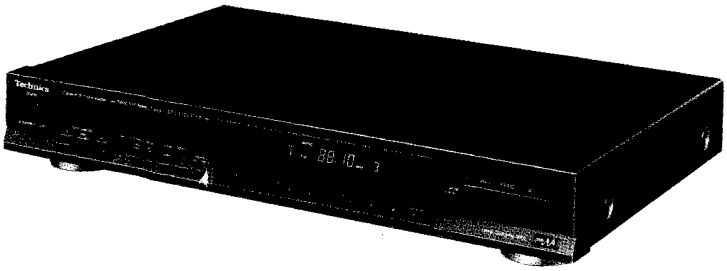
Tuner

ST-G470

QUARTZ Synthesizer
AM/FM Stereo Tuner

Color

(K) ..... Black Type



Area

Country Code	Areas	Color
(EG)	F.R. Germany	(K)
(Ei)	Italy	(K)

SPECIFICATIONS

(DIN 45 500)

■ FM TUNER SECTION

Frequency range	87.50~108.00 MHz
	87.525~108.00 MHz (+25 kHz shift)
Sensitivity	1.5 µV (IHF, usable)
S/N 30 dB	1.3 µV (75 Ω)
S/N 26 dB	1.2 µV (75 Ω)
S/N 20 dB	0.9 µV (75 Ω)
IHF 46 dB stereo quieting sensitivity	28 µV/75 Ω
Total harmonic distortion	
MONO (normal)	0.05 %
STEREO (normal)	0.1 %
S/N	
MONO	72 dB (80 dB, IHF)
STEREO	65dB (73 dB, IHF)
Frequency response	4 Hz~15 kHz, +0.5 dB~−1.0 dB
Alternate channel selectivity	
±400 kHz	65 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	100 dB
IF rejection at 98 MHz	100 dB
Spurious response rejection at 98 MHz	100 dB
AM suppression	55 dB
Stereo separation	
1 kHz	50 dB
10 kHz	40 dB
Carrier leak	
19 kHz	−75 dB (−80 dB, IHF)
38 kHz	−75 dB (−80 dB, IHF)
Channel balance (250 Hz~6,300 Hz)	±1.0 dB
Limiting point	0.85 µV
Bandwidth	
IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	75 Ω (unbalanced)

■ AM TUNER SECTION

Frequency range	
AM	522 kHz~1611 kHz (9 kHz-steps)
	530 kHz~1620 kHz (10 kHz-steps)
Sensitivity (S/N 20 dB)	
AM	20 µV, 300 µV/m
Selectivity (±9 kHz)	
AM (at 999 kHz)	50 dB
Image rejection	
AM (at 999 kHz)	40 dB
IF rejection	
AM (at 999 kHz)	60 dB

■ GENERAL

Output voltage	0.45 V (0.9 V IHF)
Power consumption	9 W
Power supply	AC 50 Hz/60 Hz, 220 V
Dimensions (W × H × D)	430 × 69 × 288 mm
	(16-15/16″ × 2-23/32″ × 11-11/32″)
Weight	2.5 kg (5.5 lb.)

Note:
Specifications are subject to change without notice. Weight and dimensions are approximate.

Technics

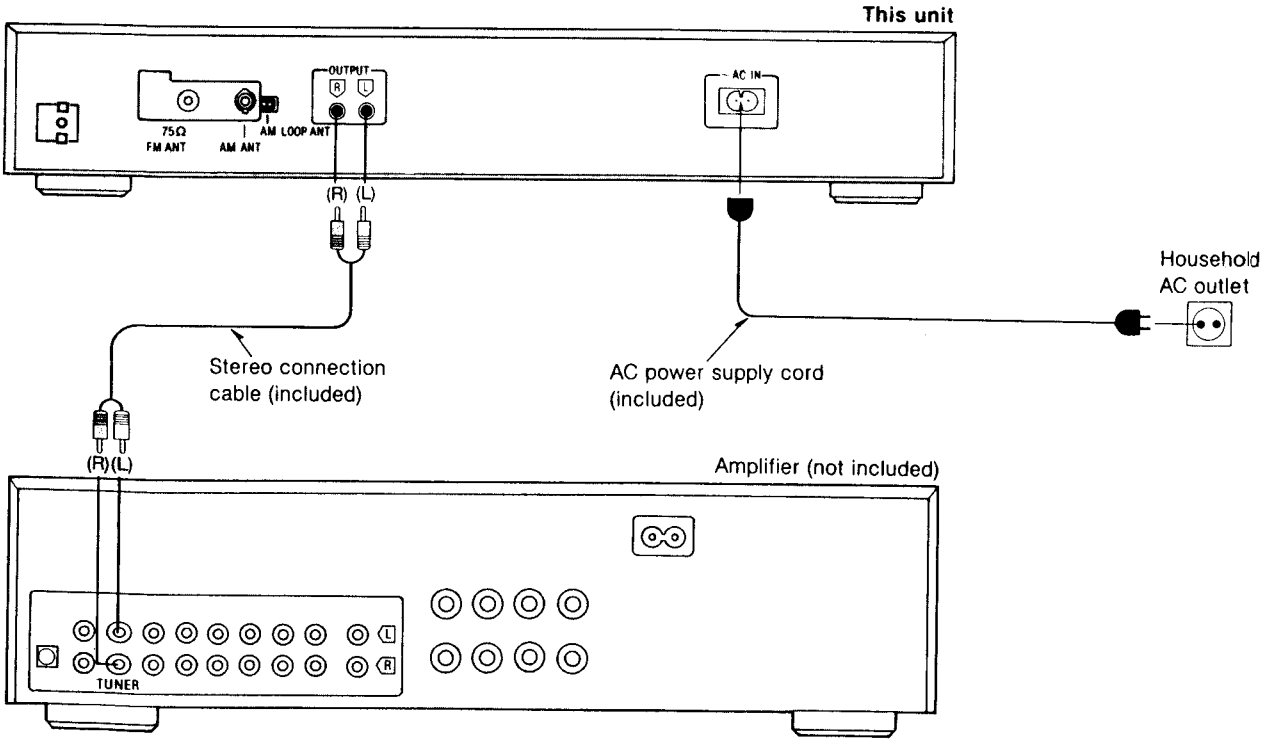
Matsushita Electric Industrial Co., Ltd.
Central P.O. Box 288, Osaka 530-91, Japan

■ CONTENTS

■ ACCESSORIES

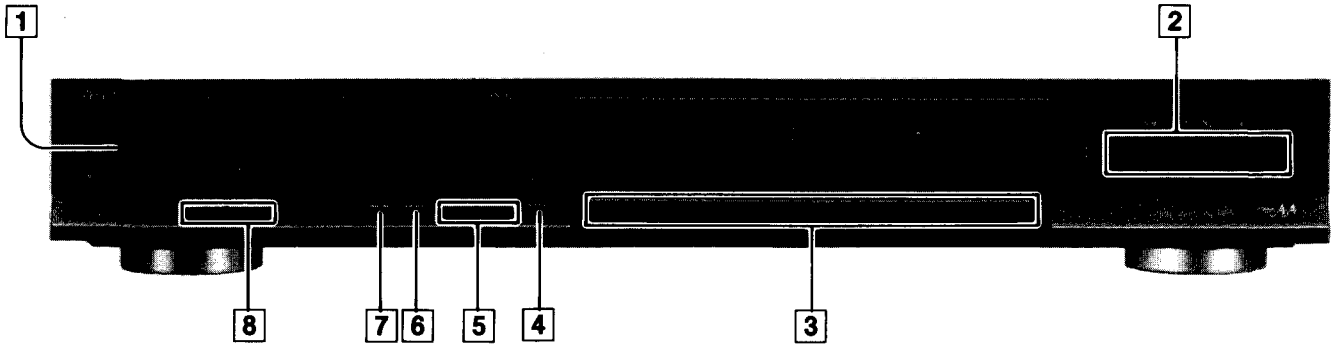
- AC power supply cord (SFDAC05E03) 1
- Stereo connection cable (SJP2276) 1
- FM indoor antenna (SSA270M) 1
- AM loop antenna (SPB1162T) 1
- AM antenna holders (SMA233-1M) (SMA231M) 2
- Screws (XTB3+10AFZ) 2

■ CONNECTIONS



■ LOCATION OF CONTROLS

Control section



1 Power "standby ⏻/on" switch (power/■ standby ⏻ ▬ on)

2 Tuning buttons (tuning)

3 Preset-tuning buttons (1 – 0) (39 channel random preset tuning)

4 Memory button (memory)

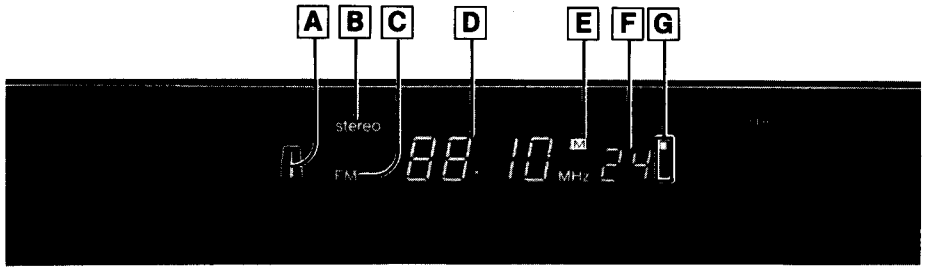
5 Preset channel buttons (preset channel)

6 FM signal-strength indication button (FM-signal)

7 FM mode selector (FM-mode)

8 Band selectors (band selector)

Display section



A Quartz-lock indicator (|)

B FM stereo indicator (stereo)

C Band indicator (band)

D Digital frequency display

E Memory indicator (M)

F Channel display (channel)

G FM mode indicator (FM mode)

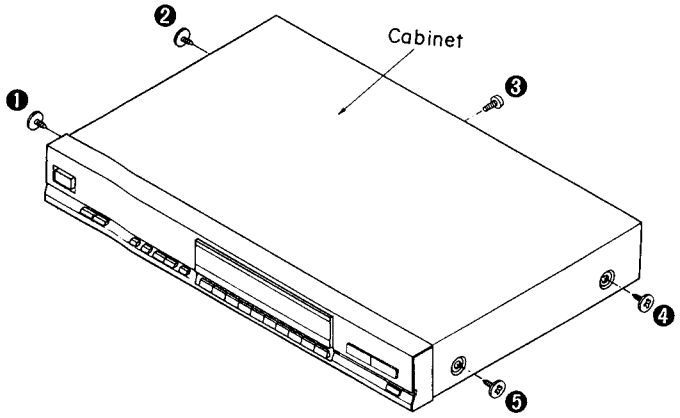
※The operating procedures and features are similar to those for and of the ST-G460.

■ DISASSEMBLY INSTRUCTIONS

"ATTENTION SERVICER"
Some chassis components may have sharp edges. Be careful when disassembling and servicing.

