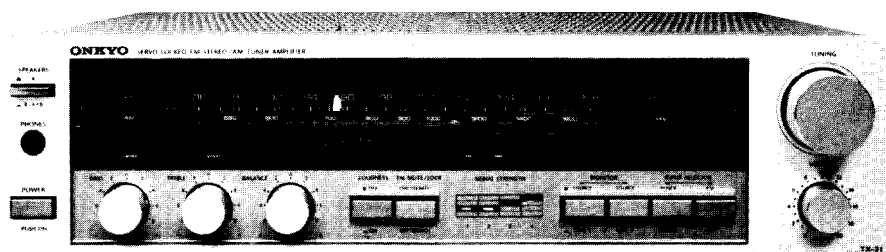


# ONKYO® SERVICE MANUAL

## SERVO LOCKED FM/AM STEREO RECEIVER MODEL TX-21



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# SPECIFICATIONS

## AMPLIFIER SECTION

Output Power:	30 watts per channel, min. RMS, at 8 $\Omega$ both channels driven, from 20 Hz to 20,000 Hz, with no more than 0.06% total harmonic distortion.
Total Harmonic Distortion:	0.06% at rated power 0.06% at 1 watt output
IM Distortion:	0.1% at rated power 0.06% at 1 watt output
Damping Factor:	35 at 8 $\Omega$
Frequency Response:	20 Hz – 30,000 Hz ( $\pm 1$ dB)
RIAA Deviation:	20 Hz – 20,000 Hz ( $\pm 0.8$ dB)
Sensitivity & Impedance:	Phono: 2.5 mV, 50 k $\Omega$ Tape Play: 150 mV, 50 k $\Omega$ Tape Rec: 150 mV, 3.5 k $\Omega$ (PH)
Phono Overload:	110 mV R.M.S. at 1 kHz, 0.06% T.H.D.
Signal-to-Noise Ratio:	Phono: 85 dB (at 10 mV input A weighted) 75 dB (IHF A-202) Tape: 95 dB (A weighted) 80 dB (IHF A-202)
Tone Controls:	Bass: $\pm 12$ dB at 100 Hz Treble $\pm 10$ dB at 10 kHz
Loudness (–30 dB):	+9 dB at 40 Hz +5 dB at 20 kHz

## TUNER SECTION

<b>FM:</b>	
Tuning Range:	87.5 – 108 MHz
Usable Sensitivity:	Mono: 12.0 dBf, 2.2 $\mu$ V Stereo: 19.2 dBf, 5 $\mu$ V
50 dB Quieting Sensitivity:	Mono: 18.3 dBf, 4.5 $\mu$ V Stereo: 39.2 dBf, 50 $\mu$ V
Capture Ratio:	1.5 dB
Image Rejection Ratio:	45 dB
Spurious Rejection Ratio:	80 dB
IF Rejection Ratio:	80 dB
Signal-to-Noise Ratio:	Mono: 71 dB Stereo: 66 dB
Alternate Channel Att.:	55 dB
AM Suppression Ratio:	50 dB
Harmonic Distortion:	Mono: 0.2% Stereo: 0.4%
Frequency Response:	30 Hz – 15,000 Hz ( $\pm 1.5$ dB) 40 dB at 1 kHz 30 dB at 100 Hz – 10,000 Hz
Muting Level:	17.2 dBf, 4 $\mu$ V
Stereo Threshold:	17.2 dBf, 4 $\mu$ V
Servo Lock Level:	17.2 dBf, 4 $\mu$ V

## AM:

Tuning Range:	525 – 1,620 kHz
Usable Sensitivity:	30 $\mu$ V
Image Rejection Ratio:	40 dB
IF Rejection Ratio:	30 dB
Harmonic Distortion:	0.8%

## GENERAL

Power Supply:	AC 120V 60 Hz (D model) AC 220V 50 Hz (G model) AC 120/220V 50/60 Hz (W model)
Outputs:	Out 1 & 2, AC Outlet (unswitched $\times 1$ ) (D model)
Inputs:	Phone, Tape Play 1 & 2, FM and AM Antennas
Antennas:	FM: 300 $\Omega$ balanced and 75 $\Omega$ unbalanced AM: built-in loop antenna and external terminal
Semiconductors:	1 FET, 11 transistors, 8 ICs, 17 diodes
Dimensions (W $\times$ H $\times$ D)	418 $\times$ 112 $\times$ 326 mm 16-1/2" $\times$ 4-1/2" $\times$ 12-7/8"
Weight:	6.6 kg 14.5 lbs.

