

Service Manual

Stereo Synthesizer Tuner

Tuner
ST-GT650

Colour

(K) Black Type

**Areas**

Suffix for Model No.	Area	Colour
(E)	Europe	(K)
(EB)	Great Britain	
(EG)	Germany and Italy	

SPECIFICATIONS \ ТЕХНИЧЕСКИЕ ХАРАКТЕРИСТИКИ
SCHEMATIC DIAGRAMS \ ПРИНЦИПИАЛЬНЫЕ СХЕМЫ
WIRING CONNECTION DIAGRAM \ СХЕМА СОЕДИНЕНИЯ
MEASUREMENTS AND ADJUSTMENTS \ ИЗМЕРЕНИЯ И РЕГУЛИРОВКИ
FUNCTIONS OF IC TERMINALS \ НАЗНАЧЕНИЕ ВЫВОДОВ ИНТЕГРАЛЬНЫХ
МИКРОСХЕМ
BLOCK DIAGRAM \ БЛОК-СХЕМА
REPLACEMENT PARTS LIST \ СПИСОК ЗАПАСНЫХ ЧАСТЕЙ
CABINET PARTS LOCATION \ РАСПОЛОЖЕНИЕ ЧАСТЕЙ КОРПУСА

Technics

SPECIFICATIONS (DIN 45 500)

■ FM TUNER SECTION

Frequency range	87.50~108.00 MHz (0.05-MHz steps)
Sensitivity	1.5 μ V (IHF, usable)
S/N 30 dB	1.3 μ V (75 Ω)
S/N 26 dB	1.2 μ V (75 Ω)
S/N 20 dB	0.9 μ V (75 Ω)
IHF 46 dB stereo quieting sensitivity	28 μ V (75 Ω)
Total harmonic distortion	
MONO (NORMAL)	0.05%
STEREO (NORMAL)	0.1%
S/N	
MONO	75 dB (80 dB, IHF)
STEREO	66 dB (72 dB, IHF)
Frequency response	10 Hz~15 kHz, +0.5 dB to -1.0 dB
Alternate channel selectivity	
NORMAL \pm 400 kHz	70 dB
SUPER NARROW \pm 200 kHz	25 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	100 dB
IF rejection at 98 MHz	95 dB
Spurious response rejection at 98 MHz	100 dB
AM suppression	55 dB
Stereo separation	
1 kHz	45 dB
Carrier leak	
19 kHz	-66 dB (-72 dB, IHF)
38 kHz	-72 dB (-78 dB, IHF)
Channel balance (250 Hz~6.3 kHz)	\pm 1.0 dB
Limiting point	0.85 μ V
Bandwidth	
IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	75 Ω (unbalanced)

■ GENERAL

Output voltage	
for (E) (EB) areas	0.3 V (0.6 V, IHF)
for (EG) area	0.6 V (1.2 V, IHF)
Power consumption	9 W
Power supply	AC 50 Hz/60 Hz, 230 V~240 V
Dimensions (W×H×D)	430×91.5×308 mm
Weight	2.9 kg

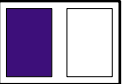
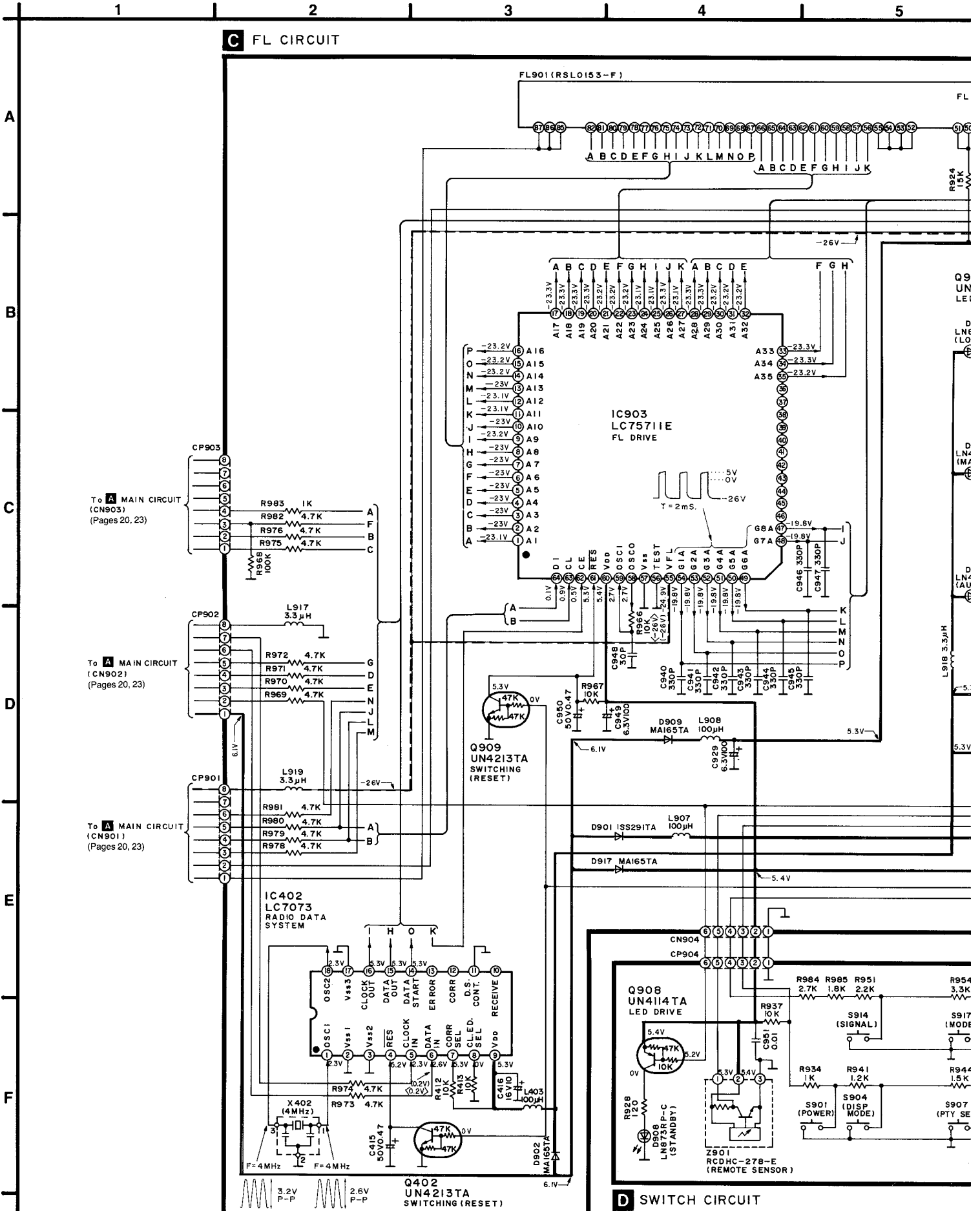
■ AM TUNER SECTION

Frequency range	
for (E) (EB) areas	
MW	522 kHz~1611 kHz (9-kHz steps)
LW	530 kHz~1620 kHz (10-kHz steps)
for (EG) area	
AM	144 kHz~288 kHz (9-kHz steps)
AM	522 kHz~1611 kHz (9-kHz steps)
AM	530 kHz~1620 kHz (10-kHz steps)
Sensitivity (S/N 20 dB)	
for (E) (EB) areas	
MW (at 999 kHz)	20 μ V, 600 μ V/m
LW (at 216 kHz)	150 μ V
for (EG) area	
AM (at 999 kHz)	20 μ V, 600 μ V/m
Selectivity (\pm 9 kHz)	
for (E) (EB) areas	
MW (at 999 kHz)	40 dB
LW (at 216 kHz)	40 dB
for (EG) area	
AM (at 999 kHz)	40 dB
Image rejection	
for (E) (EB) areas	
MW (at 999 kHz)	40 dB
LW (at 216 kHz)	40 dB
for (EG) area	
AM (at 999 kHz)	40 dB
IF rejection	
for (E) (EB) areas	
MW (at 999 kHz)	50 dB
LW (at 216 kHz)	50 dB
for (EG) area	
AM (at 999 kHz)	50 dB

Notes:

1. Specifications are subject to change without notice. Weight and dimensions are approximate.
2. Total harmonic distortion is measured by the digital spectrum analyzer.

SCHEMATIC DIAGRAM • FL/Switch circuit (Parts list on pages 35, 36, 39, 40)



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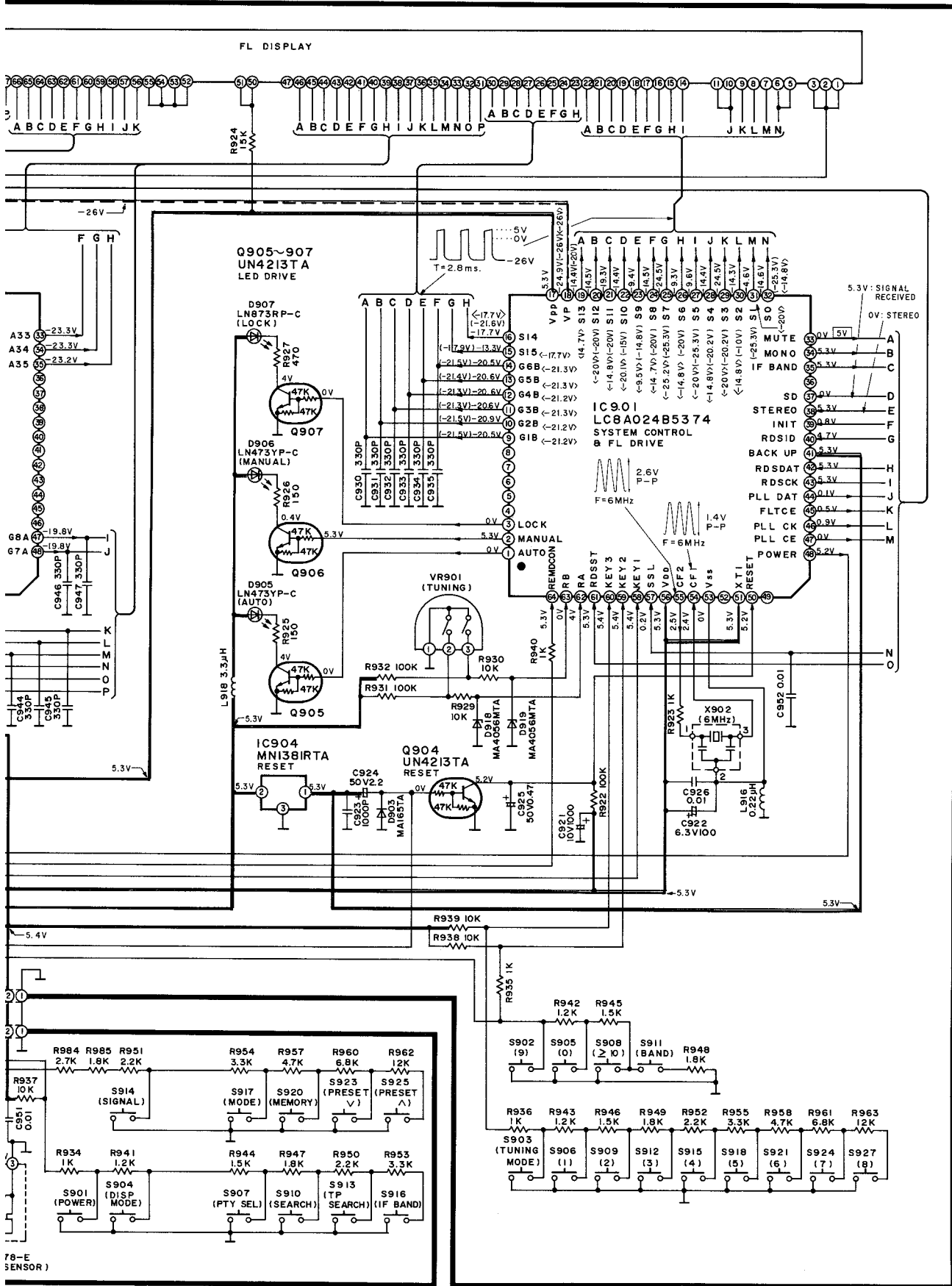
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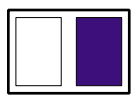
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9



78-E SENSOR)

T



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Notes:

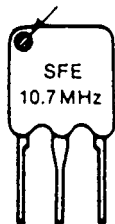
- S901: Power “(⏻)STANDBY/ON” switch. (POWER, (⏻)STANDBY/ON)
 - S902: Preset-tuning switch. (9)
 - S903: Tuning mode select switch. (TUNING MODE)
 - S904: Display mode select switch. (DISP MODE)
 - S905: Preset-tuning switch. (0)
 - S906: Preset-tuning switch. (1)
 - S907: PTY select switch. (PTY SEL)
 - S908: Preset-tuning switch. (≥ 10)
 - S909: Preset-tuning switch. (2)
 - S910: AF/PTY search switch. (SEARCH)
 - S911: Band select switch. (-BAND, -ALLOCATION)
 - S912: Preset-tuning switch. (3)
 - S913: TP search switch. (TP SEARCH)
 - S914: FM signal-strength indication switch. (SIGNAL)
 - S915: Preset-tuning switch. (4)
 - S916: FM IF band select switch. (IF BAND)
 - S917: FM mode select switch. (MODE)
 - S918: Preset-tuning switch. (5)
 - S920: Memory switch. (MEMORY)
 - S921: Preset-tuning switch. (6)
 - S923: Preset channel switch. (✓PRESET)
 - S924: Preset-tuning switch. (7)
 - S925: Preset channel switch. (PRESET^)
 - S927: Preset-tuning switch. (8)
- 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.
No mark: FM (): MW... for (E, EB) areas/AM... for (EG) area < >: LW Muting
- 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.

