

AM/FM STEREO TUNER

TX-900/TX-900U

SERVICE MANUAL

TX-900U

IMPORTANT NOTICE

This manual has been provided for the use of authorized Yamaha Retailers and their service personnel. It has been assumed that basic service procedures inherent to the industry, and more specifically Yamaha Products, are already known and understood by the users, and have therefore not been restated.

WARNING: Failure to follow appropriate service and safety procedures when servicing this product may result in personal injury, destruction of expensive components and failure of the product to perform as specified. For these reasons, we advise all Yamaha product owners that all service required should be performed by an authorized Yamaha Retailer or the appointed service representative.

IMPORTANT: The presentation or sale of this manual to any individual or firm does not constitute authorization, certification or recognition of any applicable technical capabilities, or establish a principle-agent relationship of any form.

The data provided is believed to be accurate and applicable to the unit(s) indicated on the cover. The research, engineering, and service departments of Yamaha are continually striving to improve Yamaha products. Modifications are, therefore, inevitable and specifications are subject to change without notice or obligation to retrofit. Should any discrepancy appear to exist, please contact the distributor's Service Division.

WARNING: Static discharges can destroy expensive components. Discharge any static electricity your body may have accumulated by grounding yourself to the ground buss in the unit (heavy gauge black wires connect to this buss).

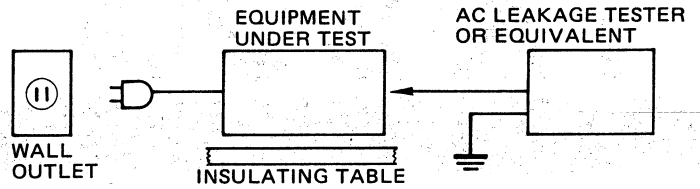
IMPORTANT: Turn the unit OFF during disassembly and parts replacement. Recheck all work before you apply power to the unit.

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TO SERVICE PERSONNEL

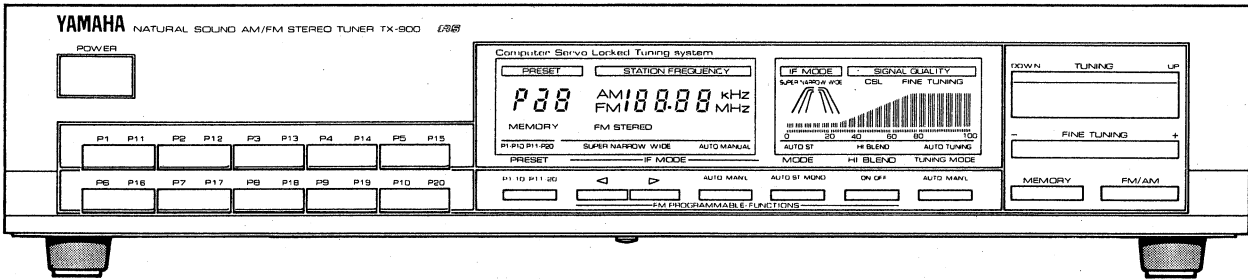
1. Critical Components Information.
Components having special characteristics are marked Δ and must be replaced with parts having specifications equal to those originally installed.
2. Leakage Current Measurement (For 120 V Model Only).
When service has been completed, it is imperative that you verify that all exposed conductive surfaces are properly insulated from supply circuits.
 - Meter impedance should be equivalent to 1500 ohm shunted by 0.15 μ F.
 - Leakage current must not exceed 0.5mA.
 - Be sure to test for leakage with the AC plug in both polarities.



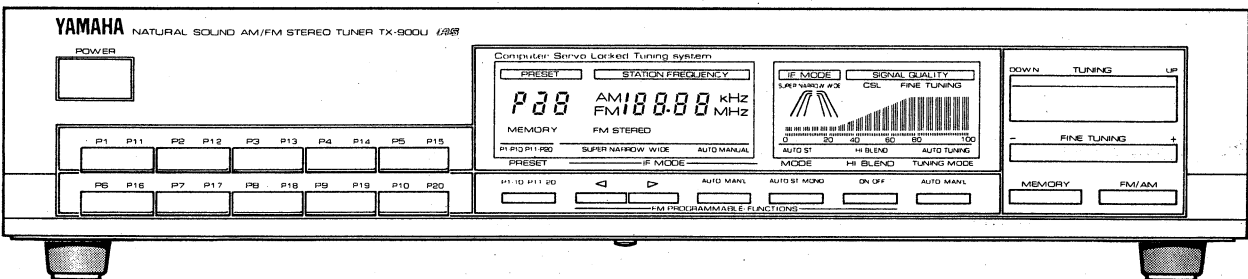
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FRONT PANELS

- TX-900

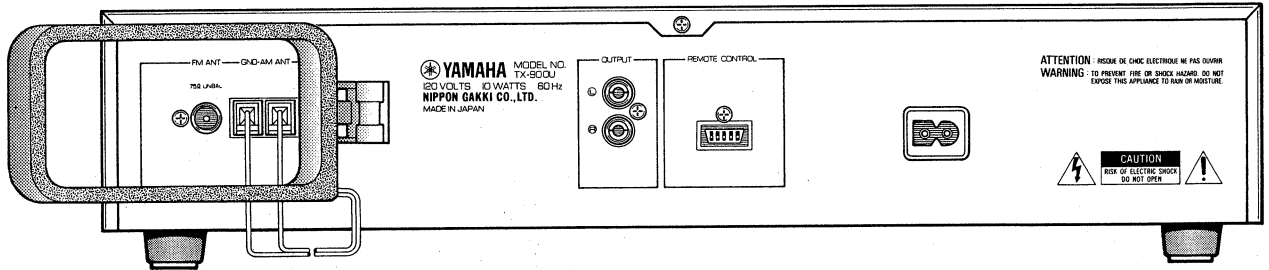


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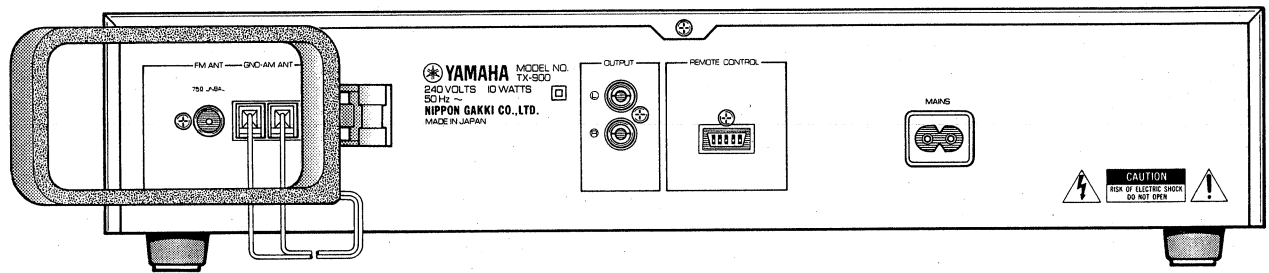


REAR PANELS

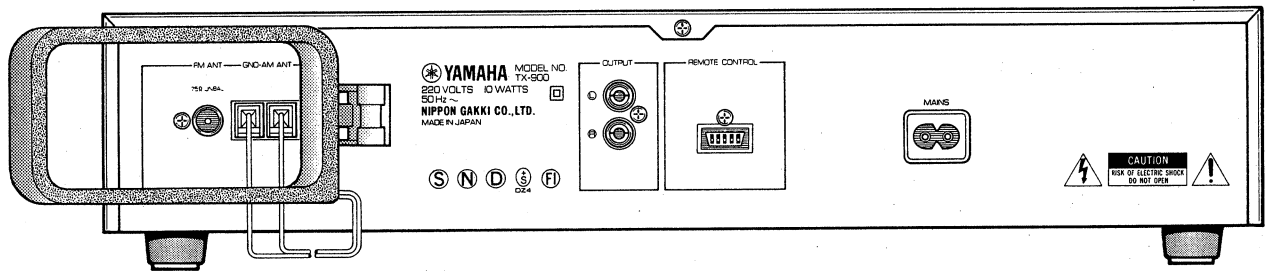
▼ U.S.A. & Canadian models



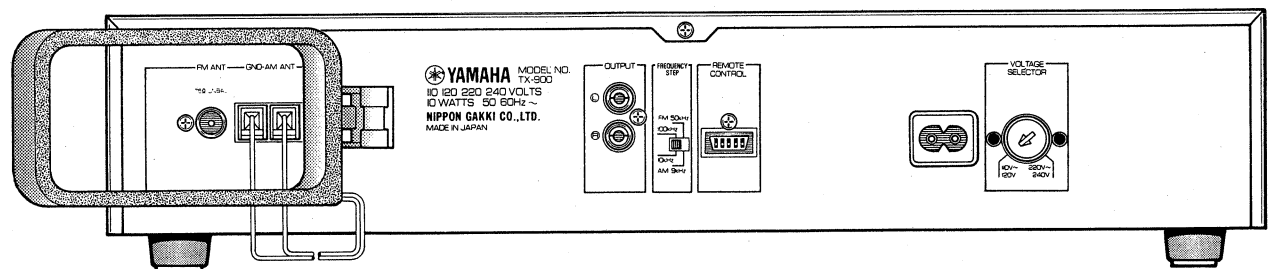
▼ British & Australian models



▼ European model



▼ Other model



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■ SPECIFICATIONS

■ FM SECTION

Tuning Range	87.6 to 108.0MHz
50dB Quieting Sensitivity (IHF)	
Mono, 75Ω, (Super Narrow)	1.6μV (15.3dBf)
Stereo, 75Ω, (Super Narrow)	21μV (37.7dBf)
Usable Sensitivity	
30dB S/N Quieting 75Ω	0.9μV(10.3dBf) (U)(C)(A)(B)(R)
Usable Sensitivity (DIN)	
Mono (S/N 26dB), 75Ω	1.4μV (G)
Stereo (S/N 46dB), 75Ω	30μV (G)
Image Response Ratio	80dB
IF Response Ratio	110dB
Spurious Response Ratio	110dB
AM Suppression Ratio	70dB
Capture Ratio (Wide)	1.2dB
Alternate Channel Selectivity (Super Narrow)	
	85dB (U) (C) (A) (B) (R)
Selectivity (two Signals)	
40kHz DEV. ±300kHz (Super Narrow)	70dB (G)
Signal to Noise Ratio (IHF)	
Mono	96dB (U) (C) (A) (B) (R)
Stereo	90dB (U) (C) (A) (B) (R)
Signal to Noise Ratio (DIN-Noise RMS)	
40kHz DEV. Mono	84dB (G)
Stereo	78dB (G)
Harmonic Distortion	
Mono, 1kHz (Wide)	0.02%
Stereo, 1kHz (Wide)	0.03%
G model (40kHz DEV.)	
Mono, 1kHz	0.02%
Stereo, 1kHz	0.03%
Stereo Separation	
1kHz (Wide)	60dB
Frequency Response	
20Hz to 15kHz	0 ± 0.5dB

■ AM SECTION

Tuning Range	530 to 1620kHz (U)(C) 531 to 1620kHz (A) (B) (G) 530 to 1620kHz or 531 to 1620kHz (R)
Usable Sensitivity	250μV/m
Selectivity	32dB
Signal to Noise Ratio	52dB
Image Response Ratio	40dB
Spurious Response Ratio	50dB
Harmonic Distortion 400Hz	0.3%

■ AUDIO SECTION

Output Level/Impedance	
FM 100% MOD 1kHz	500mV/2kΩ (U) (C) (A) (B) (R)
FM 40kHz DEV. 1kHz	400mV/2kΩ (G)
AM 30% MOD 400Hz	150mV/2kΩ (U) (C) (A) (B)(R)
AM 30% MOD 400Hz	150mV/2kΩ (G)

■ GENERAL

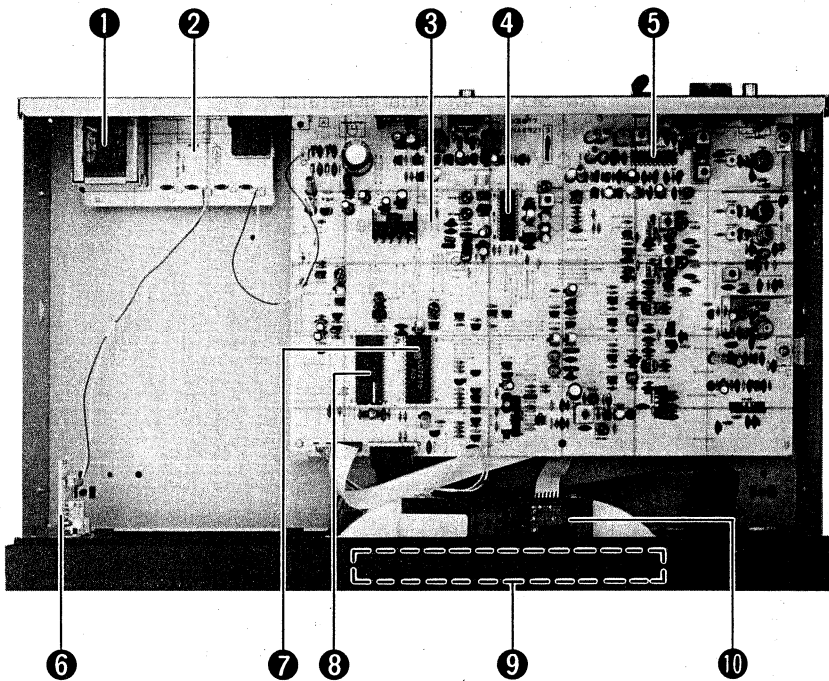
Power Supply	
U.S. & Canadian models	120V AC, 60Hz
European model	220V AC, 50Hz
British & Australian models	240V AC, 50Hz
Other model	110 – 120V AC/220 – 240V AC, 50/60Hz
Power Consumption	10W
Dimensions (W x H x D)	435 x 92.5 x 282.5 (17-1/8 x 3-5/8 x 11-1/8")
Weight	3.3 kg (7 lbs. 4 oz)

Specifications subject to change without notice.