\* Specifications and features are subject to change without notice

# PRECAUTIONS

## 1. Replacing the fuses

For continued protection against fire hazard, replace only with same type and same rating fuse.

### AC fuse

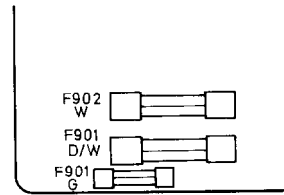
Remove the top cover.

- F901 4A-ST-6 (Parts No. : 252049)  
(Only D model)
- F901 2A-SE-EAK (Parts No. : 252074)  
(Only G model)
- F901 4A-T (Parts No. : 252014)  
(Only W model)
- F902 2A-T (Parts No. : 252002)  
(Only W model)

### Speaker fuse

Remove the top cover.

- F501. F601 4ASS-2 (Parts No. : 252059)  
(D model)
- F501. F601 4A-SE-EAK (Parts No. : 252077)  
(G model)
- F501. F601 4A-T (Parts No. : 252014)  
(W model)



## 2. Sensor Switch (SENSOR)

This switch enables the servo lock system for automatic FM tuning to be matched with the various operating conditions. Set it at LOW initially. Switch to NORM or HIGH if the TUNED lamp dose not instantly turn off when you touch the tuning knob.

## 3. De-emphasis switch (Only W model)

The 50 μsec/75 μsec selector switch employed in the W (120/220V) model is located on the bottom board. When shipped from the factory, this switch is set to the 50 μsec position. For use in 75 μsec regions, switch over to the 75 μsec position.

## 4. Voltage Selector (Rear Panel)

Some models are equipped with a voltage selector to conform with local power supplies.

Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on.

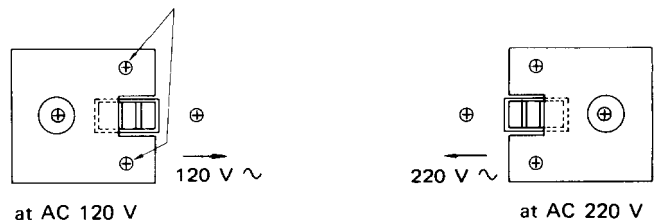
When changing the voltage setting, remove the lock plate covering the switch, then set the voltage to the correct value.

Voltage is changed by sliding the groove in the switch with a screwdriver to the right or left. Confirm that the switch has been moved all the way to the right or left before turning the power switch on.

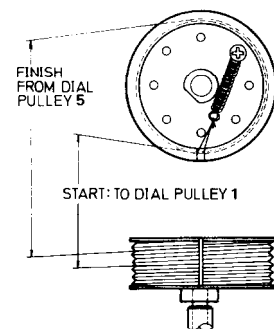
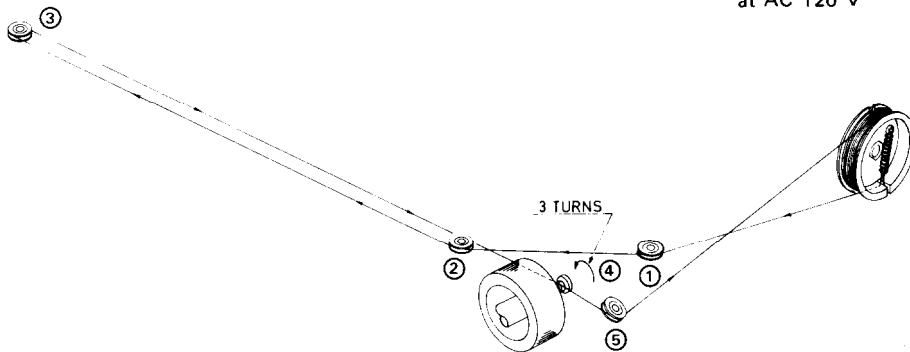
If there is no voltage selector switch on the unit you have purchased, it can only be used in areas where the power supply voltage is the same as that of the unit.

Voltage Selector Lock Plate

Remove these two screws to take off the voltage selector lock plate.

