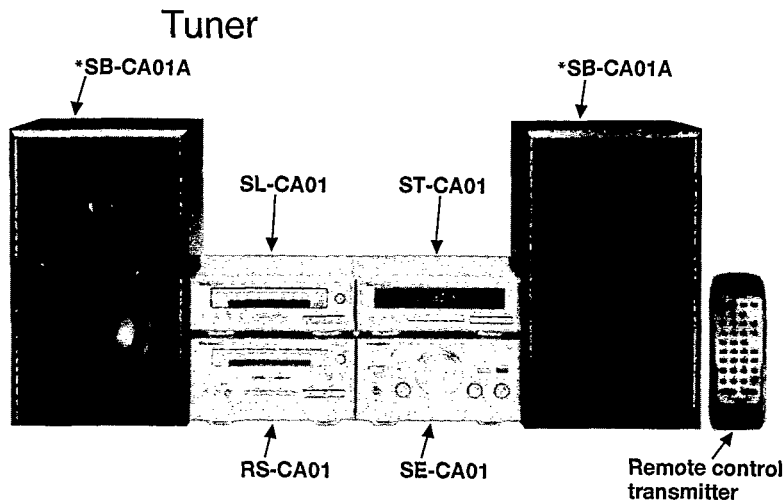


Service Manual

Tuner

ST-CA01



Colour

(N)...Gold Type

Areas

Suffix for Model No.	Area	Colour
(E)	Europe.	(N)
(EG)	Germany and Italy.	

System: SC-CA01

Because of unique interconnecting cables, when a component requires service, send or bring in the entire system.

SPECIFICATIONS

Pre-amplifier section

Input sensitivity/impedance	250 mV/15 k Ω
EXTERNAL	
Output level	150 mV/1.5 k Ω
EXTERNAL	
Frequency response	50 Hz—25 kHz
EXTERNAL	
S/N	DIN 82 dB (83 dB, IHF)
EXTERNAL	

FM tuner section

Frequency range	87.50—108.00 MHz (0.05 MHz steps)
Sensitivity	1.8 μ V (IHF usable)
S/N 26 dB	1.5 μ V
S/N	
MONO	70 dB (75 dB, IHF)
Stereo separation	35 dB
1kHz	
Antenna terminal(s)	75 Ω (unbalance)

AM tuner section

Frequency range	522—1611 kHz (9 kHz steps)
	530—1620 kHz (10 kHz steps)
Sensitivity (S/N 20 dB)	500 μ V/m

Timer section

Clock	Quartz-lock type
Function	24-hour programmable;
	Play timer (1 time), Rec timer (1 time)
	Sleep (120 min., 30 min. intervals)
Setting	1 minute—23 hours 59 minutes (1 min. intervals)

General

Dimensions (W×H×D)	186×67×235 mm
Weight	1.2 kg

Note:

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

System	Tuner	CD Player	Amplifier	Cassette deck	Speakers
SC-CA01	ST-CA01	SL-CA01	SE-CA01	RS-CA01	* SB-CA01A

* Made in PAES

△ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Technics®

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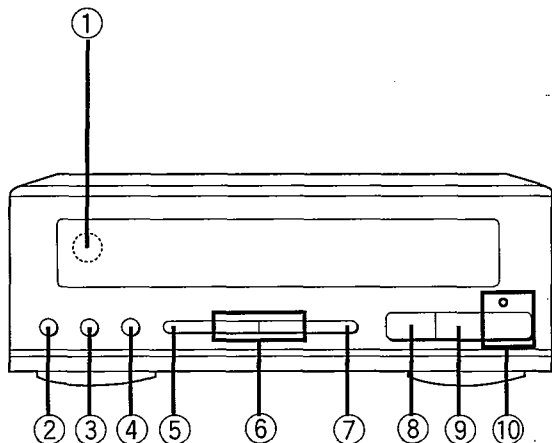
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NOTE:

Refer to the service manual for Model No. SE-CA01 (ORDER No. AD9603074C2) for information on "ACCESSORIES", "INSTALLATION", "CONNECTIONS" and "PACKAGING".

LOCATION OF CONTROLS



- ① Remote control signal sensor (SENSOR)
- ② Record timer button (⊖ REC)
- ③ Play timer button (⊖ PLAY)
- ④ Clock/timer button (CLOCK/TIMER)
- ⑤ Set button (SET)
- ⑥ Tuning/time adjust buttons
(∇, ▲ TUNING/TIME ADJUST)
- ⑦ Tuning mode select button (TUNING MODE)
- ⑧ Source input select button (INPUT SELECTOR)
- ⑨ RDS display mode select button
(RDS DISPLAY MODE)
- ⑩ Band select button and indicator (TUNER FM/AM)

SETTING THE TIME

The tuner displays the time, frequency and other information on CDs and tapes.

This is a 24-hours display clock.

These instructions explain how to set the timer for 16:25 (4:25 p.m.) on Wednesday.

1 Switch on the power.

2 ① Press **CLOCK/TIMER** to show "CLOCK".

Within 8 seconds:

Every time you press the button, the indication changes in the order of CLOCK → ⊖ REC → ⊖ PLAY → Original display.

② Press **SET**.

3 ① Press ∇ or ▲ to select the day.

Every time you press one of the buttons, the indication changes in the order of SUN ⇄ MON ⇄ TUE ⇄ WED ⇄ THU ⇄ FRI ⇄ SAT.

② Press **SET**.

4 ① Press ∇ or ▲ to select the hour.

② Press **SET**.

5 ① Press ∇ or ▲ to select the minutes.

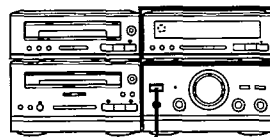
② Press **SET** to finish setting the time.

The display will return to the previous display after about 4 seconds.

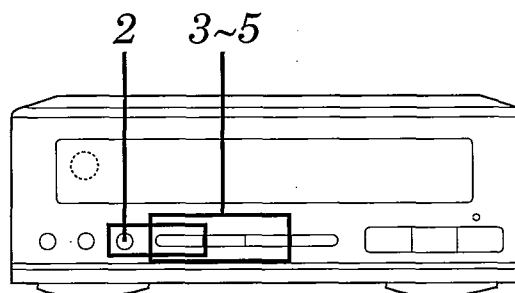
When "SUN 0:00" flashes:

If flashes when you connect the AC power supply cord for the first time or if there has been a power failure.

If this happens, reset the time.



1



If the minutes setting has gone wrong:

1. Press **CLOCK/TIMER**.
2. Press **SET** 3 times.
3. Press ∇ or ▲ to set the minutes, and then press **SET**.

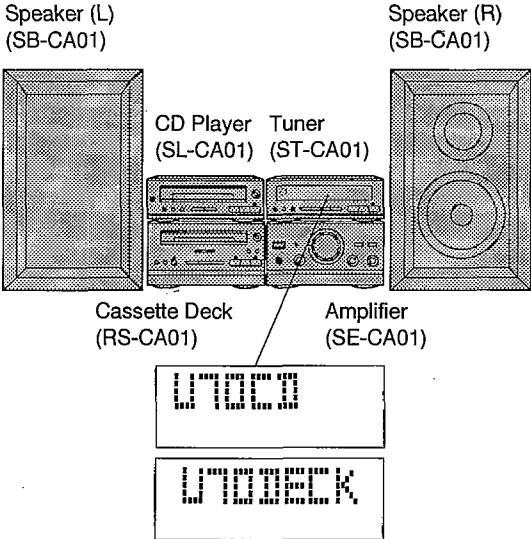
To display the clock again:

Press **CLOCK/TIMER**.

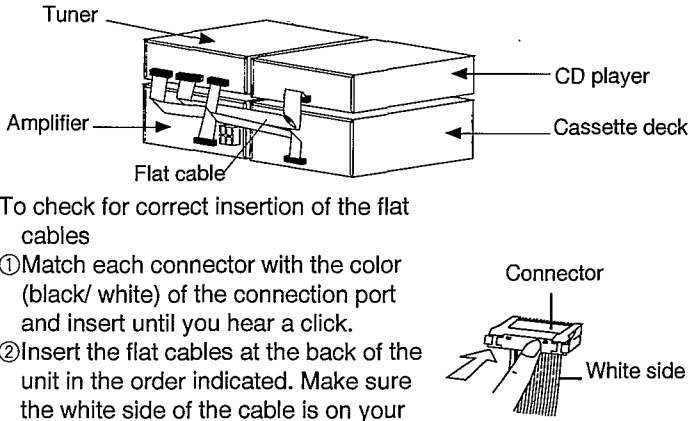
The clock display will appear for about 10 seconds.

■ ABOUT THE SELF-DIAGNOSTIC MODE

This unit is equipped with a self-diagnostic function which, in the event of a malfunction, automatically displays a code indicating the nature of the malfunctions. Use this self-diagnostic function when servicing the unit.

Display method	Display location
<p>To display the malfunction code</p> <p>U70 CD: U70 DECK:.... Automatically displays on the tuner when a malfunction occurs.</p> <p>F61 Automatically displays on the tuner when a malfunction occurs.</p> <p>To return to the normal display</p> <p>1. For U70 CD/U70 DECK:</p> <ul style="list-style-type: none"> • Press any operation button on the tuner. • To re-display the code, switch the power off (POWER STANDBY button), and then switch power back on again. <p>2. For F61:</p> <ul style="list-style-type: none"> • If "F61" is displayed, the power will automatically be switched off and the standby indicator will light up. • "F61" will be displayed for 3 seconds, and then the clock will be displayed. • To re-display the code, switch the power on. "F61" will be re-displayed, and then after 3 seconds the clock will be displayed and the power will automatically switch off. 	

Display contents

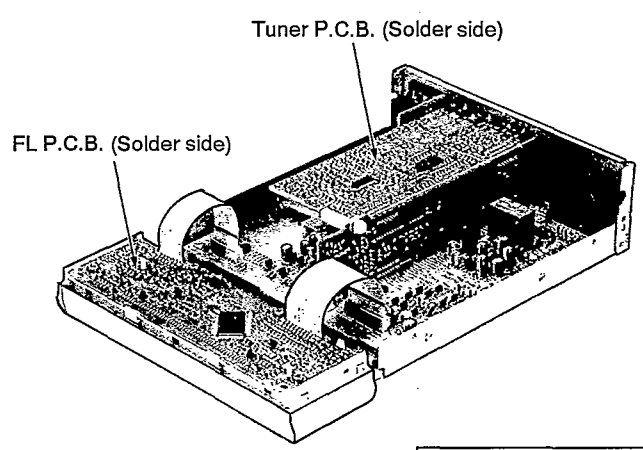
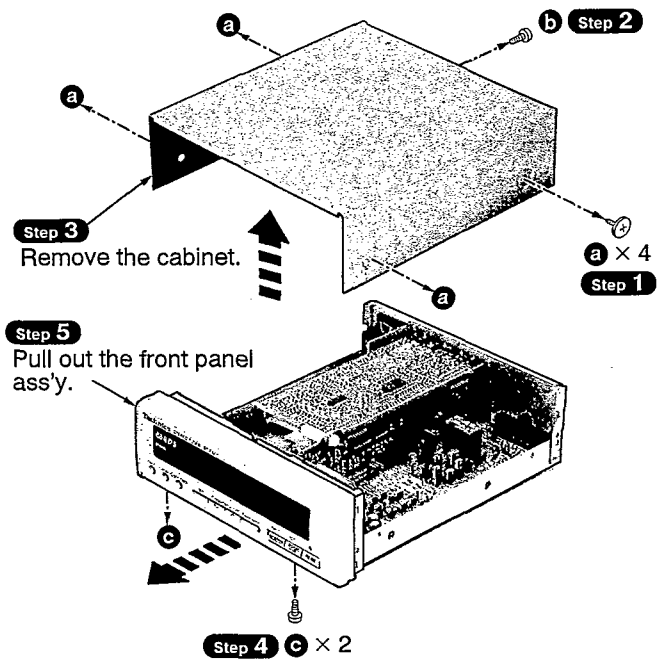
Display code	Problem or condition	Correction procedure
<p>U70 CD U70 DECK (displayed automatically)</p>	<p>A bus-line communications error has occurred as a result of the flat cables being inserted incorrectly, thus preventing the system from operating.</p> <p>1. If "U70" is displayed on the tuner, the Cassette deck or CD changer cannot be operated by remote control.</p>	 <p>1. To check for correct insertion of the flat cables</p> <ol style="list-style-type: none"> ① Match each connector with the color (black/ white) of the connection port and insert until you hear a click. ② Insert the flat cables at the back of the unit in the order indicated. Make sure the white side of the cable is on your right side. <p>2. Breakage of flat cable (Check and replace as necessary.)</p> <p>3. If the problem is not corrected by items (1.) and (2.) above, this indicates a faulty IC.</p> <p>ST-CA01: IC901 (M38197MA119F)</p> <p>SL-CA01: IC403 (LC66356B4H02)</p> <p>RS-CA01: IC701 (M37471M4264F)</p> <p>Check these IC's and replace as necessary.</p>
<p>F61</p>	<p>When the power switch is switched on, it automatically switches back off, making it impossible to switch power on.</p>	<ul style="list-style-type: none"> • Faulty amplifier (SE-CA01) output IC (IC505, 506). (When a DC voltage is applied to the speaker terminals.)

Operation Check and Main Component Replacement Procedures

- NOTE**
1. This section describes procedures for checking the operation of the major printed circuit boards and replacing the main components.
 2. For reassembly after operation checks or replacement, reverse the respective procedures. Special reassembly procedures are described only when required.
 3. Illustrated screws are equivalent to actual size.