(U) U.S.A. model (G) European model
(C) Canadian model (B) British model
(A) Australian model (R) Other model

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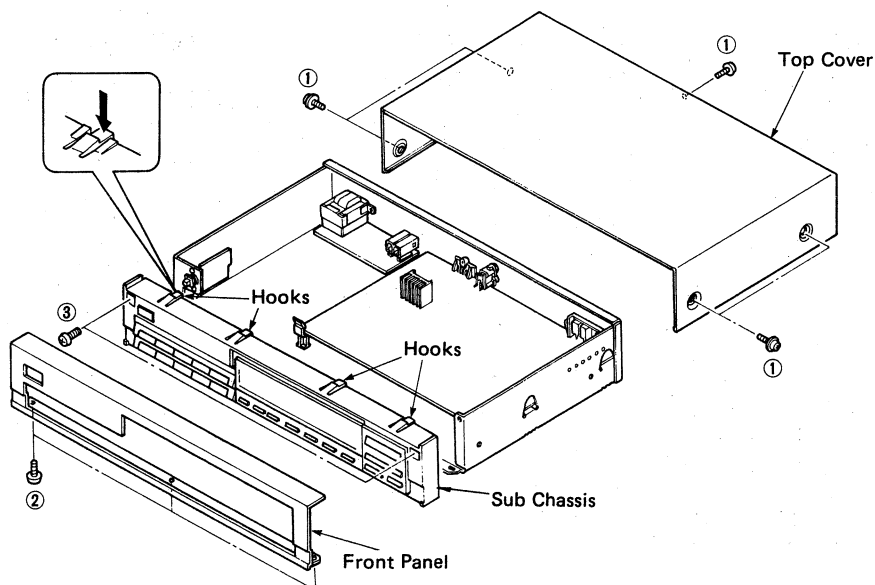
INTERNAL VIEW



- ① POWER TRANSFORMER
U, C models: XB767001
R, A, G, B models: XB766001
- ② TUNER CIRCUIT BOARD (4)
- ③ TUNER CIRCUIT BOARD (1)
- ④ MPX IC: LA3450
- ⑤ AM IC: LA1245
- ⑥ TUNER CIRCUIT BOARD (5)
- ⑦ PLL IC: LC7210
- ⑧ μ -COM: LC6520C-3276
- ⑨ LCD: VC79180, VC79190
- ⑩ LCD Circuit Board

DISASSEMBLY PROCEDURES

1. **Removal of Top Cover.**
Remove 5 screws (①) in Fig. 1, and slide the Top Cover backward.
2. **Removal of Front Panel**
Remove 3 screws (②) and 4 hooks in Fig. 1, and pull the Front Panel forward.
3. **Removal of Sub Chassis**
Remove 2 screws (③) in Fig. 1, and pull the Sub Chassis forward.



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ADJUSTMENTS

1. Before adjustment

- 1) After the power switch is pushed on, wait for 5 minutes before measuring, to be sure of the most stable operation.
- 2) Adjust the OSC coil and IFT with a nonferrous screw driver.
- 3) Set the switches to the following positions.
 TUNING MODE AUTO
 IF MODE AUTO
 HI BLEND OFF
 MODE AUTO STEREO
- 4) Proceed with the AM section adjustments after having finished the FM section adjustment.
- 5) $0\text{dB}\mu = 1\mu\text{V}$ Ex: $60\text{dB}\mu = 1\text{mV}$

2. Measuring instruments abbreviation

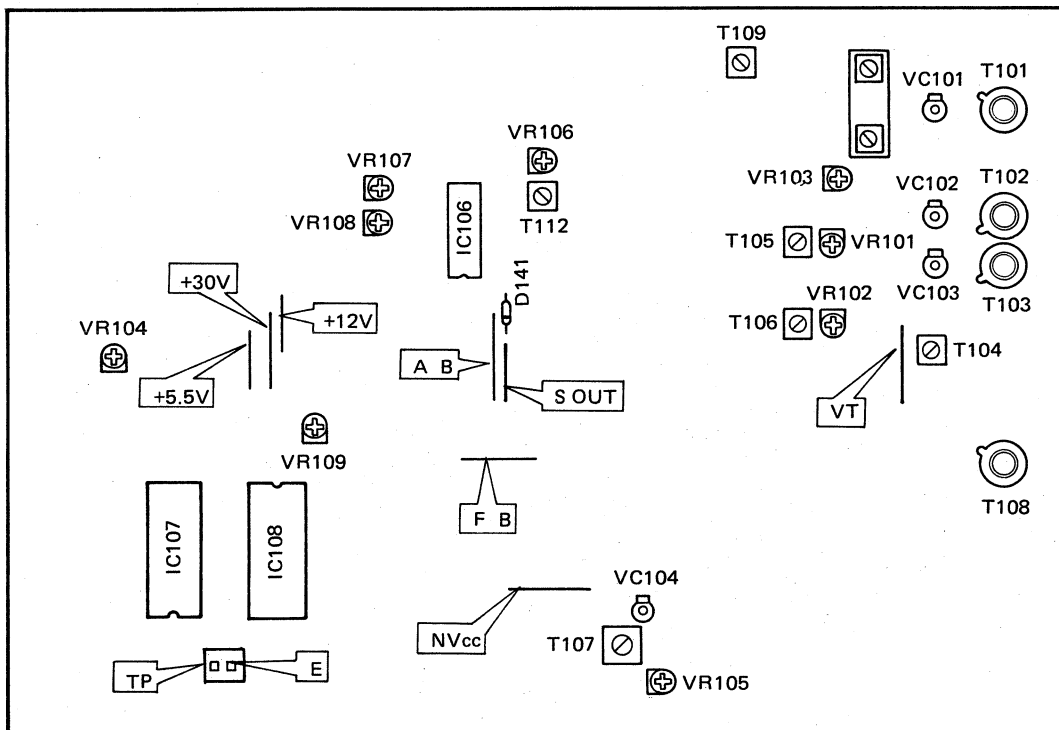
- FM SG : FM signal generator
 SSG : Stereo signal generator
 AM SG : AM signal generator
 DIST. M : Distortion meter
 A C V M : AC voltmeter
 D C V M : DC voltmeter
 OSC : Oscilloscope

POWER SUPPLY SECTION

Check that the following voltages are obtained respectively across each test point and ground on tuner circuit.

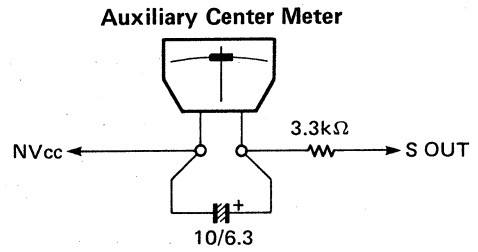
Test Point	Rating or standard	Remark								
+12	$+12.5\text{V} \pm 0.5\text{V}$	Make sure that AC line voltage comes within <table border="1"> <thead> <tr> <th>Models</th> <th>AC line voltage</th> </tr> </thead> <tbody> <tr> <td>U, C</td> <td>$120\text{V} \pm 10\%$</td> </tr> <tr> <td>G</td> <td>$220\text{V} \pm 10\%$</td> </tr> <tr> <td>A, B</td> <td>$240\text{V} \pm 10\%$</td> </tr> </tbody> </table>	Models	AC line voltage	U, C	$120\text{V} \pm 10\%$	G	$220\text{V} \pm 10\%$	A, B	$240\text{V} \pm 10\%$
Models	AC line voltage									
U, C	$120\text{V} \pm 10\%$									
G	$220\text{V} \pm 10\%$									
A, B	$240\text{V} \pm 10\%$									
+5.5	$+5.5\text{V} \pm 0.5\text{V}$									
+30	$+30\text{V} \pm 0.3\text{V}$									
FB	A + FM reception mode +12V									
	A + AM reception mode 0V									
AB	A + FM reception mode 0V									
	A + AM reception mode +12V									

TEST POINTS



FM TUNER SECTION

- Use 19kHz L.P.F. to measure the output level.
- On step 1 and 2 connect the auxiliary center meter (ji00036 or similar) to confirm the best tuned point.
- 100% modulation means that the Frequency Deviation is 75kHz.
- Shorting TP and E while set at FM will result in automatic memory of each preset from P1/P11 to P10/P20 as given in the right table. This is convenient when making an adjustment.



P1/P11	P2/P12	P3/P13	P4/P14	P5/P15
AM 630kHz	AM 1080kHz	AM 1440kHz	FM 87.5MHz	FM 95.1MHz
P6/P16	P7/P17	P8/P18	P9/P19	P10/P20
FM 98.1MHz	FM 101.5MHz	FM 108.0MHz	FM 88.0MHz	FM 106.0MHz

Step	Item to be Adjusted	Connection terminal	Instrument required	Adjustment locations	Adjustment method	Rating or standard	Remarks
1	Discriminator balance	NVcc ~ S OUT	Auxiliary center meter	T107	Adjust the pointer of the auxiliary center meter point to "0" at detuned point.		
2	Confirmation of station center set	75Ω FM ANT	FM SG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD]		Confirm that the auxiliary center meter deflects to "0" when tuned to signal of FM SG.		
		NVcc ~ S OUT	Auxiliary center meter				
3	Local oscillator Coil	75Ω FM ANT	FM SG [108MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD]	T108		VT = 25V ± 0.2V	
		VT ~ GND	DCVM				
4	RF 1	75Ω FM ANT	FM SG [106MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD]	VC102	Adjust VC102 to the maximum sensitivity.		
		OUTPUT	ACVM				
		75Ω FM ANT	FM SG [88MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD]	T102	Adjust T102 to the maximum sensitivity.		
		OUTPUT	ACVM				

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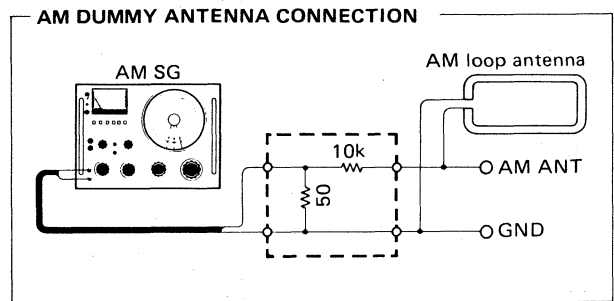
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Step	Item to be Adjusted	Connection terminal	Instrument required	Adjustment locations	Adjustment method	Rating or standard	Remarks
5	RF 2	75Ω FM ANT	FM SG [106MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD]	VC103	Adjust VC103 to the maximum sensitivity.		
		OUTPUT	ACVM				
		75Ω FM ANT	FM SG [88MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD]	T103	Adjust T103 to the maximum sensitivity.		
	OUTPUT	ACVM					
6	Repeat Steps 4 and 5, and then check again.						
7	ANT	75Ω FM ANT	FM SG [106MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD]	VC101	Adjust VC101 to the maximum sensitivity.		
		OUTPUT	ACVM				
		75Ω FM ANT	FM SG [88MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 1kHz 100% MOD]	T101	Adjust T101 to the maximum sensitivity		
	OUTPUT	ACVM					
8	Monaural distortion	75Ω FM ANT	FM SG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) MONO 100Hz 100% MOD]	VC104 VR105	Reduce distortion to minimum.	Less than -56dB	Reception should be made in WIDE
		OUTPUT L, R	DIST. M L.P.F.				
9	Stereo distortion (WIDE)	75Ω FM ANT	FM SG, SSG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) STEREO L, R 1kHz, 100% MOD]	T104 T105 T106 VR101 VR102	Reduce distortion to minimum.	Less than -56dB	Confirm that stereo indicator lights up. Reception should be made in WIDE.
		OUTPUT L, R	DIST. M L.P.F.				
10	Confirmation of stereo distortion (NARROW)	75Ω FM ANT	FM SG, SSG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) STEREO L, R 1kHz, 100% MOD]			Less than -46dB	Reception should be made in NARROW.
		OUTPUT L, R	DIST. M L.P.F.				
11	Confirmation of stereo distortion (SUPER NARROW)	75Ω FM ANT	FM SG, SSG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) STEREO L, R 1kHz, 100% MOD]			Less than -36dB	Reception should be made in SUPER NARROW.
		OUTPUT L, R	DIST. M L.P.F.				
12	Check again according to Stap 8. (MONO 1kHz, 100% MOD)						

Step	Item to be Adjusted	Connection terminal	Instrument required	Adjustment locations	Adjustment method	Rating or standard	Remarks
13	Separation	75Ω FM ANT	FM SG SSG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) STEREO L, R 1kHz 100% MOD]	VR107 (Lch) VR108 (Rch)	Provide stereo signal for R and L channels individually. ● R channel alone: adjust OUTPUT Rch VR107 until output is increased to maximum. ● R channel alone: adjust OUTPUT Lch VR108 until output is increased to maximum.	Separation: more than 40dB	Reception should be made in WIDE.
		OUTPUT	LPF ACVM OSC				
14	Pilot cancel	75Ω FM ANT	FM SG SSG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) Pilot signal 9% MOD only]	T112 VR106	Observe with oscilloscope and reduce 19kHz carrier leak level to minimum.	Less than -50dB	
		OUTPUT	Remove LPF ACVM OSC				
15	Check again according to Step 1, and if the result is unsatisfactory, start from Step 1 all over again for readjustment.						
16	Full-scale signal quality level	75Ω FM ANT	FM SG, SSG [98.1MHz ± 1kHz 75dBμ (86.2dBf, 5.62mV/75Ω) STEREO L, R 1kHz, 100% MOD]	VR104	Adjust so that all signal quality indicators light up. (Reception should be made in WIDE.)		Confirm that all signal quality indicators go out at detuned point.
17	Confirmation of BLEND	75Ω FM ANT	FM SG SSG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) STEREO L, R 1kHz 100% MOD]	① Press HI BLEND. ② Confirm that separation is down.			Confirm that HI BLEND indicator lights up.
		OUTPUT	LPF ACVM OSC				
18	IF offset	75Ω FM ANT	FM SG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) Un modulation]	VR109	By shorting across terminals T.P and E, the frequency display shifts 1 digit. Therefore, adjust VR109 until 10kHz digit becomes 1 or 0.		Reception should be made in CSL. After adjustment open across TP and E.
		TP ~ E	Short				
19	Confirmation of auto search reception	75Ω FM ANT	FM SG SSG [98.1MHz ± 1kHz 15dBμ (26.2dBf, 5.6μV/75Ω) G only 18dBμ (29.2dBf, 7.9μV/75Ω) STEREO L, R 1kHz, 30% MOD]		Confirm that auto search reception is possible with the tuning key.		Confirm that muting is performed at auto reception.

AM TUNER SECTION

- Connect the AM loop antenna to the AM ANT terminals.
- Connect the AM dummy antenna for adjustment.