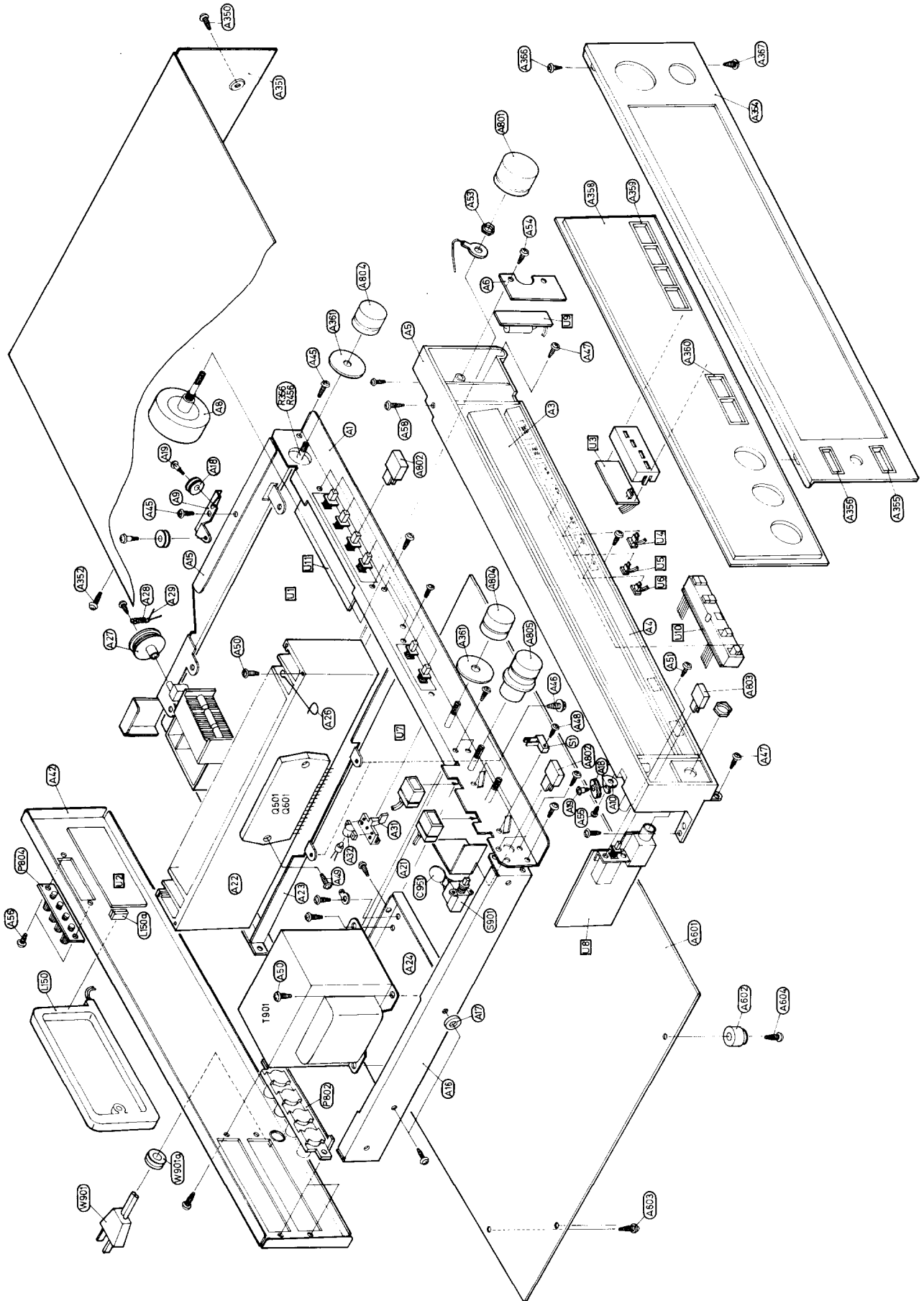


# STRINGING DIAGRAM



1. Close the variable capacitor complete and tie the stringing to the spring of the drum.
2. Thread the stringing in the direction of arrow from 1 to 3 and wind the stringing three turns around the tuning shaft counter clockwise.
3. Thread the stringing to 5.
4. Wind the stringing 1½ turns around the dial drum.