1. Checking for the FL P.C.B. and tuner P.C.B.

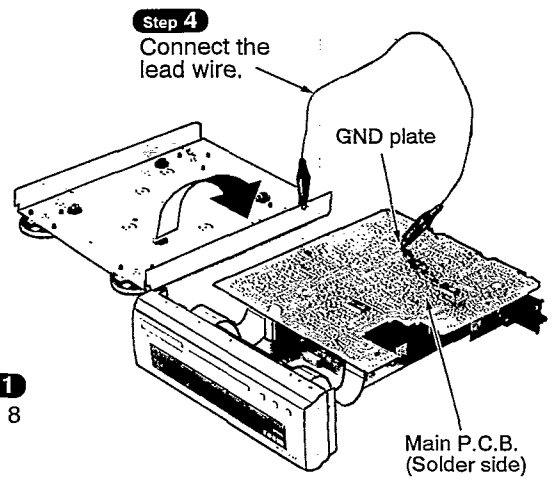
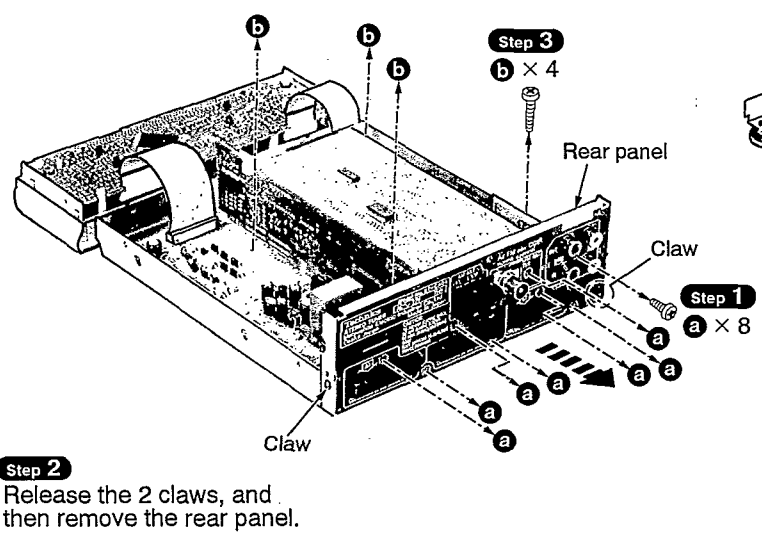
• Check the FL P.C.B. and tuner P.C.B. as shown below.



- a (Silver) [RHD30007-S]
- b (Black) [XTB3+8JFZ]
- c (Black) [XTBS3+8JFZ1]

2. Checking for the main P.C.B.

• Check the main P.C.B. as shown below.



- a (Black) [XTBS3+8JFZ1]
- b (Black) [XTB3+12JFZ]

■ TO SUPPLY POWER SOURCE

This unit ST-CA01 is designed to operate on power supplied from the Amplifier SE-CA01.

When operating the unit ST-CA01 alone for testing and servicing, without having power supplied from the Amplifier SE-CA01, use the following method.

Power Supply to Main Circuit

1. Short the section between the test points **TP602** (**[CT]**) and **TP610** (**[D.GND]**), and as well as the section between the test points **A.GND** and **TP610** (**[D.GND]**).
2. Connect the 10V AC power to pin ① of the indicator module FL901 and the GND terminal to pin ⑤ of the same FL901 module.
3. Apply 10V AC power to the section between the point **TP601** (**[AC]**) and the point **TP602** (**[CT]**) as well as the section between the point **TP603** (**[AC]**) and the point **TP602** (**[CT]**). This unit comes to stand-by mode.
4. Short the section between the test points **TP611** and **TP610** (**[D.GND]**) for a moment. The main circuit comes to power ON mode. (Whenever this operation is performed, power, ON/OFF mode is repeated.)

To Check Signals

Connect the oscilloscope to the section between the point LINE OUT (Rch) of jumper J610 and the point **TP610** (**[D.GND]**) as well as the section between the point LINE OUT (Lch) of jumper J611 and the **TP610** (**[D.GND]**), or the speaker with the built-in amplifier to the EXTERNAL (OUT) terminals and check if the signals are outputting from this unit.

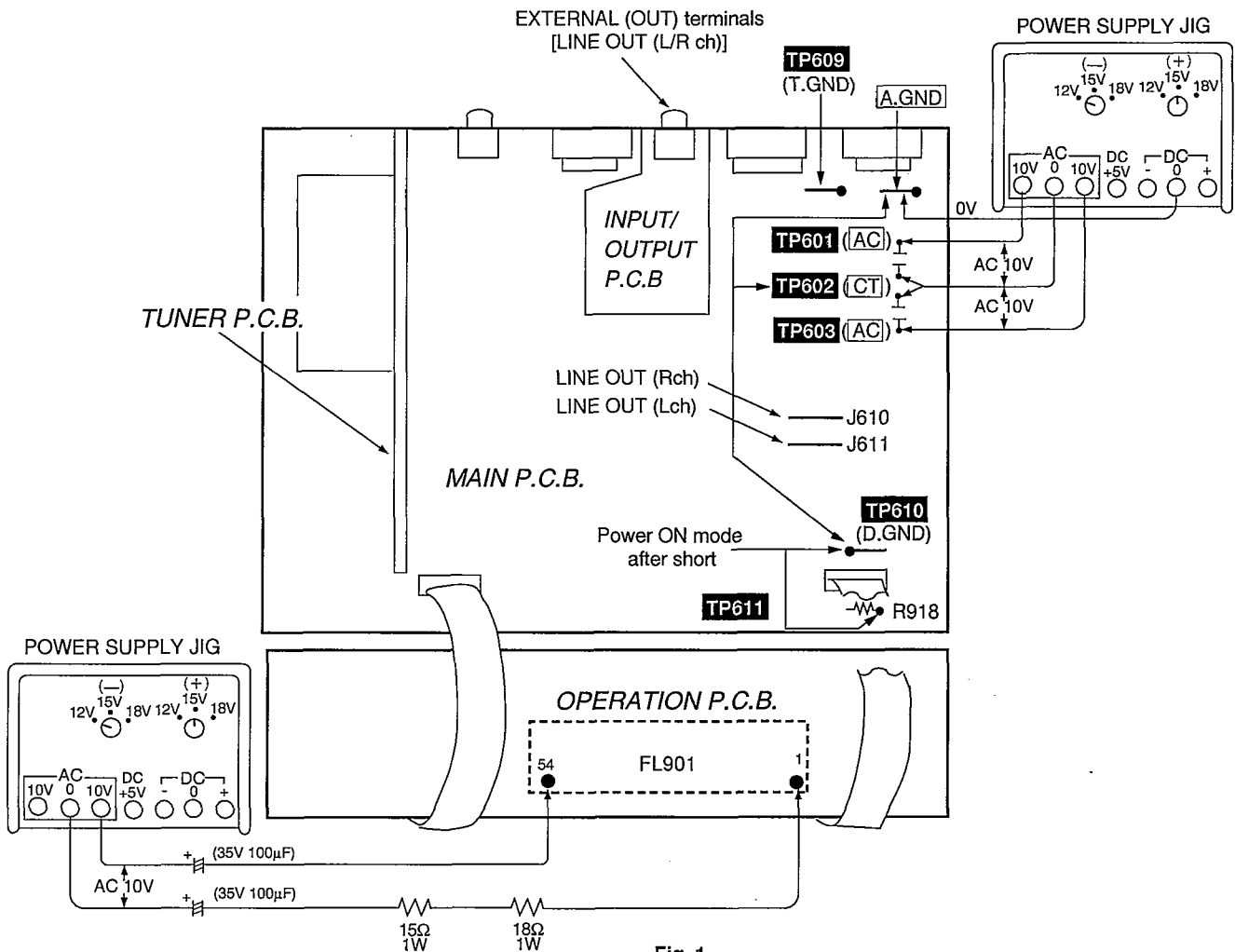
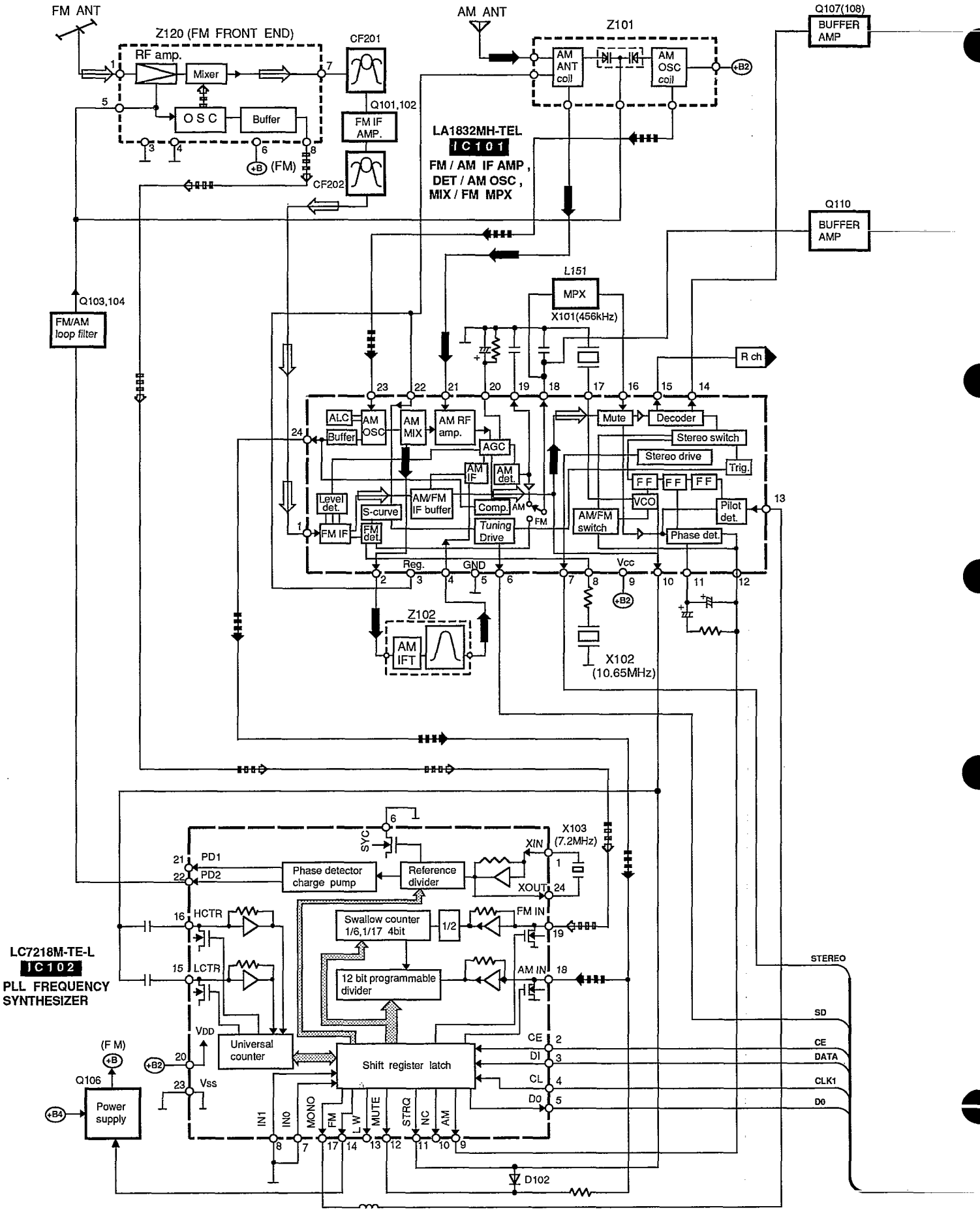
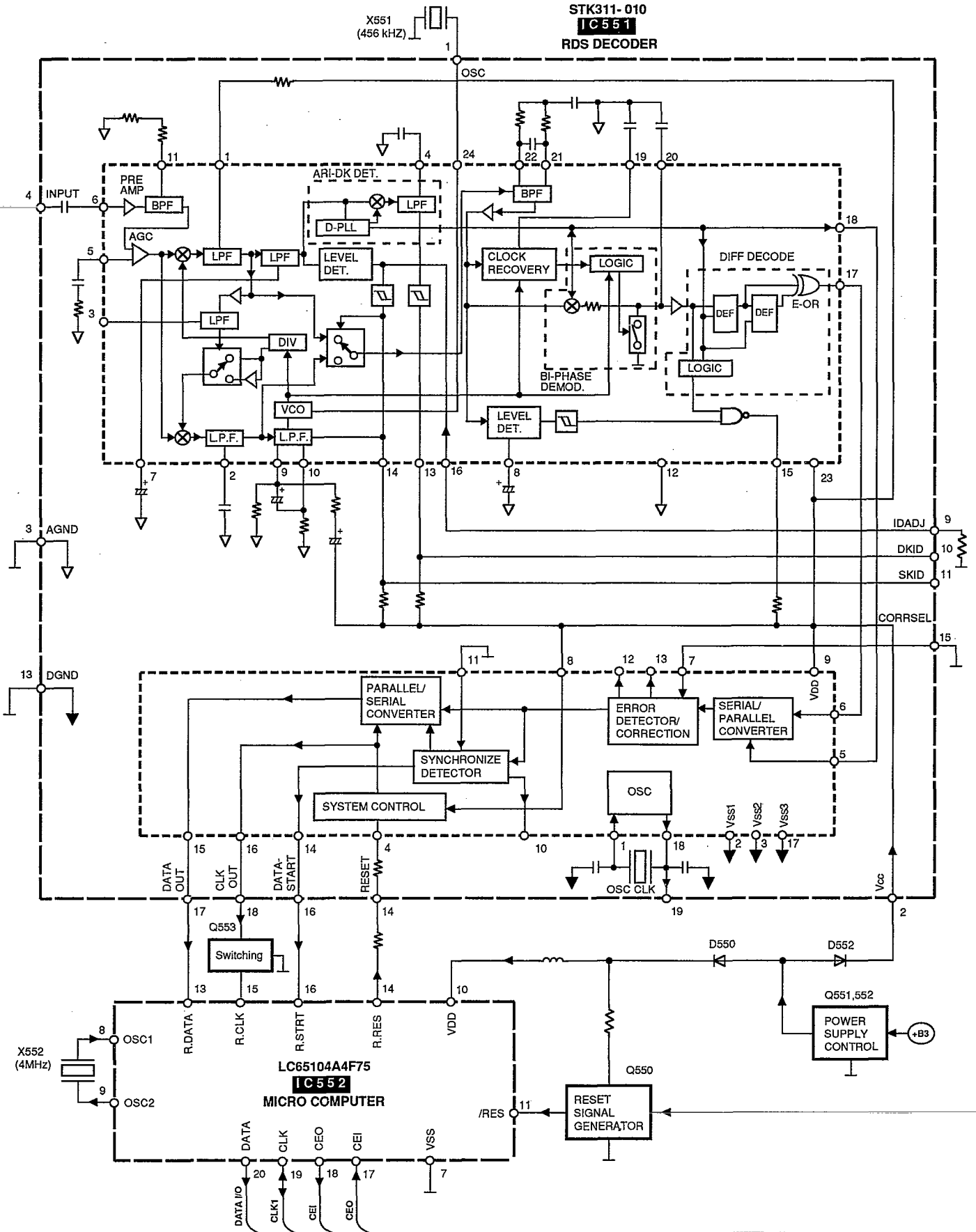