Step	Item to be Adjusted	Connection terminal	Instrument required	Adjustment locations	Adjustment method	Rating or standard	Remarks
1	AM IFT	AM ANT	AM SG AM dummy antenna [630kHz ± 0.1kHz 50dBμ (61.2dBf, 316μV/75Ω) 400Hz, 30% MOD]	T109	Adjust T109 to maximize detector output.		
		OUTPUT	ACVM				
2	Confirmation of sensitivity	AM ANT	AM SG. ACVM AM dummy antenna [630kHz ± 0.1kHz 1080kHz ± 0.1kHz 1440kHz ± 0.1kHz 400Hz, 30% MOD]		Obtain AM SG output level where distortion become 10%.	Less than 58dBμ (69.2dBf, 794μV/75Ω)	
		OUTPUT	DIST. M.				
3	Full-scale signal quality level	AM ANT	AM SG. AM dummy antenna [1080kHz ± 0.1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) 400Hz, 30% MOD]	VR103	Adjust VR103 until all signal quality indicators light up.		Confirm that all signal quality indicators goes out at detuned point.
		ME ~ GND	DCVM				
4	Confirmation of auto search reception	AM ANT	AM SG AM dummy antenna [1080kHz ± 0.1kHz 60dBμ (71.2dBf, 1mV/75Ω) 400Hz, 30% MOD]		Confirm the auto search reception with the tuning key		Confirm that muting is performed at auto reception.

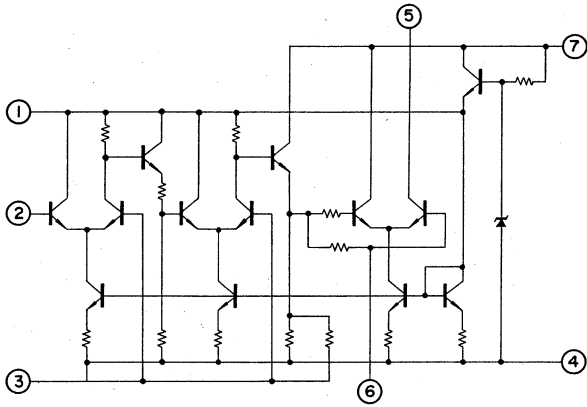
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DIGITAL CONTROL SECTION

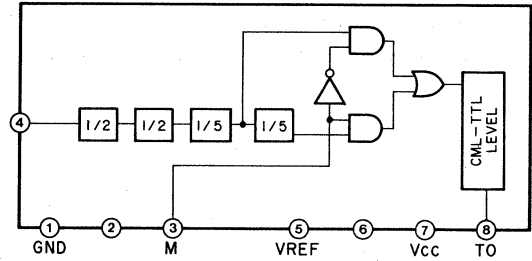
Step	Confirmation item	Connection terminal	Instrument required	Operation key	Confirmation method
1	Preset memory	75Ω FM ANT	FM SG, SSG [98.1MHz ± 1kHz 70dBμ (81.2dBf, 3.16mV/75Ω) STEREO L, R 1kHz, 100% MOD]	FM/AM key TUNING MODE key TUNING key (UP or DOWN) MEMORY key PRESET STATION key P1-P10/P11-P20	①Receive FM 98.1MHz by means of auto search. ②Set P1-P10 → P1-P10 indicator lights. ③Press MEMORY key → MEMORY indicator flashes about 5 seconds. ④Press P1 → MEMORY indicator goes OFF P1 of PRESET STATION indicator lights.
		AM ANT	AM SG AM dummy antenna [1080kHz ± 0.1kHz 80dBμ 400Hz, 30% MOD]		⑤Receive AM 1080kHz ⑥Press MEMORY key → MEMORY indicator flashes about 5 seconds. ⑦Press P2 → MEMORY indicator goes OFF P2 of PRESET STATION indicator lights.
		75Ω FM ANT AM ANT	FM SG, SSG AM SG AM dummy antenna		⑧Press P1 and P2 and check that content is read out. → P1 and P2 of PRESET STATION indica- tor lights. ⑨Press P2 → Receive AM 1080kHz ⑩Set P11-P20 → P11-P20 indicator flashes. ⑪Press MEMORY key → MEMORY indicator flashes. ⑫Press P11 → MEMORY indicator goes OFF. P11-P20 indicator lights. P11 indicator lights. ⑬Press P11 and check that content is read out.
2	Tuning mode	Same as step 1	Same as step 1	FM/AM key TUNING MODE key TUNING key (UP or DOWN) PRESET STATION key P1, P2	Tune to FM 98.1MHz and AM 1080kHz, and check that when receiving MAN'L/MONO, FM reception become forced mono AUTO TUNING indicator → Goes out FM STEREO indicator → Goes out Check that tuning operation stops when tuned while AUTO searching. AUTO TUNING indicator → lights up FM STEREO indicator → lights up
3	Fine Tuning	Same as step 1	Same as step 1	PRESET STATION key P1, P2 FINE TUNING key	①Press P1 and content is read out (FM 98.1MHz) ②Press FINE TUNING key → FINE TUNING indicator lights. ③Press TUNING key and check that 10kHz step search. Note: U, C, R models → 10kHz digit becomes 0 ④Press P2 and content is read out (AM 1080kHz) ⑤Press TUNING key and check that 1kHz step search.
4	IF mode	Same as step 1	Same as step 1	FM PROGRAMMABLE FUNCTIONS key	①Press P1 and content is read out (FM 98.1MHz) ②Press AUTO/MAN'L key → AUTO indicator lights. ③Press ◀ or ▶ key → The IF mode changes to MANUAL automatically. Also, indicators light as each key is operated. ④Set to the WIDE receiving state. → WIDE indi- cator lights. ⑤Lower the antenna input level gradually. → The IF mode changes from WIDE to NARROW and SUPER NARROW in that order.
5	Last channel memory			POWER key	①Read out P1. ②Turn OFF POWER Switch. ③Turn ON POWER Switch after 5 seconds. ④P1 content should come out. P1 of PRESET STATION indicator lights.

IC BLOCK

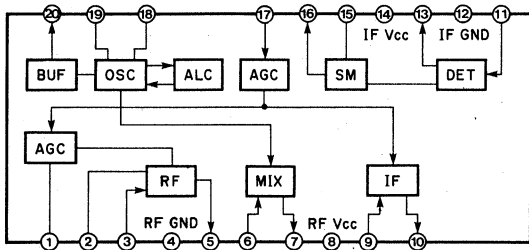
IC102: μ PC577H (E, F)
(IF Amp)



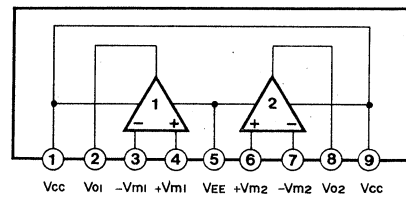
IC103: M54459L
(Divider)



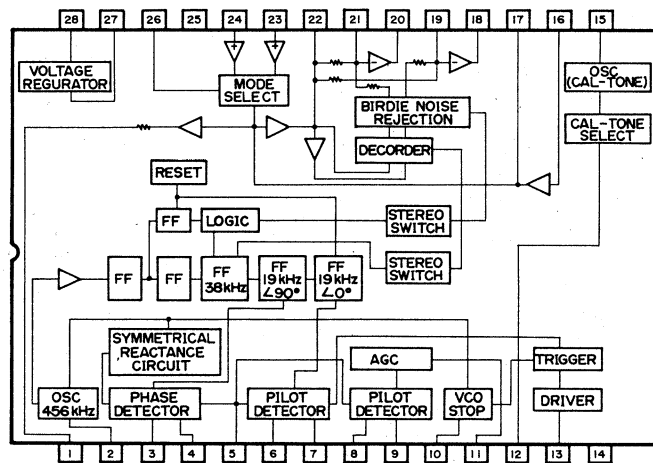
IC104: LA1245
(AM TUNER)



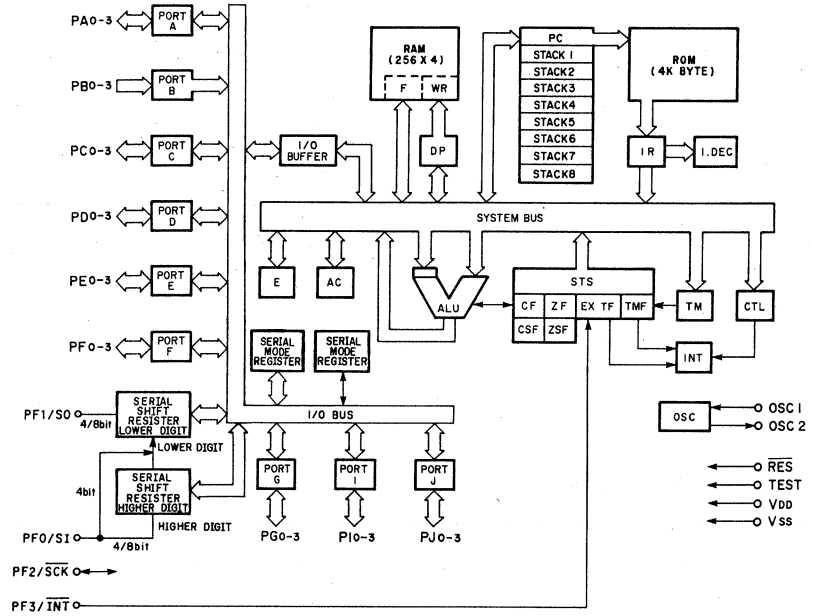
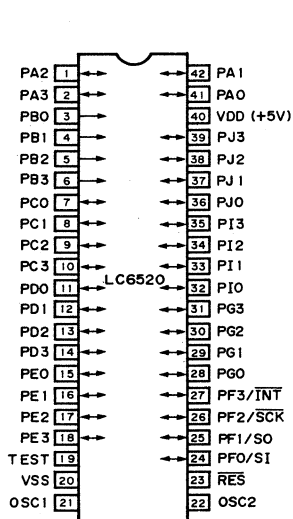
IC105: μ PC4570HA
(Dual Ope-amp)



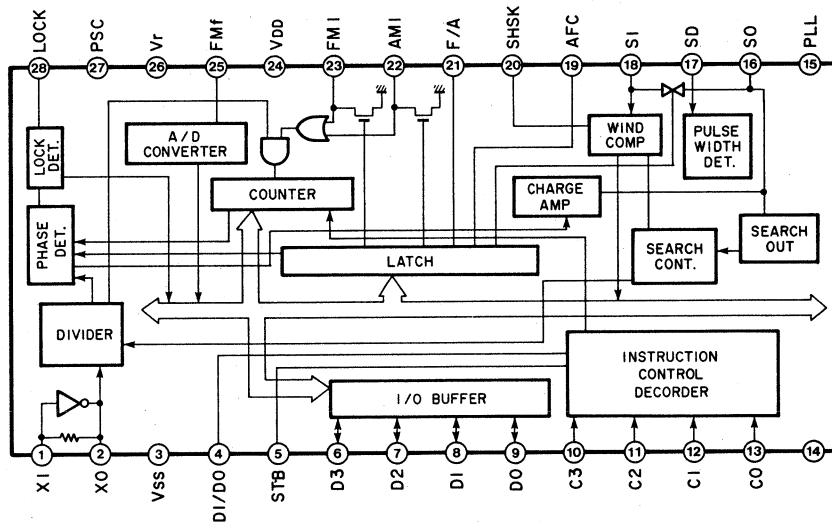
IC106: LA3450
(MPX)



IC107: LC6520C-3235
(4-bit μ -COM)

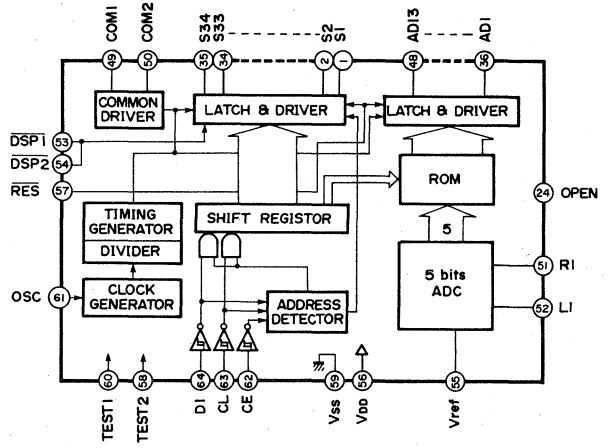
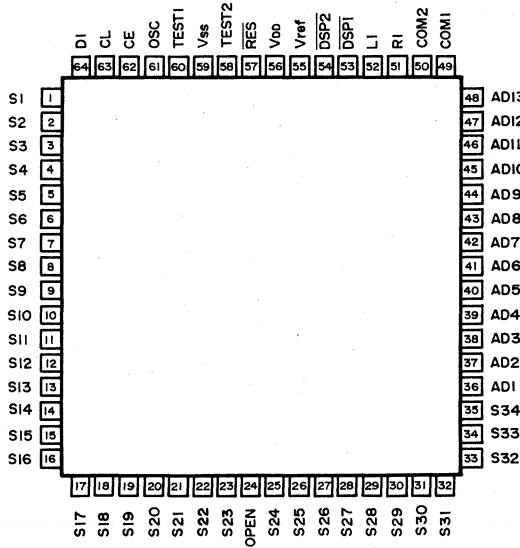


IC108: LC7210
(PLL)



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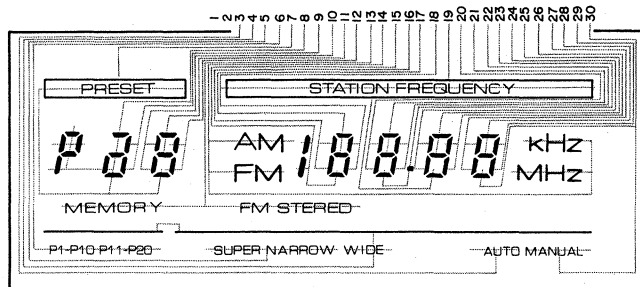
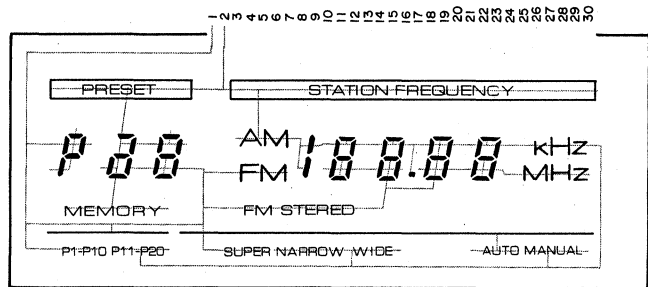
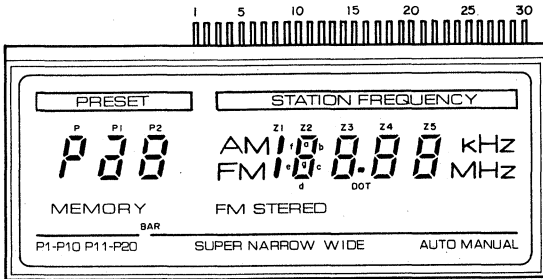
IC501: LC7583
(LCD Driver)