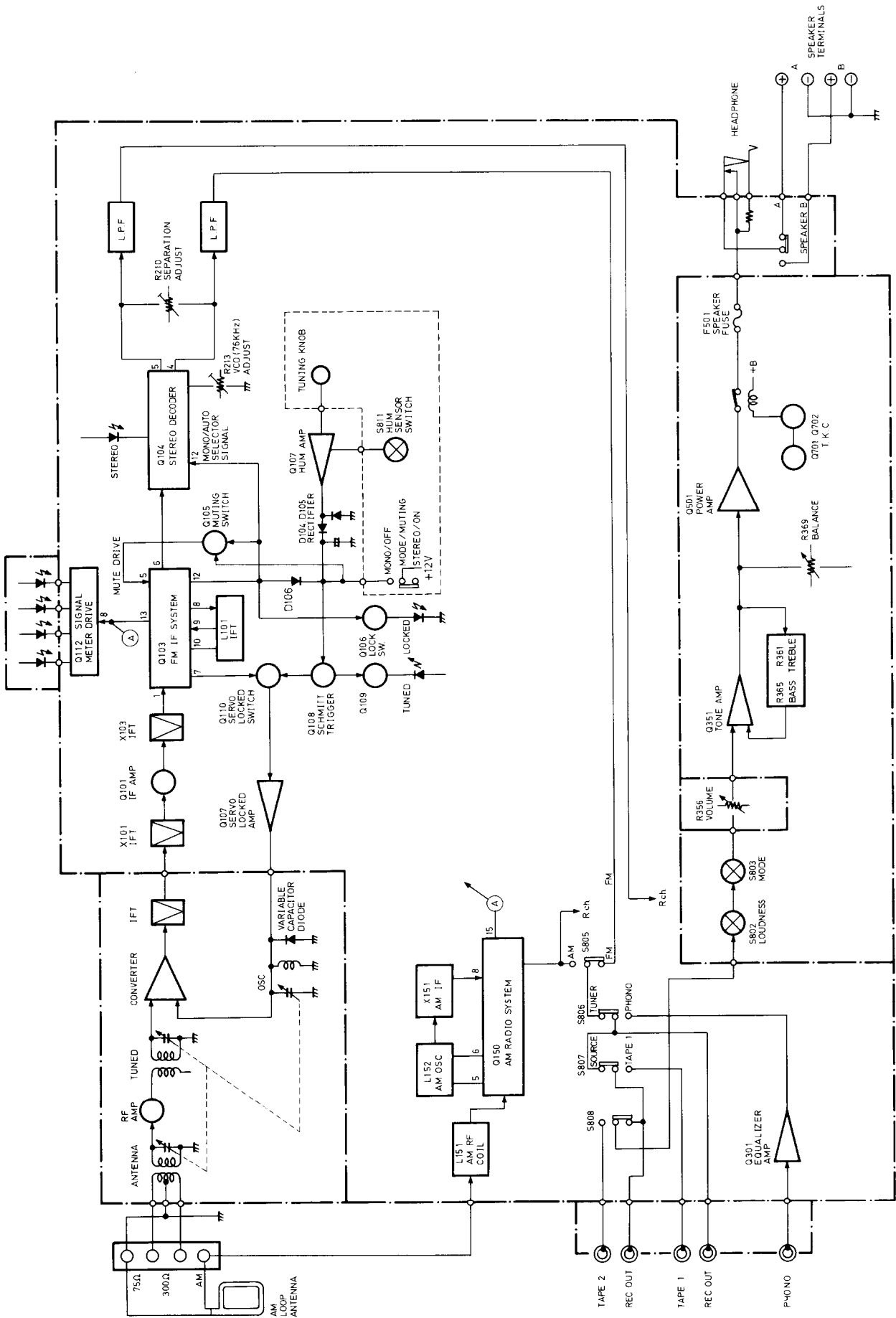
**EXPLODED VIEW**



# PARTS LIST

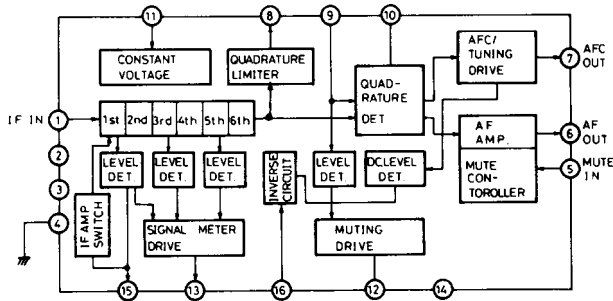
REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
A1	27110163B	Front bracket	A356	27267180	Guide, speaker	S902	25065123	NSS-1258P, Voltage selector switch (W)
A3	28130140A	Dial plate	A358	28191126	Clear plate	T901	230593	NPT-773D, Power transformer (D)
A4	28130141A	Plate S	A359	27267181	Guide	T901	230594	NPT-773G, Power transformer (G)
A5	27190146A	Holder	A360	27267182	Guide	U1	230595	NPT-773DG, Power transformer (W)
A6	27240020	Holder	A361	28140127	32 mm, Cushion		13298525C	NARF-1325c, FM/AM tuner and equalizer amplifier pc board ass'y (D)
A8	27205018	Drive shaft	A365	28140024	0.5x390x10 mm, Cushion			
A9	27140644	Bracket, dial pulley	A366	833130080	3TTP+8P, Tapping screw			
A10	27140501	Bracket, dial pulley	A367	834130068	3TTS+6B, Tapping screw			
A13	28140051	8x28x10, Cushion	A601	27170127A	Bottom board		13304525D	NARF-1325d, FM/AM tuner and equalizer amplifier pc board ass'y (G)
A14	28140254	18x45x5, Cushion	A603	831130088	3TTW+8B, Tapping screw			
A15	27115106A	Bracket, right	A604	834130128	3TTS+12B, Tapping screw			
A16	27115107B	Bracket, left	A801	28320759	Knob, tuning		13300525F	NARF-1325f, FM/AM tuner and equalizer amplifier pc board ass'y (W)
A17	27175011C	Leg	A802	27180028	Spring	U2	13298527B	NAPJ-1327b, Tape and Phono terminal pc board ass'y (D/W)
A18	27185002A	DP-16, Dial pulley	A803	28320760	Knob, push			
A19	801147A	Screw, dial pulley	A804	28320761	Knob		13304527C	NAPJ-1327c, Tape and Phono terminal pc board ass'y (G)
A20	870039A	Washer	A805	28320762	Knob, volume			
A21	27115108A	Side bracket, center	C552, C662	28320769A	Knob, treble		13298535	NADIS-1335, Signal meter pc board ass'y
A22	27160101A	Radiator	C801	330921030	0.01µF, 50V, Capacitor, ceramic (G)	U3	13298536	NADIS-1336, Stereo indicator pc board ass'y
A23	27130301	Bracket	C803, C804	379124737	0.047µF, 50V, Capacitor, mylar	U4	13298537	NADIS-1337, Tuned indicator pc board ass'y
A24	27130300	Bracket, power transformer	C951	330924730	0.047µF, 50V, Capacitor, ceramic	U5	13298538	NADIS-1338, Locked indicator pc board ass'y
A25	27150151	Shielded plate	C951a	3500060	0.01µF, 125V, Capacitor CS (D)	U6	13298539	NAAF-1339, Pre., and power amplifier pc board ass'y (D)
A26	27180057	Spring	F901	3500065A	0.01µF, 400V, Capacitor IS (G/W)	U7	13304539A	NAAF-1339a, Pre., and power amplifier pc board ass'y (G)