Fig. 1

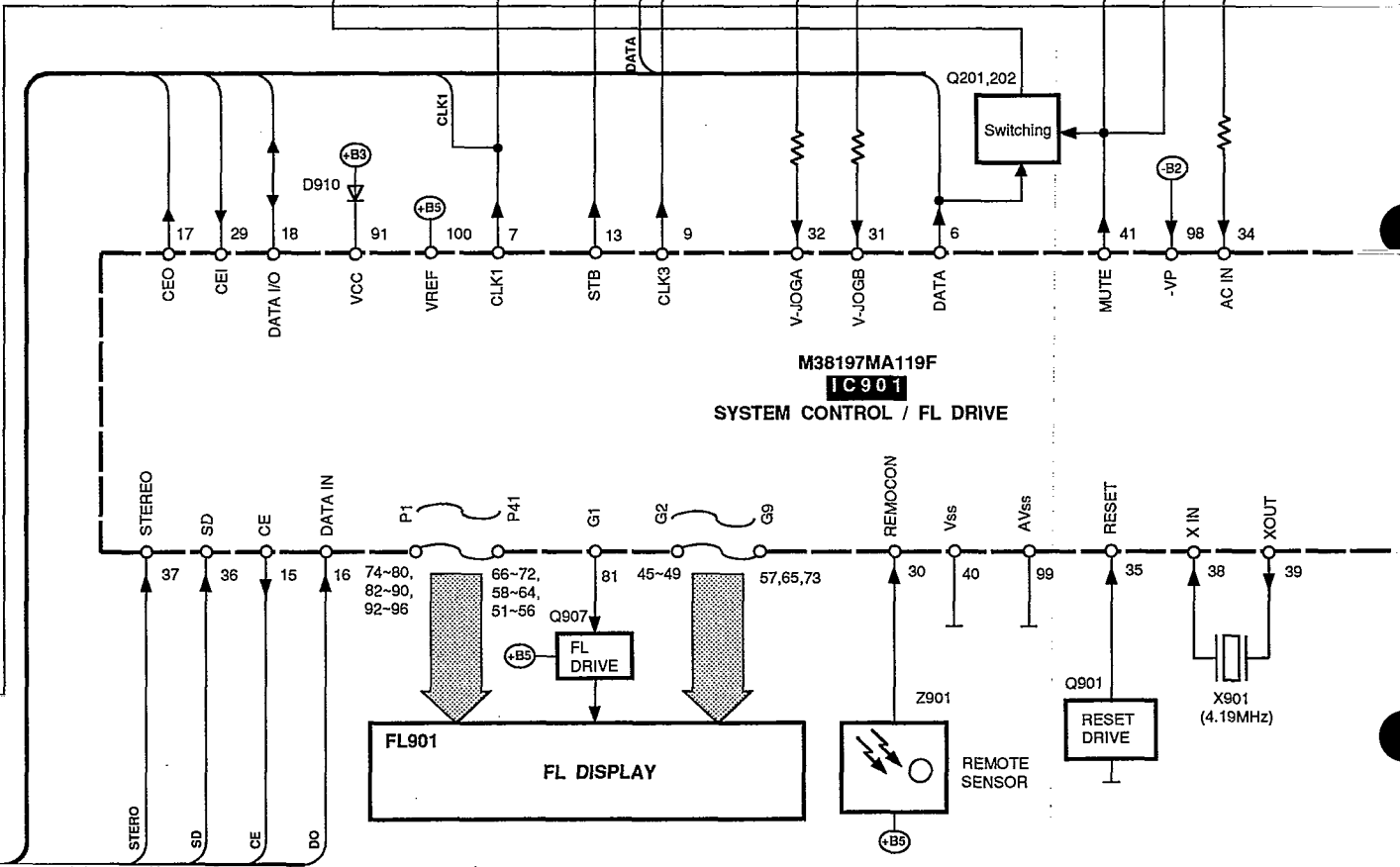
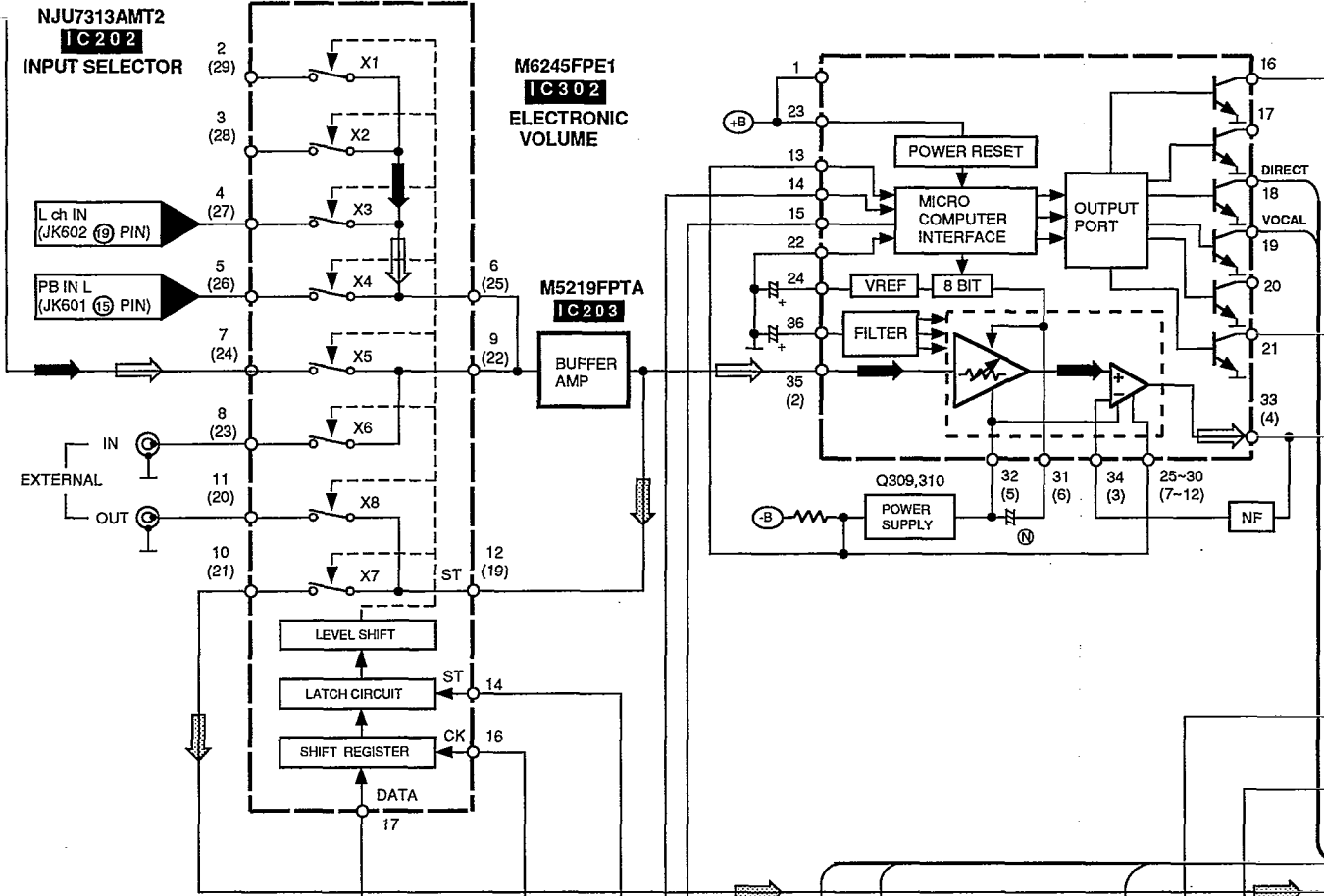
BLOCK DIAGRAM

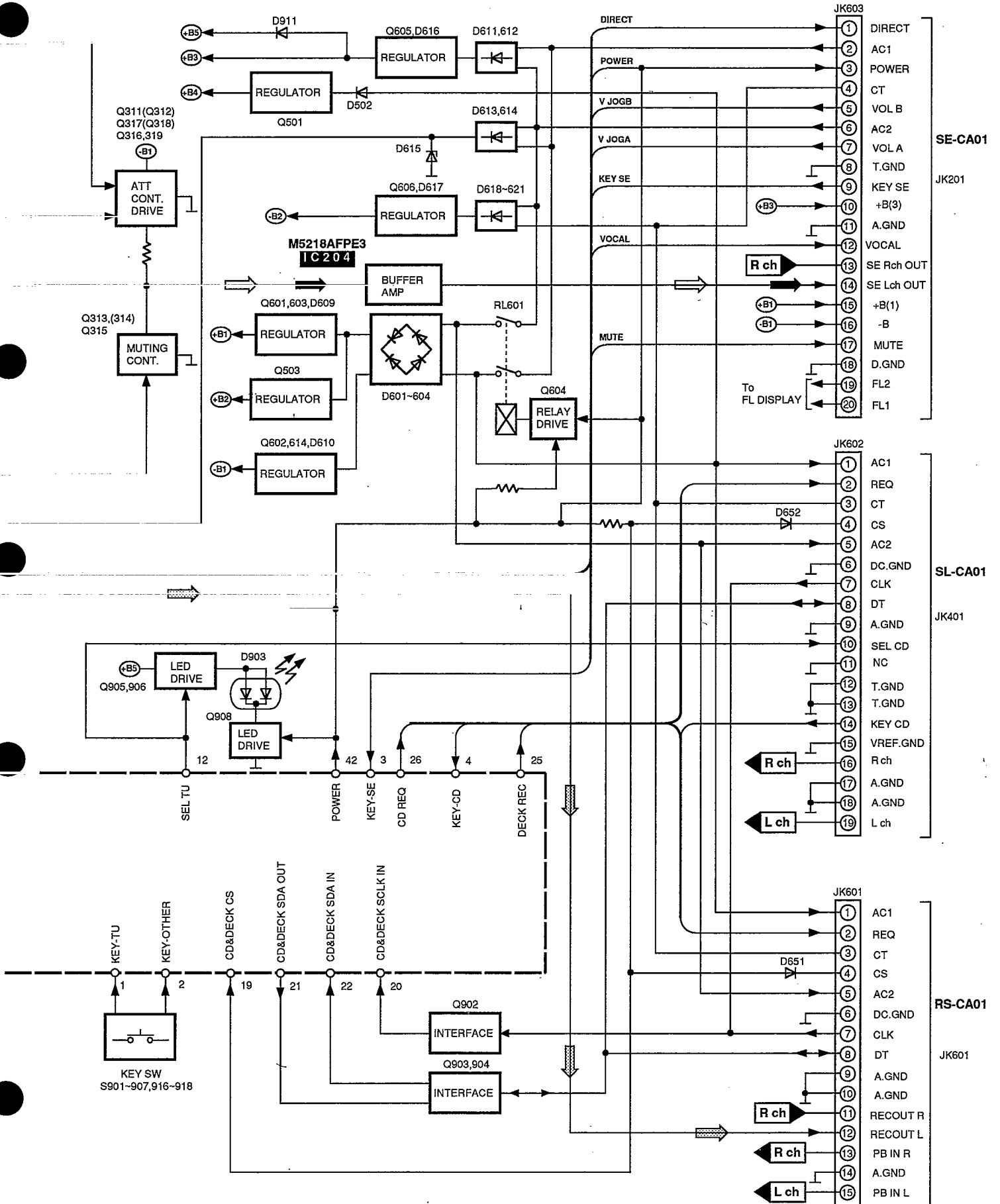


- Signal line : FM signal : FM OSC signal : AM signal : AM OSC signal
- : Rec out signal ※ () indicates pin No. of right channel.

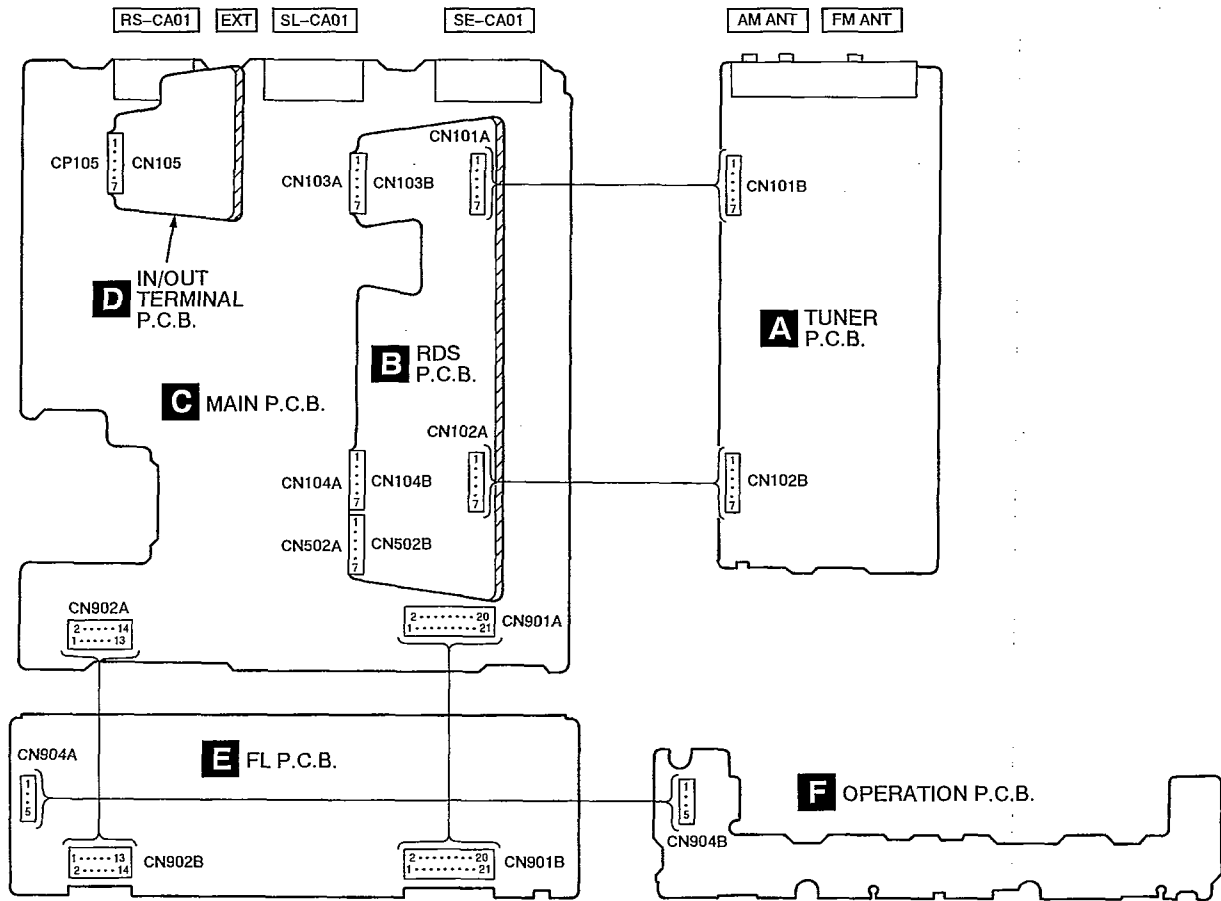


● Signal line : FM signal : FM OSC signal : AM signal : AM OSC signal
 : Rec out signal * () indicates pin No. of right channel.