TX-900/TX-900U

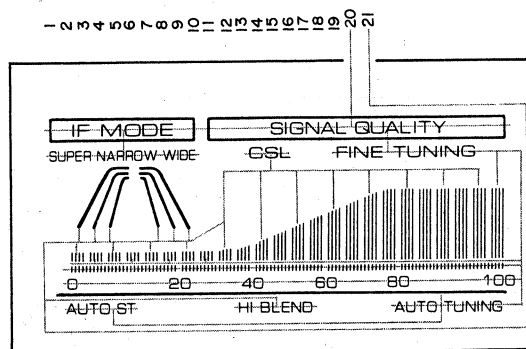
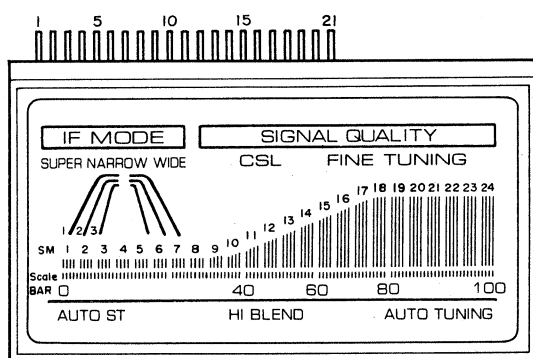
■ LCD DATA

- LCD9462M1JP

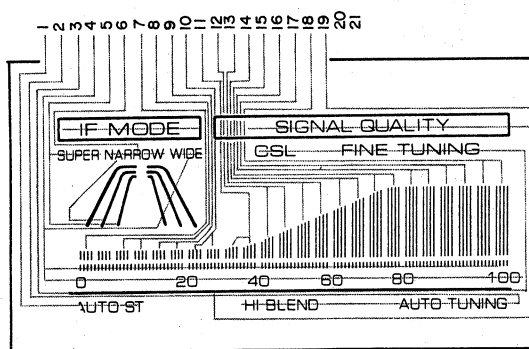


Pin No.	1	2	3	4	5	6	7	8	9	10
COM 1	COM	—	AUTO	BAR	SUPER	P1 – P10	P2 _d	p	P1 _c	P2 _e
COM 2	—	COM	—	WIDE	NARROW	P11 – P20	PRESET	P1 _{a, d, e, g}	P1 _b	P2 _f
Pin No.	11	12	13	14	15	16	17	18	19	20
COM 1	P2 _g	P2 _c	FM STEREO	FM MHz	Z2 _d	Z2 _e	Z2 _g	Z2 _c	Z4 _d	Z3 _e
COM 2	P2 _a	P2 _b	MEMORY	AM kHz	Z1	Z2 _f	Z2 _a	ZC _b	STATION FREQ	Z3 _f
Pin No.	21	22	23	24	25	26	27	28	29	30
COM 1	Z3 _g	Z3 _c	Z3 _d	Z4 _e	Z4 _g	Z4 _c	Z5 _e	Z5 _g	Z5 _c	Z5 _d
COM 2	Z3 _a	Z3 _b	DOT	Z4 _f	Z4 _a	Z4 _b	Z5 _f	Z5 _a	Z5 _b	MANUAL

● LCD9463M1JP

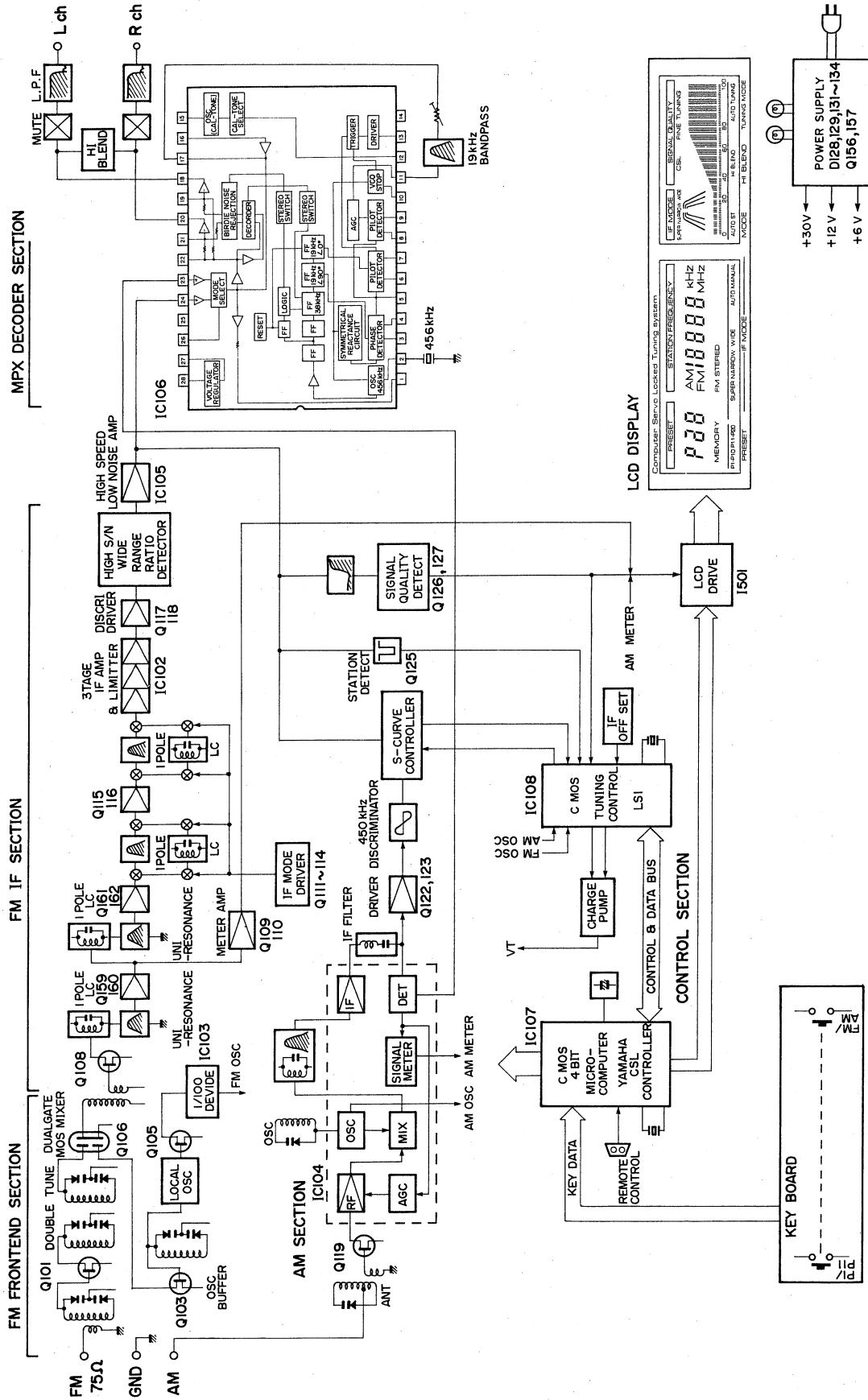


TX-900U



Pin No.	1	2	3	4	5	6	7	8	9	10	
COM 1	—	HI BLEND	CSL	WIDE /1	WIDE /3	WIDE /2	SM 1	SM 3	SM 5	SM 7	
COM 2	AUTO ST	AUTO TUNING	FINE TUNING	IF MODE 0 – 100 Scale	SUPER	NARROW	SM 2	SM 4	SM 6	SM 8	
Pin No.	11	12	13	14	15	16	17	18	19	20	21
COM 1	SM 9	SM 11	SM 13	SM 15	SM 17	SM 19	SM 21	SM 23	—	—	COM
COM 2	SM 10	SM 12	SM 14	SM 16	SM 18	SM 20	SM 22	SM 24	BAR SIGNAL QUALITY	COM	—

■ BLOCK DIAGRAM



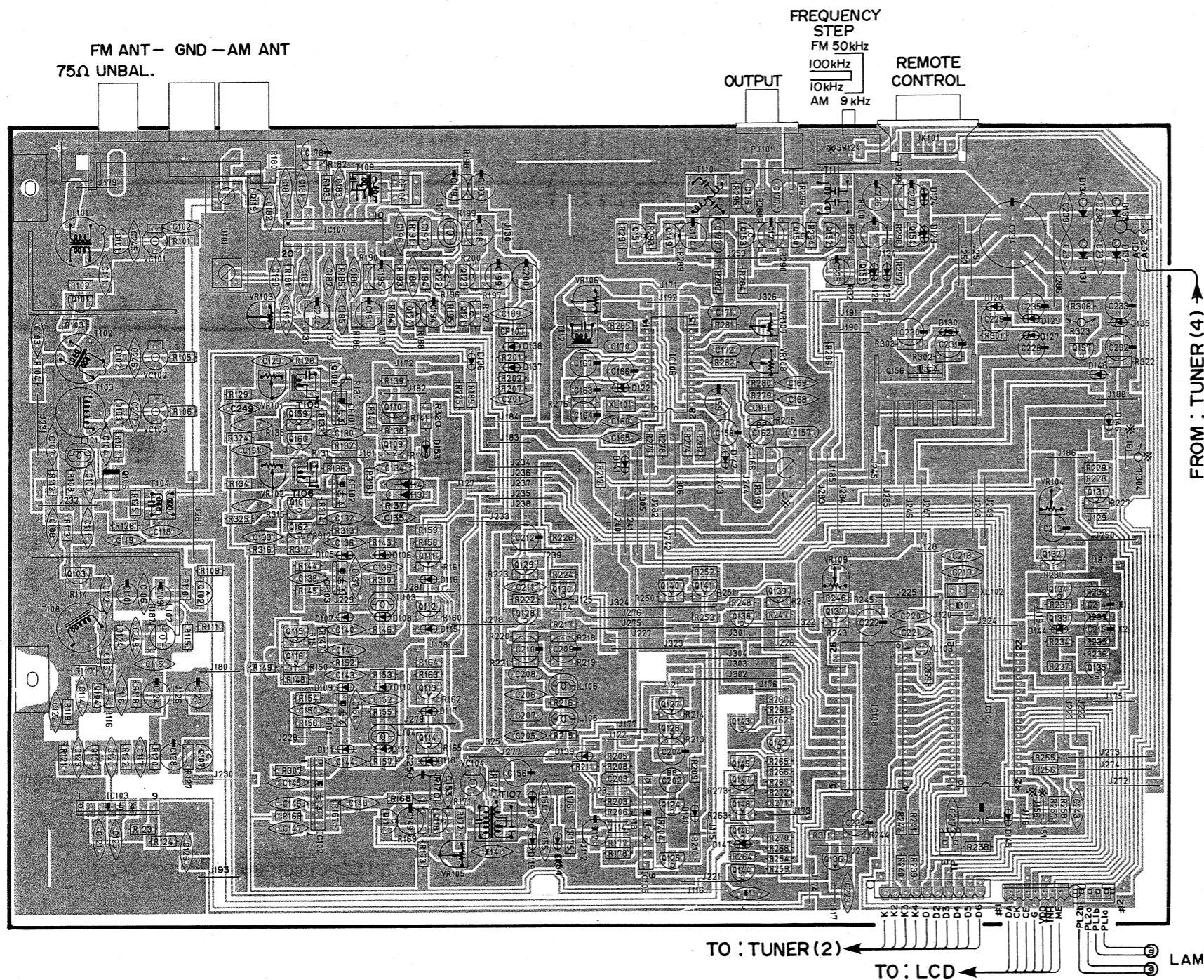
TX-900/TX-900U

PRINTED CIRCUIT BOARD (Pattern side)

1

Note) 文字面 : Component side

Tuner Circuit Board (1)



2

3

4

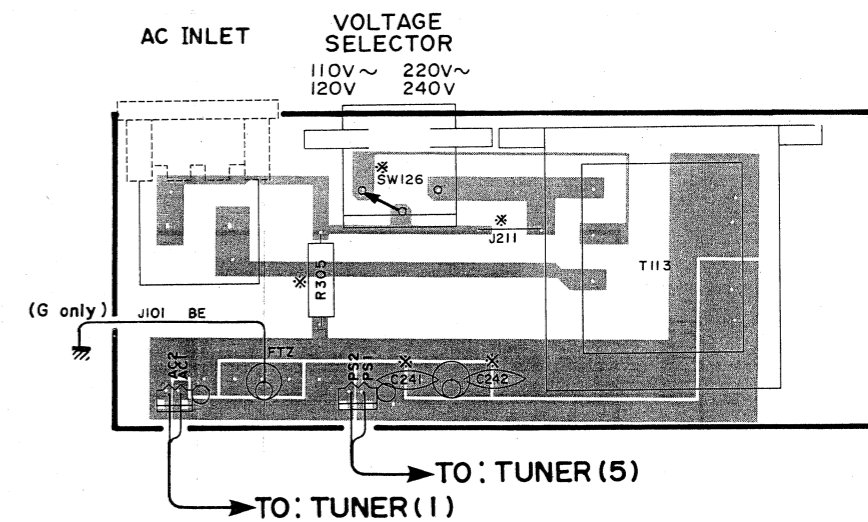
5

6

Note) * marked

	R	U, C	A, B	G
J151	OPEN	OPEN	OPEN	OPEN
J156	OPEN	OPEN	SHORT	SHORT
SW124	VA94530	OPEN	OPEN	OPEN
R305	OPEN	1/2P 2.2M	OPEN	OPEN
SW126	LA00581	OPEN	OPEN	OPEN
J211	OPEN	SHORT	SHORT	SHORT
R304	OPEN	OPEN	10	OPEN
C241, 242	OPEN	OPEN	OPEN	0.01
J161	SHORT	SHORT	OPEN	SHORT
J166	SHORT	SHORT	SHORT	OPEN
T114	OPEN	OPEN	OPEN	VC59920

Tuner Circuit Board (4)