A27	27200027	Dial drum	F901a	27300080	Cover, capacitor			
A28	273803	SP-14A, Spring	F901	252049	4A (ST-6), AC fuse (D)		13300539B	NAAF-1339b, Pre., and power amplifier pc board ass'y (W)
A29	273903	Stringing	F901	252074	2A-SE-EAK, AC fuse (G)			
A30	28165060	Pointer	F901	252014	4A-T, AC fuse (W)		13298540	NASW-1340, Switch pc board ass'y
A32	27300493	Cover, pointer lamp	F902	252002	2A-T, AC fuse (W)	U8	13298541	NAPL-1341, Lamp pc board ass'y
A41	28175054	Insulator plate	F501, F601	252059	4A (SS-2), Speaker protection fuse (D)	U9	13298542	NADIS-1342, Selector indicator pc board ass'y
A42	27120370	Back panel (D)	F501, F601	252077	4A-SE-EAK, Speaker protection fuse (G)	U10		
	27120375	Back panel (G)				U11	13298529	NASW-1329, Switch pc board ass'y
	27120376	Back panel (W)				W901	253099A	AS-UC-3, Power supply cable (D)
A45	834130068	3TTS+6B, Tapping screw	F501, F601	252014	4A-T, Speaker protection fuse (W)	W901a	253083	AS-CEE, Power supply cable (G/W)
A46	831130088	3TTW+8B, Tapping screw	L150	232098	NMA-3040, AM loop antenna		270025	SR-3P-4, Strainrelief (D)
A47	834130088	3TTS+8B, Tapping screw	L150a	27190129	Holder, antenna		270280	SR-4K-4, Strainrelief (G/W)
A48	833126127	2.6TTP+12S, Tapping screw	P802, P803	25060049	NTM-4PRMN18, Speaker terminal			
A49	834130168	3TTS+16B, Tapping screw	P804	25060035	NTM-4PRMC06, Antenna terminal			
A50	834140088	4TTS+8B, Tapping screw	P805	25045088	Connector, antenna (G)			
A51	82113006	3P+6FN, Pan head screw	P805a	870057	N10B, Toothed washer (G)			
A52	87619014	W9x14F, Washer	P901	25050046	NSCT-2P15, AC outlet (D)			
A53	8631901	N-9F, Nut	Q501, Q601	222020	STK-463, Power amplifier IC			
A54	831430088	3TTW+8B (BC), Tapping screw	R356, R456	5147016	N16RG100KBT30, Volume control variable resistor			
A55	833130080	3TTP+8P, Tapping screw	R910	431523355	3.3MΩ, 1/2W, Resistor, solid (D)	Note: D: Only 120 V model		
A56	834230108	3TTS+10B (Ni), Tapping screw	S1	25065150	NLF-1107, Leaf switch	G: Only 220 V model		
A57	838130068	3TTB+6B, Tapping screw	S901	25035321 or	NPS-111-L285P or	W: Only 120/220 V model		
A58	833130100	3TTP+10P, Tapping screw	S901	25035135	NPS-111-L100P, Power switch (D)			
A351	28184145	Top cover	S901	25035176 or	NPS-111-L140P or			
A352	834430068	3TTS+6B (BC), Tapping screw		25035322	NPS-111-L286P, Power switch (G/W)			
A354	13298121	Front panel ass'y						
A355	27267179	Guide, power						