●Use of ceramic filters in pairs

The ceramic filters (CF101~CF104) 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 (D911, D912) for use as different diodes must be used depending on each rank of the ceramic filters.

Color marking
(Red, Blue or Orange)



RANK (Color)	D911	D912	CENTER FREQUENCY
Orange	×	○	10.72 MHz
Red	○	○	10.70 MHz
Blue	○	×	10.67 MHz

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

•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.

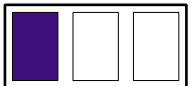
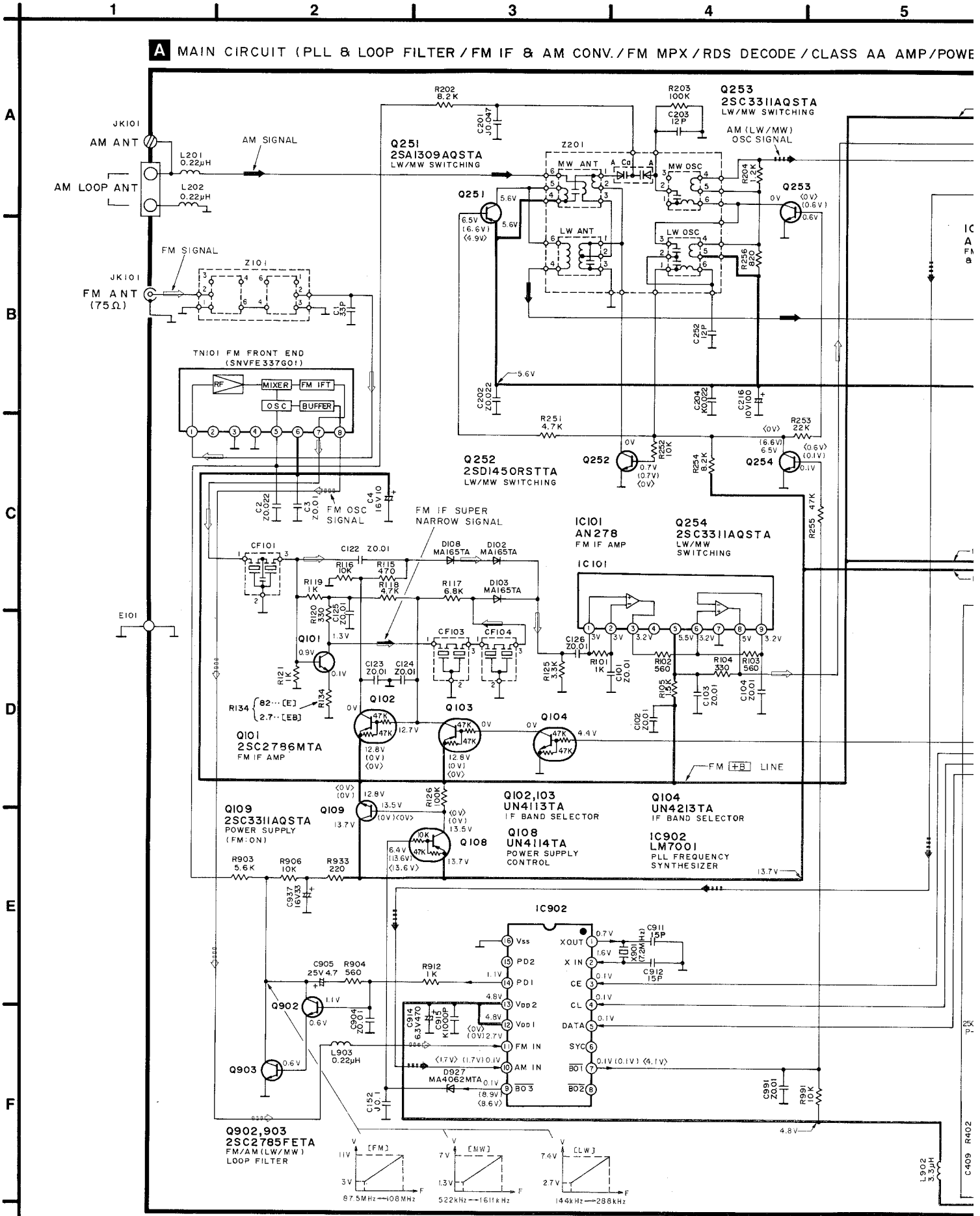
- The supply part number is described alone in the replacement parts list.

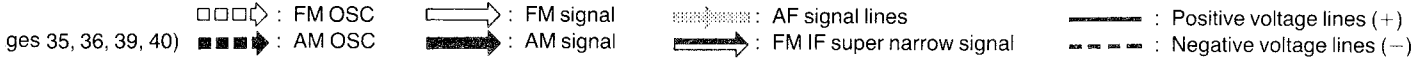
Part No.	Production Part No.	Supply Part No.
Z901	RCDHC-278-E	RCDHC-278

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

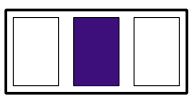
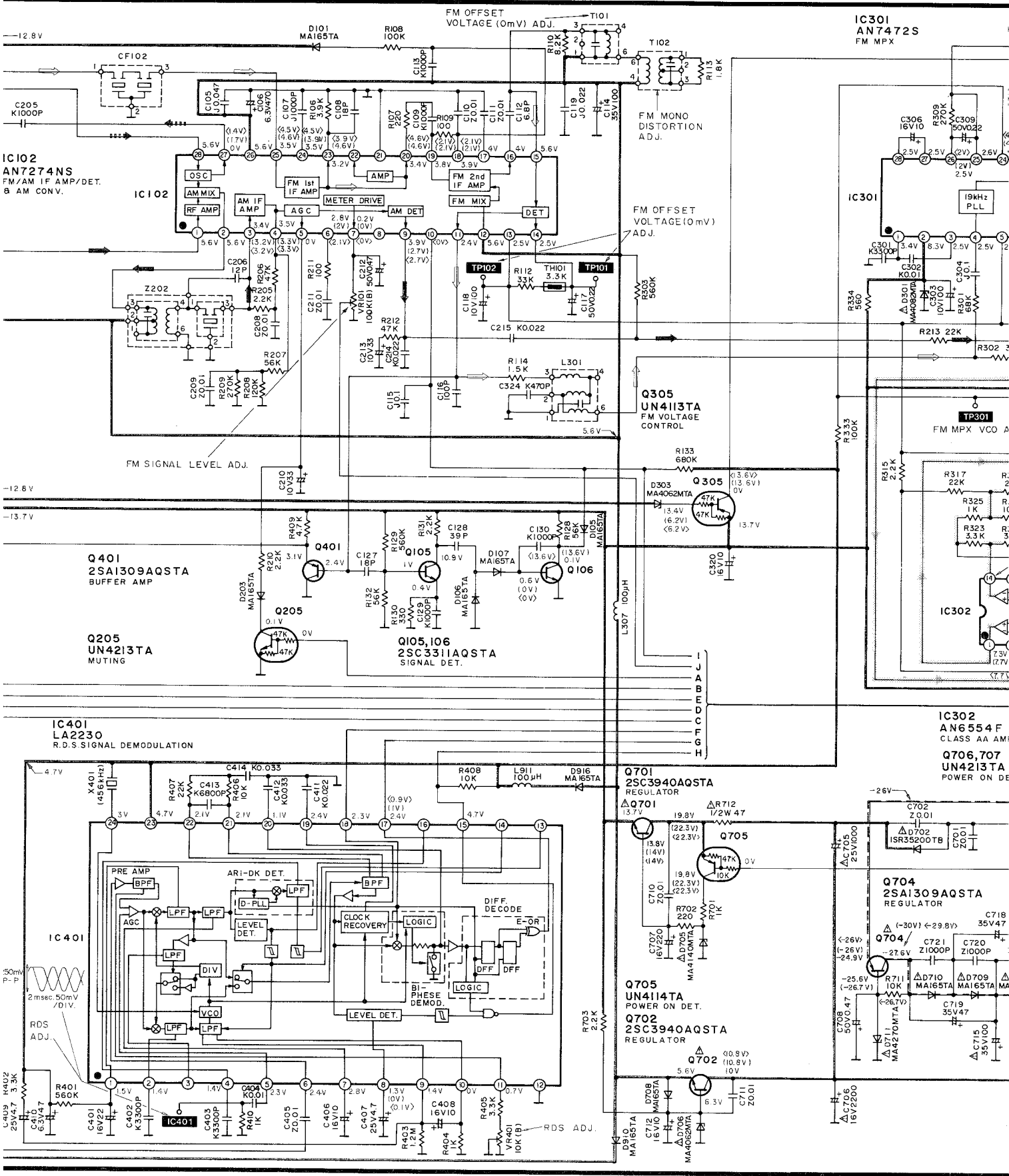
———— Positive voltage lines (+)
- - - - - Negative voltage lines (-)

SCHEMATIC DIAGRAM • Main/Power supply circuit for (E), (EB) areas (Parts list on pag

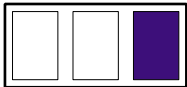
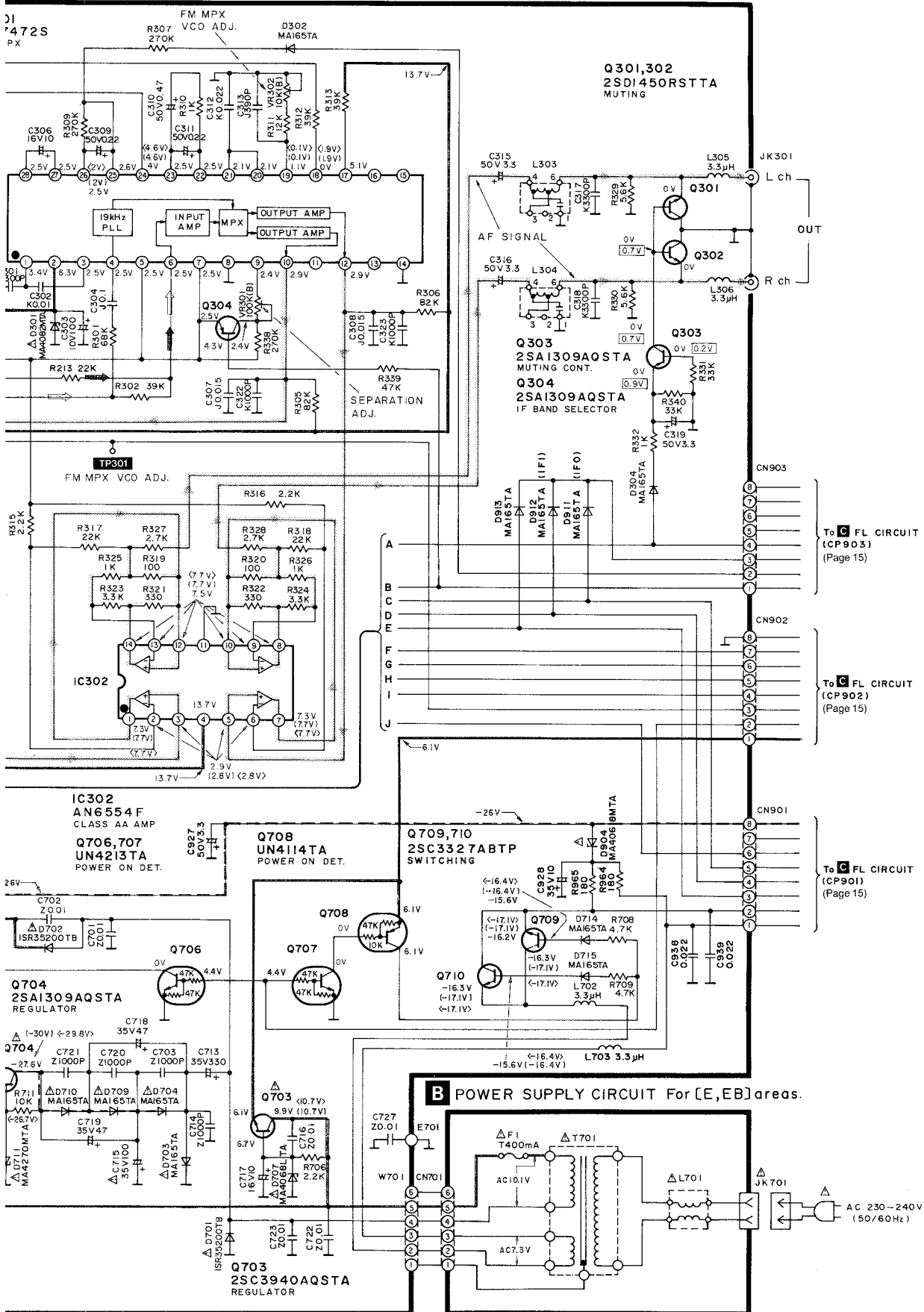