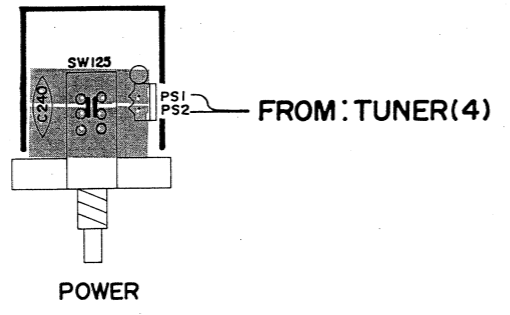


TX-900/TX-900U

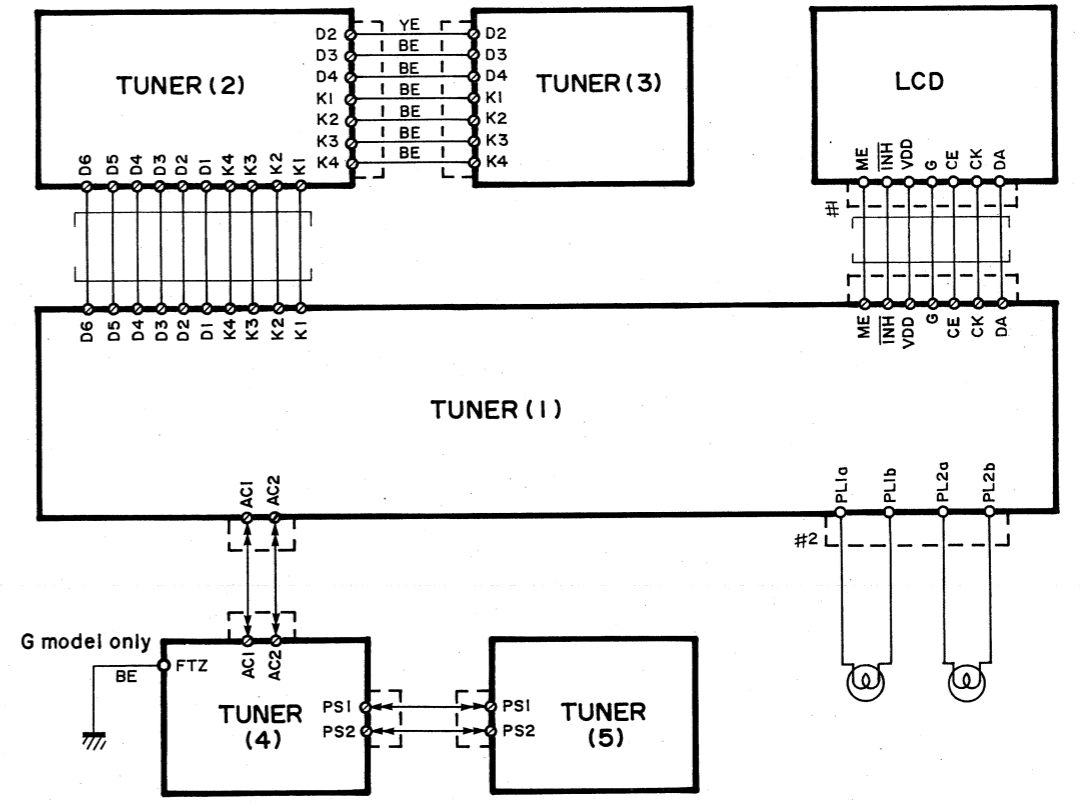
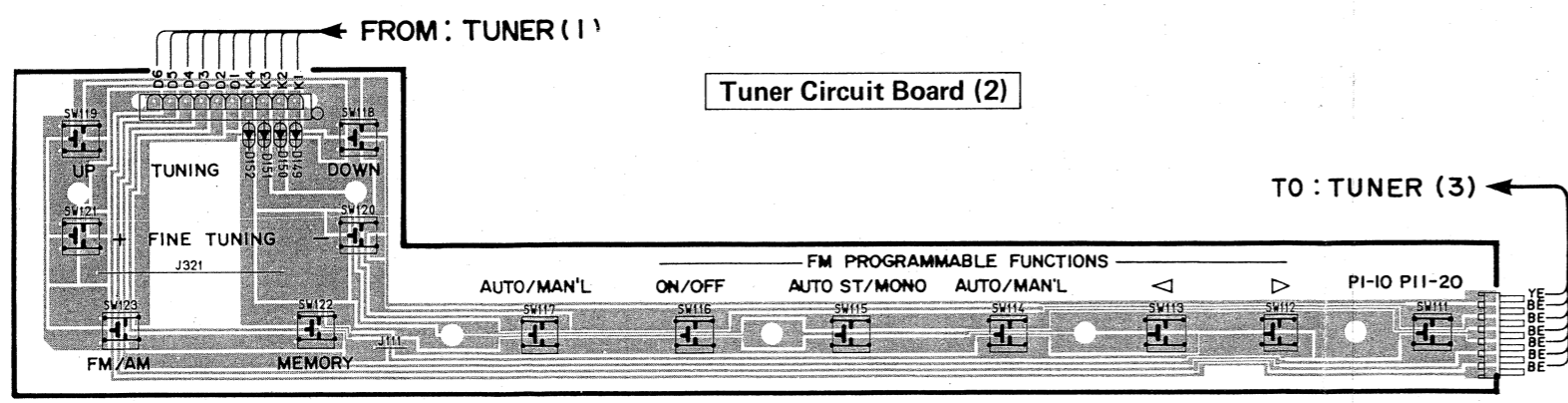
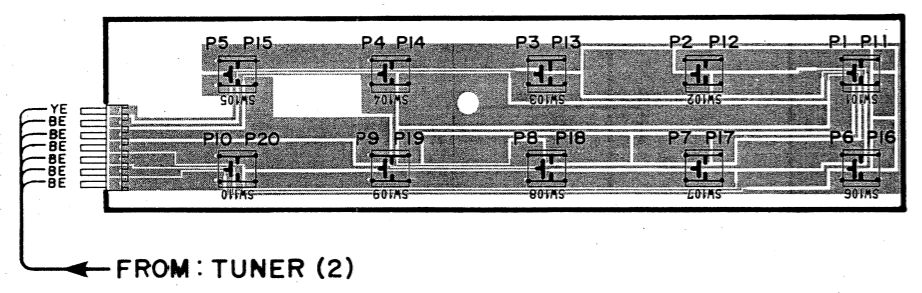
■ PRINTED CIRCUIT BOARD (Pattern side)

■ WIRING

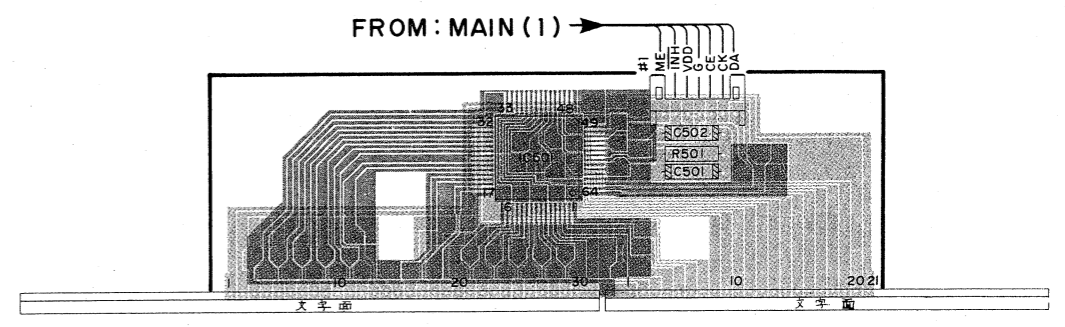
Tuner Circuit Board (5)



Tuner Circuit Board (3)



LCD Circuit Board



1
2
3
4
5
6

PARTS LIST

TX-900/TX-900U

■WARNING

Components having special characteristics are marked Δ and must be replaced with parts having specifications equal to those originally installed.

• Carbon resistors (1/6W or 1/4W) are not included in the ELECTRICAL PARTS list. For the parts No. of the carbon resistor, refer to p. 28.

■ELECTRICAL PARTS

Ref. No.	Part No.	Description	部 品 名	Remarks	Common Model	Markets	ランク
※	NA 09:21:30	Tuner Circuit Board	チューナーシート			J	
※	NA 09:21:40	"	"			UC	
※	NA 09:21:50	"	"			R	
※	NA 09:21:60	"	"			AB	
※	NA 09:21:70	"	"			G	
	VA 75:99:00	Ceramic Cap.	セラコン	2pF CH50V	C247	R,U,A,G, C,B	
	VA 76:05:00	"	"	8pF CH50V	"	J	
	VA 76:02:00	"	"	5pF CH50V	C245,246	R,U,A,G, C,B	
	VA 76:07:00	"	"	12pF CH50V	"	J	
	VA 75:99:00	"	"	2pF CH50V	C112		
	VA 76:04:00	"	"	7pF CH50V	C101,111		
	Fi 19:11:00	"	"	10pF CH50V	C104,123		
	Fi 19:11:00	"	"	10pF CH50V	C248	J	
	VA 76:05:00	"	"	8pF CH50V	"	R,U,A,G, C,B	
	VA 76:08:00	"	"	15pF CH50V	C122		
	VA 76:10:00	"	"	22pF CH50V	C190,220,221		
	VA 76:12:00	"	"	33pF CH50V	C114,168,169		
	Fi 19:22:20	"	"	220pF CH50V	C105,139,152,154, 155,218,219		
	Fi 46:11:50	"	"	15pF SH50V	C113		
	FG 21:11:20	"	"	12pF 50V	C211		
	FG 21:21:00	"	"	100pF 50V	C205,206		
	FG 21:24:70	"	"	470pF 50V	C160		
	FG 21:31:00	"	"	1000pF 50V	C125,180,192,196		
	FG 44:41:00	"	"	0.01 μ F 50V	C102,103,106~108,115~121,129~138,140,141,143~148,150, 151,153,181~189,201,217,223,236~240,243,249,250		Δ
	FG 44:41:00	"	"	0.01 μ F 50V	C241,242	G	Δ
	FG 44:42:20	"	"	0.022 μ F 50V	C251		
	FG 44:44:70	"	"	0.047 μ F 50V	C165		
	VB 17:01:00	Electrolytic Cap.	ケミコン	4700 μ F 5.5V	C216		
	FA 15:32:70	Mylar Cap.	マイラーコン	2700pF 50V	C176,177		
	FA 15:34:70	"	"	4700pF 50V	C207,208		
	FA 15:34:70	"	"	4700pF 50V	C157	J,R,U,A, C,B	
	UT 45:23:30	Polypropylene Film Cap.	ポリプロコン	330pF 100V	"	G	
	FA 15:42:20	Mylar	マイラーコン	0.022 μ F 50V	C173		
	FA 15:41:00	"	"	0.01 μ F 50V	C170		
	FA 15:44:70	"	"	0.047 μ F 50V	C203		
	FA 15:42:20	"	"	0.022 μ F 50V	C161	J,R,U,A, C,B	
	FA 15:41:80	"	"	0.018 μ F 50V	"	G	
	UL 46:61:00	Electrolytic Cap.	ローノイズケミコン	1 μ F 50V	C110		
	UL 46:62:20	"	"	2.2 μ F 50V	C109		
	UJ 11:81:00	"	ケミコン	100 μ F 6.3V	C159		
	UJ 11:84:70	"	"	470 μ F 6.3V	C156		
	UJ 13:71:00	"	"	10 μ F 16V	C127,178,179,191,193,198~200, 215,224,232,233,250		
	UJ 13:73:30	"	"	33 μ F 16V	C128,214		
	UJ 13:74:70	"	"	47 μ F 16V	C231		
	UJ 13:81:00	"	"	100 μ F 16V	C124,158,227,230		
	UJ 13:82:20	"	"	220 μ F 16V	C226		
	UJ 45:72:20	"	"	22 μ F 35V	C228		
	UJ 16:54:70	"	"	0.47 μ F 50V	C163,164		
	UJ 16:61:00	"	"	1 μ F 50V	C149,164,166,167,194, 209,210,222,225		
	UJ 46:63:30	"	"	3.3 μ F 50V	C212,213		
	UJ 16:64:70	"	"	4.7 μ F 50V	C174,175,195,204		
	UJ 16:72:20	"	"	22 μ F 50V	C229,235		
	UJ 14:92:20	"	"	2200 μ F 25V	C234		

※New Parts (新規部品)