**BLOCK DIAGRAM**

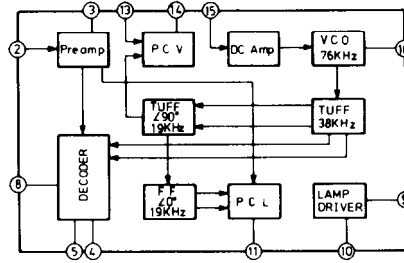


# BLOCK DIAGRAM OF IC

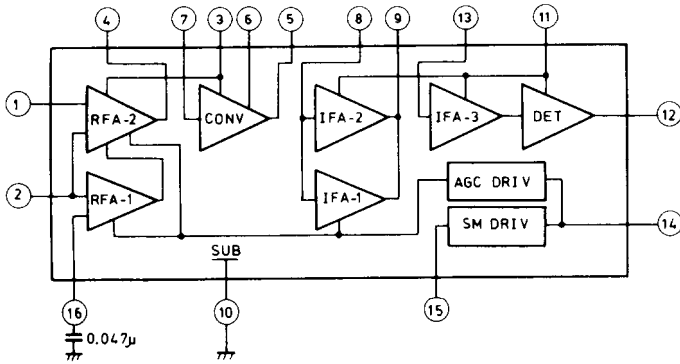
## μPC1167C2 (FM IF system)



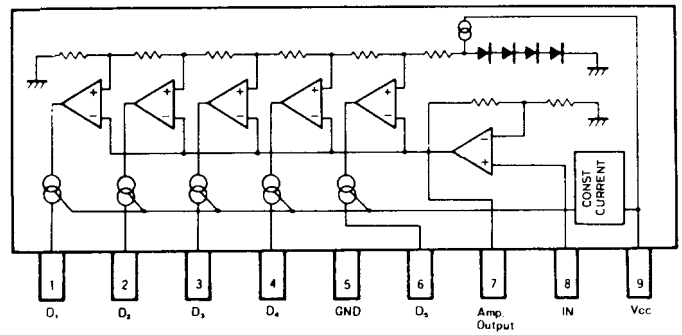
## HA 1196 (Stereo decoder)