WIRING CONNECTION DIAGRAM



Terminal guide of IC's transistors and diodes

<p>No.1</p>	<table border="1"> <tr><td>M5218AFPE3</td><td>8PIN</td></tr> <tr><td>M5219FPTA</td><td>8PIN</td></tr> <tr><td>LA1832MH-TEL</td><td>24PIN</td></tr> <tr><td>LC7218M-TE-L</td><td>24PIN</td></tr> <tr><td>NJU7313AMT2</td><td>30PIN</td></tr> <tr><td>LC65104A4F75</td><td>30PIN</td></tr> <tr><td>M62425FPE1</td><td>36PIN</td></tr> </table>	M5218AFPE3	8PIN	M5219FPTA	8PIN	LA1832MH-TEL	24PIN	LC7218M-TE-L	24PIN	NJU7313AMT2	30PIN	LC65104A4F75	30PIN	M62425FPE1	36PIN	<p>M38197MA119F</p>	<p>STK311-010</p>	<p>2SC3940AQSTA</p>
	M5218AFPE3	8PIN																
M5219FPTA	8PIN																	
LA1832MH-TEL	24PIN																	
LC7218M-TE-L	24PIN																	
NJU7313AMT2	30PIN																	
LC65104A4F75	30PIN																	
M62425FPE1	36PIN																	
<p>2SB621AQRSTA</p>	<p>2SA1309AQSTA 2SC2785FETA 2SC2787LTA 2SC3311AQSTA 2SC3311ARSTA UN411FTA UN4111AITA UN4115TA UN4119TA</p>	<p>UN4211AITA UN4214AITA</p>	<p>2SB1417PQTA 2SD2137PQTA</p>	<p>2SD2144STA DTC143ESTP DTC143XSTP</p>														
<p>MA4150MTA MA4300MTA</p>	<p>MA185TA</p>		<p>MA4039MTA MA4051MTA MA4062HTA MA4082LTA</p>	<p>1SS291TA MA165TA MA723TA</p>														
<p>MA719TA</p>	<p>RL1N4003N02</p>	<p>SPR-305MDTF</p>																

■ SCHEMATIC DIAGRAM (Parts list on pages 25~28.)


- This schematic diagram may be modified at any time with development of new technology.

A	TUNER CIRCUIT	12, 13
B	RDS CIRCUIT	14
C	MAIN CIRCUIT	15~17
D	INPUT/OUTPUT CIRCUIT	15
E	FL CIRCUIT	18, 19
F	OPERATION CIRCUIT	19

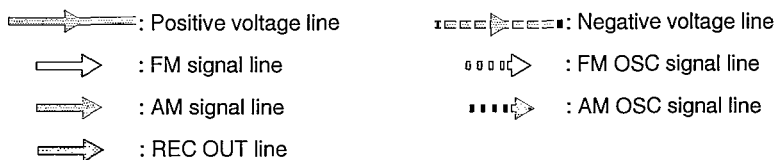
Notes:

- **S901**: RDS display mode switch (RDS DISPLAY MODE)
- **S902**: FM/AM switch (FM/AM)
- **S903**: Tuning mode select switch (TUNING MODE)
- **S904**: Clock/timer switch (CLOCK/TIMER)
- **S905**: Set switch (SET)
- **S906, 907**: Tuning/Time adjust switch (TUNING/TIME ADJUST)
(S906: DOWN, S907: UP)
- **S916**: Play timer switch (⏮ PLAY)
- **S917**: Record timer switch (⏸ REC)
- **S918**: Source input select switch (INPUT SELECTOR)
- 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.
- Voltage values and waveforms are measured as indicated in the schematic diagram when test points between **TP602** and **TP610**, and between **TP610** and **[A. GND]**, and between **TP609** and **[A. GND]** are shorted.

No mark: FM mode (): AM mode

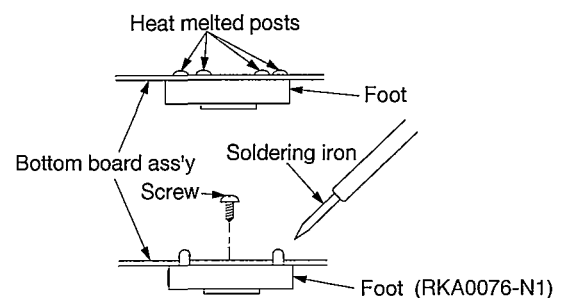
- Important safety notice:
Components identified by  mark have special characteristics important for safety.
Furthermore, special parts which have purpose of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.
When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.
- **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 foil.
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.

- Voltage and signal line

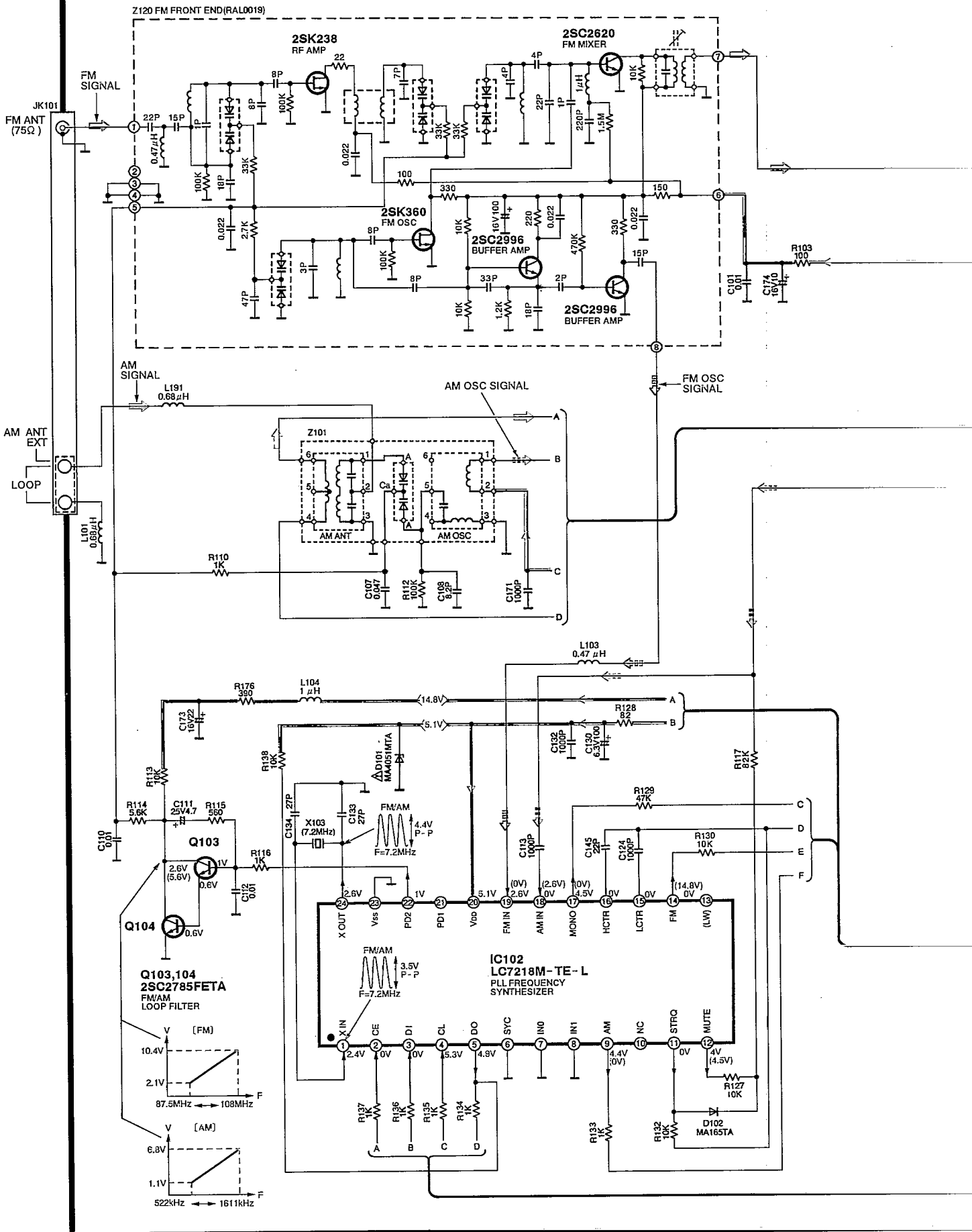


■ REPLACEMENT OF THE FOOT

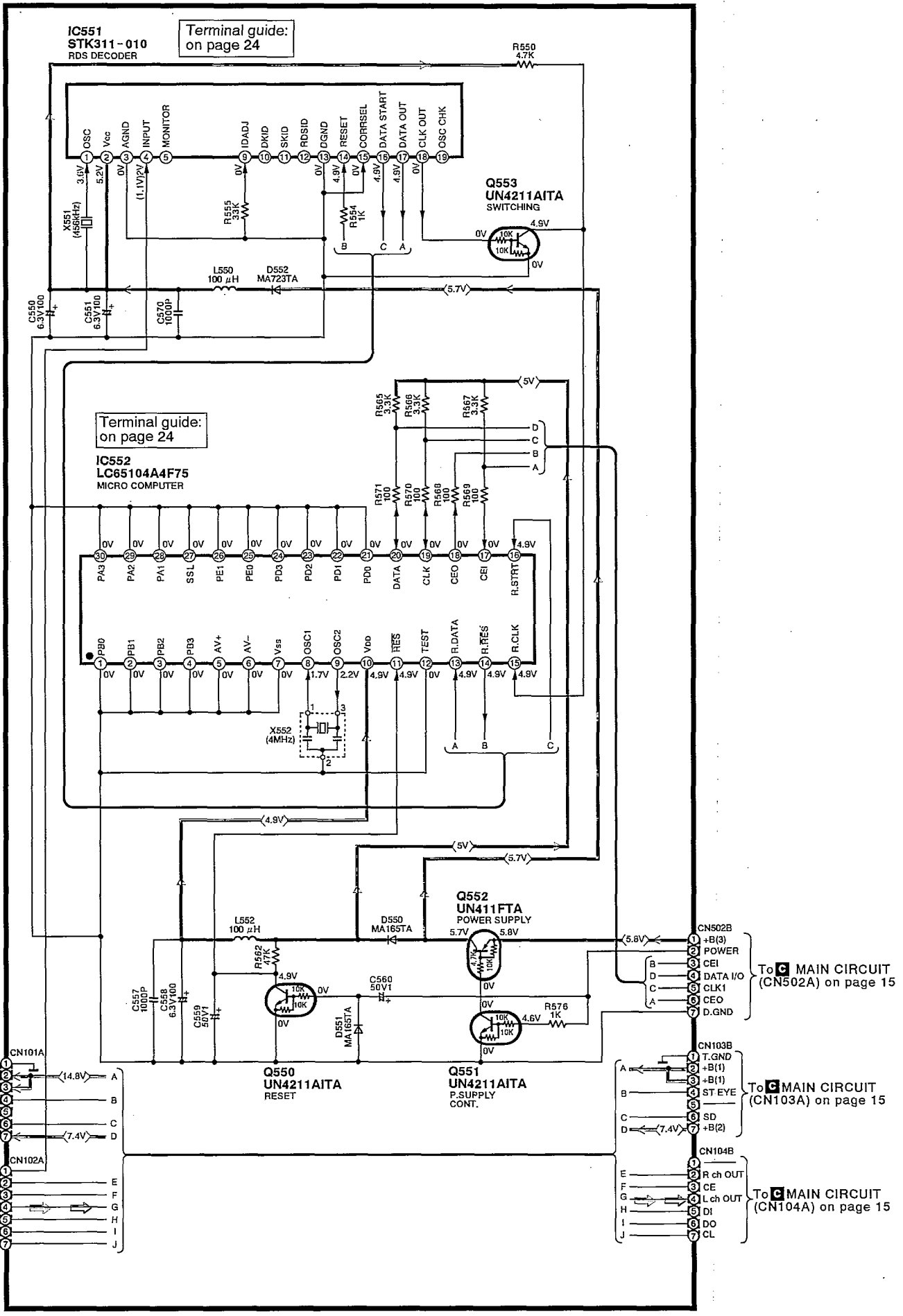
1. Remove the 4 heat melted posts on the Bottom board ass'y with a pair of nippers or similar tool.
2. To replace the foot (RKA0076-N1) on the Bottom board ass'y melt the 4 posts with a soldering iron or install it with a screw (XTB3+6J).