TX-900U

TX-900/TX-900U

Ref. No.	Part No.	Description	部 品 名	Remarks	Common Model	Markets	ランク
	UK 34 73 30	Electrolytic Cap.	33 μ F 16V	BP コ ン	C162		
	UK 16 54 70	"	0.47 μ F 50V	"	C202		
	UT 45 24 30	Polypropylene Film Cap.	430pF 100V	ポ リ プ ロ コ ン	C171,172	G	
	UT 45 25 10	"	510pF 100V	"	"	J,A,B	
	UT 45 27 50	"	750pF 100V	"	"	R,U,C	
	UT 45 25 60	"	560pF 100V	"	C197		
※	VC 46 33 00	Trimmer Cap	5P	ト リ マ ー コ ン	VC104		
※	VC 46 34 00	"	11P	"	VC101~103		
	VB 10 67 00	FM IFT Coil	10.7MHz	FM IF コ イ ル	T105,106		
	GE 10 06 50	"		"	T104		
	GE 10 02 80	FM Discr Coil		FMディスクリコイル	T107		
	GE 10 04 70	AM IFT Coil	450kHz	AM IFT コ イ ル	T109		
	VB 47 94 00	LC Filter	19kHz	LC フ ィ ル タ ー	T112		
※	VC 25 84 00	MPX Filter	FB-10D	MPX フ ィ ル タ ー	T110,111		
※	VC 24 58 00	FM Antenna Coil		FMアンテナコイル	T101	J	
※	VC 24 59 00	"		"		R,U,A,G, C,B	
※	VC 24 60 00	RF Coil		RF コ イ ル	T102	J	
※	VC 24 61 00	"		"	"	R,U,A,G, C,B	
※	VC 24 62 00	"		"	T103	J	
※	VC 24 63 00	"		"	"	R,U,A,G, C,B	
※	VC 24 64 00	FM OSC Coil		FM OSC コ イ ル	T108	J	
※	VC 24 65 00	"		"	"	R,U,A,G, C,B	
※	VC 59 92 00	Anti-birdie Filter		アンチバーディーフィルター	T114	G	
※	XB 76 50 01	Power Transformer		電 源 ト ラ ン ス	T113	J	△
※	XB 76 60 01	"		"	"	R,A,G,B	△
※	XB 76 70 01	"		"	"	U,C	△
※	VC 31 64 00	FM Ceramic Filter	SFA10.7MDH20-N	FMセラミックフィルター	CF101,102		
		"	SFE10.7MS3G	"	CF103,104		
							PACK
	GG 00 04 20	AM Ceramic Discr	CDA450A	AMセラミックディスクリ	CF107		
※	VC 21 90 00	AM Ceramic Filter	SFZ450JL	AMセラミックフィルター	CF106		
	GG 00 07 50	Ceramic Resonator	CSB456F11	セ ラ ミ ッ ク 振 動 子	XL101		
	GG 00 07 70	"	FCR800K	"	XL102		
	QU 00 39 00	Quartz Crystal Unit	32kHz	水 晶 振 動 子	XL103		
	VB 17 03 00	Coil	1 μ H	コ イ ル	L101,103,104		
	VB 10 96 00	"	220 μ H	"	L107,		
	VB 10 03 00	"	8.2mH	"	L105,106,		
※	VB 05 69 00	"	220 μ H	"	L102		
	HZ 00 51 10	Carbon Resistor	2.2M Ω /2W	カ ー ボ ン 抵 抗	R305	U,C	△
	HV 45 41 00	Flam Proof Carbon Resistor	10 Ω /4W	不 燃 化 カ ー ボ ン 抵 抗	R304	A,B	
	HV 45 51 50	"	150 Ω /4W	"	R323		△
	VB 86 11 00	Pre-Set Potentiometer	B1k Ω	半 固 定 抵 抗	VR101,102		
	VB 86 14 00	"	B4.7k Ω	"	VR105,109		
	VB 86 16 00	"	B22k Ω	"	VR103,106		
	VB 86 23 00	"	B1M Ω	"	VR104,107,108		
※	VC 21 87 00	Transistor	2SA1317S	ト ラ ン ジ ス タ	Q110,111,113,120,126,127,129,133, 136,137,140~142,145,148,154,155		

※New Parts (新規部品)

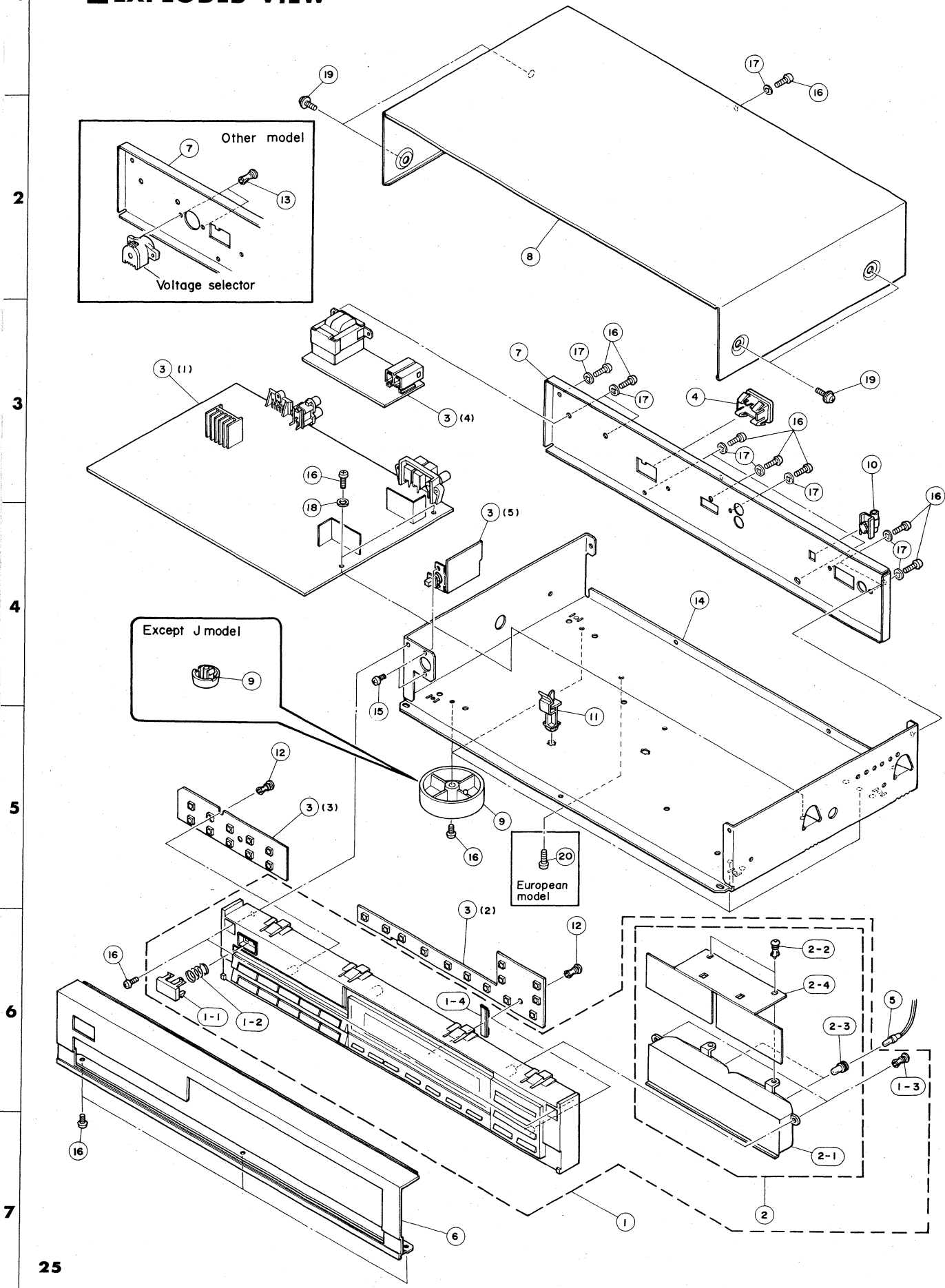
Ref. No.	Part No.	Description	部品名	Remarks	Common Model	Markets	ランク
*	VC 21 89 00	Transistor	2SC3330S	トランジスタ	Q102,107,112,114,121~123,125,128,130~132,134,135,138,139,143,144,146,147		
	iC 04 60 80	"	2SC1809(N,P)	"	Q115~118,159~162		
	iX 60 42 00	"	2SC2878(A,B)	"	Q124,149~153		
	iD 04 38 10	"	2SD438(E,F)	"	Q157		
*	VC 21 88 00	"	2SC1847	"	Q156		
	VB 10 62 00	"	2SC2995(R,O,Y)	"	Q104		
	VB 10 06 00	FET	2SK241(Y)	F E T	Q101,103,108		
	iE 10 41 00	"	2SK161	"	Q105		
	iE 10 38 00	"	3SK107(F)	"	Q100		
	iE 10 26 00	"	2SK246(Y)	"	Q119		
	VB 10 55 00	FM Varactor Diode	KV1320	FMバラクタダイオード	D101~104		
	VB 44 40 00	Diode	ISS287	ダイオード	D105~112,115~120,122~126,128,129,136~142,144~153		
	iF 00 84 80	"	ISR35-100A	"	D131~134		
	iF 00 03 30	"	IS188FMI	"	D113,114		
	iF 00 89 10	Zener Diode	MTZ6.8B	ツェナーダイオード	D135		
	iF 00 89 00	"	MTZ13C	"	D130		
	iF 00 91 60	"	MTZ30B	"	D127		
	iF 01 06 30	"	MTZ4.3B	"	D154		
	iG 04 14 00	IC	M54459L	I C	IC103		
	iG 03 45 10	"	# PC577H(E,F)	"	IC102		
	iG 04 78 00	"	LA1245	"	IC104		
*	XB 24 70 01	"	# PC4570HA	"	IC105		
*	XB 76 10 01	"	LA3450	"	IC106		
	iG 04 91 00	"	LC7210	"	IC108		
*	XB 76 30 03	"	LC6520C-3276	"	IC107		
	VA 94 53 00	Side Switch		スライドスイッチ	SW124	R	
*	VC 27 72 00	Push Switch		プッシュスイッチ	SW125		△
	KA 90 63 80	Switch	EVO-QRB-04M	ライトタッチスイッチ	SW101~123		
	LA 00 58 10	Voltage Selector		電圧切替器	SW126	R	△
	LB 50 07 10	Connector Socket	5P	STコネクタソケット	JK101		
	LB 20 22 60	Pin Jack	2P	ピンジャック	PJ101		
	NA 08 78 40	AM Coil Pack		AMコイルパック	U101		
*	VD 00 47 00	Base Pin	4P i-Type	PHベースピン			
	LA 00 58 00	Antenna Terminal	3P	アンテナ端子			
	VA 72 60 00	Holder, Wire	10P	パラレルケーブルホルダー			
	BA 09 29 70	Heat Sink		放熱器			
*	VC 09 80 00	AC Inlet		ACインレット		J,R,U,A, C,B	△
*	VC 69 47 00	"		"		G	△
	LB 20 13 90	Base Pin	TEB2P-SHF	2.5ピッチベースピン			
	BB 06 95 10	Ground Plate		ランド金具			
*	AA 63 12 40	Shield Plate		シールドプレート			

*New Parts (新規部品)

Ref. No.	Part No.	Description	部品名	Remarks	Common Model	Markets	ランク
*	NA 09 28 30	LCD Circuit Board		LCDシート			
	FX 60 07 90	Ceramic Cap.	0.01μF 16V	セラコン	C502		
	FG 71 31 00	"	1000pF 50V	"	C501		
*	XB 76 40 01	IC	LC7583	I C	IC501		
	HJ 35 74 70	Carbon Resistor	47kΩ 1/4W	カーボン抵抗	R501		
*	VC 79 18 00	LCD	LCD9462MIJP	L C D			
*	VC 79 19 00	"	LCD9463MIJP	"			
*	VD 00 59 00	Base Pin	7P L-Type	PHベースピン			

*New Parts (新規部品)

1 ■ EXPLODED VIEW



■ MECHANISM PARTS

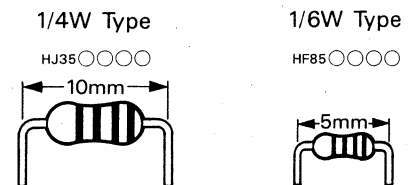
Note) φ : Diameter

Ref. No.	Part No.	Description	部品名	Remarks	Common Model	Markets	ランク
* 1	NB 63 94 90	Sub Chassis Unit	サブシャーシユニット	Silver			
* "	NB 63 95 00	"	"	Black			
1-1	CB 65 89 50	Button	ボ タ ン	Silver POWER	TX-500		
"	CB 65 89 60	"	"	Black "	"		
1-2	AA 61 70 60	Spring	ス プ リ ン グ				
1-3	CB 60 56 20	Plastic Rivet	プラスチックリベット				
1-4	CB 66 20 40	Spacer	ス ペ ー サ ー		TX-500		
* 2	NB 64 05 20	LCD Unit	LCD ユ ニ ッ ト				
* 2-1	CB 65 79 80	Riflector	リ フ レ ク タ ー				
2-2	CB 60 56 20	Plastic Rivet	プラスチックリベット				
2-3	VB 22 26 00	Cap. Lamp	ランプ キャップ				
* 2-4	NA 09 28 30	LCD Circuit Board	LCD 表 示 シ ー ト				
* 3	NA 09 21 30	Tuner Circuit Board	チューナーシート			J	
* "	NA 09 21 40	"	"			U,C	
* "	NA 09 21 50	"	"			R	
* "	NA 09 21 60	"	"			A,B	
* "	NA 09 21 70	"	"			G	
* 4	VC 09 82 00	Cover, AC Inlet	ACインレットカバー			J,R,A,G,B	
* "	VC 09 81 00	"	"			U,C	
* 5	VC 21 83 00	Lamp	ラ ン プ	150mA 8V	Inter-changeable		
* "	VC 21 82 00	"	"	150mA 9.2V			
* 6	BA 09 54 30	Front Panel	フ ロ ン ト パ ネ ル	Silver		J,R,A,G,B	
* "	BA 09 54 40	"	"	Black		J,R,A,G,B	
* "	BA 09 63 20	"	"	Silver		U,C	
* "	BA 09 63 30	"	"	Black		U,C	
* 7	AA 63 10 90	Rear Panel	リ ア パ ネ ル			R	
* "	AA 63 11 00	"	"			U,C	
* "	AA 63 11 10	"	"			A,B	
* "	AA 63 11 20	"	"			G	
* "	AA 63 10 80	"	"			J	
8	AA 63 10 10	Top Cover	ト ッ プ カ バ ー	Silver	TX-500		
"	AA 63 10 20	"	"	Black	"		
9	CB 61 03 90	Leg	脚			R,U,A,G,C,B	
"	NB 62 01 40	Leg Ass'y	脚 Ass'y			J	
10	CB 60 74 70	Holder, Antenna	アンテナホルダー				
11	CB 65 93 30	Support, PCB	PCB サポート		TX-500		
12	CB 60 56 20	Plastic Rivet	プラスチックリベット				
13	CB 60 92 60	"	"			R	
14	AA 63 11 30	Chassis	シ ャ ー シ		TX-500		
15	ED 33 00 66	Binding Head Screw	3x6 FCRM3-BI	バインド小ネジ	PACK		
16	Ei 33 00 86	Binding Head Tapping Screw	3x8 FCRM3-BI	バインドタッピングネジ	PACK		
17	EV 41 30 36	Toothed Lock Washer	φ3 FCRM3-BI	歯付座金	PACK		
18	EV 20 30 36	Plain Washer	φ3 FCRM3-BI	平座金	PACK		
19	EK 13 00 20	Cup Screw	4x8 FNM3-3g	カップスクリュー(タイト)	Silver		
"	EK 36 50 40	"	4x8 FCRM3-BI	"	Black		
20	Ei 13 01 20	Binding Head Tapping Screw	3x12 FCM3-3g	バインドタッピングネジ		G	

*New Parts (新規部品)