Ref. No. 1	Removal of the cabinet

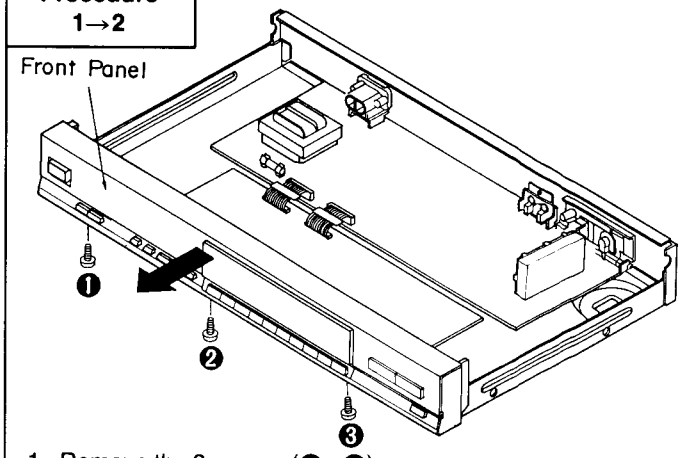
Procedure 1



●Remove the 5 screws (❶~❺).

Ref. No. 2	Removal of the front panel

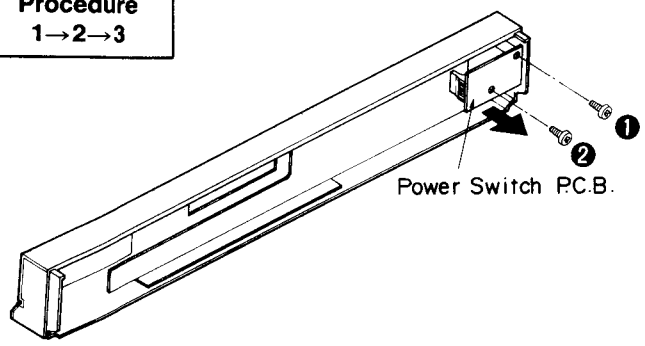
Procedure 1→2



1. Remove the 3 screws (❶~❸).
2. Remove the front panel in the direction of the arrow.

Ref. No. 3	Removal of the power switch P.C.B.

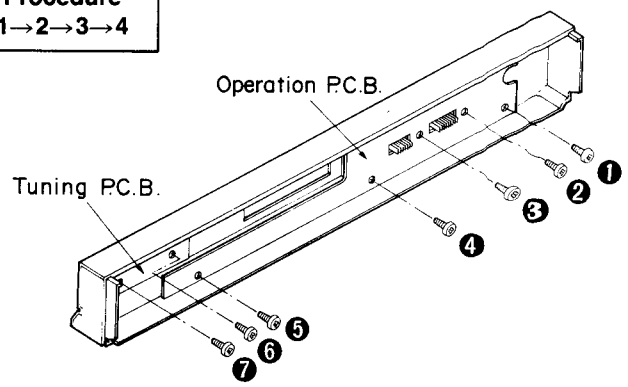
Procedure 1→2→3



1. Remove the 2 screws (❶, ❷).
2. Remove the power switch P.C.B. in the direction of the arrow.

Ref. No. 4	Removal of the operation P.C.B. and tuning P.C.B.

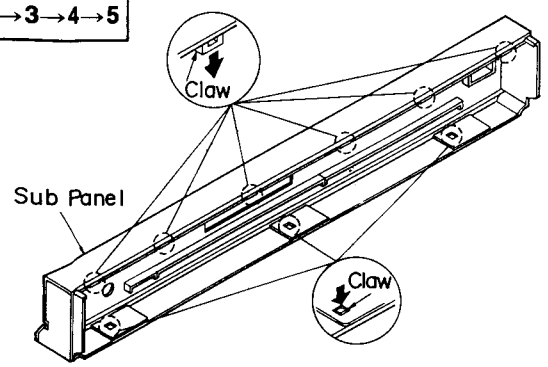
Procedure 1→2→3→4



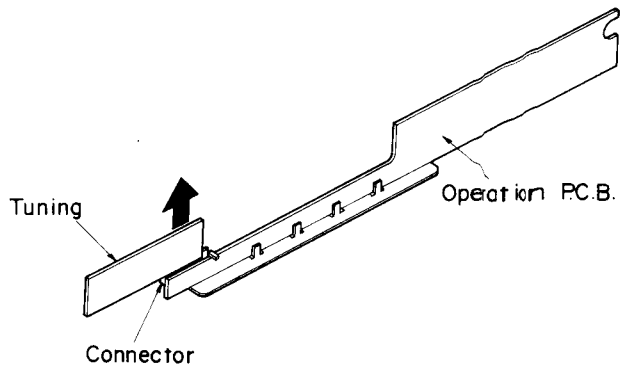
1. Remove the 7 screws (❶~❼).

Ref. No. 5	Removal of the sub panel

Procedure 1→2→3→4→5

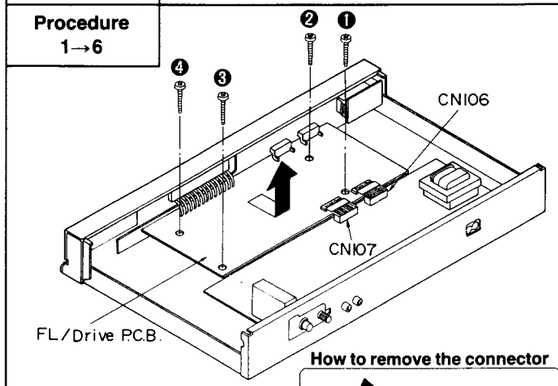


●Remove the 9 claws.



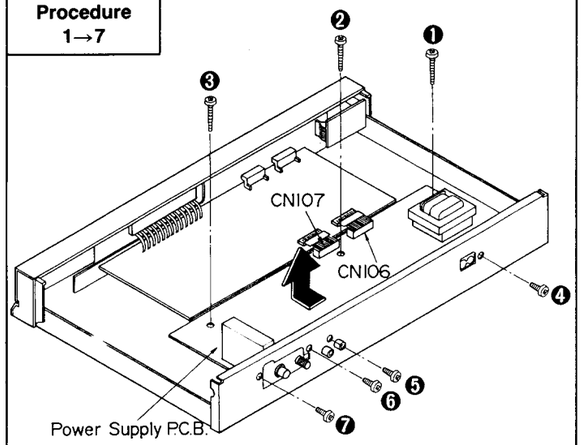
2. Remove the tuning P.C.B. in the direction of the arrow.

Ref. No. 6	Removal of the FL Drive P.C.B.
Procedure 1→6	



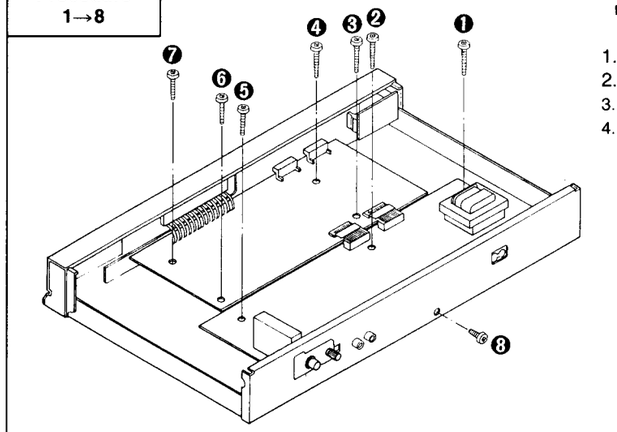
1. Remove the 4 screws (❶~❹).
2. Remove the 2 connectors (CN106, CN107).
3. Remove the FL drive P.C.B. in the direction of the arrow.

Ref. No. 7	Removal of the power supply P.C.B.
Procedure 1→7	



1. Remove the 7 screws (❶~❼).
2. Remove the 2 connectors (CN106, CN107).
3. Remove the power supply P.C.B. in the direction of the arrow.

Ref. No. 8	Checking of the FL drive P.C.B. and power supply P.C.B.
Procedure 1→8	

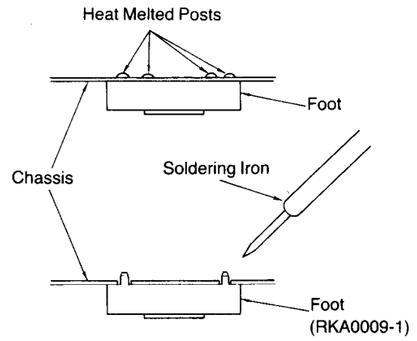


•When checking the soldered surfaces of main P.C.B. and replacing the parts, do as show.

1. Remove the 11 screws (❶~⓫).
2. Pull out the front panel in the direction of the arrow Ⓐ.
3. Remove the bottom chassis in the direction of the arrow Ⓑ.
4. Reinstall the front panel to the FL drive P.C.B.

•Replacement of the Foot.

1. Remove the 4 heat melted posts on the chassis with a pair of nippers or similar tool.
2. To replace the foot (RKA0009-1) on the chassis, melt the 4 posts with a soldering iron.



■ MEASUREMENTS AND ADJUSTMENTS

■ FM

Control positions and equipment used

- FM signal generator (FM-SG)
- **Stereo modulator**
- **Distortion analyser**
- **Oscilloscope**
- Choke coil (100μH)
- Resistor(100kΩ)
- **Frequency counter**
- AC and DC electronic voltmeter(EVM)

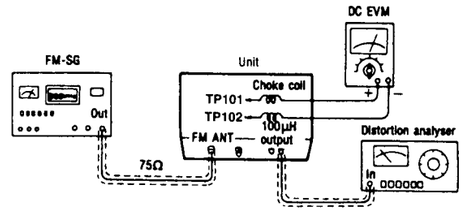
Note: For **Z201**, **Z202**, **L301**, **L303** and **L304**, they are supplied as adjusted parts. So, do not turn the cores of the parts. It is not necessary to adjust AM circuit.

FM MONO DISTORTION ADJUSTMENT

1.Test equipment connection is shown in figure.
2.Set the unit to **"FM"** mode.
3.Set the radio frequency display and signal generator to **100.10MHz**.
4.Adjust the core of **T101** so that the voltage measured in signal mode is **0mV (0±20 mV)** in 300 mV range.
5.Adjust **T102** so that the distortion factor of L-CH is minimized.
6.Repeat steps 4 and 5.
7.Make sure that the distortion factors of L-CH and R-CH are nearly the same and minimum.

Note: The adjusting screwdriver used should be made of resin.

FM SIGNAL GENERATOR CONDITION
Modulation 100%
Modulation frequency 1kHz
Output level 66dB



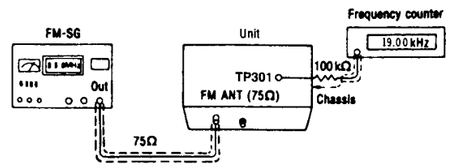
MPX VCO ADJUSTMENT

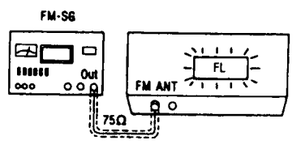
1.Test equipment connection is shown in figure.
2.Set the unit to "**auto**" position.
3.Set the radio frequency display and signal genarator to **100.10MHz**.
4.Adjust **VR302** for **19kHz±30Hz** on frequency counter reading.

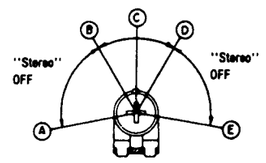
•USING ALTERNATE SYSTEM

1.Apply stereo signal from generator or receive the stereo broadcast.
2.Adjust **VR302** until stereo indicator lights up. Fix the arm of **VR302** as shown in figure.