A TUNER CIRCUIT (P.C.Board: on page 20)

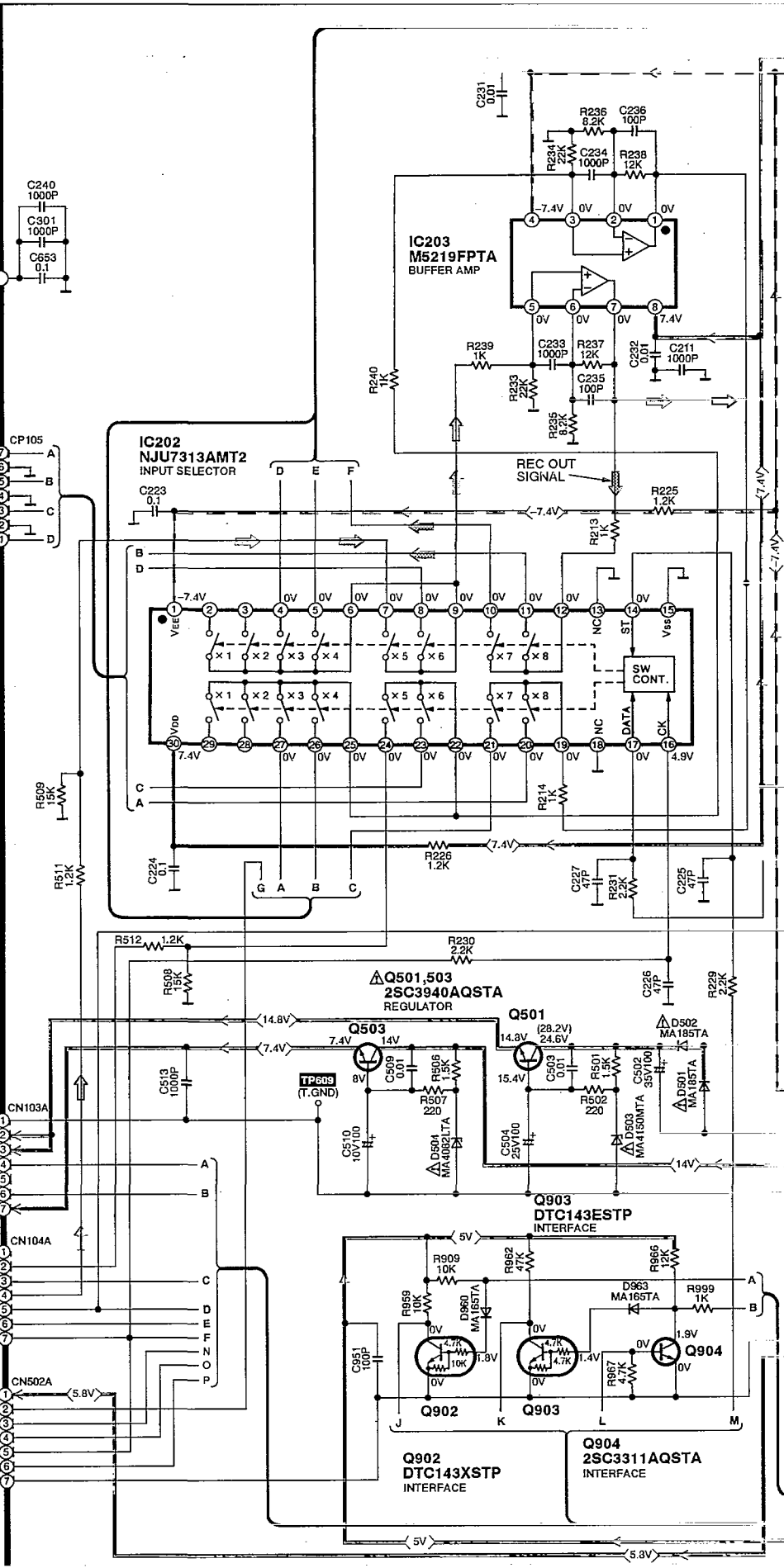
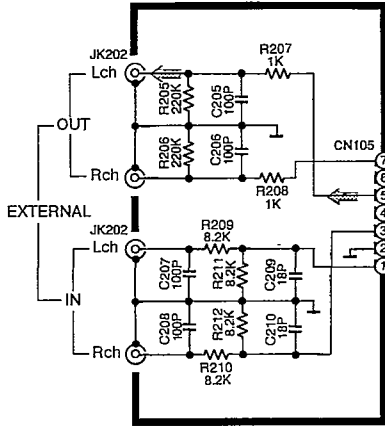


B RDS CIRCUIT (P.C.Board: on page 20)



C MAIN CIRCUIT (P.C.Board: on page 21)

D IN/OUT TERMINAL CIRCUIT (P.C.Board: on page 20)

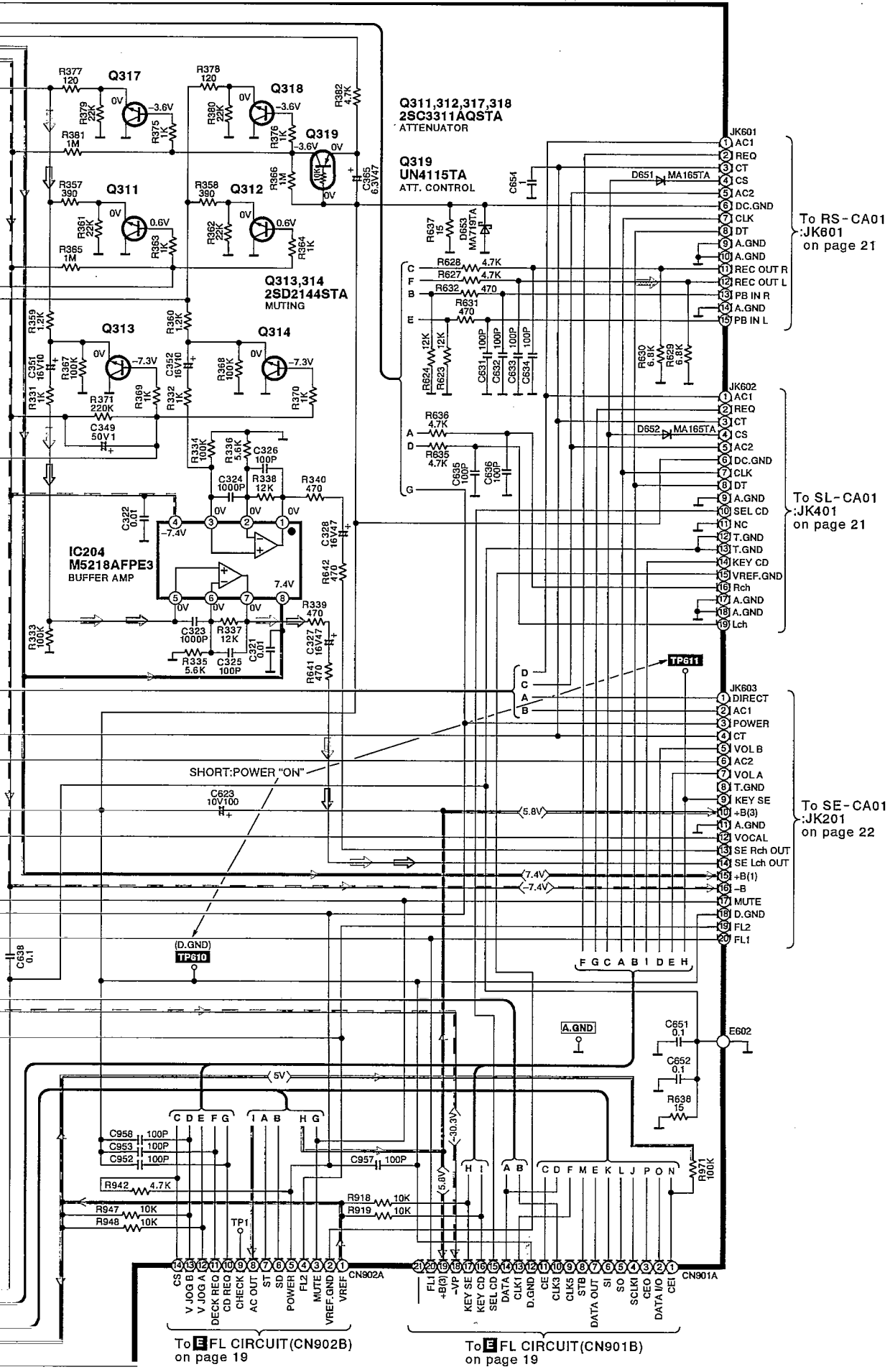


To B RDS CIRCUIT (CN103B) on page 14

To B RDS CIRCUIT (CN104B) on page 14

To B RDS CIRCUIT (CN502B) on page 14

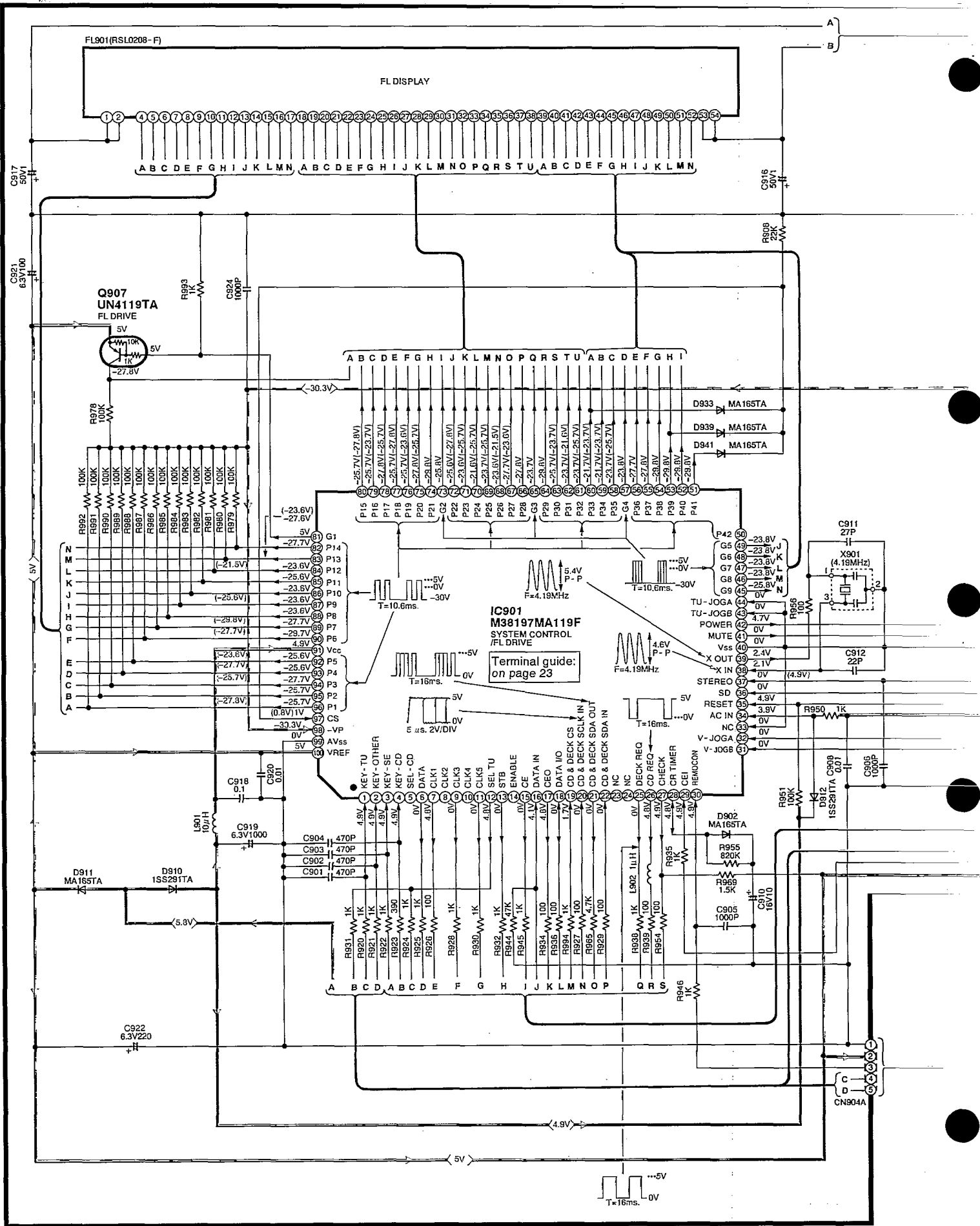
C MAIN CIRCUIT (P.C.Board: on page 21)

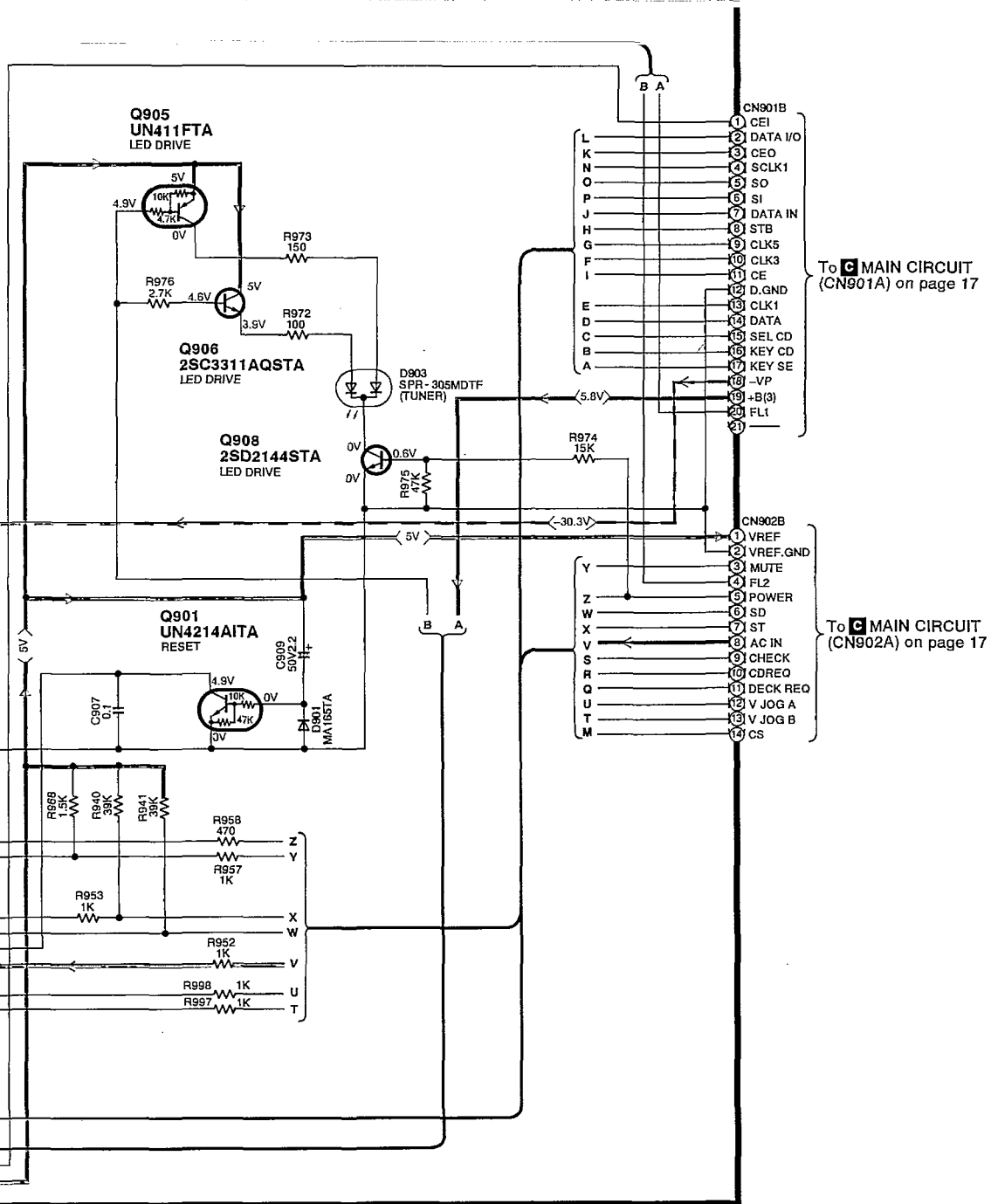


To **E** FL CIRCUIT (CN902B) on page 19

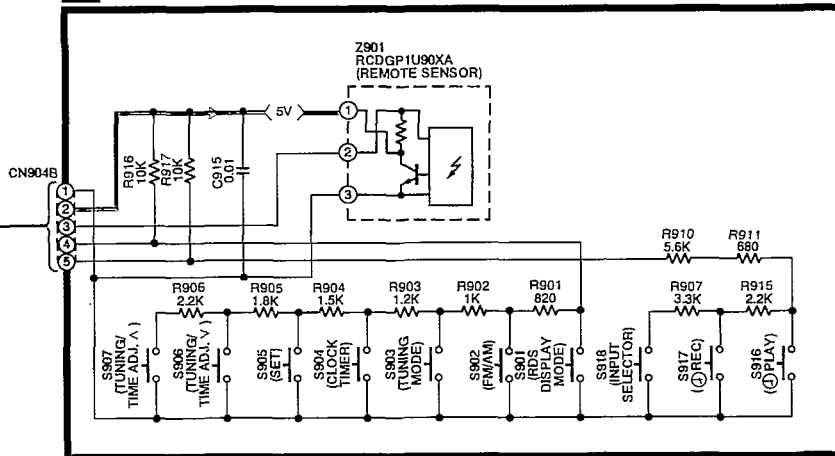
To **F** FL CIRCUIT (CN901B) on page 19

E FL CIRCUIT (P.C.Board: on page 22)