Parts List for Carbon Resistor

Value	1/4W Type Part No.	1/6W Type Part No.	Value	1/4W Type Part No.	1/6W Type Part No.
1.0 Ω	HJ353100	※	12KΩ	HJ357120	HF857120
1.8 "	HJ353180	※	15 "	HJ357150	HF857150
2.2 "	HJ353220	HF853220	18 "	HJ357180	HF857180
3.3 "	HJ353330	HF853330	22 "	HJ357220	HF857220
4.7 "	HJ353470	HF853470	27 "	HJ357270	HF857270
5.6 "	HJ353560	HF853560	33 "	HJ357330	HF857330
10 "	HJ354100	HF854100	39 "	HJ357390	HF857390
15 "	HJ354150	HF854150	47 "	HJ357470	HF857470
22 "	HJ354220	HF854220	56 "	HJ357560	HF857560
27 "	HJ354270	HF854270	68 "	HJ357680	HF857680
33 "	HJ354330	HF854330	82 "	HJ357820	HF857820
39 "	HJ354390	HF854390	91 "	HJ357910	HF857910
47 "	HJ354470	HF854470	100 "	HJ358100	HF858100
56 "	HJ354560	HF854560	120 "	HJ358120	HF858120
68 "	HJ354680	HF854680	150 "	HJ358150	HF858150
82 "	HJ354820	HF854820	180 "	HJ358180	HF858180
100 "	HJ355100	HF855100	220 "	HJ358220	HF858220
110 "	HJ355110	HF855110	270 "	HJ358270	HF858270
120 "	HJ355120	HF855120	330 "	HJ358330	HF858330
150 "	HJ355150	HF855150	390 "	HJ358390	HF858390
160 "	HJ355160	※	470 "	HJ358470	HF858470
180 "	HJ355180	HF855180	560 "	HJ358560	HF858560
220 "	HJ355220	HF855220	680 "	HJ358680	HF858680
270 "	HJ355270	HF855270	820 "	HJ358820	HF858820
330 "	HJ355330	HF855330	1.0MΩ	HJ359100	HF859100
390 "	HJ355390	HF855390	1.2 "	HJ359120	※
470 "	HJ355470	HF855470	1.5 "	HJ359150	HF859150
510 "	※	HF855510	1.8 "	HJ359180	HF859180
560 "	HJ355560	HF855560	2.2 "	HJ359220	HF859220
680 "	HJ355680	HF855680	3.3 "	HJ359330	HF859330
820 "	HJ355820	HF855820	3.9 "	HJ359390	※
910 "	HJ355910	HF855910	4.7 "	HJ359470	※
1.0KΩ	HJ356100	HF856100			
1.2 "	HJ356120	HF856120			
1.5 "	HJ356150	HF856150			
1.8 "	HJ356180	HF856180			
2.0 "	HJ356200	HF856200			
2.2 "	HJ356220	HF856220			
2.4 "	HJ356240	HF856240			
2.7 "	HJ356270	HF856270			
3.0 "	HJ356300	HF856300			
3.3 "	HJ356330	HF856330			
3.6 "	HJ356360	HF856360			
3.9 "	HJ356390	HF856390			
4.7 "	HJ356470	HF856470			
5.1 "	HJ356510	HF856510			
5.6 "	HJ356560	HF856560			
6.8 "	HJ356680	HF856680			
8.2 "	HJ356820	HF856820			
9.1 "	HJ356910	HF856910			
10 "	HJ357100	HF857100			

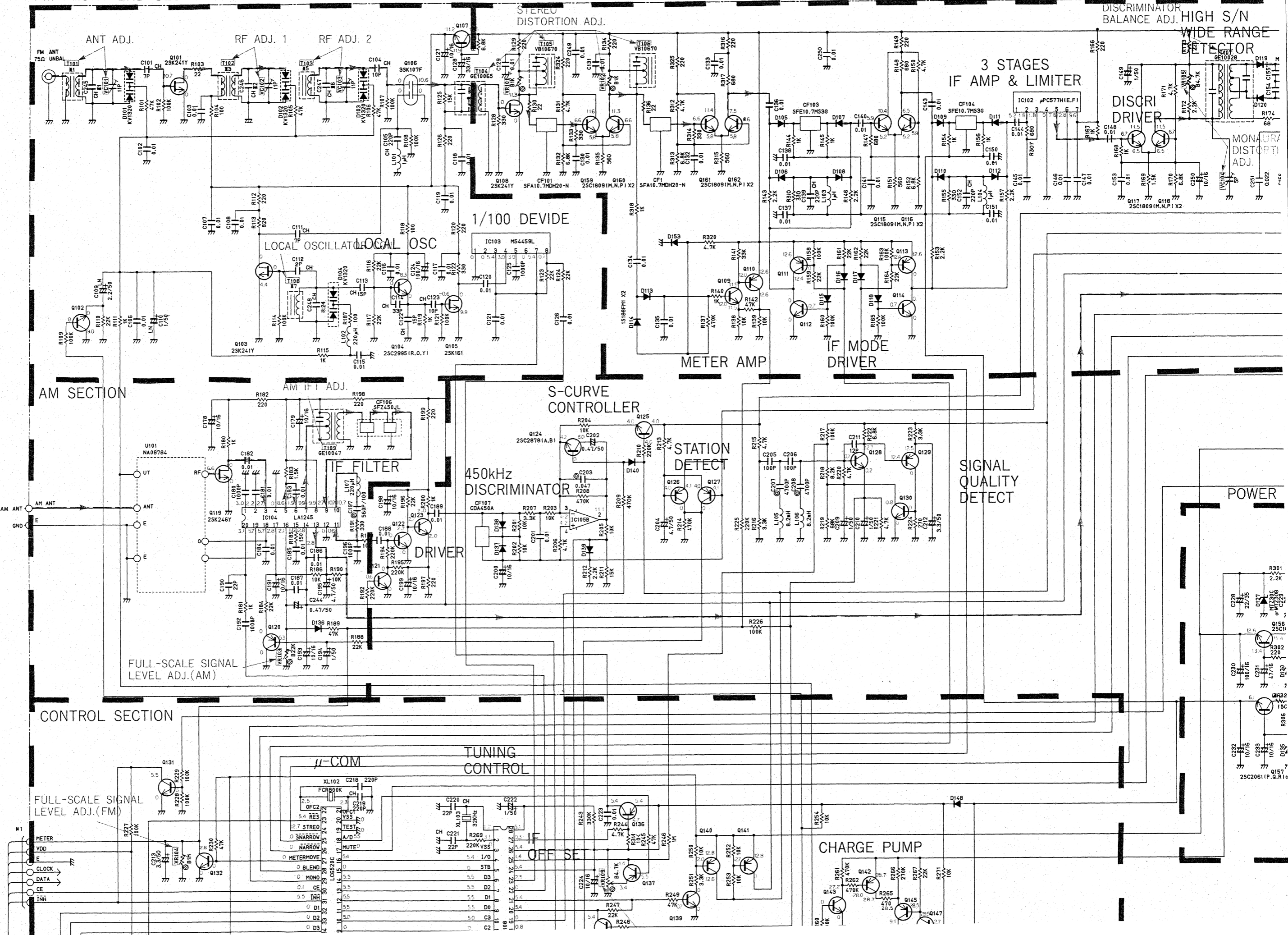


TX-900U

SCHEMATIC DIAGRAM

FM FRONT END SECTION

FM IF SECTION



1
2
3
4
5
6

6

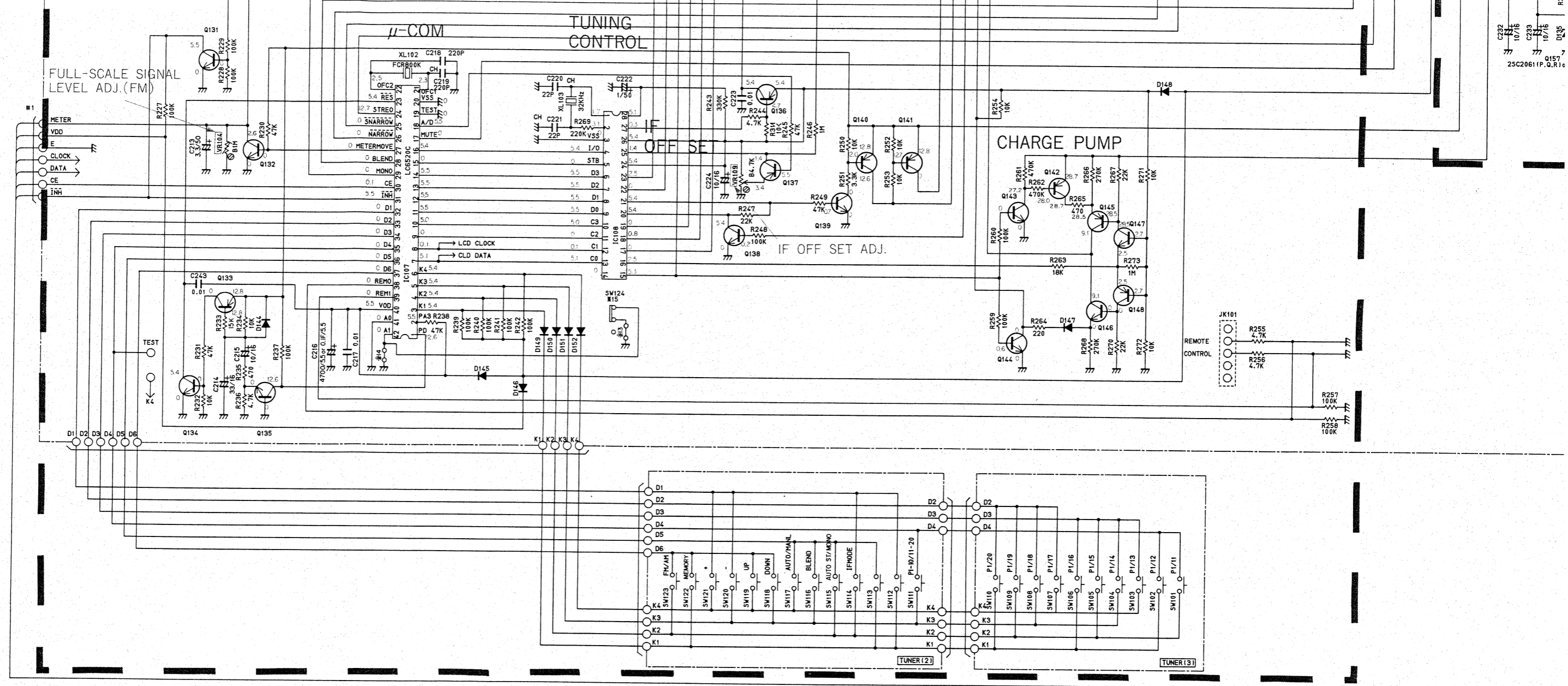
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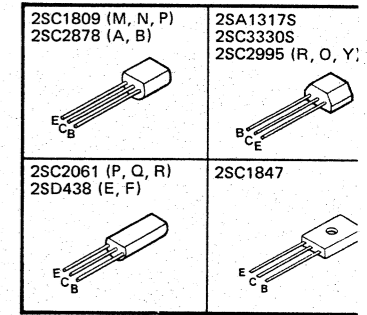
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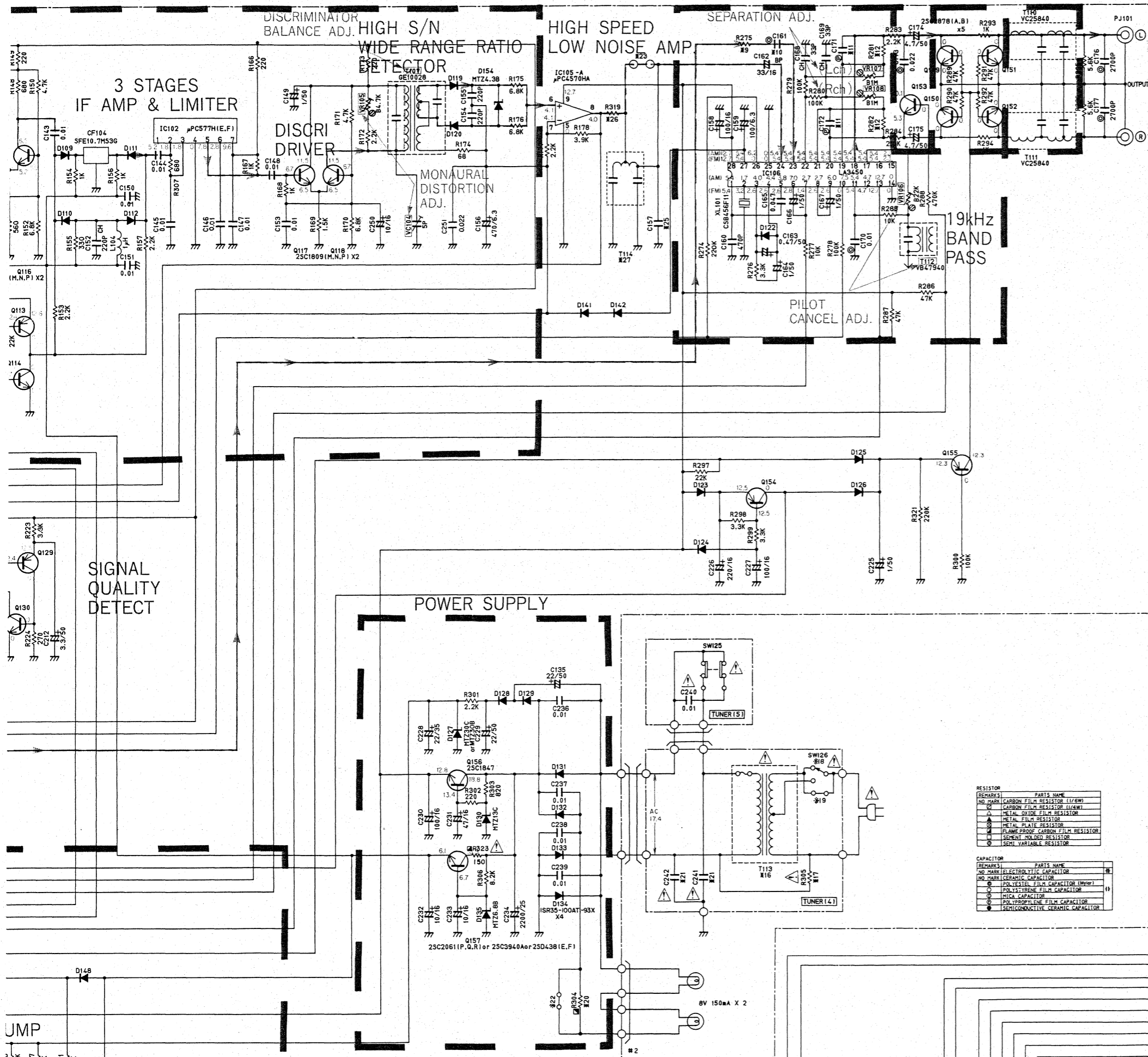
10