FM SIGNAL GENERATOR CONDITION
Modulation 0%
Modulation frequency 0kHz
Output level 66dB







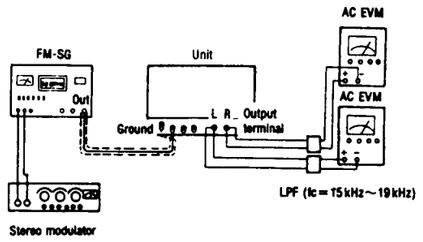
VR302

Ⓐ–Ⓑ,
Ⓓ–Ⓔ..... **"Stereo" OFF position**
Ⓑ–Ⓓ..... **"Stereo" ON position (indicator lighting)**
Ⓒ..... **Adjust point of pilot circuit**

SEPARATION ADJUSTMENT

1.Test equipment connection is shown in figure.
2.Set the unit to **"FM"** mode.
3.Set the radio frequency display and signal generator to **100.10MHz.**
4.Adjust **VR301** so that the R-CH output is minimized when stereo modulator is in "L"(L-CH modulation) mode.

FM SIGNAL GENERATOR CONDITION
Modulation.....Stereo "L" mode or "R" mode 90%, Pilot 10%
Modulation frequency .....1kHz(Pilot 19kHz)
Output level 66dB

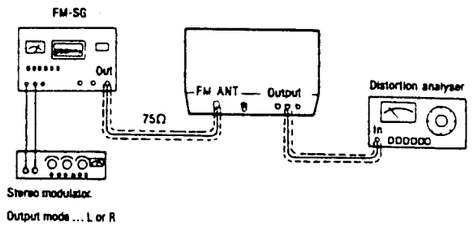


FM STEREO DISTORTION ADJUSTMENT

1.Test equipment connection is shown in figure.
2.Set the unit to **"FM"** mode.
3.Set the radio frequency display and signal generator to **100.10MHz.**
4. Adjust **L1** so that the distortion factor of L-CH is minimized.
5.Make sure that the distortion factors of L-CH and R-CH are nearly the same and minimum.

Note: The adjusting screwdriver used should be made of resin.

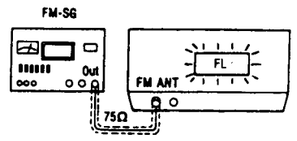
FM SIGNAL GENERATOR CONDITION
Modulation .....L"mode or "R"mode 90%, Pilot 10%
Modulation frequency .....1kHz(Pilot 19kHz)
Output level.....66dB



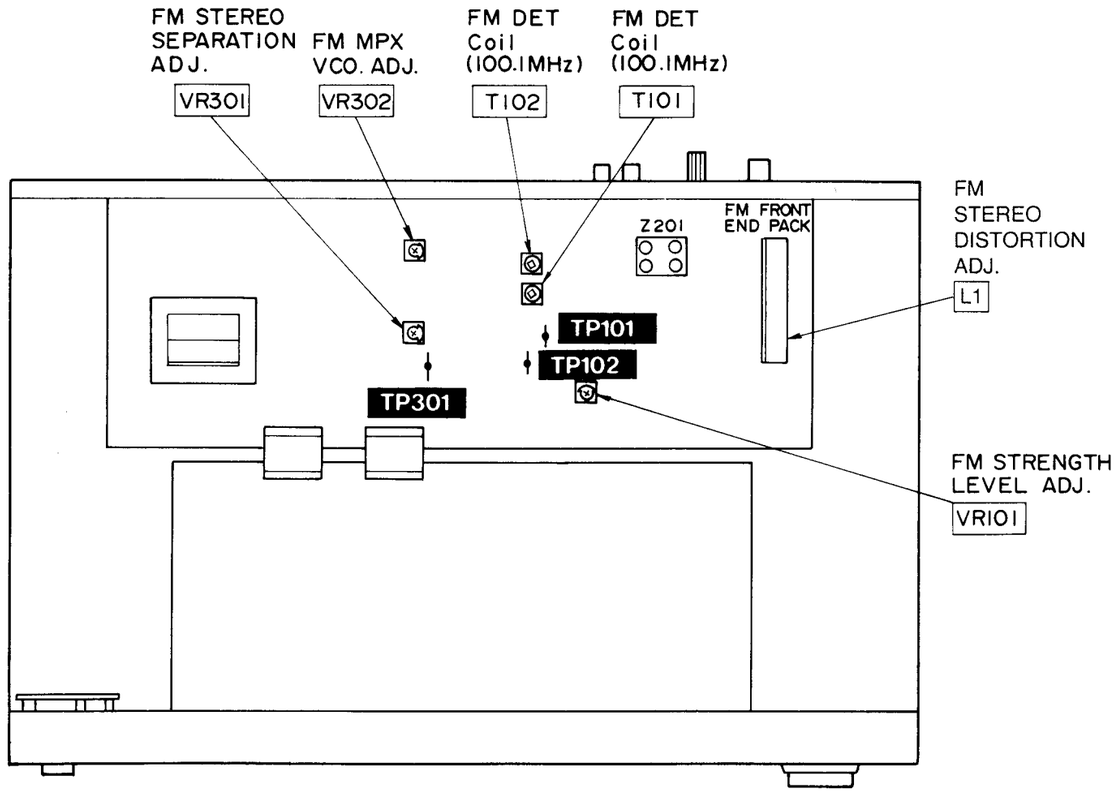
FM SIGNAL STRENGTH LEVEL ADJUSTMENT

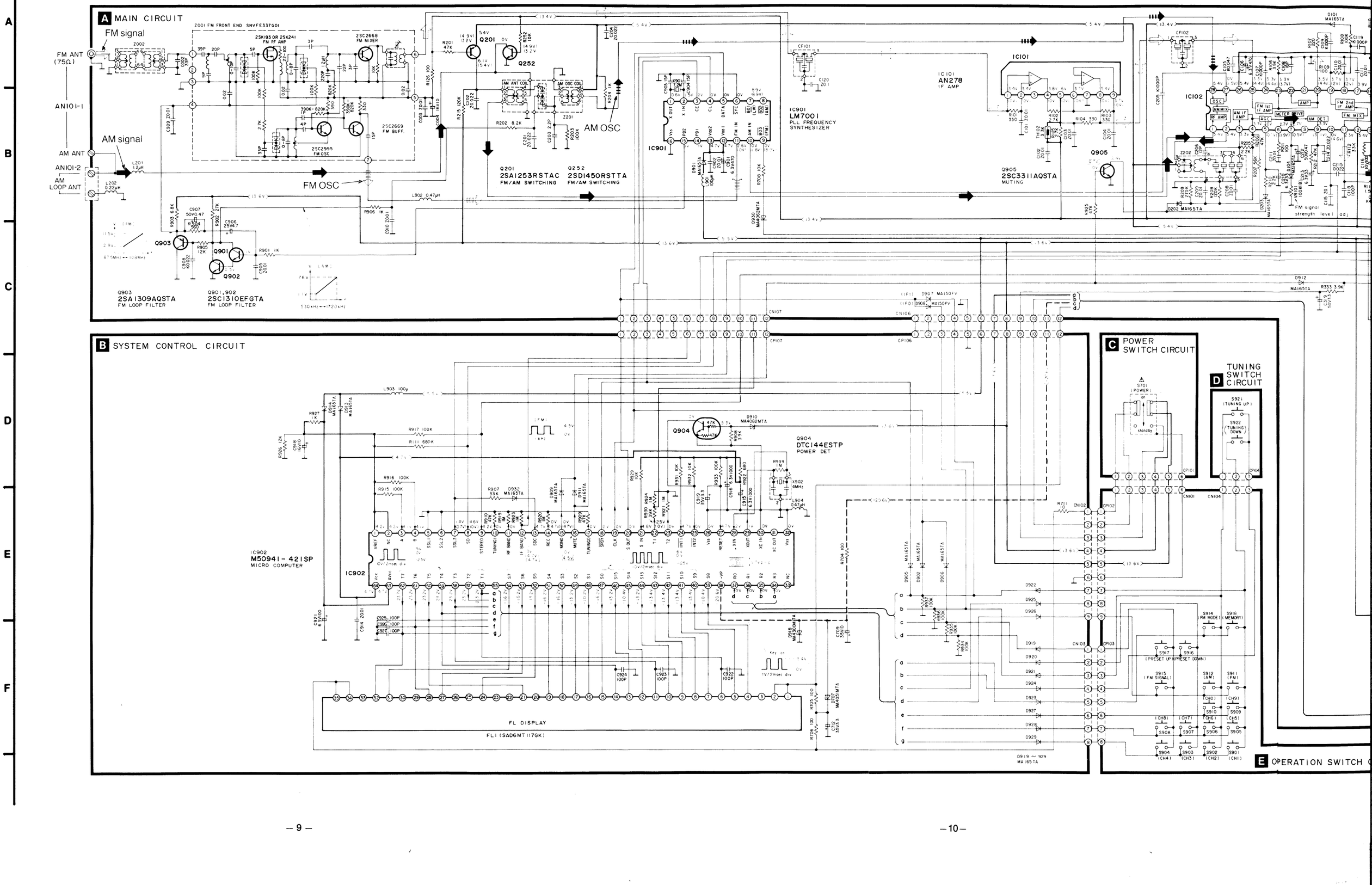
1. Test equipment connection is shown in figure.
2. Set the unit to "**FM**" mode.
3. Set the radio frequency display and signal generator to **100.10MHz.**
4. Change FL display from "frequency" to "dB" by pressing the FM signal button.
5. Adjust **VR101** so that **54dB** is indicated. "**54dB**" is indicated on the FL display.
6. Repeat steps 4, 5.

FM SIGNAL GENERATOR CONDITION
Modulation 30%
Modulation frequency.....1kHz
Output level.....66dB