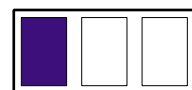
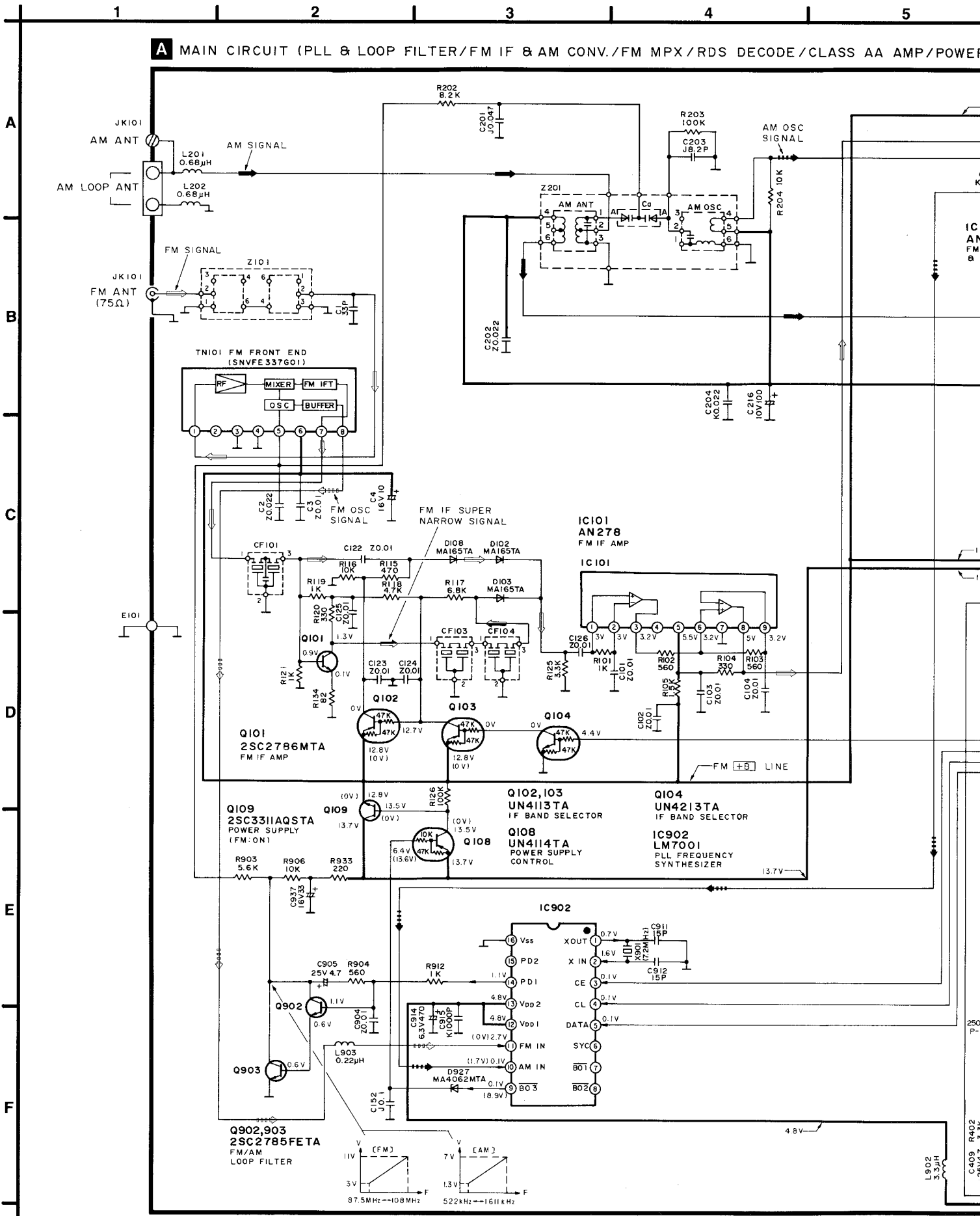
'ER SUPPLY) For [E, EB] areas



lines (+)
3 lines (-)



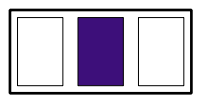
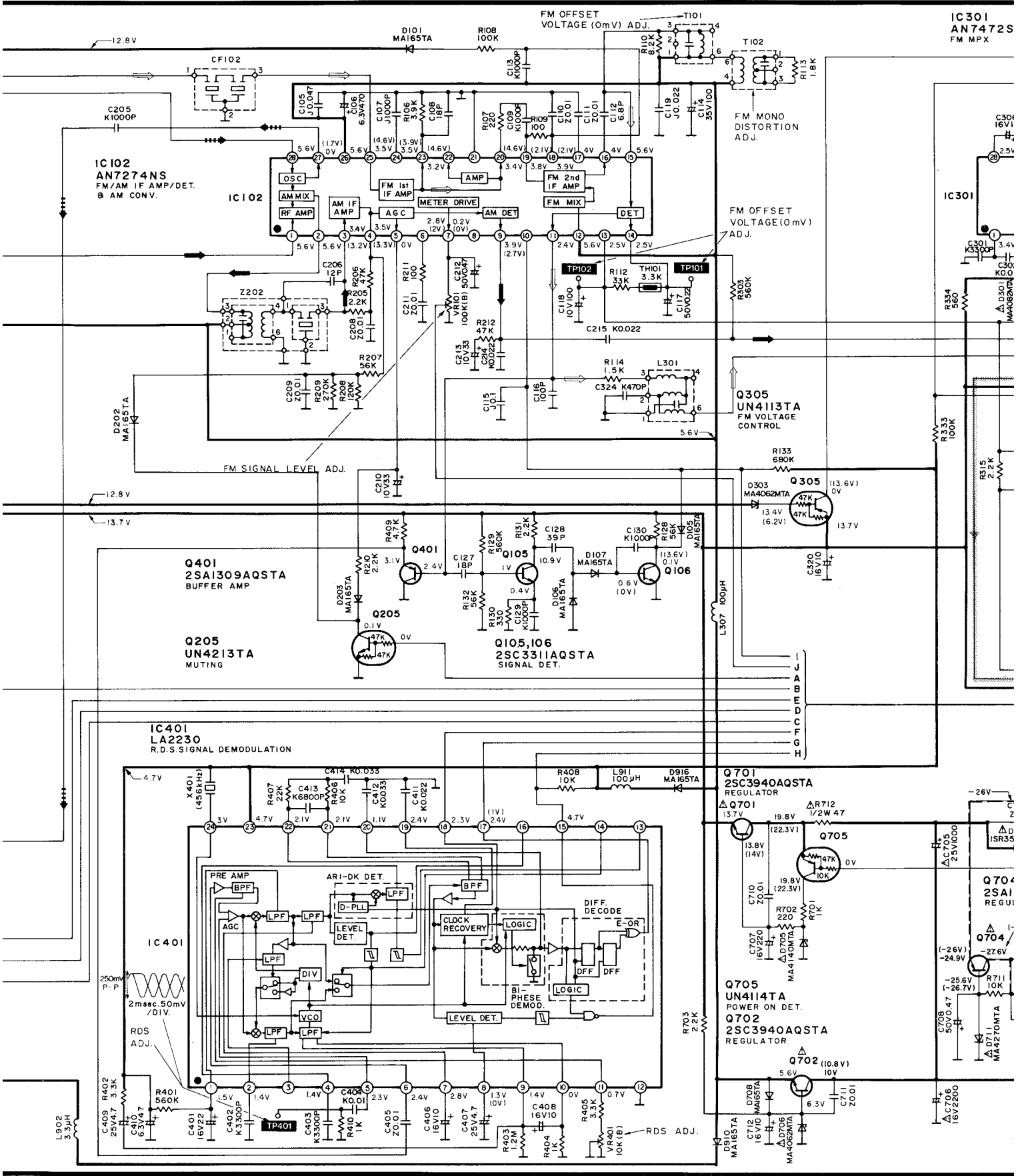
■ SCHEMATIC DIAGRAM • Main/Power supply circuit for (EG) area (Parts list on pages 35, 36,



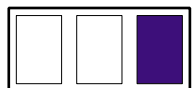
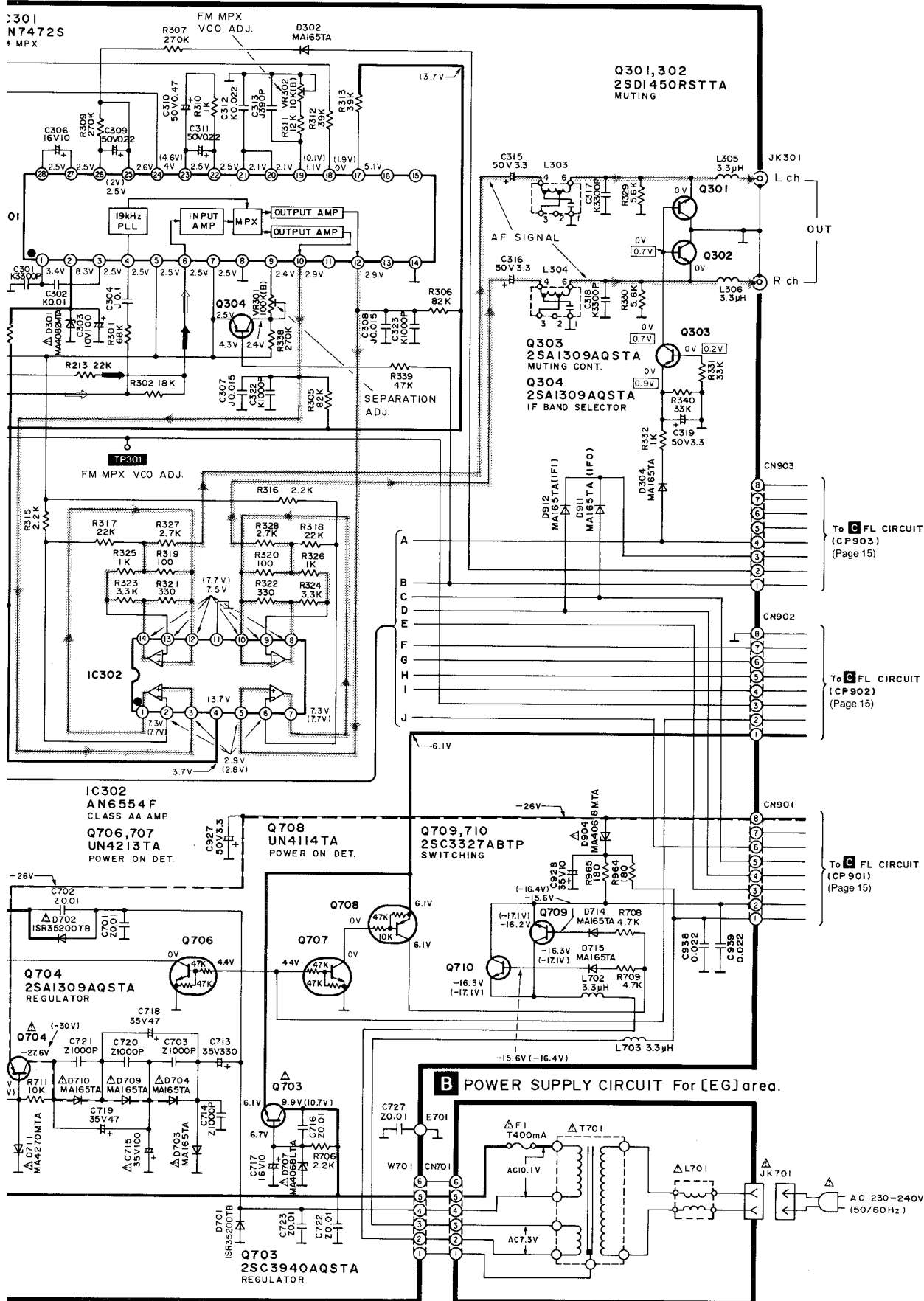
on pages 35, 36, 39, 40)

• Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with t
 Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
 No mark: FM (): MW...for (E, EB) areas/AM...for (EG) area <>: LW □: Muting

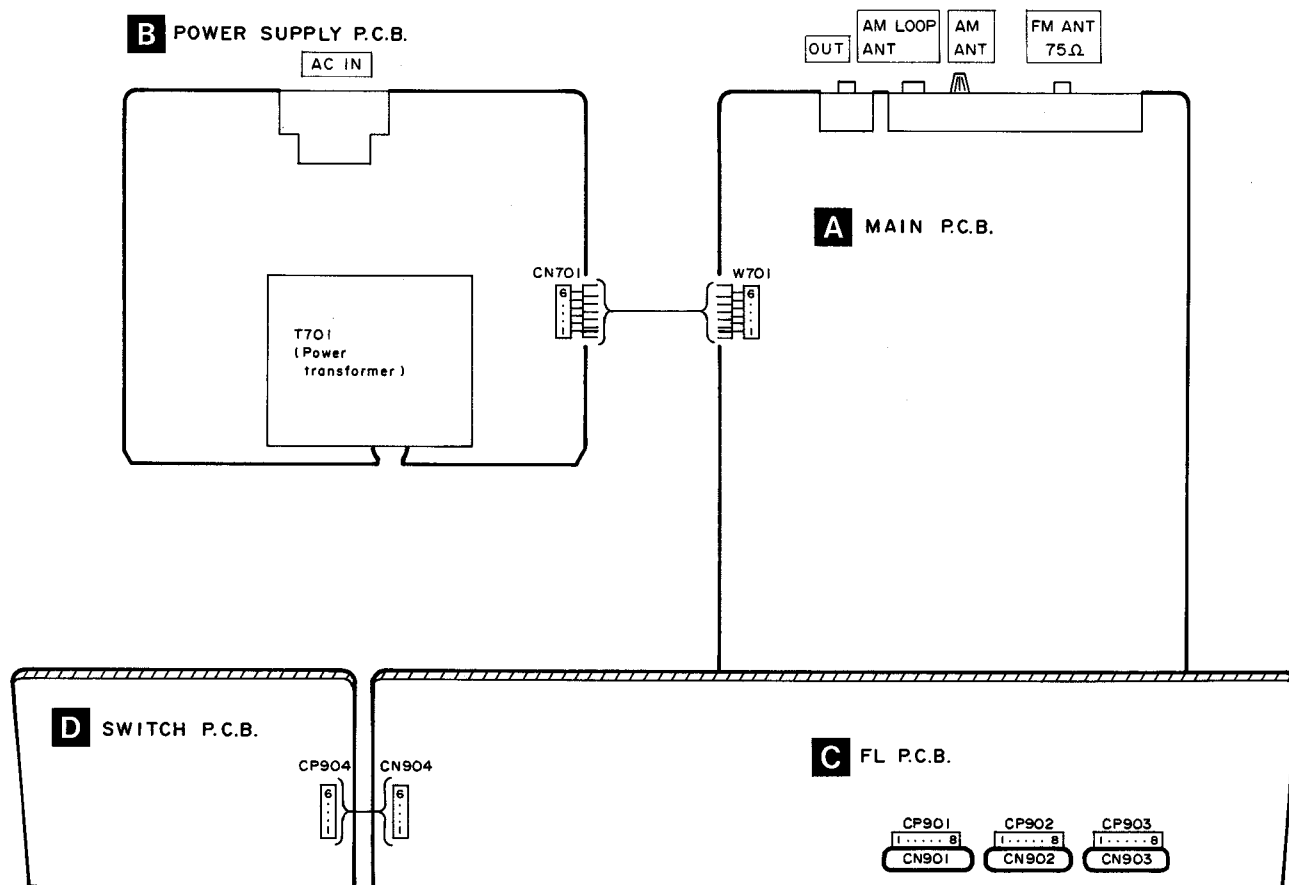
5 6 7 8 9
 A AMP/POWER SUPPLY) For [EG] area



ice) with the chassis taken as standard.
ter.



WIRING CONNECTION DIAGRAM



Terminal guide of IC's, transistors and diodes

<p>AN7274NS AN7472S</p>	<p>LC7073</p>	<p>LA2230</p>	<p>AN6554F 14Pin LM7001 16Pin</p>	<p>LC8A024B5374 LC75711E</p>
<p>AN278</p>	<p>MN1381RTA</p>	<p>2SC3940AQSTA</p>	<p>2SC3327ABTP</p>	<p>2SA1309AQSTA 2SC2785FETA 2SC2786MTA 2SC3311AQSTA 2SD1450RSTTA UN4113TA UN4114TA UN4213TA</p>
<p>MA165TA 1SS291TA 1SR35200TB</p>	<p>MA4140MTA MA4270MTA</p>	<p>MA4056MTA MA4062MTA MA4068MTA MA4082MTA MA4068LTA</p>	<p>LN473YP-C LN873RP-C</p>	

MEASUREMENTS AND ADJUSTMENTS

Equipment used

- FM signal generator (FM-SG)
- AM signal generator (AM-SG)
- Stereo modulator
- Distortion analyser
- RDS modulator
- Resistor (100 k Ω)
- Oscilloscope
- Choke coil (100 μ H)
- Frequency counter
- AC and DC electronic voltmeter (EVM)
- 75 Ω coaxial cable

Note: for Z101, Z202, L301, L303 and L304, they are supplied as adjusted parts, So, do not turn the cores of the parts.

MW RF ADJUSTMENT [for (E) (EB) areas]

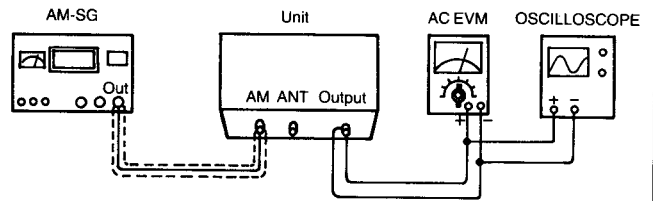
1. Test equipment connection is shown in figure.
2. Set the unit to "MW" mode.
3. Set the radio frequency display and signal generator to 612 kHz.
4. Adjust Z201-1 so that the output terminal is maximized.

AM SIGNAL GENERATOR CONDITION

- Modulation 30%
- Modulation frequency 400 Hz

Note:

Adjust the output from AM signal generator to a low level.



AM RF ADJUSTMENT [for (EG) area]

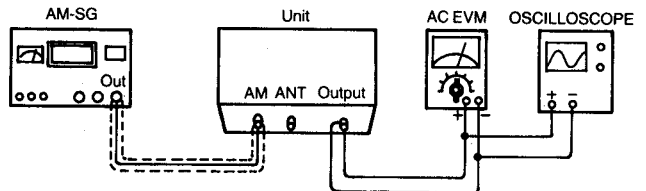
1. Test equipment connection is shown in figure.
2. Set the unit to "AM" mode.
3. Set the radio frequency display and signal generator to 612 kHz.
4. Adjust Z201 so that the output terminal is maximized.

AM SIGNAL GENERATOR CONDITION

- Modulation 30%
- Modulation frequency 400 Hz

Note:

Adjust the output from AM signal generator to a low level.



LW RF ADJUSTMENT [for (E) (EB) areas]

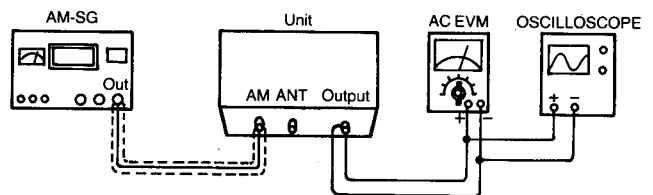
1. Test equipment connection is shown in figure.
2. Set the unit to "LW" mode.
3. Set the radio frequency display and signal generator to 144 kHz.
4. Adjust Z201-2 so that the output terminal is maximized.

AM SIGNAL GENERATOR CONDITION

- Modulation 30%
- Modulation frequency 400 Hz

Note:

Adjust the output from AM signal generator to a low level.



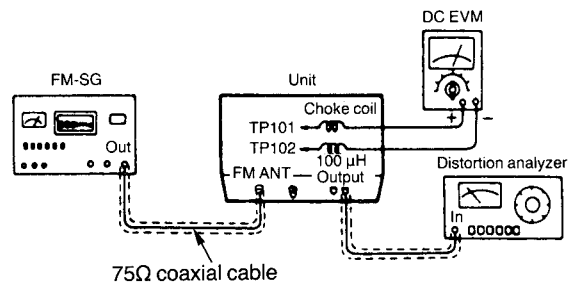
FM MONO DISTORTION/FM OFFSET VOLTAGE ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "FM" and "IF normal" mode.
3. Set the radio frequency display and signal generator to **100.10 MHz**.
4. Adjust the core of **T101** so that the voltage measured in signal mode is **0 mV** (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 1 kHz
 Output level 66 dB



FM MPX VCO ADJUSTMENT

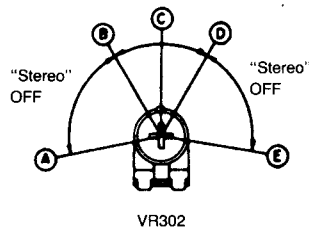
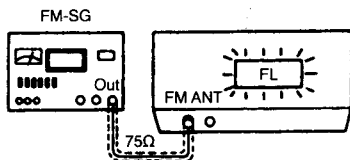
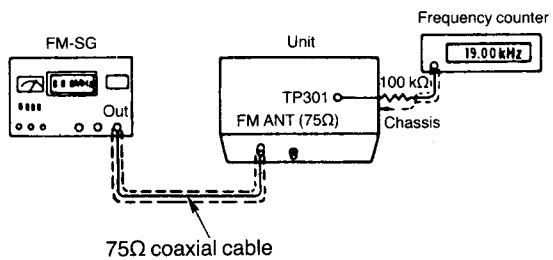
1. Test equipment connection is shown in figure.
2. Set the unit to "FM" and "IF normal" mode.
3. Set the radio frequency display and signal generator to **100.50 MHz**.
4. Adjust **VR302** for **19 kHz ± 30 Hz** on frequency counter reading.

•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 0 kHz
 Output level 66 dB



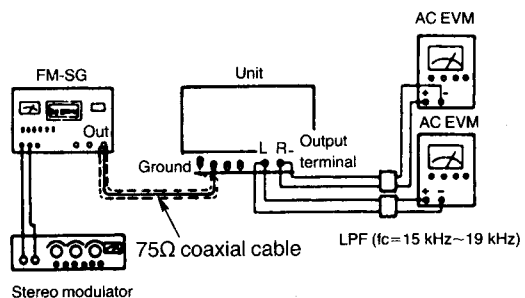
- Ⓐ~Ⓑ, Ⓓ~Ⓔ "Stereo" OFF position
- Ⓑ~Ⓓ "Stereo" ON position (Indicator lighting)
- Ⓒ Adjust point of pilot circuit

FM STEREO 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 **100.20 MHz**.
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 1 kHz (Pilot 19 kHz)
 Output level 66 dB

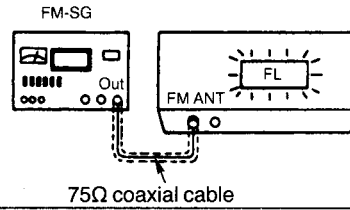


FM SIGNAL STRENGTH LEVEL ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to "FM" and "IF normal" mode.
3. Set the radio frequency display and signal generator to **100.50 MHz**.
4. Change FL display from "frequency" to "dB" by pressing the FM signal button.
5. Adjust **VR101** so that **54 dB** is indicated. "54 dB" is indicated on the FL display.
6. Repeat steps 4, 5.