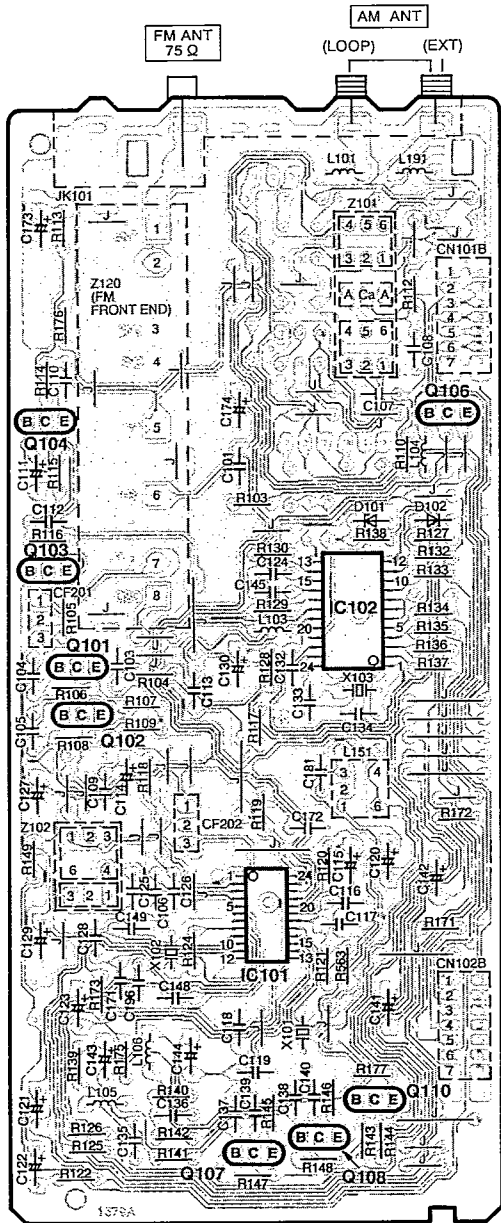
F OPERATION CIRCUIT (P.C.Board: on page 22)



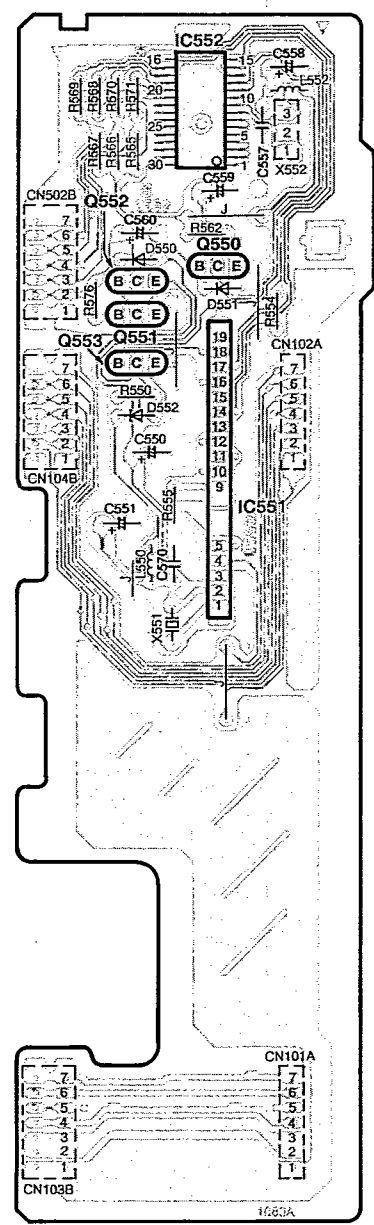
PRINTED CIRCUIT BOARD DIAGRAM

• This circuit board diagram may be modified at any time with the development of new technology.

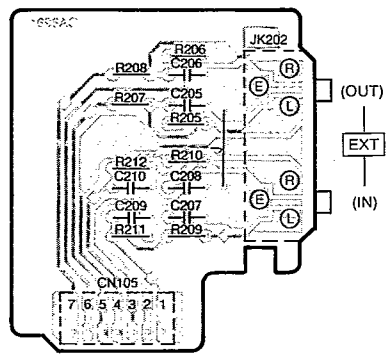
A TUNER P.C.B. (REP2374A-T)



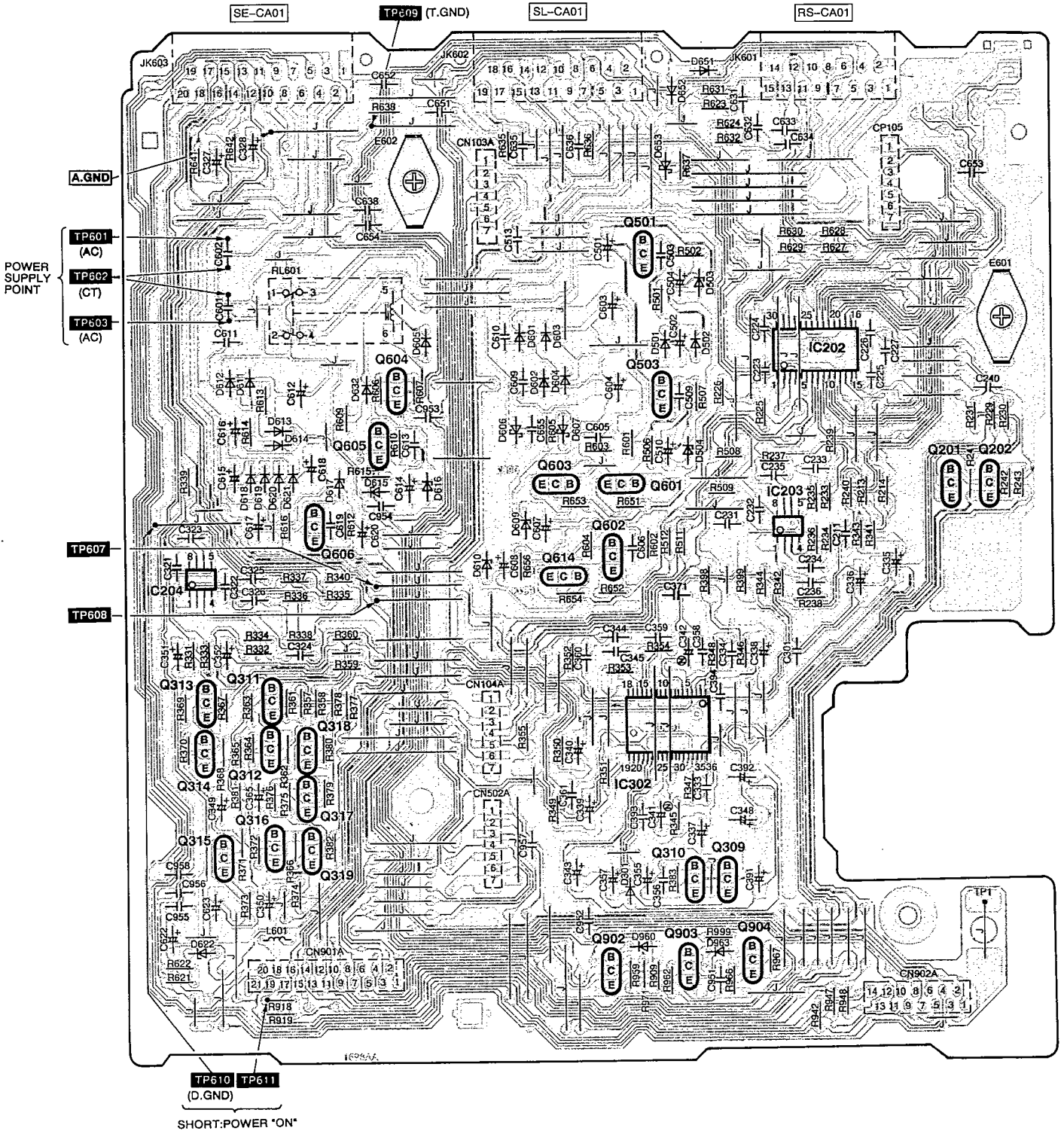
B RDS P.C.B. (REP2375A-T)



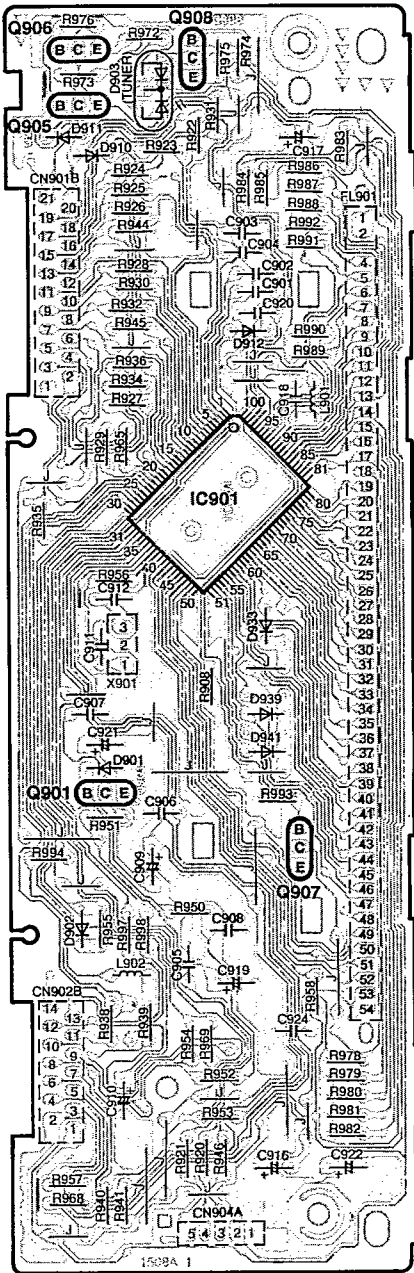
D IN/OUT TERMINAL P.C.B. (REP2299B-M)



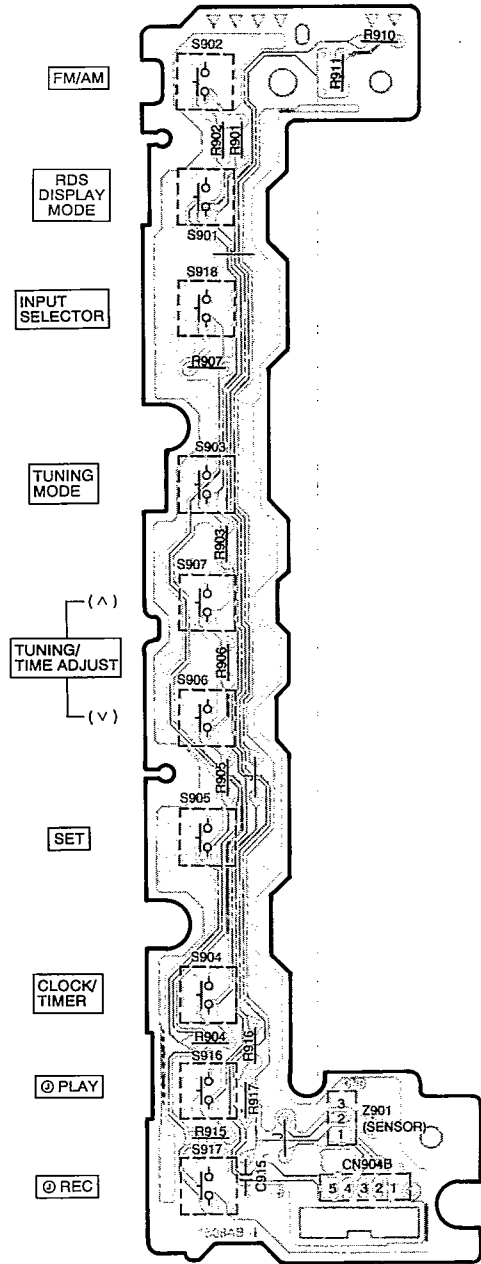
C MAIN P.C.B. (REP2299B-M)



E FL P.C.B. (REP2300B-S)



F OPERATION P.C.B. (REP2300B-S)