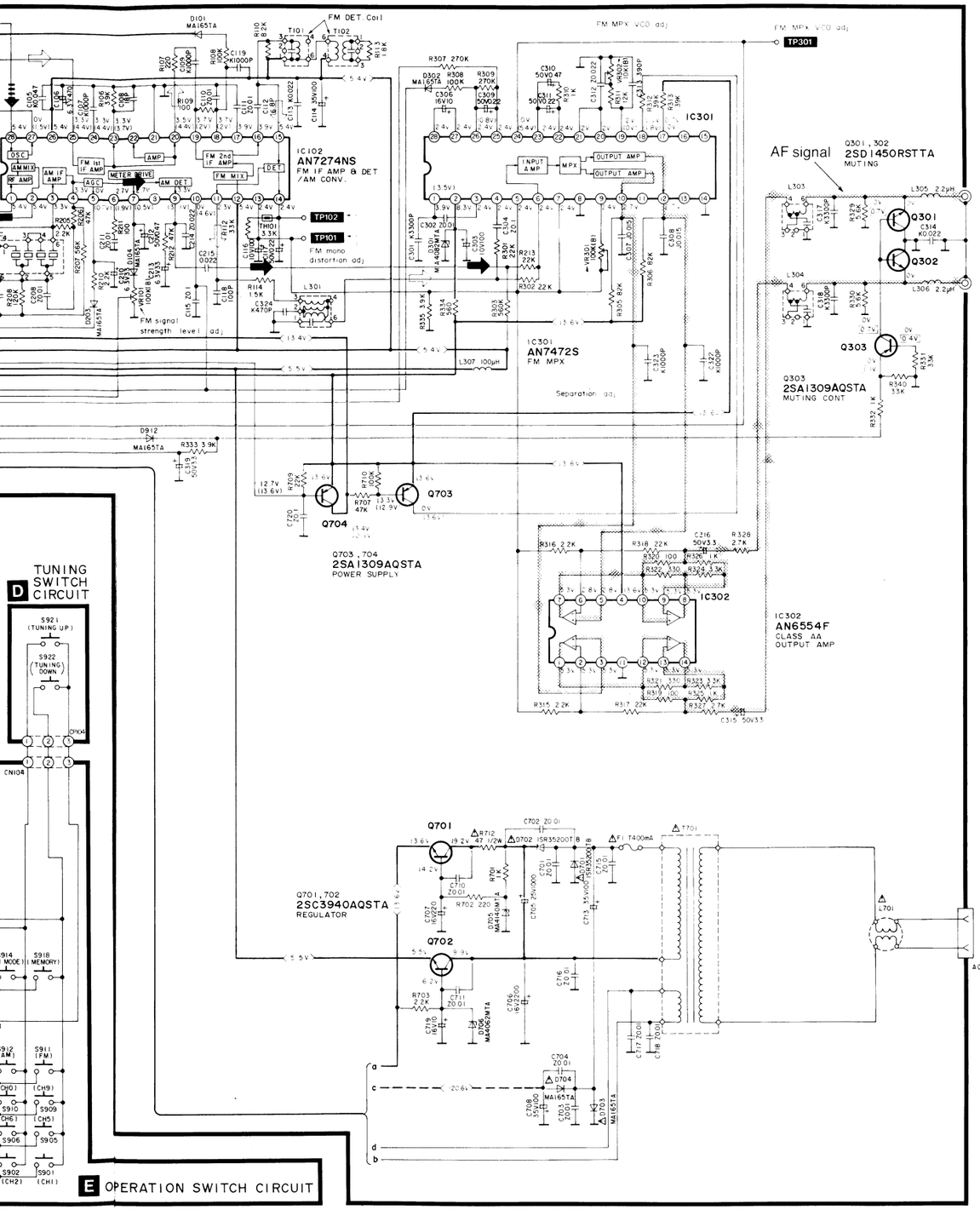


•Adjustment points.




A MAIN CIRCUIT
FM signal
FM ANT (75Ω)
AM signal
AM ANT
AM LOOP ANT
Z001 FM FRONT END SNVFE337G01
2SK193 OR 2SK241 FM RF AMP
2SC2668 FM MIXER
2SC2995 FM OSC
2SC2669 FM BUFF.
FM OSC
AM OSC
Q201 Q252
Q201 2SA1253RSTAC FM/AM SWITCHING
Q252 2SD1450RSTTA FM/AM SWITCHING
IC901 LM7001 PLL FREQUENCY SYNTHESIZER
IC101 AN278 IF AMP
Q905 2SC3311AQSTA MUTING
Q903 2SA1309AQSTA FM LOOP FILTER
Q901,902 2SC1310EFGTA FM LOOP FILTER
B SYSTEM CONTROL CIRCUIT
IC902 M50941-421SP MICRO COMPUTER
Q904 DTC144ESTP POWER DET
FL DISPLAY
FL1 (SAD6MT117GK)
C POWER SWITCH CIRCUIT
D TUNING SWITCH CIRCUIT
E OPERATION SWITCH

ST-G470



■ SCHEMATIC DIAGRAM (Parts list on page 19~21)

(This schematic diagram may be modified at any time with the development of new technology.)

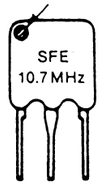
Notes:

- **•S701:** Power switch in "**on**" position.
- **•S901~S910:** Preset tuning **(39 channel random preset tuning)** switches.
  S901: CH1, S902: CH2, S903: CH3,
  S904: CH4, S905: CH5, S906: CH6,
  S907: CH7, S908: CH8, S909: CH9,
  S910: CH0
- **•S911, S912** Band selectors **(band selector)** switches.
  S911: FM, S912: AM
- **•S914:** FM mode selector **(FM-mode)** switch.
- **•S915:** FM signal-strength indication **(FM-signal)** switch.
- **•S916, S917:** Preset channel **(preset channel)** switches.
  S916: DOWN, S917: UP
- **•S918:** Memory **(memory)** switch.
- **•S921, S922:** Tuning **(tuning)** switches.
  S921: UP, S922: DOWN

• Use of ceramic filters in pairs

The ceramic filters (CF101, CF102) for FM-IF circuit are available in three ranks. For this circuit, be sure to use the ceramics of the same rank in a pair. At repairing and replacement, pay close attention to the diodes (D907, D908) for use as different diodes must be used depending on each rank of the ceramic filters.

Color marking
(Red, Blue or Orange)



RANK (Color)	D907	D908	CENTER FREQUENCY
Orange	○	○	10.72 MHz
Red	×	×	10.70 MHz
Blue	×	○	10.67 MHz

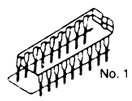
Note: ○ mark: Diode is used.
× mark: Diode is not used.

- Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
- ( ): AM voltage
  [ ]: muting voltage
- ——— Positive voltage lines (+)
  – – – – Negative voltage lines (–)
  ▭▭▭▷ **FM OSC**
  ▪▪▪▪▶ **AM OSC**
  AF signal
  FM signal
  AM signal
- Important safety notice
  Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

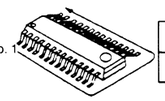
•Caution!

IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.
- Cover the parts boxes made of plastics with aluminum coil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the legs of IC or LSI with the fingers directly.

■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

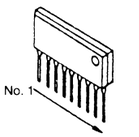


AN6554F	14 pin
LM7001	16 pin
M50941-421SP	64 pin

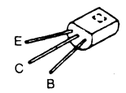


AN7274NS	28 pin
AN7472S	

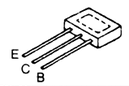
AN278	9 pin



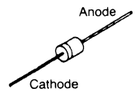
2SC1310, 2SC3940



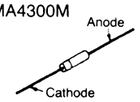
2SA1309, 2SC3311
2SD1450,
DTC144ES,
2SA1253RSTAC



MA165, MA150FV
1SR35200

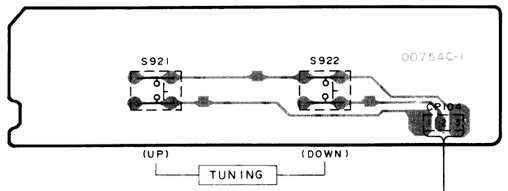


MA4062, MA4082M
MA4140M, MA4051M
MA4300M

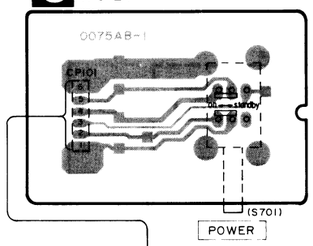


■ PRINTED CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM (Parts list on pages 19~21)

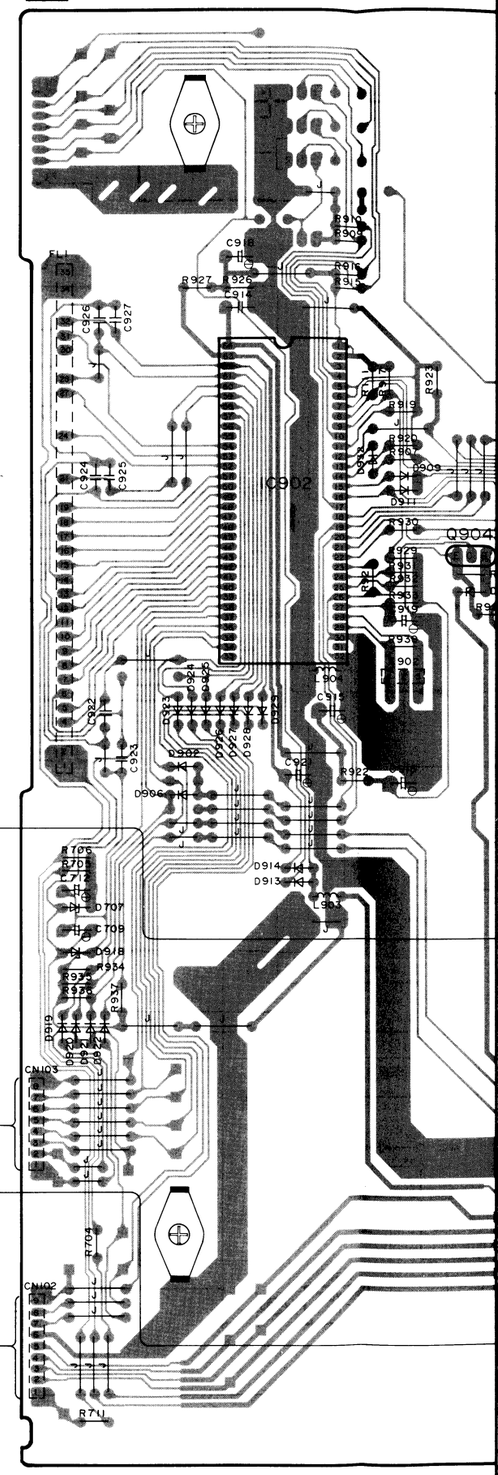
D TUNING SWITCH P.C.B.



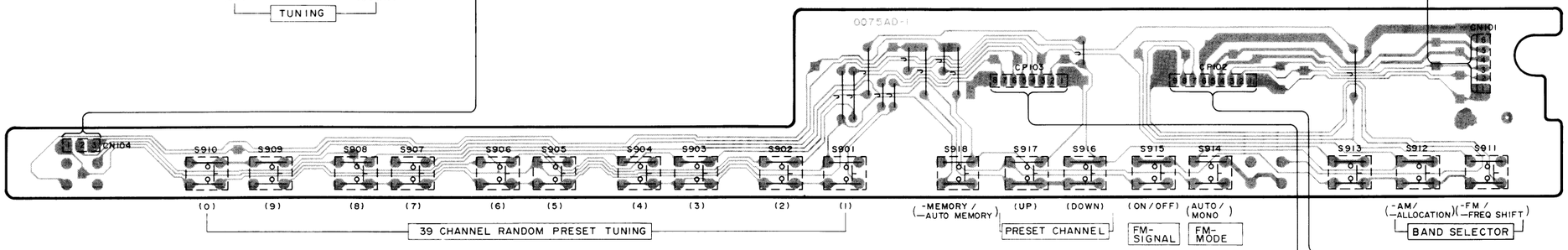
C POWER SWITCH P.C.B.