FM SIGNAL GENERATOR CONDITION

Modulation 30%
 Modulation frequency 1 kHz
 Output level 60 dB



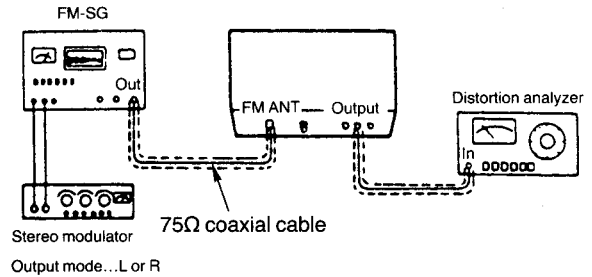
FM STEREO DISTORTION ADJUSTMENT

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 **100.10 MHz**.
4. Adjust **TN101** 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 1 kHz (Pilot 19 kHz)
 Output level 66 dB

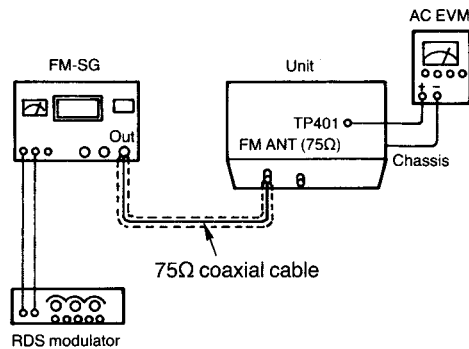


RDS (Radio data system) BPF ADJUSTMENT

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 **100.10 MHz**.
4. Adjust **VR401** so that the **TP401** output is maximized.

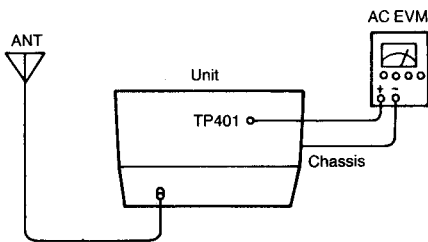
FM SIGNAL GENERATOR CONDITION

Modulation 100%
 Modulation frequency 1 kHz
 RDS modulation 2.7%
 Output level 66 dB

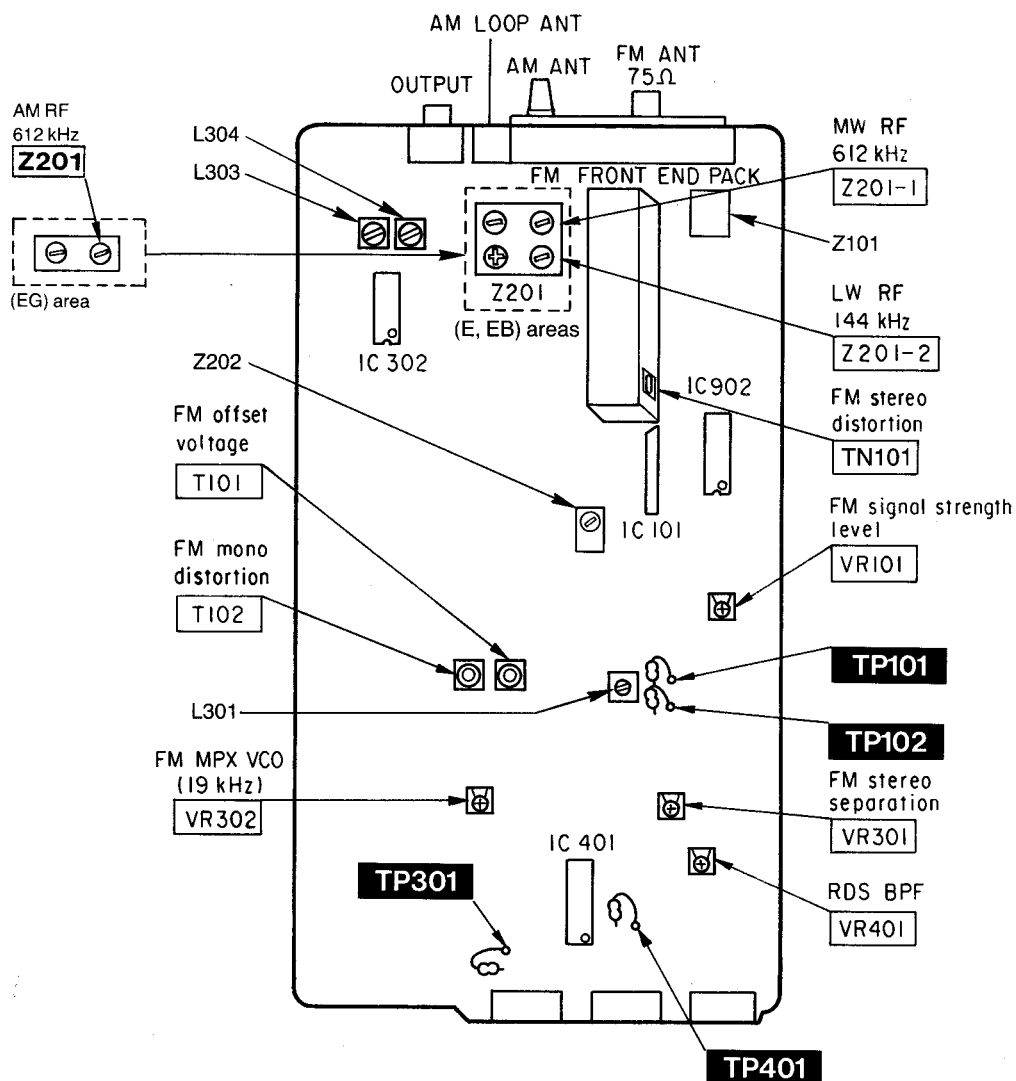


How to make simple adjustment without using a RDS modulator

1. Tune into a FM broadcast with a RDS signal transmitted from a FM station whose electric field intensity is more than **50 dB**.
2. Adjust **VR401** to increase a bi-phase signal to a maximum.



● Adjustment point



■ FUNCTIONS OF IC TERMINALS

● IC903 (LC75711E)

Pin No.	Terminal Name	I/O	Function
1 } 35	A1 } A35	O	FL segment signal output
36 } 38	No use	—	—
39 } 43	No use	—	—
44 } 46	No use	—	—
47 } 54	G8A } G1A	O	FL glide signal output

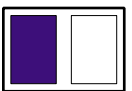
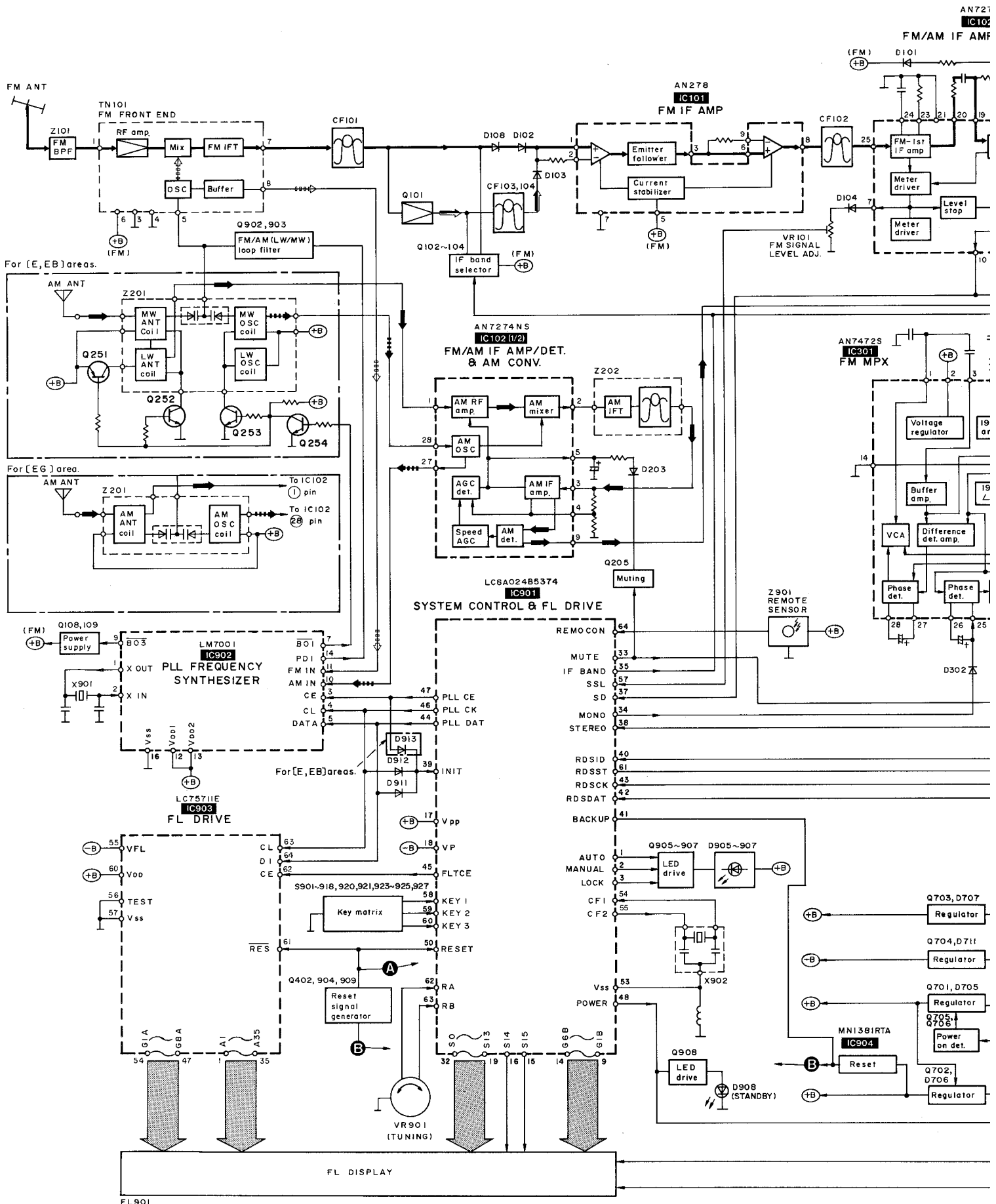
Pin No.	Terminal Name	I/O	Function
55	VFL	I	FL drive power input
56	TEST	—	GND
57	V _{SS}	—	
58	OSC O	O	Connecting terminal for resistor and capacitor
59	OSC I	I	
60	V _{DD}	I	Power supply
61	RES	I	Reset signal input
62	CE	I	FLD control chip select signal input
63	CL	I	Serial clock input
64	DI	I	Serial data input

●IC901 (LC8A024B5374)

Pin No.	Terminal Name	I/O	Function
1	AUTO	O	Tuning mode LED drive signal output
2	MANUAL		
3	LOCK		
4 } 8	No use	—	—
9 } 14	G1B } G6B	O	Grid signal output
15 • 16	S15 • S14	O	Segment signal output
17	VPP	—	Power supply for FL (+5 V)
18	VP	—	Power supply for FL (−VP)
19 } 32	S13 } S0	O	Segment signal output
33	MUTE	O	Muting signal output
34	MONO	O	Forcible monaural select signal output
35	IF BAND	O	IF BAND select signal output H: NARROW L: NORMAL
36	No use	—	—
37	SD	I	Station detector signal input
38	STEREO	I	Stereo signal input
39	INIT	I	Initial setting signal input
40	RDSID	I	RDSID signal input
41	BACK UP	I	Power failure detect signal input

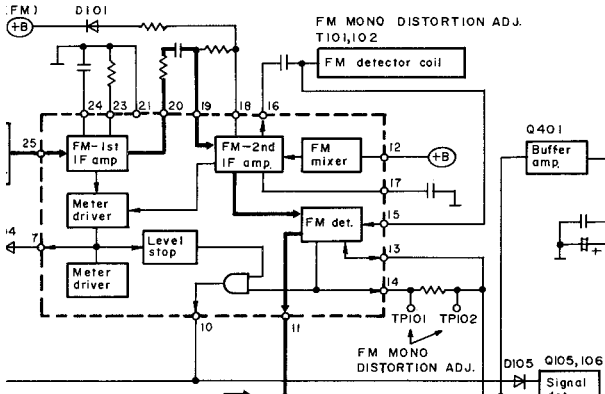
Pin No.	Terminal Name	I/O	Function
42	RDS DAT	I	RDS data input
43	RDS CK	I	RDS clock input
44	PLL DAT	O	Serial data output
45	FLTCE	O	FLTC chip enable signal output
46	PLL CK	O	Serial clock signal output
47	PLL CE	O	LM7001 chip enable signal output
48	POWER	O	Power control signal output
49	No use	—	—
50	RESET	I	Reset signal input
51	XTI	I	Connected to V _{DD}
52	No use	—	—
53	V _{SS}	—	GND
54	CF1	I	Connecting terminal for ceramic filter
55	CF2	O	
56	V _{DD}	—	Power supply (+5 V)
57	SSL	I	Tuning level signal input
58 } 60	KEY 1 } KEY 3	I	Key matrix signal input
61	RDS ST	I	RDS data start signal input
62	RA	I	Rotary encoda A signal input
63	RB	I	Rotary encoda B signal input
64	REMOCON	I	Remote control signal input

■ BLOCK DIAGRAM



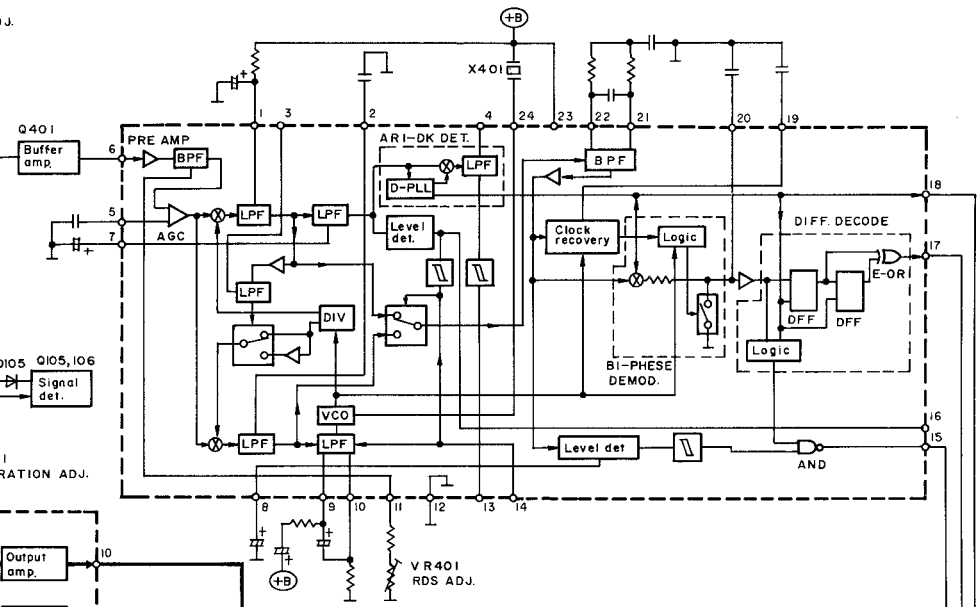
AN7274NS
IC102(1/2)

FM/AM IF AMP/DET & AM CONV.