■ TERMINAL GUIDE

● IC901 (M38197MA119F): SYSTEM CONTROL/ FL DRIVE

Pin No.	Mark	I/O	Function	Pin No.	Mark	I/O	Function
1	KEY-TU	I	Tuner operation switch signal input	33	MIC DET	I	Microphone connecting detect signal input
2	KEY-OTHER	I	Other operation switch signal input	34	AC IN	I	AC power source input terminal
3	KEY-SE	I	SE-CA01 operation switch signal input	35	RESET	I	Reset signal input
4	KEY-CD	I	SL-CA01 operation switch signal input	36	SD	I	SD signal input for tuner circuit
5	SELECTOR CD	—	Not used	37	STEREO	I	STEREO signal input for tuner circuit
6	DATA	O	Data output for NJU7313, M62425, LC7218, LA2785, and LV1010	38	X IN	I	Connected to the ceramic oscillator (F=4.19MHz)
7	CLK1	O	Clock output for NJU7313, LC7218, LA2785, LV1010 and LC65104	39	X OUT	O	
8	CLK2	O	Clock output (Not used, open)	40	Vss	—	GND terminal
9	CLK3	O	Clock output for M62425 (Main volume)	41	MUTE	O	Muting signal output
10	CLK4	—	Not used	42	POWER	O	Power control signal output
11	CLK5	O	SE-CA01, LED drive (BU209F-E2) signal output	43	TU-JOGB	I	JOG (TUNING) control terminal
12	SEL_TU	O	LED (D903-TUNER ON) drive signal output	44	TU-JOGA	I	
13	STB	O	STB signal output for NJU7313	45 49	G9 G5	O	Grid signal output
14	ENABLE	—	Not used	50 56	P42 P36	O	Segment signal output
15	CE	O	Chip enable signal output for LC7218	57	G4	O	Grid signal output
16	DATA IN	I	Data input from LC7218	58 64	P35 P29	O	Segment signal output
17	CEO	O	Serial data output terminal for (E, EG) areas.	65	G3	O	Grid signal output
18	DATA I/O	I/O	Serial data input/output terminal for (E, EG) areas.	66 72	P28 P22	O	Segment signal output
19	CE & DECK CS	I	Serial data communication starting signal input	73	G2	O	Grid signal output
20	CD & DECK SCLK IN	I	Serial clock input	74 80	P21 P15	O	Segment signal output
21	CD & DECK SDA OUT	O	Serial data output	81	G1	O	Grid signal output
22	CD & DECK SDA IN	I	Serial data input	82 90	P14 P6	O	Segment signal output
23	NC	—	Not used	91	Vcc	—	Power supply (+5V)
24	NC	—	Not used	92 96	P5 P1	O	Segment signal output
25	DECK REQ	O	RS-CA01 request signal output	97	CS	I	Scan signal input
26	CD REQ	O	SL-CA01 request signal output	98	-VP	—	Negative power supply
27	DPL & CHECK	I/O	Clock check signal	99	AVSS	—	Connect to GND
28	CR TIMER	I/O	Capacitor and resistor oscillation terminal	100	VREF	—	Reference voltage input
29	CEI	I	Serial data input terminal for (EG) area only				
30	REMOCON	I	Remove control signal input				
31	V-JOGB	I	Volume control signal input				
32	V-JOGA	I					

● IC551 (STK311-010): RDS DECODER

Pin No.	Mark	I/O	Function
1	OSC	I	Crystal OSC input terminal (f=456kHz)
2	VCC	I	Power supply terminal
3	AGND	—	GND terminal
4	INPUT	I	RDS signal input terminal
5	MONITOR	—	Not used, open
6	—	—	—
7	—	—	—
8	—	—	—
9	IDADJ	—	ID setting terminal
10	DKID	—	Not used, open

Pin No.	Mark	I/O	Function
11	SKID	—	Not used, open
12	RDSID	—	Not used, open
13	DGND	—	GND terminal
14	RESET	I	RDS reset signal input terminal
15	CORRSEL	—	Not used, connected to GND
16	DATA START	O	RDS start signal output terminal
17	DATA OUT	O	RDS data signal output terminal
18	CLKOUT	O	RDS clock signal output terminal
19	OSCCLK	—	Not used, open

● IC552 (LC65104A4F75): MICROCOMPUTER

Pin No.	Mark	I/O	Function
1	PB0	—	Not used
2	PB1	—	Not used
3	PB2	—	Not used
4	PB3	—	Not used
5	AV+	—	Not used
6	AV-	—	Not used
7	VSS	—	GND terminal
8	OSC1	I	Oscillating terminal (f=4MHz)
9	OSC2	O	Oscillating terminal (f=4MHz)
10	VDD	I	+5V
11	RES	I	Reset signal input
12	TEST	—	Not used
13	R. DATA	I	RDS data signal input
14	R. RES	O	RDS reset signal output
15	R. CLK	I	RDS clock signal input

Pin No.	Mark	I/O	Function
16	R. STRT	I	RDS start signal input
17	CEI	I	Serial data input detection terminal
18	CEO	O	Serial data output detection terminal
19	CLK	I/O	Serial clock input/output terminal
20	DATA	I/O	Serial data input/output terminal
21	PD0	—	Not used
22	PD1	—	Not used
23	PD2	—	Not used
24	PD3	—	Not used
25	PE0	—	Not used
26	PE1	—	Not used
27	SSL	—	Not used
28	PA1	—	Not used
29	PA2	—	Not used
30	PA3	—	Not used

REPLACEMENT PARTS LIST

Notes: • Important safety notice:

 Components identified by Δ mark have special characteristics important for safety.

Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.

When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.

• [M] indicates in Remarks columns parts that are supplied by MESA.

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT (S)		Q908	2SD2144S	TRANSISTOR	
						DIODE (S)	
IC101	LA1832MH-TEL	FM/AM IF AMP/AM OSC		D101	MA4051MTA	DIODE	Δ
IC102	LC7218M-TE-L	PLL FREQUENCY SYNTHESIZER		D102	MA165	DIODE	
IC202	NJU7313AMT2	INPUT SELECTOR		D301	MA165	DIODE	
IC203	M5219FPTA	BUFFER AMP		D501, 502	MA185TA	DIODE	Δ
IC204	M5218AFPE3	BUFFER AMP		D503	MA4150M	DIODE	Δ
IC302	M62425FPE1	ELECTRONIC VOLUME		D504	MA4082LTA	DIODE	Δ
IC551	STK311-010	RDS DECODER	[M]	D550, 551	MA165	DIODE	
IC552	LC65104A4F75	MICRO COMPUTER		D552	MA723TA	DIODE	
IC901	M38197MA119F	SYSTEM CONTROL/FL DRIVE		D601-604	RL1N4003N02	DIODE	Δ
		TRANSISTOR(S)		D605	MA165	DIODE	
				D606, 607	MA719TA	DIODE	
Q101, 102	2SC2787L	TRANSISTOR		D609, 610	MA4082LTA	DIODE	Δ
Q103, 104	2SC2785FE	TRANSISTOR		D611, 612	RL1N4003N02	DIODE	Δ
Q106	UN4111	TRANSISTOR		D613, 614	MA185TA	DIODE	Δ
Q107, 108	2SC3311ARSTA	TRANSISTOR		D615	MA4051MTA	DIODE	Δ
Q110	2SC3311ARSTA	TRANSISTOR		D616	MA4062-H	DIODE	Δ
Q201	UN4111	TRANSISTOR		D617	MA4300M	DIODE	Δ
Q202	2SC3311A-Q	TRANSISTOR		D618-621	MA185TA	DIODE	Δ
Q309, 310	2SA1309A-R	TRANSISTOR		D622	MA4039MTA	DIODE	Δ
Q311, 312	2SC3311A-Q	TRANSISTOR		D632	MA165	DIODE	
Q313, 314	2SD2144S	TRANSISTOR		D651, 652	MA165	DIODE	
Q315, 316	UN4115	TRANSISTOR		D653	MA719TA	DIODE	
Q317, 318	2SC3311A-Q	TRANSISTOR		D901, 902	MA165	DIODE	
Q319	UN4115	TRANSISTOR		D903	SPR-305MDTF	L. E. D.	
Q501	2SC3940AQSTA	TRANSISTOR	Δ	D910	1SS291TA	DIODE	
Q503	2SC3940AQSTA	TRANSISTOR	Δ	D911	MA165	DIODE	
Q550, 551	UN4211	TRANSISTOR		D912	1SS291TA	DIODE	
Q552	UN411FTA	TRANSISTOR		D933	MA165	DIODE	
Q553	UN4211	TRANSISTOR		D939	MA165	DIODE	
Q601	2SD2137PQTA	TRANSISTOR	Δ	D941	MA165	DIODE	
Q602	2SB1417PQTA	TRANSISTOR	Δ	D960	MA165	DIODE	
Q603	2SD2137PQTA	TRANSISTOR	Δ	D963	MA165	DIODE	
Q604	2SD2144S	TRANSISTOR				COMPONENT COMBINATION (S)	
Q605	2SD2137PQTA	TRANSISTOR	Δ				
Q606	2SB621A-R	TRANSISTOR	Δ	Z101	RLA22002M-T	COMPONENT COMBINATION	
Q614	2SB1417PQTA	TRANSISTOR	Δ	Z102	RL122006M-T	COMPONENT COMBINATION	
Q901	UN4214TA	TRANSISTOR		Z901	RCDGP1U90XA	REMOTE SENSOR	
Q902	DTC143XSTP	TRANSISTOR				COIL (S)	
Q903	DTC143ESTP	TRANSISTOR					
Q904	2SC3311A-Q	TRANSISTOR		L101	ELESNR68MA	COIL	
Q905	UN411FTA	TRANSISTOR		L103	ELETR47MA9	COIL	
Q906	2SC3311A-Q	TRANSISTOR					
Q907	UN4119	TRANSISTOR					

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
L104	ELEXT1R0KA9	COIL		CN101A	RJT057W007-1	CONNECTOR (7P)	
L105, 106	ELELN822KL	COIL		CN101B	RJU057W007	SOCKET (7P)	
L151	SLM1B10M-1M	COIL		CN102A	RJT057W007-1	CONNECTOR (7P)	
L191	ELESNR68MA	COIL		CN102B	RJU057W007	SOCKET (7P)	
L550	ELEXT101KA9	COIL		CN103A	RJT057W007-1	CONNECTOR (7P)	
L552	ELEXT101KA9	COIL		CN103B	RJU057W007	SOCKET (7P)	
L601	ELEXT1R0KA9	COIL		CN104A	RJT057W007-1	CONNECTOR (7P)	
L901	RLQA100JT-Y	COIL		CN104B	RJU057W007	SOCKET (7P)	
L902	ELEXT1R0KA9	COIL		CN502A	RJT057W007-1	CONNECTOR (7P)	
		FILTER(S)		CN502B	RJU057W007	SOCKET (7P)	
CF201	RLFFETNGD01L	CERAMIC FILTER		CN901A	RJSIA6821	CONNECTOR (21P)	
CF202	RLFFETNGD01L	CERAMIC FILTER		CN901B	RJSIA6221-1	CONNECTOR (21P)	
		OSCILLATOR(S)		CN902A	RJSIA6814	CONNECTOR (14P)	
X101	RSXZ456KM07M	OSCILLATOR (456KHz)		CN902B	RJSIA6214-1	CONNECTOR (14P)	
X102	RLFDGT05DD	OSCILLATOR (10. 65MHz)		CN904A	RJT066H05A	CONNECTOR (5P)	
X103	RSXC7M20S05T	OSCILLATOR (7. 2MHz)		CN904B	RJU066H05	SOCKET (5P)	
X551	RSXZ456KM07M	OSCILLATOR (456KHz)		CP105	RJT057W007-1	CONNECTOR (7P)	
X552	RVCST4R00MT	OSCILLATOR (4MHz)		JK601	RJT065K15	CONNECTOR (15P)	
X901	RSXC4M19S02T	OSCILLATOR (4. 19MHz)		JK602	RJT065K19	CONNECTOR (19P)	
		DISPLAY TUBE(S)		JK603	RJT065K20	CONNECTOR (20P)	
FL901	RSLO208-F	DISPLAY TUBE				EARTH PLATE(S)	
		FM FRONT END(S)		E601, 602	SNE1004-2	EARTH PLATE	
Z120	RAL0019	FM FRONT END				JACK(S)	
		SWITCH(ES)		JK101	RJH5210M	FM/AM ANT	
S901	EVQ21405R	RDS DISPLAY MODE		JK202	SJF3069N	EXT IN/OUT	
S902	EVQ21405R	FM/AM					
S903	EVQ21405R	TUNING MODE					
S904	EVQ21405R	CLOCK/TIMER MODE					
S905	EVQ21405R	CLOCK/TIMER SET					
S906	EVQ21405R	TUNING /TIME ADJ. DOWN					
S907	EVQ21405R	TUNING /TIME ADJ. UP					
S916	EVQ21405R	TIMER PLAY					
S917	EVQ21405R	TIMER REC					
S918	EVQ21405R	INPUT SELECTOR					
		RELAY(S)					
RL601	RSY0017M-0	RELAY	△				
		CONNECTOR(S) AND SOCKET(S)					
CN105	RJU057W007	CONNECTOR (7P)					