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PIN CONNECTION DIAGRAM OF TRANS





● Unless otherwise specified
 PNP TRANSISTOR 2SA1317S
 NPN TRANSISTOR 2SC3330S
 DIODE 1SS287

Note) *marked

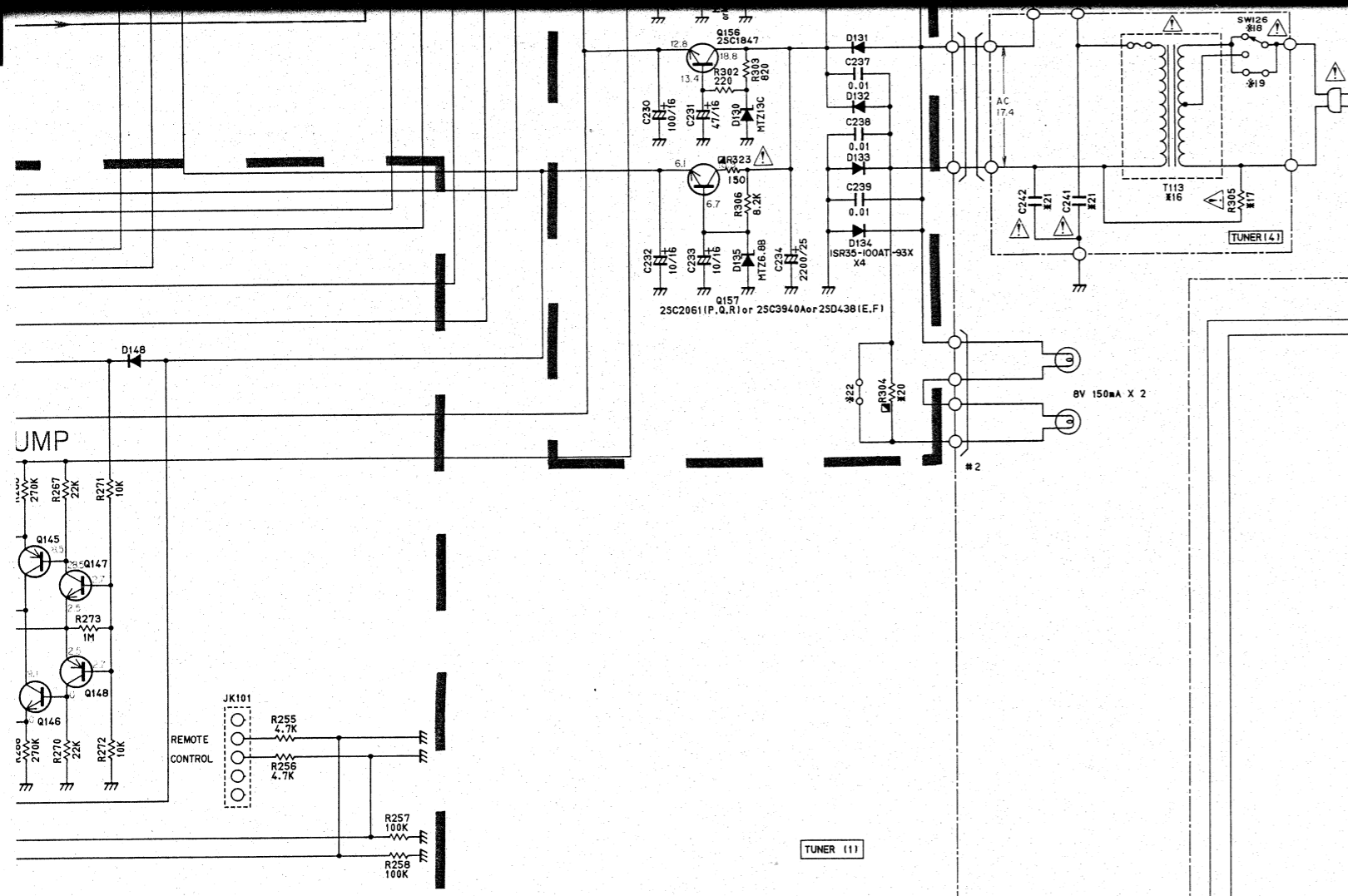
#	J	R	U,C	A,B	G
1	T101	VC24580	VC24590	VC24590	VC24590
2	C245, 246	12pF	5pF	5pF	5pF
3	T102	VC24600	VC24610	VC24610	VC24610
4					
5	T103	VC24620	VC24630	VC24630	VC24630
6	C247	CH8pF/50V	CH2pF/50V	CH2pF/50V	CH2pF/50V
7	T108	VC24640	VC24650	VC24650	VC24650
8					
9	R275	47kΩ	47kΩ	47kΩ	68kΩ
10	C161	0.022μF	0.022μF	0.022μF	0.018μF
11	C171, 172	510pF/100V	750pF/100V	750pF/100V	430pF/100V
12	R281, 282	100kΩ	100kΩ	100kΩ	120kΩ
13	J151	Short	Open	Open	Open
14	J156	Short	Open	Open	Short
15	SW124	Open	VA94530	Open	Open
16	T113	XB765001	XB766001	XB767001	XB766001
17	R305	Open	Open	2.2MΩ	Open
18	SW126	Open	LA00581	Open	Open
19	J211	Short	Open	Short	Short
20	R304	Open	Open	Open	10Ω
21	C241, 242	Open	Open	Open	0.01
22	J161	Short	Short	Short	Open
23	J166	Short	Short	Short	Open
24	C248	10pF	8pF	8pF	8pF
25	C157	Ⓞ4700pF	Ⓞ4700pF	Ⓞ4700pF	Ⓞ330pF/100V
26	R319	330Ω	330Ω	330Ω	2.2kΩ
27	T114	Open	Open	Open	VC59920

RESISTOR PARTS NAME
 NO. MARK CARBON FILM RESISTOR (1/4W)
 CARBON FILM RESISTOR (1/4W)
 METAL OXIDE FILM RESISTOR
 METAL FILM RESISTOR
 METAL PLATE RESISTOR
 FLAME PROOF CARBON FILM RESISTOR
 SEMI-CONDUCTIVE RESISTOR
 SEMI-VARIABLE RESISTOR

CAPACITOR PARTS NAME
 NO. MARK ELECTROLYTIC CAPACITOR
 NO. MARK CERAMIC CAPACITOR
 POLYESTER FILM CAPACITOR (MMWF)
 POLYSTYRENE FILM CAPACITOR
 MICA CAPACITOR
 POLYPROPYLENE FILM CAPACITOR
 SEMI-CONDUCTIVE CERAMIC CAPACITOR

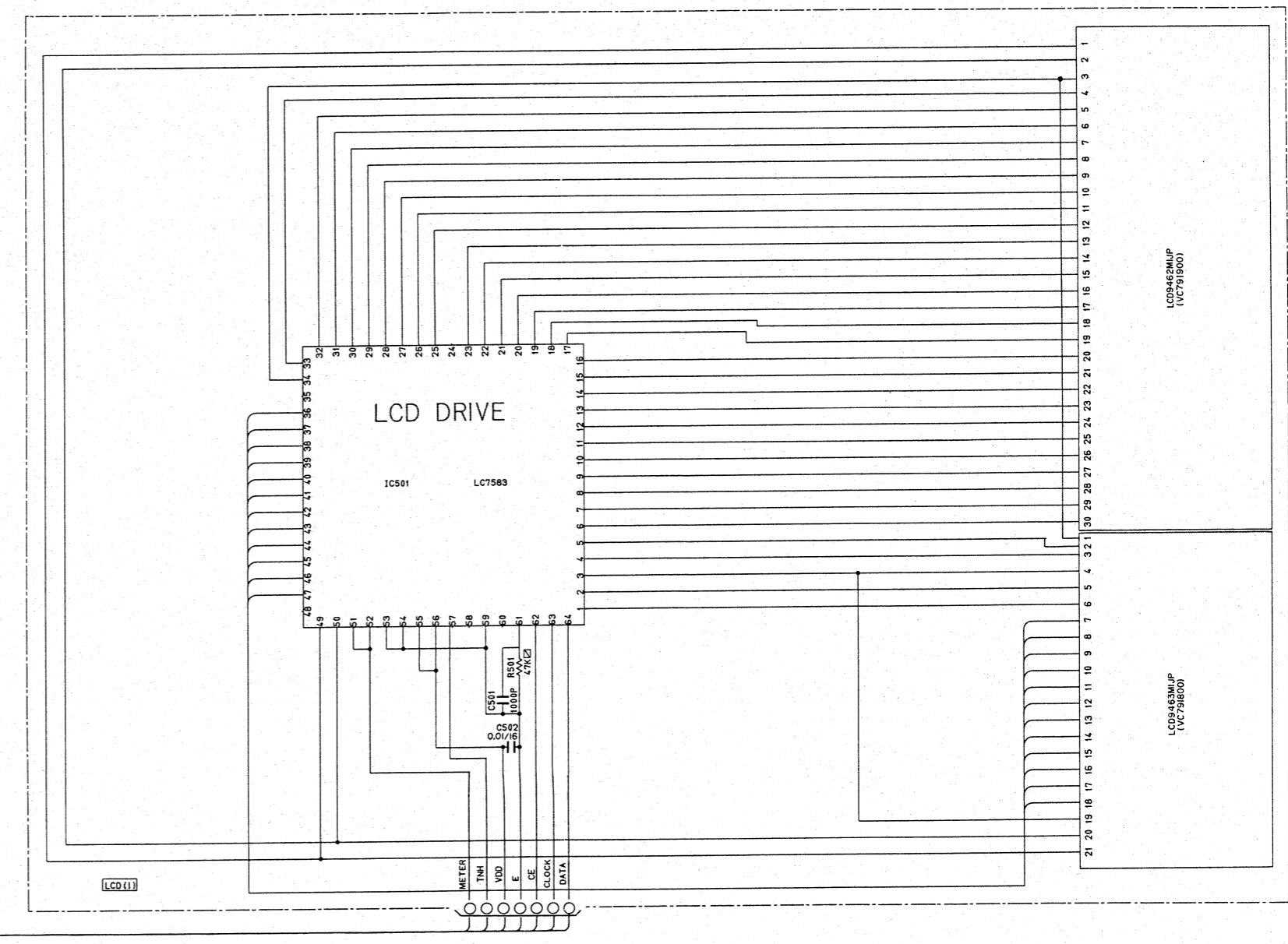
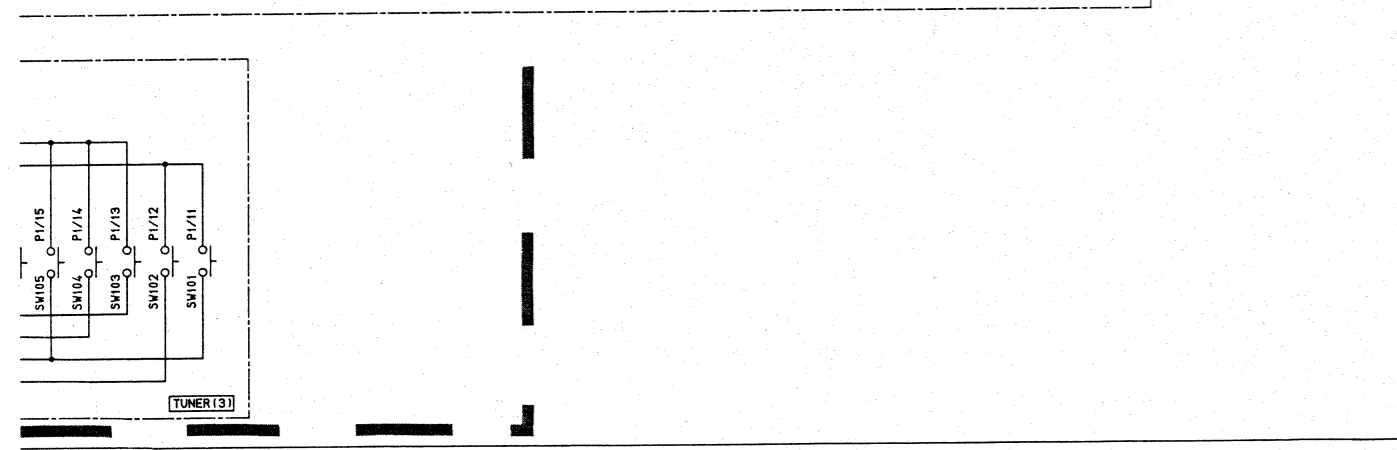
UMP

2 11 10 9 8 7 6 5 4 3 2 1



RESISTOR	
REMARKS	PARTS NAME
NO MARK	CARBON FILM RESISTOR (1/4W)
CI	CARBON FILM RESISTOR (1/4W)
▲	METAL OXIDE FILM RESISTOR
△	METAL FILM RESISTOR
□	METAL PLATE RESISTOR
⊖	FLAME PROOF CARBON FILM RESISTOR
⊕	SEMICONDUCTIVE RESISTOR
⊙	SEMI VARIABLE RESISTOR

CAPACITOR	
REMARKS	PARTS NAME
NO MARK	ELECTROLYTIC CAPACITOR
NO MARK	CERAMIC CAPACITOR
⊖	POLYESTER FILM CAPACITOR (MHP)
⊙	POLYSTYRENE FILM CAPACITOR
⊕	MICA CAPACITOR
⊖	POLYPROPYLENE FILM CAPACITOR
●	SEMICONDUCTIVE CERAMIC CAPACITOR



PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICs.

2SC1809 (M, N, P) 2SC2878 (A, B) 	2SA1317S 2SC3330S 2SC2995 (R, O, Y) 	2SK241 (Y) 2SK161 	2SK107 (F) 	1SR35-100A 	KV1320 	M54459L 	LA1245 	LA3450 	LC7583
2SC2061 (P, Q, R) 2SD438 (E, F) 	2SC1847 	2SK246 (Y) 	1SS287 1S88FMI MT26.8B MT213C MTZ30B MTZ4.3B 	μPC577H (E, F) 	μPC4570HA 	LC7210 	LC6520C-3235 		

* All voltages are measured with a 10MΩ/DC electric volt meter.
 * Components having special characteristics are marked ▲ and must be replaced with parts having specifications equal to those originally installed.
 * Schematic diagram is subject to change without notice.