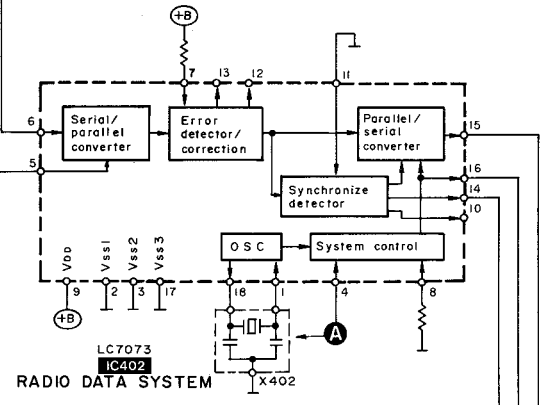
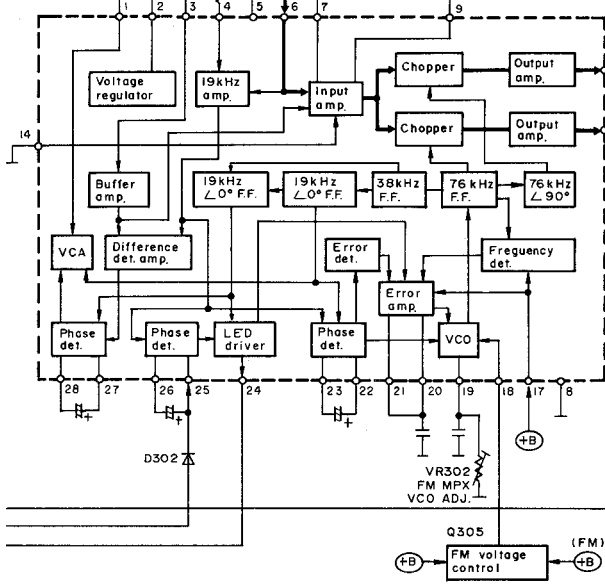


LA2230
IC401

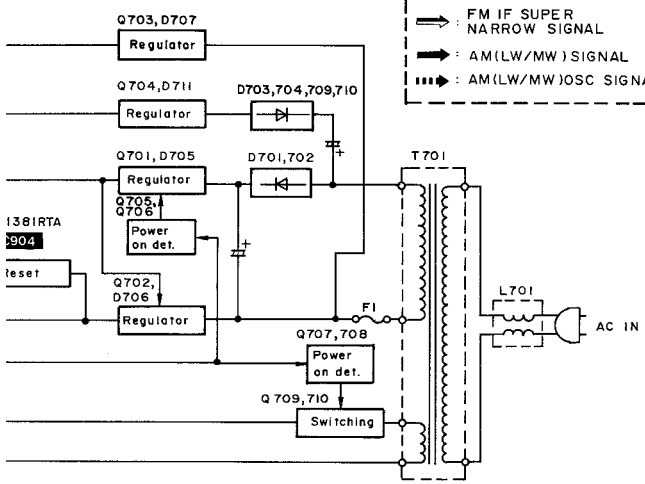
R.D.S. SIGNAL DEMODULATION



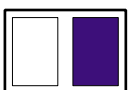
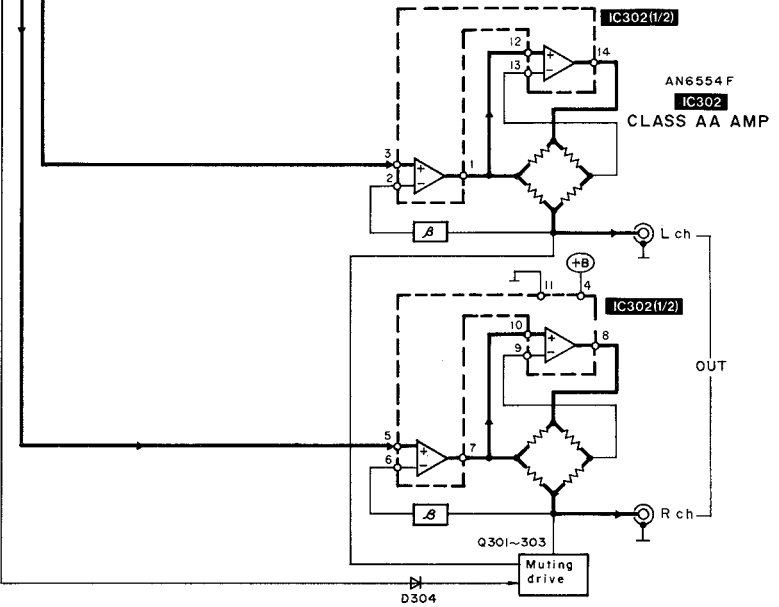
7472S
C301
M MPX



Note:
 -> FM SIGNAL
 o-o-o-o-> FM OSC SIGNAL
 -> FM IF SUPER NARROW SIGNAL
 -> AM(LW/MW) SIGNAL
 -> AM(LW/MW) OSC SIGNAL



AN6554F
IC302
CLASS AA AMP



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.

*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.

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)		D303	MA4062MTA	DIODE	
IC101	AN278	I. C, FM IF AMP.		D304	MA165	DIODE	
IC102	AN7274NS	I. C, FM/AM IF AMP. &DET.		D701, 702	1SR35200TB	DIODE	Δ
IC301	AN7472S	I. C, FM MPX		D703, 704	MA165	DIODE	Δ
IC302	AN6554F	I. C, CLASS AA AMP.		D705	MA4140M	DIODE	Δ
IC401	LA2230	I. C, RDS SIGNAL DEMODULATION		D706	MA4062MTA	DIODE	Δ
IC402	LC7073	I. C, RADIO DATA SYSTEM		D707	MA4068L	DIODE	Δ
IC901	LC8A024B5374	I. C, SYSTEM CONTROL		D708	MA165	DIODE	
IC902	LM7001	I. C, PLL FREQ. SYNTHESIZER		D709, 710	MA165	DIODE	Δ
IC903	LC75711E	I. C, FL DRIVE		D711	MA4270	DIODE	Δ
IC904	MN1381RTA	I. C, RESET		D714, 715	MA165	DIODE	
		TRANSISTOR(S)		D901	1SS291TA	DIODE	
Q101	2SC2786M	TRANSISTOR		D902, 903	MA165	DIODE	
Q102, 103	UN4113TA	TRANSISTOR		D904	MA4068M	DIODE	Δ
Q104	UN4213	TRANSISTOR		D905, 906	LN473YP-C	LED	
Q105, 106	2SC3311A-Q	TRANSISTOR		D907, 908	LN873RP-C	LED	
Q108	UN4114TA	TRANSISTOR		D909-912	MA165	DIODE	
Q109	2SC3311A-Q	TRANSISTOR		D913	MA165	DIODE	(E, EB)
Q205	UN4213	TRANSISTOR		D916, 917	MA165	DIODE	
Q251	2SA1309A-R	TRANSISTOR	(E, EB)	D918, 919	MA4056MTA	DIODE	
Q252	2SD1450RTA	TRANSISTOR	(E, EB)	D927	MA4062MTA	DIODE	
Q253, 254	2SC3311A-Q	TRANSISTOR	(E, EB)			VARIABLE RESISTOR(S)	
Q301, 302	2SD1450RTA	TRANSISTOR		VR101	EVNDXAA00B15	V. R, FM SIGNAL LEVEL ADJ.	
Q303, 304	2SA1309A-R	TRANSISTOR		VR301	EVNDXAA00B15	V. R, FM STEREO SEPARATION	
Q305	UN4113TA	TRANSISTOR		VR302	EVNDXAA00B14	V. R, FM MPX VCO ADJ.	
Q401	2SA1309A-R	TRANSISTOR		VR401	EVNDXAA00B14	V. R, RDS ADJ.	
Q402	UN4213	TRANSISTOR		VR901	RRVEC16B12-A	V. R, TUNING CONTROL	
Q701-703	2SC3940AQSTA	TRANSISTOR	Δ			CERAMIC FILTER(S)	
Q704	2SA1309A-R	TRANSISTOR	Δ	CF101	RLFFETNGA01L	CERAMIC FILTER	[RED]
Q705	UN4114TA	TRANSISTOR		CF101	RLFFETNGB01L	CERAMIC FILTER	[BLUE]
Q706, 707	UN4213	TRANSISTOR		CF101	RLFFETNGC01L	CERAMIC FILTER	[ORANGE]
Q708	UN4114TA	TRANSISTOR		CF102	RLFFETNGA02L	CERAMIC FILTER	[RED]
Q709, 710	2SC3327-A	TRANSISTOR		CF102	RLFFETNGB02L	CERAMIC FILTER	[BLUE]
Q902, 903	2SC2785FE	TRANSISTOR		CF102	RLFFETNGC02L	CERAMIC FILTER	[ORANGE]
Q904-907	UN4213	TRANSISTOR		CF103, 104	RLFFETNGA01L	CERAMIC FILTER	[RED] (E, EG)
Q908	UN4114TA	TRANSISTOR		CF103, 104	RLFFETNGB01L	CERAMIC FILTER	[BLUE] (E, EG)
Q909	UN4213	TRANSISTOR		CF103, 104	RLFFETNGC01L	CERAMIC FILTER	[ORANGE] (E, EG)
		DIODE(S)		CF103, 104	SVFE107MZ2-A	CERAMIC FILTER	(EB)
D101-103	MA165	DIODE				THERMISTOR(S)	
D105-108	MA165	DIODE		TH101	ERTD2ZHL332T	THERMISTOR	
D202	MA165	DIODE	(EG)			COMPONENT COMBINATION(S)	
D203	MA165	DIODE		TN101	SNVFE337G01	FM FRONT END	
D301	MA4082MTA	DIODE	Δ	Z101	SLA4Z13-Z	COMPONENT COMBINATION	
D302	MA165	DIODE					