RESISTORS AND CAPACITORS

Notes: * Capacity values are in microfarads (μF) 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	Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks
		RESISTORS	R235, 236	ERDS2TJ822	1/4W 8. 2K	R601, 602	ERD2FCVJ4R7T	1/4W 4. 7 Δ
			R237, 238	ERDS2TJ123	1/4W 12K	R603, 604	ERDS2TJ102	1/4W 1K
			R239, 240	ERDS2TJ102	1/4W 1K	R605	ERDS2TJ101	1/4W 100
R103	ERDS2TJ101	1/4W 100	R241-243	ERDS2TJ103	1/4W 10K	R606	ERDS2TJ393	1/4W 39K
R104	ERDS2TJ103	1/4W 10K	R331, 332	ERDS2TJ102	1/4W 1K	R607	ERDS2TJ153	1/4W 15K
R105	ERDS2TJ471	1/4W 470	R333, 334	ERDS2TJ104	1/4W 100K	R609	ERQ16NKW2R2E	1/6W 2. 2 Δ
R106	ERDS2TJ474	1/4W 470K	R335, 336	ERDS2TJ562	1/4W 5. 6K	R610	ERDS2TJ222	1/4W 2. 2K
R107	ERDS2TJ331	1/4W 330	R337, 338	ERDS2TJ123	1/4W 12K	R612	ERDS2TJ472	1/4W 4. 7K
R108	ERDS2TJ474	1/4W 470K	R339, 340	ERDS2TJ471	1/4W 470	R613, 614	ERDS2TJ682T	1/4W 6. 8K
R109	ERDS2TJ331	1/4W 330	R341, 342	ERDS2TJ222	1/4W 2. 2K	R615	ERDS2TJ103	1/4W 10K
R110	ERDS2TJ102	1/4W 1K	R343, 344	ERDS2TJ224T	1/4W 220K	R616	ERD25FVJ4R7T	1/4W 4. 7 Δ
R112	ERDS2TJ104	1/4W 100K	R345-348	ERDS2TJ103	1/4W 10K	R621, 622	ERDS2TJ151	1/4W 150
R113	ERDS2TJ103	1/4W 10K	R349, 350	ERDS2TJ102	1/4W 1K	R623, 624	ERDS2TJ123	1/4W 12K
R114	ERDS2TJ562	1/4W 5. 6K	R351	ERDS2TJ182	1/4W 1. 8K	R627, 628	ERDS2TJ472	1/4W 4. 7K
R115	ERDS2TJ561	1/4W 560	R352	ERDS2TJ102	1/4W 1K	R629, 630	ERDS2TJ682T	1/4W 6. 8K
R116	ERDS2TJ102	1/4W 1K	R353	ERDS2TJ182	1/4W 1. 8K	R631, 632	ERDS2TJ471	1/4W 470
R117	ERDS2TJ823T	1/4W 82K	R354, 355	ERDS2TJ222	1/4W 2. 2K	R635, 636	ERDS2TJ472	1/4W 4. 7K
R118	ERDS2TJ472	1/4W 4. 7K	R357, 358	ERDS2TJ391	1/4W 390	R637, 638	ERDS2TJ150T	1/4W 15
R119	ERDS2TJ103	1/4W 10K	R359, 360	ERDS2TJ122	1/4W 1. 2K	R641, 642	ERDS2TJ471	1/4W 470
R120	ERDS2TJ473	1/4W 47K	R361, 362	ERDS2TJ223	1/4W 22K	R651-654	ERDS2TJ2R2T	1/4W 2. 2
R121	ERDS2TJ332	1/4W 3. 3K	R363, 364	ERDS2TJ102	1/4W 1K	R656	ERDS2TJ221	1/4W 220
R122	ERDS2TJ272T	1/4W 2. 7K	R365, 366	ERDS2TJ105T	1/4W 1M	R901	ERDS2TJ821	1/4W 820
R124	ERDS2TJ271	1/4W 270	R367, 368	ERDS2TJ104	1/4W 100K	R902	ERDS2TJ102	1/4W 1K
R125, 126	ERDS2TJ152	1/4W 1. 5K	R369, 370	ERDS2TJ102	1/4W 1K	R903	ERDS2TJ122	1/4W 1. 2K
R127	ERDS2TJ103	1/4W 10K	R371	ERDS2TJ224T	1/4W 220K	R904	ERDS2TJ152	1/4W 1. 5K
R128	ERDS2TJ820	1/4W 82	R372	ERDS2TJ105T	1/4W 1M	R905	ERDS2TJ182	1/4W 1. 8K
R129	ERDS2TJ473	1/4W 47K	R373	ERDS2TJ222	1/4W 2. 2K	R906	ERDS2TJ222	1/4W 2. 2K
R130	ERDS2TJ103	1/4W 10K	R374	ERDS2TJ182	1/4W 1. 8K	R907	ERDS2TJ332	1/4W 3. 3K
R132	ERDS2TJ103	1/4W 10K	R375, 376	ERDS2TJ102	1/4W 1K	R908	ERDS2TJ223	1/4W 22K
R133-137	ERDS2TJ102	1/4W 1K	R377, 378	ERDS2EJ121	1/4W 120	R909	ERDS2TJ103	1/4W 10K
R138	ERDS2TJ103	1/4W 10K	R379, 380	ERDS2TJ223	1/4W 22K	R910	ERDS2TJ562	1/4W 5. 6K
R139, 140	ERDS2TJ272T	1/4W 2. 7K	R381	ERDS2TJ105T	1/4W 1M	R911	ERDS2TJ681	1/4W 680
R141, 142	ERDS2TJ102	1/4W 1K	R382	ERDS2TJ472	1/4W 4. 7K	R915	ERDS2TJ222	1/4W 2. 2K
R143, 144	ERDS2TJ222	1/4W 2. 2K	R383	ERDS2TJ223	1/4W 22K	R916-919	ERDS2TJ103	1/4W 10K
R145, 146	ERDS2TJ821	1/4W 820	R397, 398	ERQ16NKW2R2E	1/6W 2. 2 Δ	R920-922	ERDS2TJ102	1/4W 1K
R147, 148	ERDS2TJ474	1/4W 470K	R501	ERDS2TJ152	1/4W 1. 5K	R923	ERDS2TJ391	1/4W 390
R149	ERDS2TJ680T	1/4W 68	R502	ERDS2TJ221	1/4W 220	R924, 925	ERDS2TJ102	1/4W 1K
R171, 172	ERDS2TJ102	1/4W 1K	R506	ERDS2TJ152	1/4W 1. 5K	R926, 927	ERDS2TJ101	1/4W 100
R173	ERDS2TJ471	1/4W 470	R507	ERDS2TJ221	1/4W 220	R928	ERDS2TJ102	1/4W 1K
R175	ERDS2TJ102	1/4W 1K	R508, 509	ERDS2TJ153	1/4W 15K	R929	ERDS2TJ101	1/4W 100
R176	ERDS2TJ391	1/4W 390	R511, 512	ERDS2TJ122	1/4W 1. 2K	R930-932	ERDS2TJ102	1/4W 1K
R177	ERDS2TJ472	1/4W 4. 7K	R550	ERDS2TJ472	1/4W 4. 7K	R934	ERDS2TJ101	1/4W 100
R205, 206	ERDS2TJ224T	1/4W 220K	R554	ERDS2TJ102	1/4W 1K	R935	ERDS2TJ102	1/4W 1K
R207, 208	ERDS2TJ102	1/4W 1K	R555	ERDS2TJ333	1/4W 33K	R936	ERDS2TJ101	1/4W 100
R209-212	ERDS2TJ822	1/4W 8. 2K	R562	ERDS2TJ473	1/4W 47K	R938	ERDS2TJ102	1/4W 1K
R213, 214	ERDS2TJ102	1/4W 1K	R563	ERDS2TJ332	1/4W 3. 3K	R939	ERDS2TJ101	1/4W 100
R225, 226	ERDS2TJ122	1/4W 1. 2K	R565-567	ERDS2TJ332	1/4W 3. 3K	R940, 941	ERDS2TJ393	1/4W 39K
R229-231	ERDS2TJ222	1/4W 2. 2K	R568-571	ERDS2TJ101	1/4W 100	R942	ERDS2TJ472	1/4W 4. 7K
R233, 234	ERDS2TJ223	1/4W 22K	R576	ERDS2TJ102	1/4W 1K	R944	ERDS2TJ473	1/4W 47K

Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks
R945, 946	ERDS2TJ102	1/4W 1K	C132	ECBT1H102KB5	50V 1000P	C510	RCE1AKA101BG	10V 100U
R947, 948	ERDS2TJ103	1/4W 10K	C133, 134	ECBT1H270JU5	50V 27P	C513	ECBT1H102KB5	50V 1000P
R950	ERDS2TJ102	1/4W 1K	C135, 136	ECBT1C103KS5	16V 0.01U	C550, 551	ECA0JKF101B	6.3V 100U
R951	ERDS2TJ104	1/4W 100K	C137, 138	ECBT1H561KB5	50V 560P	C557	ECBT1H102KB5	50V 1000P
R952, 953	ERDS2TJ102	1/4W 1K	C139, 140	ECBT1C682KR5	16V 6800P	C558	ECEA0JKA101B	6.3V 100U
R954	ERDS2TJ101	1/4W 100	C141-144	ECEA1HKA010B	50V 1U	C559, 560	ECEA1HKA010B	50V 1U
R955	ERDS2TJ824	1/4W 820K	C145	ECBT1H220JC5	50V 22P	C570	ECBT1H102KB5	50V 1000P
R956	ERDS2TJ101	1/4W 100	C148	ECBT1C103NS5	16V 0.01U	C601, 602	ECKT1H223ZF	50V 0.022U
R957	ERDS2TJ102	1/4W 1K	C149	ECBT1H104ZF5	50V 0.1U	C603	ECA1EM102B	25V 1000U Δ
R958	ERDS2TJ471	1/4W 470	C171, 172	ECBT1H102KB5	50V 1000P	C604	RCE1EM471BV	25V 470U Δ
R959	ERDS2TJ103	1/4W 10K	C173	ECEA1CKA220B	16V 22U	C605, 606	ECBT1E103ZF	25V 0.01U
R962	ERDS2TJ473	1/4W 47K	C174	RCE1CKA100BG	16V 10U	C607, 608	RCE1AKA470BG	10V 47U
R965	ERDS2TJ472	1/4W 4.7K	C181	ECBT1H471KB5	50V 470P	C609	ECBT1H102KB5	50V 1000P
R966	ERDS2TJ123	1/4W 12K	C196	ECBT1H102KB5	50V 1000P	C610, 611	ECBT1H104ZF5	50V 0.1U
R967	ERDS2TJ472	1/4W 4.7K	C205-208	ECBT1H101KB5	50V 100P	C612	RCE1EM471BV	25V 470U
R968, 969	ERDS2TJ152	1/4W 1.5K	C209, 210	ECBT1H180J5	50V 18P	C613	ECBT1E103ZF	25V 0.01U
R971	ERDS2TJ104	1/4W 100K	C211	ECBT1H102KB5	50V 1000P	C614	RCE1AKA470BG	10V 47U
R972	ERDS2TJ101	1/4W 100	C223, 224	ECBT1H104ZF5	50V 0.1U	C615	ECEA1EKA101B	25V 100U
R973	ERDS2TJ151	1/4W 150	C225-227	ECBT1H470J5	50V 47P	C616	ECA1HM470B	50V 47U
R974	ERDS2TJ153	1/4W 15K	C231, 232	ECBT1E103ZF	25V 0.01U	C617	ECA1HM470B	50V 47U Δ
R975	ERDS2TJ473	1/4W 47K	C233, 234	ECBT1H102KB5	50V 1000P	C618	ECA1JM470B	63V 47U
R976	ERDS2TJ272T	1/4W 2.7K	C235, 236	ECBT1H101KB5	50V 100P	C619	ECBT1E103ZF	25V 0.01U
R978-992	ERDS2TJ104	1/4W 100K	C240	ECBT1H102KB5	50V 1000P	C620	RCE1VKA100BG	35V 10U
R993, 994	ERDS2TJ102	1/4W 1K	C301	ECBT1H102KB5	50V 1000P	C622	ECEA1VKA470B	35V 47U
R997-999	ERDS2TJ102	1/4W 1K	C321, 322	ECBT1E103ZF	25V 0.01U	C623	RCE1AKA101BG	10V 100U
			C323, 324	ECBT1H102KB5	50V 1000P	C631-636	ECBT1H101KB5	50V 100P
		CAPACITORS	C325, 326	ECBT1H101KB5	50V 100P	C638	ECBT1H104ZF5	50V 0.1U
			C327, 328	RCE1CKA470BG	16V 47U	C651-653	ECBT1H104ZF5	50V 0.1U
C101	ECBT1C103NS5	16V 0.01U	C333, 334	ECBT1H221KB5	50V 220P	C654	ECBT1C105ZF5	16V 1U
C103	ECBT1C103NS5	16V 0.01U	C335, 336	RCE1CKA100BG	16V 10U	C655	ECQV1H24JM3	50V 0.22U
C104, 105	ECBT1H102KB5	50V 1000P	C337, 338	ECEA1CKA220B	16V 22U	C901-904	ECBT1H471KB5	50V 470P
C106	ECBT1C103NS5	16V 0.01U	C339, 340	RCE1CKA100BG	16V 10U	C905, 906	ECBT1H102KB5	50V 1000P
C107	ECBT1H473ZF5	50V 0.047U	C341, 342	ECEA1AKN100B	10V 10U	C907	ECBT1H104ZF5	50V 0.1U
C108	ECBT1H8R2KC5	50V 8.2P	C343	RCE1CKA100BG	16V 10U	C908	ECBT1E103ZF	25V 0.01U
C109, 110	ECBT1C103NS5	16V 0.01U	C344, 345	ECBT1H470J5	50V 47P	C909	ECEA1HKA2R2B	50V 2.2U
C111	ECEA1EKA4R7B	25V 4.7U	C348	ECEA1CKA330B	16V 33U	C910	RCE1CKA100BG	16V 10U
C112	ECBT1C103NS5	16V 0.01U	C349	ECEA1HKA010B	50V 1U	C911	ECBT1H270JU5	50V 27P
C113	ECBT1H102KB5	50V 1000P	C350	ECEA0JKA470B	6.3V 47U	C912	ECBT1H20GC5	50V 22P
C114	RCE1HKA3R3BG	50V 3.3U	C351, 352	RCE1CKA100BG	16V 10U	C915	ECBT1E103ZF	25V 0.01U
C115	ECEA1EKA4R7B	25V 4.7U	C355	ECEA1CKA330B	16V 33U	C916, 917	ECEA1HKA010B	50V 1U
C116	ECBT1C822KS5	16V 8200P	C356	ECBT1H104ZF5	50V 0.1U	C918	ECBT1H104ZF5	50V 0.1U
C117	ECQP1391JZ	100V 390P	C357	RCE1AKA101BG	10V 100U	C919	RCE0JU102BV	6.3V 1000U
C118, 119	ECFR1C103KR	16V 0.01U	C358-361	ECBT1H102KB5	50V 1000P	C920	ECBT1E103ZF	25V 0.01U
C120, 121	ECEA1HKA010B	50V 1U	C365	ECEA0JKA470B	6.3V 47U	C921	ECA0JKF101B	6.3V 100U
C122	ECEA1HKA2R2B	50V 2.2U	C371	ECBT1H102KB5	50V 1000P	C922	ECEA0JKA221B	6.3V 220U
C123	ECEA1HKA010B	50V 1U	C391, 392	ECEA1CKA101B	16V 100U	C924	ECBT1H102KB5	50V 1000P
C124	ECBT1H102KB5	50V 1000P	C393, 394	ECBT1H102KB5	50V 1000P	C951-958	ECBT1H101KB5	50V 100P
C125	ECBT1H150JC5	50V 15P	C501	ECEA1EKA101B	25V 100U			
C126	ECBT1H473ZF5	50V 0.047U	C502	ECA1VM101B	35V 100U			
C127	ECEA1CKA220B	16V 22U	C503	ECBT1E103ZF	25V 0.01U			
C128	ECBT1H102KB5	50V 1000P	C504	ECEA1EKA101B	25V 100U			
C129, 130	ECEA0JKA101B	6.3V 100U	C509	ECBT1E103ZF	25V 0.01U			

REPLACEMENT PARTS LIST

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND CHASSIS		17	XTBS26+8J	SCREW	
				18	SHE170-2	P. C. B. SUPPORT	
				19	XTBS3+8JFZ1	SCREW	
1	RHD30007-S	SCREW		20	XTB3+12JFZ	SCREW	
2	RKMO327A-S	CABINET		21	BMC0313	TUNER EARTH SPRING	
3	XTB3+8JFZ	SCREW					
4	REZO883	FFC(14P)					
5	REZO884	FFC(21P)					
7	RGRD242B-A	REAR PANEL					
8	RFKJTHD7-N	BOTTOM CHASSIS ASS'Y					
8-1	RKA0076-N1	FOOT					
9	RMNO203	P. C. B. HOLDER					
10	RMNO195	FL HOLD PIECE					
11	RMNO381	FL HOLDER					
12	RFKGTCA01E-N	FRONT PANEL ASS'Y					
13	RGK0821-S	SIDE ORNAMENT (L)					
14	RGK0822-S	SIDE ORNAMENT (R)					
15	RGL0334-1Q	PANEL LIGHT					
16	RGU1394A-S	BUTTON					

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