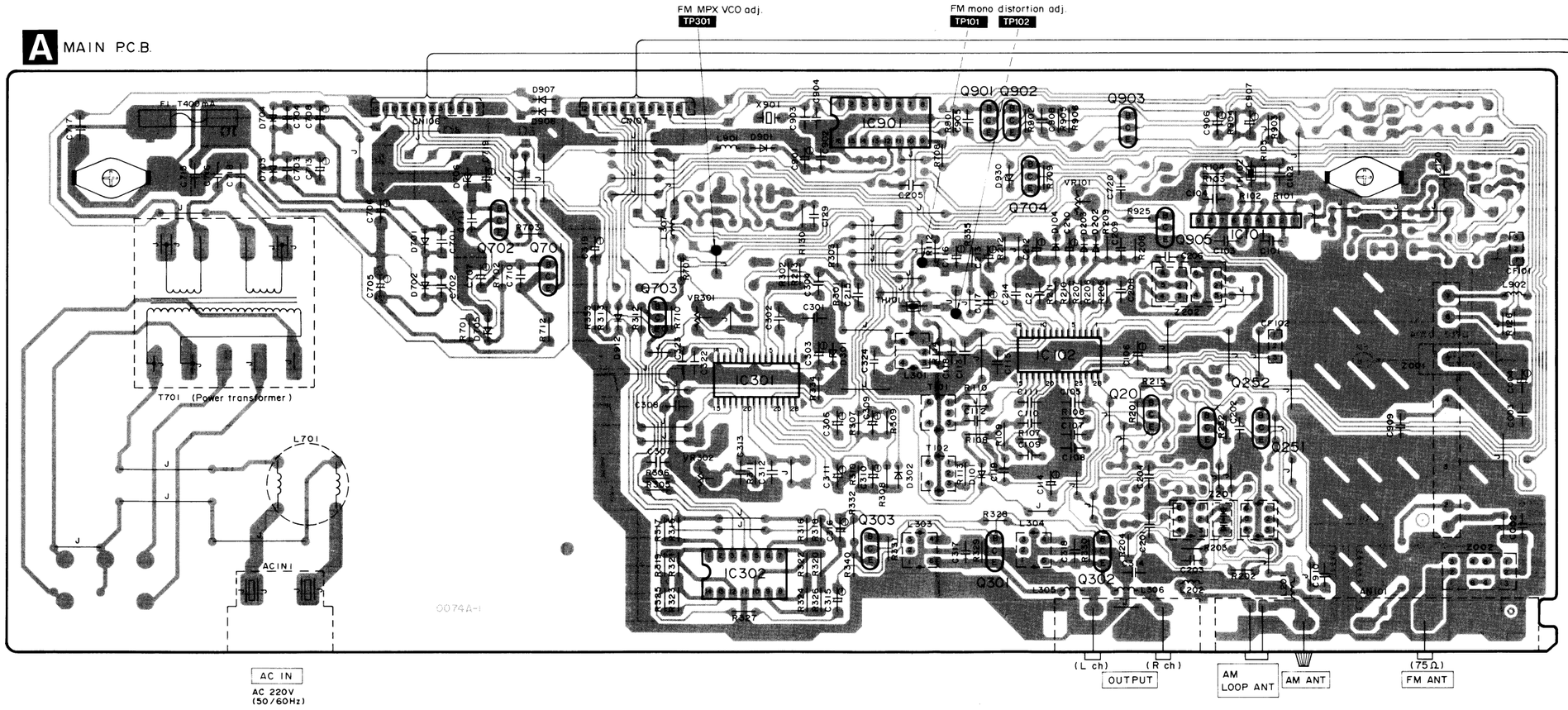
B SYSTEM CONTROL P.C.B.



E OPERATION SWITCH P.C.B.

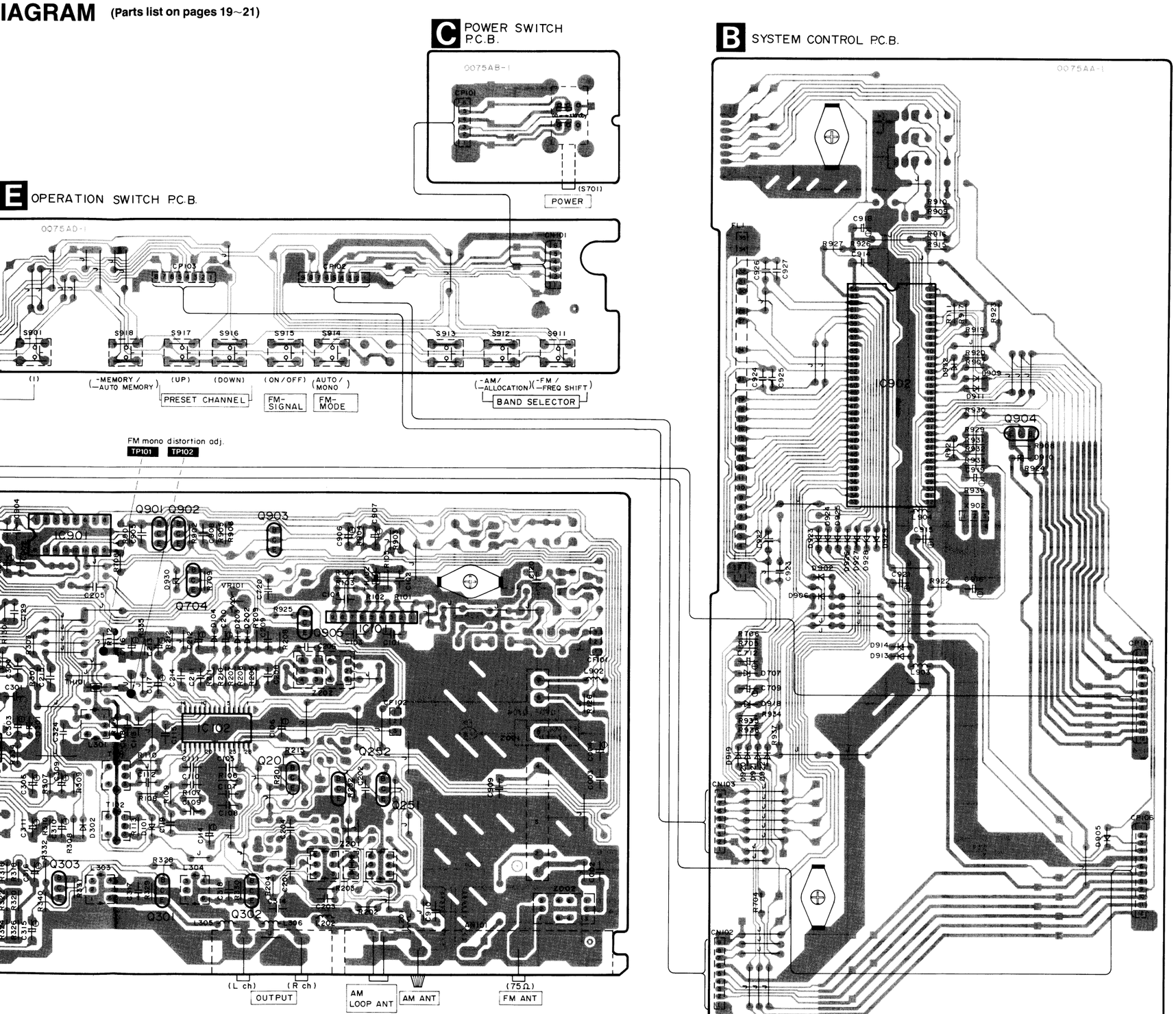


A MAIN P.C.B.



5 6 7 8 9 10 11

IAGRAM (Parts list on pages 19~21)

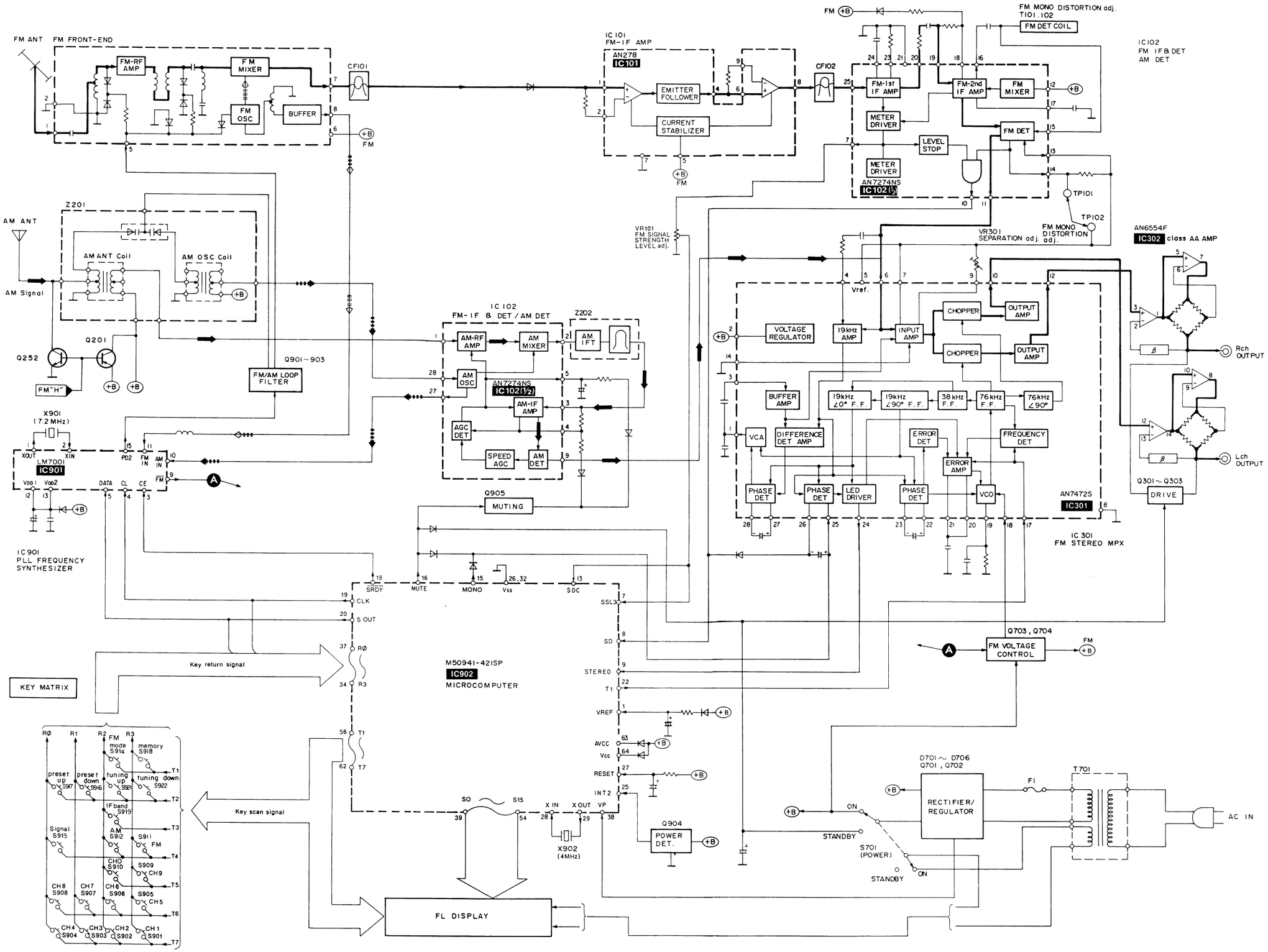


■ FUNCTIONS OF IC TERMINALS (IC902: M50941-421SP)