ST-GT650

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
Z201	RLA6Z002-T	COMPONENT COMBINATION	(E, EB)	S913	EVQ21405R	SW, TP SEARCH	
Z201	RLA2Z001-T	COMPONENT COMBINATION	(EG)	S914	EVQ21405R	SW, SIGNAL	
Z202	RLI2Z002-W	COMPONENT COMBINATION		S915	EVQ21405R	SW, PRESET-TUNING (4)	
Z901	RCDHC-278	REMOTE SENSOR		S916	EVQ21405R	SW, IF BAND	
		COIL (S)		S917	EVQ21405R	SW, MODE	
L201, 202	ELESNR22MA	COIL	(E, EB)	S918	EVQ21405R	SW, PRESET-TUNING (5)	
L201, 202	ELESNR68MA	COIL	(EG)	S920	EVQ21405R	SW, MEMORY	
L301	SLM1B10M-1M	COIL		S921	EVQ21405R	SW, PRESET-TUNING (6)	
L303, 304	RLM2B004-K	COIL		S923	EVQ21405R	SW, PRESET DOWN	
L305, 306	ELEXT3R3KA9	COIL		S924	EVQ21405R	SW, PRESET-TUNING (7)	
L307	ELEXT101KA9	COIL		S925	EVQ21405R	SW, PRESET UP	
L403	ELEXT101KA9	COIL		S927	EVQ21405R	SW, PRESET-TUNING (8)	
L701	RLQZ600M-W	COIL	△			CONNECTOR (S)	
L702, 703	ELEXT3R3KA9	COIL		CN701	SJT30643-V	CONNECTOR (6P)	
L902	ELEXT3R3KA9	COIL		CN901-903	RJU003K008M1	SOCKET (8P)	
L903	ELEXT22MA9	COIL		CN904	SJS50682JQH	SOCKET (6P)	
L907, 908	ELEXT101KA9	COIL		CP901-903	RJT003K008-1	CONNECTOR (8P)	
L911	ELEXT101KA9	COIL		CP904	SJT30645JQ	CONNECTOR (6P)	
L916	ELEXT22MA9	COIL				EARTH TERMINAL (S)	
L917-919	ELEXT3R3KA9	COIL		E101	SNE1004-1	GND PLATE	
		TRANSFORMER (S)		E701	SNE1004-1	GND PLATE	
T101	RLI4B005-Z	COIL				FUSE HOLDER (S)	
T102	RLI4B006-Z	COIL		FC703, 704	EYF52BC	FUSE HOLDER	
T701	RTP1K4E022	POWER TRANSFORMER	△			JACK (S)	
		OSCILLATOR (S)		JK101	RJH4202M	ANTENNA TERMINAL	
X401	RSXZ456KM07	OSCILLATOR (456KHz)		JK301	SJF3068-5N	OUTPUT TERMINAL	
X402	RVBCST4R00MT	OSCILLATOR (4MHz)		JK701	SJS9236	AC INLET	△
X901	SVQ49U722-S	OSCILLATOR (7.2MHz)				TEST POINT (S)	
X902	EF0EC6004T4	OSCILLATOR (6MHz)		TP101	ERD25V0R00T	TEST POINT	
		FUSE		TP102	ERD25V0R00T	TEST POINT	
F1	XBA2C04TB0	FUSE, 250V T400ma	△	TP301	ERD25V0R00T	TEST POINT	
		DISPLAY		TP401	ERD25V0R00T	TEST POINT	
FL901	RSL0153-F	FL DISPLAY					
		SWITCH (ES)					
S901	EVQ21405R	SW, POWER					
S902	EVQ21405R	SW, PRESET-TUNING (9)					
S903	EVQ21405R	SW, TUNING MODE					
S904	EVQ21405R	SW, DISP MODE					
S905	EVQ21405R	SW, PRESET-TUNING (0)					
S906	EVQ21405R	SW, PRESET-TUNING (1)					
S907	EVQ21405R	SW, PTY SELECTOR					
S908	EVQ21405R	SW, PRESET-TUNING (≥10)					
S909	EVQ21405R	SW, PRESET-TUNING (2)					
S910	EVQ21405R	SW, SEARCH					
S911	EVQ21405R	SW, -BAND					
S912	EVQ21405R	SW, PRESET-TUNING (3)					

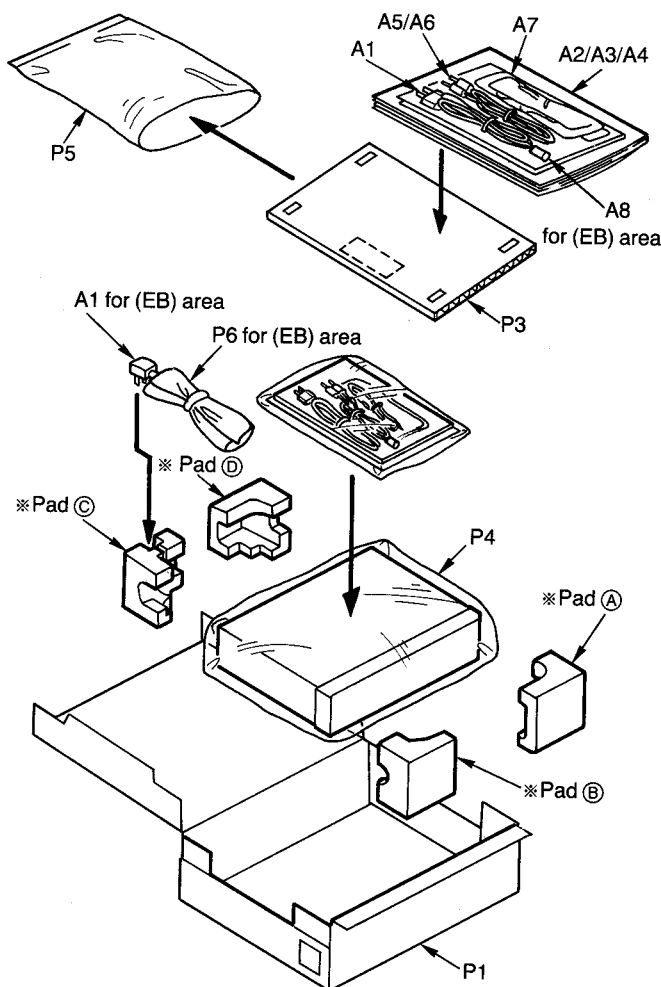
Note: The "(SF)" mark denotes the standard part.

*[VRD]: indicates parts that are supplied by Video Recorder Division.

Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET PARTS	
1	RKM0078-1K	CABINET	
2	SNE2129-1	SCREW	
3	XTBS3+8JFZ1	SCREW	
4	RWJ1806120KQ	FLAT CABLE (6P) (W701)	
5	RGRO148A-E1	REAR PANEL	(E)
5	RGRO148A-F1	REAR PANEL	(EB)
5	RGRO148A-D1	REAR PANEL	(EG)
6	RGWO174-T	KNOB, TUNING CONTROL	
7	RKA0053-A	FOOT	
8	RMK0174-2	BOTTOM BOARD	
9	RMN0195	FL SPACER	
10	RMN0220A	FL HOLDER	
11	RFKGTGT650EK	FRONT PANEL ASS'Y	
11-1	RKWO269A-K	FL PANEL	
12	RGK0543-S	ORNAMENT	
13	RFKNTGT650EA	PANEL LIGHT (A) ASS'Y	
14	RFKNTGT650EB	PANEL LIGHT (B) ASS'Y	
15	RGU0879A-K	BUTTON, PRESET etc.	
16	RGU0880A-K	BUTTON, FUNCTION etc.	
17	RGU0881A-K	BUTTON, MODE etc.	
18	RGU0882-K	BUTTON, POWER	
19	RHN90001	NUT	
20	XTBS26+8J	SCREW	
21	SHE187-2	P. C. B. SUPPORT	
22	XTBS3+8JFZ1	SCREW	
23	XTB3+20JFZ	SCREW	
24	XTB3+6J	SCREW	
		PACKING MATERIALS	
P1	RPG1593	PACKING CASE	(E, EG)
P1	RPG1594	PACKING CASE	(EB)
P2	RPN0628-1	PAD	(E, EG)
P2	RPN0690	PAD	(EB)
P3	RPQ0164	ACCESSORY PAD	
P4	XZB50X65A02Z	PROTECTION COVER (UNIT)	
P5	XZB24X34C04	PROTECTION COVER	
P6	RPH0032	MIRROR SHEET	(EB)

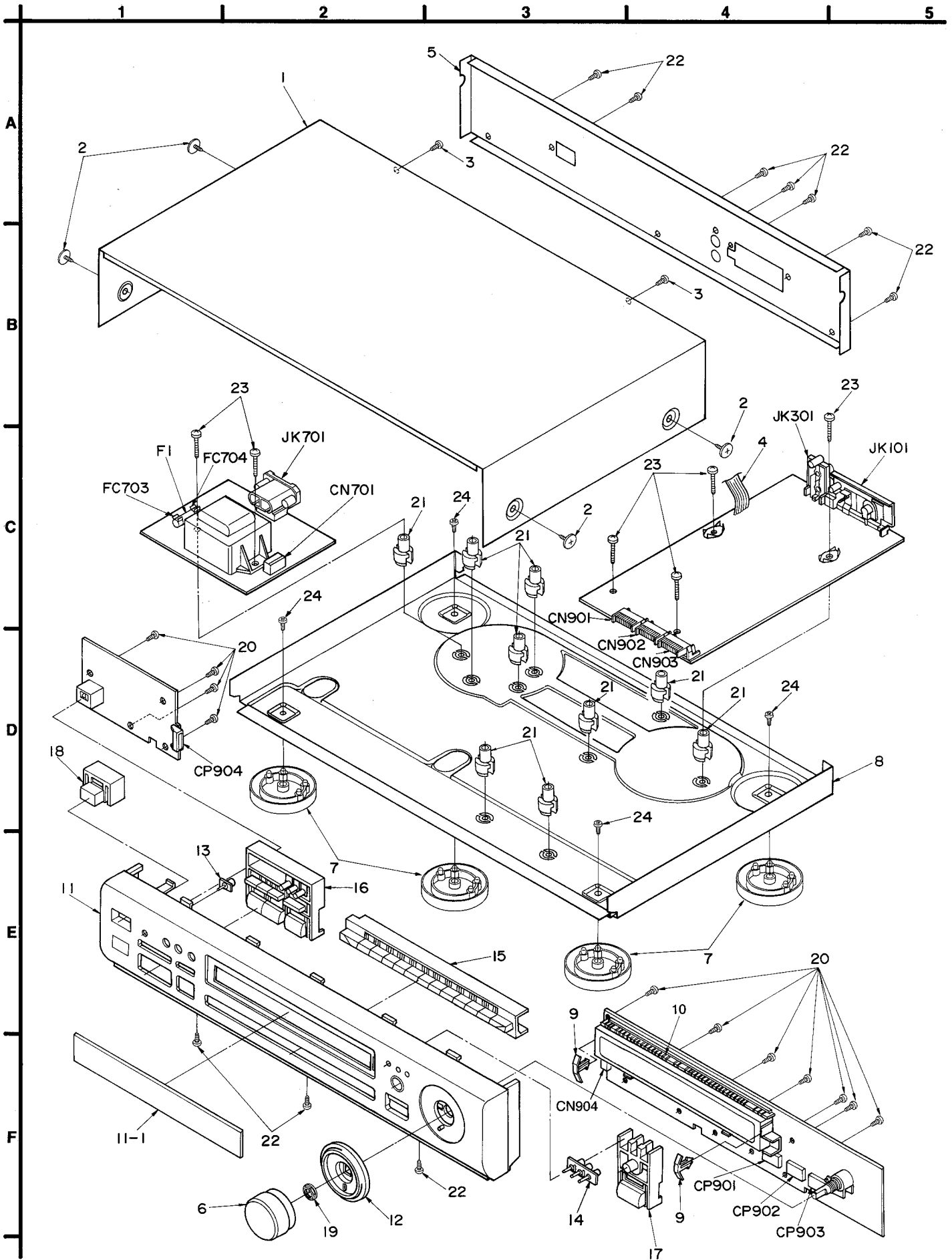
Ref. No.	Part No.	Part Name & Description	Remarks
		ACCESSORIES	
A1	RJA0019-2K	AC POWER SUPPLY CORD	△ (E, EG) (SF)
A1	VJA0733	AC POWER SUPPLY CORD	△ (EB) (SF) [VRD]
A2	RQA0013	WARRANTY CARD	
A3	RQCB0169	SERVICE CENTER LIST	
A4	RFKSTGT650EK	INSTRUCTIONS MANUAL	(E)
A4	RQT2000-B	INSTRUCTIONS MANUAL	(EB)
A4	RQT2003-D	INSTRUCTIONS MANUAL	(EG)
A5	RSA0007	FM INDOOR ANTENNA	
A6	SJP2276	STEREO CONNECTION CABLE	
A7	SPB1163T	LW/MW LOOP ANTENNA	
A7-1	SMA233-1M	ANTENNA HOLDER	
A7-2	XTN3+10AFZ	SCREW	
A8	SJP9009	ATTACHMENT PLUG	△ (EB)

■ PACKAGING



P2: *Pad (A) (B) (C) (D) Ass'y

■ CABINET PARTS LOCATION



Notes : * Capacity values 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	Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks
		RESISTORS	R255	ERDS2TJ473	1/4W 47K E, EB	R922	ERDS2TJ104	1/4W 100K
			R256	ERDS2TJ821	1/4W 820 E, EB	R923	ERDS2TJ102	1/4W 1K
			R301	ERDS2TJ683	1/4W 68K	R924	ERDS2TJ153	1/4W 15K
R101	ERDS2TJ102	1/4W 1K	R302	ERDS2TJ393	1/4W 39K E, EB	R925, 926	ERDS2TJ151	1/4W 150
R102, 103	ERDS2TJ561	1/4W 560	R302	ERDS2TJ183T	1/4W 18K EG	R927	ERDS2TJ471	1/4W 470
R104	ERDS2TJ331	1/4W 330	R303	ERDS2TJ564	1/4W 560K	R928	ERDS2EJ121	1/4W 120
R105	ERDS2TJ152	1/4W 1.5K	R305, 306	ERDS2TJ823T	1/4W 82K	R929, 930	ERDS2TJ103	1/4W 10K
R106	ERDS2TJ392T	1/4W 3.9K	R307	ERDS2TJ274	1/4W 270K	R931, 932	ERDS2TJ104	1/4W 100K
R107	ERDS2TJ221	1/4W 220	R309	ERDS2TJ274	1/4W 270K	R933	ERDS2TJ221	1/4W 220
R108	ERDS2TJ104	1/4W 100K	R310	ERDS2TJ102	1/4W 1K	R934-936	ERDS2TJ102	1/4W 1K
R109	ERDS2TJ101	1/4W 100	R311	ERDS2TJ123	1/4W 12K	R937-939	ERDS2TJ103	1/4W 10K
R110	ERDS2TJ822	1/4W 8.2K	R312, 313	ERDS2TJ393	1/4W 39K	R940	ERDS2TJ102	1/4W 1K
R112	ERDS2TJ333	1/4W 33K	R315, 316	ERDS2TJ222	1/4W 2.2K	R941-943	ERDS2TJ122	1/4W 1.2K
R113	ERDS2TJ182	1/4W 1.8K	R317, 318	ERDS2TJ223	1/4W 22K	R944-946	ERDS2TJ152	1/4W 1.5K
R114	ERDS2TJ152	1/4W 1.5K	R319, 320	ERDS2TJ101	1/4W 100	R947-949	ERDS2TJ182	1/4W 1.8K
R115	ERDS2TJ471	1/4W 470	R321, 322	ERDS2TJ331	1/4W 330	R950-952	ERDS2TJ222	1/4W 2.2K
R116	ERDS2TJ103	1/4W 10K	R323, 324	ERDS2TJ332	1/4W 3.3K	R953-955	ERDS2TJ332	1/4W 3.3K
R117	ERDS2TJ682T	1/4W 6.8K	R325, 326	ERDS2TJ102	1/4W 1K	R957, 958	ERDS2TJ472	1/4W 4.7K
R118	ERDS2TJ472	1/4W 4.7K	R327, 328	ERDS2TJ272T	1/4W 2.7K	R960, 961	ERDS2TJ682T	1/4W 6.8K
R119	ERDS2TJ102	1/4W 1K	R329, 330	ERDS2TJ562	1/4W 5.6K	R962, 963	ERDS2TJ123	1/4W 12K
R120	ERDS2TJ331	1/4W 330	R331	ERDS2TJ333	1/4W 33K	R964, 965	ERDS2TJ181T	1/4W 180
R121	ERDS2TJ102	1/4W 1K	R332	ERDS2TJ102	1/4W 1K	R966, 967	ERDS2TJ103	1/4W 10K
R125	ERDS2TJ332	1/4W 3.3K	R333	ERDS2TJ104	1/4W 100K	R968	ERDS2TJ104	1/4W 100K
R126	ERDS2TJ104	1/4W 100K	R334	ERDS2TJ561	1/4W 560	R969-976	ERDS2TJ472	1/4W 4.7K
R128	ERDS2TJ563	1/4W 56K	R338	ERDS2TJ274	1/4W 270K	R978-982	ERDS2TJ472	1/4W 4.7K
R129	ERDS2TJ564	1/4W 560K	R339	ERDS2TJ473	1/4W 47K	R983	ERDS2TJ102	1/4W 1K
R130	ERDS2TJ331	1/4W 330	R340	ERDS2TJ333	1/4W 33K	R984	ERDS2TJ272T	1/4W 2.7K
R131	ERDS2TJ222	1/4W 2.2K	R401	ERDS2TJ564	1/4W 560K	R985	ERDS2TJ182	1/4W 1.8K
R132	ERDS2TJ563	1/4W 56K	R402	ERDS2TJ332	1/4W 3.3K	R991	ERDS2TJ103	1/4W 10K E, EB
R133	ERDS2TJ684	1/4W 680K	R403	ERDS2TJ125	1/4W 1.2M			
R134	ERDS2TJ820	1/4W 82 E, EG	R404	ERDS2TJ102	1/4W 1K			
R134	ERDS2TJ2R7T	1/4W 2.7 EB	R405	ERDS2TJ332	1/4W 3.3K			CAPACITORS
R202	ERDS2TJ822	1/4W 8.2K	R406	ERDS2TJ103	1/4W 10K	C1	ECBT1H330J5	50V 33P
R203	ERDS2TJ104	1/4W 100K	R407	ERDS2TJ223	1/4W 22K	C2	ECBT1E223ZF	25V 0.022U
R204	ERDS2TJ122	1/4W 1.2K E, EB	R408	ERDS2TJ103	1/4W 10K	C3	ECBT1E103ZF	25V 0.01U
R204	ERDS2TJ103	1/4W 10K EG	R409	ERDS2TJ472	1/4W 4.7K	C4	ECEA1CKA100B	16V 10U
R205	ERDS2TJ222	1/4W 2.2K	R410	ERDS2TJ102	1/4W 1K	C101-104	ECBT1E103ZF	25V 0.01U
R206	ERDS2TJ473	1/4W 47K	R412, 413	ERDS2TJ103	1/4W 10K	C105	ECQV1H473JM3	50V 0.047U
R207	ERDS2TJ563	1/4W 56K	R701	ERDS2TJ102	1/4W 1K	C106	ECAQJ471B	6.3V 470U
R208	ERDS2TJ124T	1/4W 120K	R702	ERDS2TJ221	1/4W 220	C107	ECQB1H102JF3	50V 1000P
R209	ERDS2TJ274	1/4W 270K	R703	ERDS2TJ222	1/4W 2.2K	C108	ECBT1H180JC5	50V 18P
R210	ERDS2TJ222	1/4W 2.2K	R706	ERDS2TJ222	1/4W 2.2K	C109	ECBT1H102KB5	50V 1000P
R211	ERDS2TJ101	1/4W 100	R708, 709	ERDS2TJ472	1/4W 4.7K	C110, 111	ECKR1H103ZF5	50V 0.01U
R212	ERDS2TJ473	1/4W 47K	R711	ERDS2TJ103	1/4W 10K	C112	ECBT1H6R8KC5	50V 6.8P
R213	ERDS2TJ223	1/4W 22K	R712	ERDS1FVJ470T	1/2W 47 Δ	C113	ECBT1H102KB5	50V 1000P
R251	ERDS2TJ472	1/4W 4.7K E, EB	R903	ERDS2TJ562	1/4W 5.6K	C114	ECA1VM101B	35V 100U
R252	ERDS2TJ103	1/4W 10K E, EB	R904	ERDS2TJ561	1/4W 560	C115	ECQV1H104JM3	50V 0.1U
R253	ERDS2TJ223	1/4W 22K E, EB	R906	ERDS2TJ103	1/4W 10K	C116	ECBT1H101KB5	50V 100P
R254	ERDS2TJ822	1/4W 8.2K E, EB	R912	ERDS2TJ102	1/4W 1K	C117	ECEA1HKAR22B	50V 0.22U

Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks			
C118	ECEA1AKA101B	10V 100U	C415	ECEA1HKAR47B	50V 0.47U			
C119	ECQB1H223JF3	50V 0.022U	C416	ECEA1CKA100B	16V 10U			
C122-126	ECBT1E103ZF	25V 0.01U	C701, 702	ECKR1H103ZF5	50V 0.01U			
C127	ECBT1H180JC5	50V 18P	C703	ECKR2H102ZF5	500V 1000P			
C128	ECBT1H390J5	50V 39P	C705	ECA1EM102E	25V 1000U Δ			
C129, 130	ECBT1H102KB5	50V 1000P	C706	ECA1CM222E	16V 2200U Δ			
C152	ECQV1H104JM3	50V 0.1U	C707	ECA1CM221B	16V 220U			
C201	ECQV1H473JM3	50V 0.047U	C708	ECEA1HKAR47B	50V 0.47U			
C202	ECBT1E223ZF	25V 0.022U	C710, 711	ECBT1E103ZF	25V 0.01U			
C203	ECBT1H120JC5	50V 12P E, EB	C712	ECEA1CKA100B	16V 10U			
C203	ECBT1H8R2JC5	50V 8.2P EG	C713	ECA1VM331B	35V 330U			
C204	ECFR1E223KR	25V 0.022U	C714	ECKR2H102ZF5	500V 1000P			
C205	ECBT1H102KB5	50V 1000P	C715	ECA1VM101B	35V 100U Δ			
C206	ECBT1H120JC5	50V 12P	C716	ECBT1E103ZF	25V 0.01U			
C208, 209	ECBT1E103ZF	25V 0.01U	C717	ECEA1CKA100B	16V 10U			
C210	ECEA1AKA330B	10V 33U	C718, 719	ECEA1VU470	35V 47U			
C211	ECKR1H103ZF5	50V 0.01U	C720, 721	ECKR2H102ZF5	500V 1000P			
C212	ECEA1HKAR47B	50V 0.47U	C722, 723	ECKR1H103ZF5	50V 0.01U			
C213	ECEA1AKA330B	10V 33U	C727	ECKR1H103ZF5	50V 0.01U			
C214, 215	ECFR1E223KR	25V 0.022U	C904	ECBT1E103ZF	25V 0.01U			
C216	ECEA1AKA101B	10V 100U	C905	ECEA1EKA4R7B	25V 4.7U			
C252	ECBT1H120JC5	50V 12P E, EB	C911, 912	ECBT1H150JC5	50V 15P			
C301	ECFR1E332KR	25V 3300P	C914	ECA0JM471B	6.3V 470U			
C302	ECFR1E103KR	25V 0.01U	C915	ECBT1H102KB5	50V 1000P			
C303	ECEA1AKA101B	10V 100U	C921	ECA1AM102B	10V 1000U			
C304	ECQV1H104JM3	50V 0.1U	C922	ECEA0JKA101B	6.3V 100U			
C306	ECEA1CKA100B	16V 10U	C923	ECBT1H102KB5	50V 1000P			
C307, 308	ECQB1H153JF3	50V 0.015U	C924	ECEA1HKA2R2B	50V 2.2U			
C309	ECEA1HKAR22B	50V 0.22U	C925	ECEA1HKAR47B	50V 0.47U			
C310	ECEA1HKAR47B	50V 0.47U	C926	ECBT1E103ZF	25V 0.01U			
C311	ECEA1HKAR22B	50V 0.22U	C927	ECEA1HKA3R3B	50V 3.3U			
C312	ECFR1E223KR	25V 0.022U	C928	ECEA1VKA100B	35V 10U			
C313	ECQP1391JZ	50V 390P	C929	ECEA0JKA101B	6.3V 100U			
C315, 316	ECEA1HKA3R3B	50V 3.3U	C930-935	ECBT1H331KB5	50V 330P			
C317, 318	ECFR1E332KR	25V 3300P	C937	ECEA1CKA330B	16V 33U			
C319	ECEA1HKA3R3B	50V 3.3U	C938, 939	ECKT1H223ZF	50V 0.022U			
C320	ECEA1CKA100B	16V 10U	C940-947	ECBT1H331KB5	50V 330P			
C322, 323	ECBT1H102KB5	50V 1000P	C948	ECBT1H300J5	50V 30P			
C324	ECBT1H471KB5	50V 470P	C949	ECEA0JKA101B	6.3V 100U			
C401	ECEA1CKA220B	16V 22U	C950	ECEA1HKAR47B	50V 0.47U			
C402, 403	ECFR1E332KR	25V 3300P	C951, 952	ECBT1E103ZF	25V 0.01U			
C404	ECFR1E103KR	25V 0.01U	C991	ECBT1E103ZF	25V 0.01U E, EB			
C405	ECBT1E103ZF	25V 0.01U						
C406	ECEA1CKA100B	16V 10U						
C407	ECEA1EKA4R7B	25V 4.7U						
C408	ECEA1CKA100B	16V 10U						
C409	ECEA1EKA4R7B	25V 4.7U						
C410	ECEA0JKA470B	6.3V 47U						
C411	ECFR1E223KR	25V 0.022U						
C412	ECFR1E333KR	25V 0.033U						
C413	ECFR1E682KR	25V 6800P						
C414	ECFR1E333KR	25V 0.033U						