PIN NO.	IN/OUT	MARK	DESCRIPTION OF TERMINAL
1	INPUT	VREF	Reference voltage terminal.
2	——	NC	Not used in this unit.
3	——	A	Not used in this unit, connected to GND.
4		B	
5 • 6	——	SSL1 • SSL2	
7	INPUT	SSL3	FM signal level detector terminal.
8	INPUT	SD	Station detection of auto tuning terminal. • Received: "H", No signal: "L"
9	INPUT	STEREO	Reference voltage terminal.
10 • 17	——	TUNING 0 • TUNING 1	Not used in this unit.
11	——	RF BAND	Not used in this unit.
12	OUTPUT	IF BAND	FM IF BAND selector terminal. • "normal": "L", "super narrow": "H"
13	——	NC	Not used in this unit.
14	——	REC	Not used in this unit.
15	OUTPUT	MONO	Forcible monaural selection terminal. 4.8V 0 Forcible monaural mode
16	OUTPUT	MUTE	Terminal to eliminate shock noise due to unlocking at PLL. 〈Muting output〉 • Pin 25 (CE) is "L"→"H" or "H"→"L" • Power switch "off". • Frequency change. (up/down, FM↔AM (MW/LW), REC). • FM RF/IF selection.
18	OUTPUT	SRDY	PLL data output terminal. SRDY: serial I/O enable signal, CLK: clock signal, SOUT: serial data signal.
19		CLK	
20		SOUT	
21	INPUT	SIN	Control input terminal.
22	OUTPUT	T1	Clock pulse waveform output terminal. • FM: 1kHz signal (duty 50%)
23	——	T2	Not used in this unit.
24	INPUT	$\overline{INT1}$	Remote control input terminal. Not used in this unit.
25	INPUT	$\overline{INT2}$	Power supply detection terminal.
26 • 32	——	Vss	Ground terminal.
27	INPUT	RESET	Reset signal terminal.
28	INPUT	XIN	Connecting terminal for crystal oscillator.
29	OUTPUT	XOUT	
30	——	XCIN	Not used in this unit, connected to GND.
31	——	XCOUT	Not used in this unit.
33	——	NC	
34 ~ 37	INPUT	R0 ~ R3	Terminal for key return signal to external key matrix. 3.6V 0 1V/2msec div
38	INPUT	VP	Power supply terminal for FL display.
39 ~ 54	OUTPUT	S0 ~ S15	Segment signal terminal for FL display. 5V 0V 26.0V 10V/5msec div
55	——	NC	Not used in this unit.
56 ~ 62	OUTPUT	T1 ~ T7	Terminal for key scan signal to external key matrix and grid signal terminal for FL display. 5V 0V 26.0V 10V/2msec div
63	INPUT	AVcc	Power supply terminal of device.
64	INPUT	Vcc	

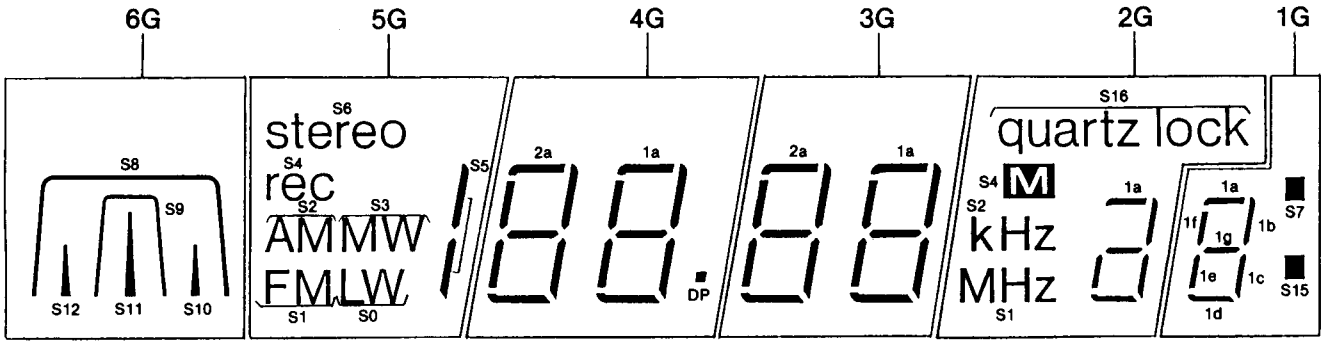
ST-G470

■ BLOCK DIAGRAM



■ DESCRIPTION OF FL PANEL [FL1 (SAD6MT117GK)]

• GRID ASSIGNMENT



• PIN CONNECTION

PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
CONNECTION	F1	F1	NP	S8	S9	6G	S10	S11	S12	S13	5G	S14	S15	4G	S0	S1	S2	S3	S4	NP	3G	NP	NP	S5	NP	NP	S6	2G	NP	S16	S7	1G	NP	F2	F2

• ANODE CONNECTION

	6G	5G	4G	3G	2G	1G
S0	-	LW	2d	2d	-	-
S1	-	FM	2e	2e	MHz	-
S2	-	AM	2c	2c	kHz	-
S3	-	MW	2g	2g	-	-
S4	-	rec	2f	2f	M	-
S5	-	/	2b	2b	-	-
S6	-	stereo	2a	2a	-	-
S7	-	-	-	-	-	■
S8	⌐¬	-	1d	1d	1d	1d
S9	⌐¬	-	1e	1e	1e	1e
S10	|	-	1c	1c	1c	1c
S11	|	-	1g	1g	1g	1g
S12	|	-	1f	1f	-	1f
S13	-	-	1b	1b	1b	1b
S14	-	-	1a	1a	1a	1a
S15	-	-	DP	-	-	■
S16	-	-	-	-	quartz lock	-

■ REPLACEMENT PARTS LIST

Notes: *Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
*The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.)
Parts without these indications can be used for all areas.
*[F]: Indicates parts that are supplied by PFS. (Panasonic France S.A. Longwy division).

Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)	
IC101	AN278	IC, BUFFER AMP.	
IC102	AN7274NS	IC, FM IF AMP.	
IC301	AN7472S	IC, FM MPX	
IC302	AN6554F	IC, CLASS AA OUTPUT AMP.	
IC901	LM7001	IC, PLL FREQUENCY SYNTHE	
IC902	M50941-421SP	IC, MICRO COMPUTER	
		TRANSISTOR(S)	
Q201	2SA1253RSTAC	TRANSISTOR	
Q252	2SD1450RSTTA	TRANSISTOR	
Q301, 302	2SD1450RSTTA	TRANSISTOR	
Q303	2SA1309AQSTA	TRANSISTOR	
Q701, 702	2SC3940AQSTA	TRANSISTOR	
Q703, 704	2SA1309AQSTA	TRANSISTOR	
Q901, 902	2SC1310EFGTA	TRANSISTOR	
Q903	2SA1309AQSTA	TRANSISTOR	
Q904	DTC144ESTP	TRANSISTOR	
Q905	2SC3311AQSTA	TRANSISTOR	
		DIODE(S)	
D101	MA165TA	DIODE	
D104	MA165TA	DIODE	
D202, 203	MA165TA	DIODE	
D301	MA4082MTA	DIODE	
D302	MA165TA	DIODE	
D701, 702	1SR35200TB	DIODE	⚠
D703, 704	MA165TA	DIODE	⚠
D705	MA4140MTA	DIODE	
D706	MA4062MTA	DIODE	
D707	MA4051MTA	DIODE	
D901, 902	MA165TA	DIODE	
D905, 906	MA165TA	DIODE	
D907, 908	MA150FV	DIODE	
D909	MA165TA	DIODE	
D910	MA4082MTA	DIODE	
D911-914	MA165TA	DIODE	
D918	MA4300MTA	DIODE	
D919-929	MA165TA	DIODE	
D930	MA4062MTA	DIODE	
D932	MA165TA	DIODE	

Ref. No.	Part No.	Part Name & Description	Remarks
		VARIABLE RESISTOR(S)	
VR101	EVNDXAA00B15	V. R, STRENGTH LEVEL ADJ.	
VR301	EVNDXAA00B15	V. R, FM MPX VCO ADJ.	
VR302	EVNDXAA00B14	V. R, STEREO SEPARATION ADJ.	
		THERMISTOR(S)	
TH101, 102	ERTD2ZHL332T	THERMISTOR	
		COMPONENT COMBINATION(S)	
Z001	SNVFE337G01	COMPONENT COMBINATION	
Z002	SLA4Z13-Z	COMPONENT COMBINATION	
Z201	SLA2Z1-T	COMPONENT COMBINATION	
Z202	RL12Z002-W	COMPONENT COMBINATION	
		COIL(S)	
L201	ELEPK1R2MA	COIL	
L202	ELEPKR22MA	COIL	
L301	SLM1B10-M	COIL	
L303, 304	RLM2B003-K	COIL	
L305, 306	RLQZP2R2KT-Y	COIL	
L307	RLQZP101KT-Y	COIL	
L701	SLQZ650MH49	COIL	⚠
L901	RLQZP101KT-Y	COIL	
L902	RLQZPR47KT-Y	COIL	
L903	RLQZP101KT-Y	COIL	
L904	RLQZPR47KT-Y	COIL	
		DISPLAY	
FL1	SAD6MT117GK	FL DISPLAY	
		FUSE	
F1	XBA2C04TB0	FUSE 250V TO. 4A	⚠
		TRANSFORMER(S)	
T101	RLI4B005-Z	TRANSFORMER	
T102	RLI4B006-Z	TRANSFORMER	
T701	SLT5K264-K	POWER TRANSFORMER	⚠

Ref. No.	Part No.	Part Name & Description	Remarks
		OSCILLATOR(S)	
X901	SVQ49U722T-S	OSCILLATOR	
X902	EF0GC4004T4	CERAMIC FILTER	
		CERAMIC FILTER(S)	
CF101	SVFE107MZ2-A	CERAMIC FILTER	(RED)
CF101	SVFE107MZ2-B	CERAMIC FILTER	(BLUE)
CF101	SVFE107MZ2-C	CERAMIC FILTER	(ORANGE)
CF102	SVFE107MX2-A	CERAMIC FILTER	(RED)
CF102	SVFE107MX2-B	CERAMIC FILTER	(BLUE)
CF102	SVFE107MX2-C	CERAMIC FILTER	(ORANGE)
		SWITCH(ES)	
S701	SSH1218	POWER SWITCH	⚠
S901-912	EVQQB005R	PUSH SWITCHES	
S914-918	EVQQB005R	PUSH SWITCHES	
S921, 922	EVQQB005R	PUSH SWITCHES	

Ref. No.	Part No.	Part Name & Description	Remarks
		JACK(S)	
AC1N1	SJS9236	AC INLET	⚠
AN101	SJF8305N	TERMINAL BOARD(ANT)	
CN101	SJS50681BB	SOCKET(6P)	
CN102	RJU003K009M1	SOCKET(9P)	
CN103	RJU003K008M1	SOCKET(8P)	
CN104	SJS50382JQH	SOCKET(3P)	
CN106, 107	RJU005W012	SOCKET(12P)	
CP101	SJT30648BB	CONNECTOR(6P)	
CP102	RJT003K009M1	CONNECTOR(9P)	
CP103	RJT003K008M1	CONNECTOR(8P)	
CP104	SJT30345JQ	CONNECTOR(3P)	
CP106, 107	RJT005W012	CONNECTOR(12P)	

Notes : * Capacity valuse are in microfarads (uF) unless specified otherwise, P=Pico-farads(pF) F=Farads(F)
* Resistance values are in ohms, unless specified otherwise, 1K=1,000(OHM) , 1M=1,000k(OHM)

Ref. No.	Part No.	Values & Remarks
		RESISTORS
R101	ERDS2TJ331T	1/4W 330
R102	ERDS2TJ272T	1/4W 2.7K
R103, 104	ERDS2TJ331T	1/4W 330
R105	ERDS2TJ272T	1/4W 2.7K
R106	ERDS2TJ392T	1/4W 3.9K
R107	ERDS2TJ221T	1/4W 220
R108	ERDS2TJ104T	1/4W 100K
R109	ERDS2TJ101T	1/4W 100
R110	ERDS2TJ822T	1/4W 8.2K
R111	ERDS2TJ684T	1/4W 680K
R112	ERDS2TJ333T	1/4W 33K
R113	ERDS2TJ182T	1/4W 1.8K
R114	ERDS2TJ152T	1/4W 1.5K
R126	ERDS2TJ101T	1/4W 100
R201	ERDS2TJ473T	1/4W 47K
R202	ERDS2TJ822T	1/4W 8.2K
R203	ERDS2TJ104T	1/4W 100K
R204	ERDS2TJ102T	1/4W 1K
R205	ERDS2TJ222T	1/4W 2.2K
R206	ERDS2TJ473T	1/4W 47K
R207	ERDS2TJ563T	1/4W 56K
R208	ERDS2TJ124T	1/4W 120K

Ref. No.	Part No.	Values & Remarks
R209	ERDS2TJ274T	1/4W 270K
R210	ERDS2TJ222T	1/4W 2.2K
R211	ERDS2TJ101T	1/4W 100
R212	ERDS2TJ473T	1/4W 47K
R213	ERDS2TJ223T	1/4W 22K
R215	ERDS2TJ124T	1/4W 120K
R252	ERDS2TJ103T	1/4W 10K
R301, 302	ERDS2TJ223T	1/4W 22K
R303	ERDS2TJ564T	1/4W 560K
R305, 306	ERDS2TJ823T	1/4W 82K
R307	ERDS2TJ274T	1/4W 270K
R308	ERDS2TJ104T	1/4W 100K
R309	ERDS2TJ274T	1/4W 270K
R310	ERDS2TJ102T	1/4W 1K
R311	ERDS2TJ123T	1/4W 12K
R312, 313	ERDS2TJ393T	1/4W 39K
R315, 316	ERDS2TJ222T	1/4W 2.2K
R317, 318	ERDS2TJ223T	1/4W 22K
R319, 320	ERDS2TJ101T	1/4W 100
R321, 322	ERDS2TJ331T	1/4W 330
R323, 324	ERDS2TJ332T	1/4W 3.3K
R325, 326	ERDS2TJ102T	1/4W 1K
R327, 328	ERDS2TJ272T	1/4W 2.7K
R329, 330	ERDS2TJ562T	1/4W 5.6K
R331	ERDS2TJ333T	1/4W 33K

Ref. No.	Part No.	Values & Remarks
R332	ERDS2TJ102T	1/4W 1K
R333	ERDS2TJ392T	1/4W 3.9K
R334	ERDS2TJ561T	1/4W 560
R335	ERDS2TJ392T	1/4W 3.9K
R340	ERDS2TJ333T	1/4W 33K
R701	ERDS2TJ102T	1/4W 1K
R702	ERDS2TJ221T	1/4W 220
R703	ERDS2TJ222T	1/4W 2.2K
R704-706	ERDS2TJ101T	1/4W 100
R707	ERDS2TJ473T	1/4W 47K
R708	ERDS2TJ103T	1/4W 10K
R709	ERDS2TJ223T	1/4W 22K
R710	ERDS2TJ104T	1/4W 100K
R711	ERDS2TJ100T	1/4W 10
R712	ERDS1FVJ470T	1/2W 47 ⚠
R901	ERDS2TJ102T	1/4W 1K
R902	ERDS2TJ273T	1/4W 27K
R903	ERDS2TJ682T	1/4W 6.8K
R904	ERDS2TJ561T	1/4W 560
R905	ERDS2TJ123T	1/4W 12K
R906	ERDS2TJ102T	1/4W 1K
R907	ERDS2TJ333T	1/4W 33K
R908	ERDS2TJ392T	1/4W 3.9K
R909, 910	ERDS2TJ473T	1/4W 47K
R915-917	ERDS2TJ104T	1/4W 100K

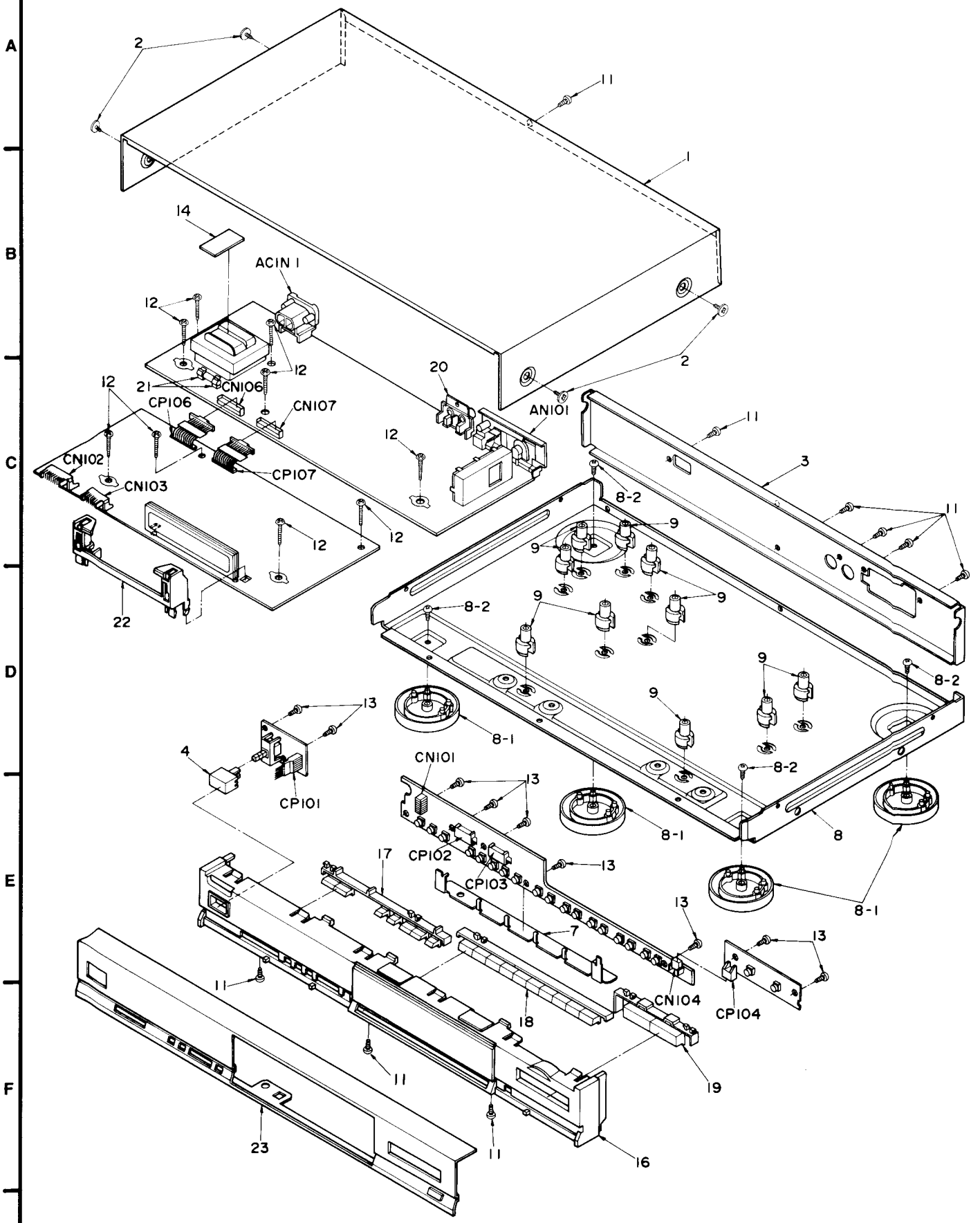
Ref. No.	Part No.	Values & Remarks
R919-921	ERDS2TJ105T	1/4W 1M
R922	ERDS2TJ681T	1/4W 680
R923, 924	ERDS2TJ105T	1/4W 1M
R925	ERDS2TJ473T	1/4W 47K
R926	ERDS2TJ123T	1/4W 12K
R927	ERDS2TJ102T	1/4W 1K
R929	ERDS2TJ103T	1/4W 10K
R930	ERDS2TJ393T	1/4W 39K
R931, 932	ERDS2TJ103T	1/4W 10K
R933-937	ERDS2TJ104T	1/4W 100K
R939	ERDS2TJ105T	1/4W 1M
		CAPACITORS
C002	ECCR1H330KC5	50V 33P
C003	ECKR1H103ZF5	50V 0.01U
C004	ECEA1CK100B	16V 10U
C101-104	ECKR1H103ZF5	50V 0.01U
C105	ECQM1H473KV3	50V 0.047U
C106	ECEA0JU471B	6.3V 470U
C107	ECQM1H102KV3	50V 1000P
C108	ECBT1H180JC5	50V 18P
C109	ECBT1H102KB5	50V 1000P
C110, 111	ECKR1H103ZF5	50V 0.01U
C112	ECBT1H6R8KC5	50V 6.8P
C113	ECQM1H223KV3	50V 0.022U
C114	ECEA1VU101B	35V 100U
C115	ECFR1E104ZF5	25V 0.1U
C116	ECEA1AU101B	10V 100U
C117	ECEA1HKR22B	50V 0.22U
C118	ECBT1H101KB5	50V 100P
C119	ECBT1H102KB5	50V 1000P
C120	ECFR1E104ZF5	25V 0.1U
C201, 202	ECKR1H223ZF5	50V 0.022U
C203	ECBT1H2R2JC5	50V 2.2P
C204	ECKR1H223ZF5	50V 0.022U
C205	ECBT1H102KB5	50V 1000P
C206	ECBT1H120JC5	50V 12P
C208, 209	ECKR1H103ZF5	50V 0.01U
C210	ECEA0JK330B	6.3V 33U
C211	ECKR1H103ZF5	50V 0.01U
C212	ECEA1HKR47B	50V 0.47U
C213	ECEA0JK330B	6.3V 33U
C214	ECKR1H223ZF5	50V 0.022U
C215	ECFR1E223KR	25V 0.022U
C301	ECFR1E332KR	25V 3300P
C302	ECKR1H103ZF5	50V 0.01U
C303	ECEA1AU101B	10V 100U
C304	ECFR1E104ZF5	25V 0.1U
C306	ECEA1CK100B	16V 10U
C307, 308	ECQB1H153JZ3	50V 0.015U
C309	ECEA1HKR22B	50V 0.22U

Ref. No.	Part No.	Values & Remarks
C310	ECEA1HKR47B	50V 0.47U
C311	ECEA1HKR22B	50V 0.22U
C312	ECKR1H223ZF5	50V 0.022U
C313	ECQP1391JZ3	50V 390P
C314	ECQM1H223KV3	50V 0.022U
C315, 316	ECEA1HPX3R3B	50V 3.3U
C317, 318	ECFR1E332KR	25V 3300P
C319	ECEA1HPX3R3B	50V 3.3U
C322, 323	ECBT1H102KB5	50V 1000P
C324	ECKR1H471KB5	50V 470P
C701-704	ECKR1H103ZF5	50V 0.01U
C705	ECA1EPT102LE	25V 1000U
C706	ECA1CPT222LE	16V 2200U
C707	ECEA1CU221B	16V 220U
C708	ECEA1VU101B	35V 100U
C709	ECEA1VK100B	35V 10U
C710, 711	ECKR1H103ZF5	50V 0.01U
C712	ECEA1VK3R3B	35V 3.3U
C713	ECEA1VU101B	35V 100U
C715-718	ECKR1H103ZF5	50V 0.01U
C719	ECEA1CK100B	16V 10U
C720	ECFR1E104ZF5	25V 0.1U
C901	ECEA0JU471B	6.3V 470U
C902	ECBT1E103ZF5	25V 0.01U
C903, 904	ECBT1H150JC5	50V 15P
C905	ECKR1H103ZF5	50V 0.01U
C906	ECEA25M4R7RB	25V 4.7U
C907	ECEA1HKR47B	50V 0.47U
C908	ECFR1E223KR	25V 0.022U
C909, 910	ECKR1H103ZF5	50V 0.01U
C914	ECKR1H103ZF5	50V 0.01U
C915, 916	ECEA0JU102B	6.3V 1000U
C918	ECEA1CK100B	16V 10U
C919	ECEA1VK3R3B	35V 3.3U
C921	ECEA0JU101B	6.3V 100U
C922-927	ECBT1H101KB5	50V 100P

Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET PARTS	
1	RKM0032-K	CABINET	
2	SNE2129-1	SCREW	
3	RGR0018A-X	REAR PANEL	(EG)
3	RGR0018A-T	REAR PANEL	(EI) F
4	RGU0030	POWER BUTTON	
7	RMA0074	HOLDER	
8	RFKJT610LE-K	CHASSIS ASS'Y	
8-1	RKA0009-1	FOOT	
8-2	XTB3+6J	SCREW	
9	SHE187-2	HOLDER	
11	XTBS3+8JFZ1	SCREW	
12	XTB3+20JFZ	SCREW	
13	XTB3+8JFZ	SCREW	
14	SHG6374-2	SPACER	
16	RFKNTG460EGK	FRONT GRILL	
17	RFKNTG470EGK	FUNCTION BUTTON	
18	RGU0112-K	PRESET BUTTON	
19	RGU0114-K	TUNING BUTTON	
20	RJH3201N	TERMINAL BOARD	
21	SJT390	FUSE HOLDER	⚠
22	RMR0128	FL HOLDER	
23	RFKGTG470EGK	FRONT PANEL	

Ref. No.	Part No.	Part Name & Description	Remarks
		PACKING MATERIAL	
P1	RPG0510	CARTON BOX	(EG)
P1	RPG0512	CARTON BOX	(EI) F
P2	SPSD152	ACCESSORIES BOX	
P3	RPN0124-1	PAD	
P4	XZB52X60A01Z	PROTECTION COVER	
		ACCESSORIES	
A1	RQA0013	WARRANTY CARD	
A2	RQCB0169	SERVICENTOR LIST	
A3	RQT0512-D	INSIRUCTIONS MANUAL	(EG)
A3	RQT0513-V	INSIRUCTIONS MANUAL	(EI) F
A4	SFDAC05E03	AC CORD	⚠
A5	SJP2276	CORD	
A6	SPB1162T	AM LOOP ANTENNA	
A6-1	SMA233-1M	HOLDER	
A6-2	SMA231M	HOLDER	
A6-3	XTB3+10AFZ	SCREW	
A7	SSA270M	FM ANTENNA	
A8	RQCS0009	CAUTION NOTE for FTZ	(EG)

■ EXPLODED VIEW



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ORDER NO. AD9005134C2-A

Tuner

ST-G470

DEUTSCH

■ MESSUNGEN UND EINSTELL METHODEN

■ FM

Einstellungen der Bedienelemente und zu verwendende Geräte.

- UKW Meßsender (UKW Nebsender)
- Stereo-Modulator
- Verzerrungs-Analystator
- Elektronische Wechselstrom-und Gleichstrom-Voltmeter (EVM)
- Oszilloskop
- Frequenzzähler
- Drosselspule (100μH)
- Widerstand (100KΩ)

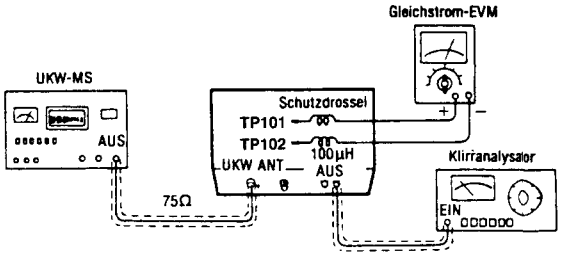
Anmerkung: Für **Z201, Z202, L301, L303** und **L304**, werdeven justiert Ersatzteil geliefert. Dien Kern dieses Teils daher nicht drehen.

UKW-MONO-VERZERRUNGS-JUSTIERUNG

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Stellen Sie die Einheit auf **"FM(UKW)"** Betrieb.
3. Die Radiofrequenzanzeige und den Messender auf **100.10MHz** einstellen.
4. Den Kern von **T101** so justieren, daß die im Signalzustand gemessene Spannung **0mV (0±20mV)** im 300mV-Bereich beträgt.
5. **T102** so justieren, daß der Verzerrungsfaktor des linken Kanals minimal wird.
6. Schritte 4 und 5 einige Male wiederholen.
7. Versichern Sie sich, daß die Verzerrungsfaktoren von Kanal L und Kanal R annähernd gleich sind und auf ein Minimum gehalten sind.

Anmerkung:
Für die Justierung ist ein Schraubendreher aus Kunststoff zu verwenden.

ZUSTAND DES UKW-MESSENDERS
Modulation 100%
Modulationsfrequenz 1kHz
Ausgangspegel 66dB



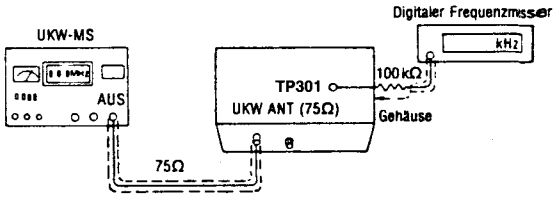
MPX-SGO-JUSTIERUNG

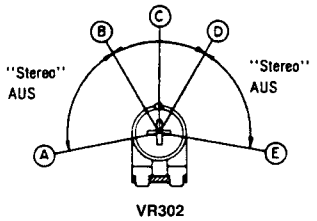
1. Der Testaufbau ist in der Abbildung gezeigt.
2. Den UKW-Bertriebsart-Wahlshalter in die „**auto**" Position stellen.
3. Radio und Meßsender auf **100.10MHz** einstellen.
4. **VR302** auf **19 kHz ± 30 Hz** auf der Frequenzzähleranzeige justieren.

● VERWENDUNG EINES ALTERNATIVSYSTEMS

1. Stereosignal vom Meßsender eingeben oder eine Stereo-Sendung empfangen.
2. **VR302** justieren, bis die Stereo-Anzeige aufleuchtet. Den Arm von **VR302** mit Lack sichern, wie in der Abbildung gezeigt.

ZUSTAND DES UKW-MESSENDERS
Modulation 0%
Modulationsfrequenz 0kHz
Ausgangspegel 66dB



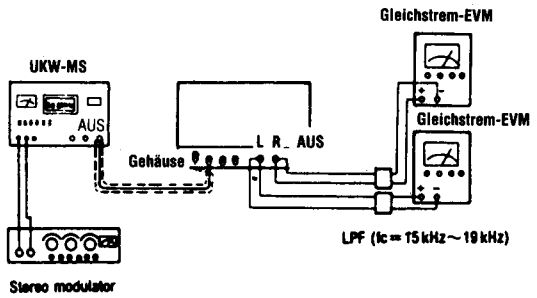


Ⓐ−Ⓑ,
Ⓓ−Ⓔ..... "Stereo" AUS Stellung
Ⓑ−Ⓓ..... "Stereo" EIN Stellung (Anzeigebeleuchtung)
Ⓒ..... Einstellpunkt des pilotschaltkreis'

TRENNUNGS-JUSTIERUNG

1. **Der Testaufbau ist in der Abbildung gezeigt.**
2. **Stellen Sie die Einheit auf "FM" Betrieb.**
3. **Die Radiofrequenzanzeige und den Messender auf 100.10 MHz einstellen.**
4. **VR301 so justieren, daß der R-Ausgang minimal ist, wenn der Stereomodulator im L-Betriebszustand (Linker Kanal moduliert) ist.**

ZUSTAND DES UKW-MESSENDERS
Modulation ..... "L" order "R" Betriebsart 90%, Pilotssignal 10%
Modulations frequenz ..... 1kHz(Pilot 19kHz)
Ausgangspegel 66dB

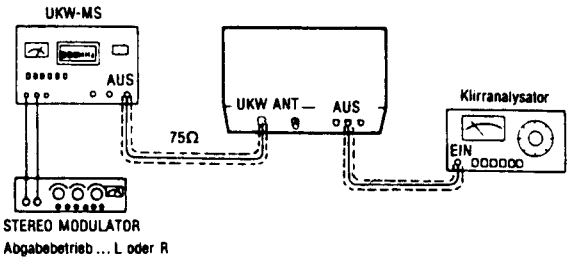


UKW STEREO KLIRRFAKTOR-JUSTIERUNG

1.Der Testaufbau ist in der Abbildung gezeigt.
2.Stellen Sie die Einheit auf **"FM(UKW)"** Betrieb.
3.Die Radiofrequenzanzeige und den Messender auf **100.10MHz** einstellen.
4.**L1** so justieren, daß der Verzerrungsfaktor des linken Kanals minimal wird.
5.überprüfen, daß die Verzerrungsfaktoren des linken und rechten Kanals fast gleich sind.

Anmerkung:
Für die Justierung ist ein Schraubendreher aus Kunststoff zu verwenden.

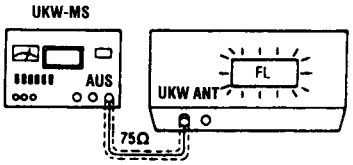
ZUSTAND DES UKW-MESSENDERS
Modulation ..... "L" order "R" Betriebsart 90%, Pilotssignal 10%
Modulationsfrequenz .....1kHz(Pilot 19kHz)
Ausgangspegel 66dB



UKW-SIGNALSTÄRKEPEGELS-JUSTIERUNG

1. **Für den Anschluß des Prüfgerätes siehe die Abbildung.**
2. **Das Gerät auf "FM" stellen.**
3. **Das Hochfrequenz-Anzeigegerät und den Signalgenerator auf 100.10 MHz stellen.**
4. **Durch Drücken der UKW-Signaltaste das Flüssigkristalldisplay von "frequency" auf "dB" umschalten.**
5. **VR101 so einstellen, daß 54dB angezeigt wird. "54dB" wird auf dem Flüssigkristalldisplay angezeigt.**
6. **Die Schritte 4, 5 wiederholen.**

ZUSTAND DES UKW-MESSENDERS
Modulation 30%
Modulations frequenz 1kHz
Ausgangspegel 66dB



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