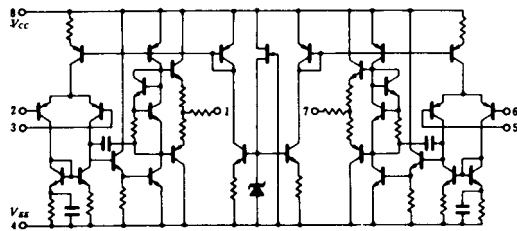
## LA1240 (AM radio system)



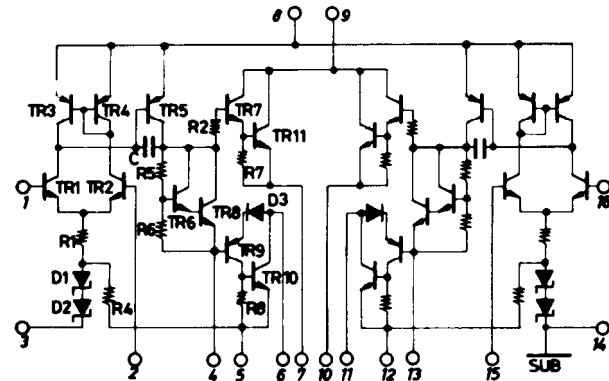
## BA6124 (Signal meter driver)



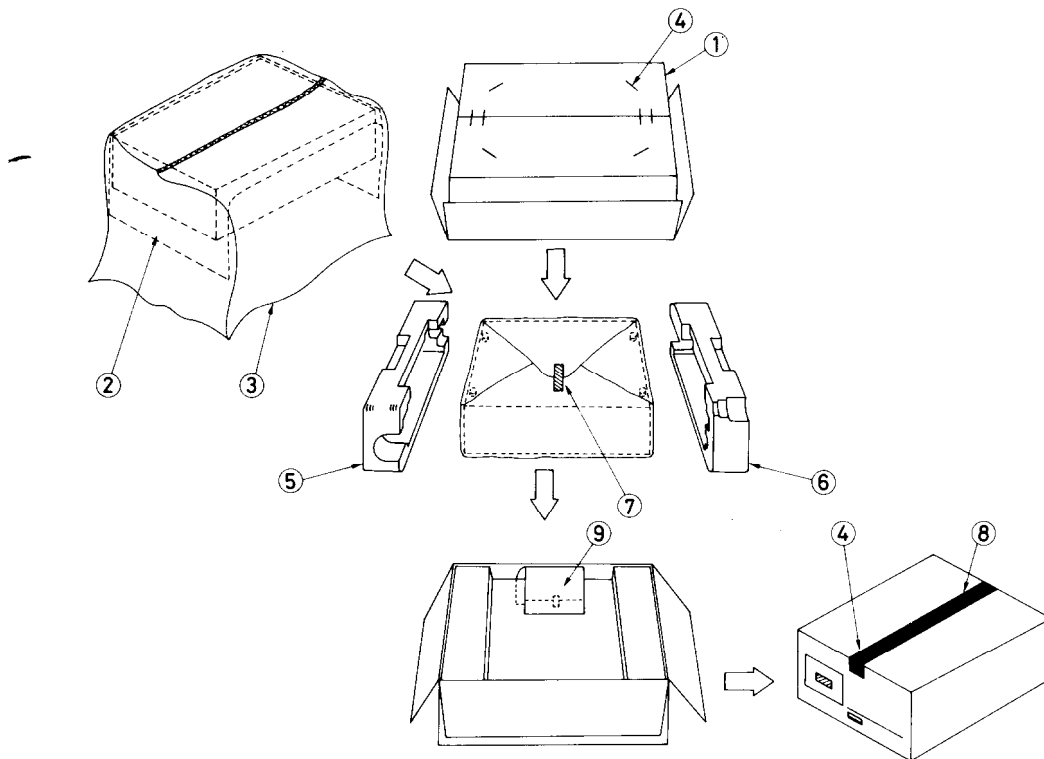
## NJM4558D, 4559DX EQUIVALENT CIRCUIT



## STK-463 EQUIVALENT CIRCUIT



## PACKING VIEW



### REF. NO. PARTS NO. DESCRIPTION

REF. NO.	PARTS NO.	DESCRIPTION
1	29050546	Master carton box
2	29095012-1	500x800 mm, Protection sheet
3	29100036A	850x550 mm, Poly-vinyl bag
4	282301	Sealing hook
5	29090689	Pad, right side
6	29090688	Pad, left side
7	261504	30x50 mm, Adhesive tape
8	260012	Damp tape
9		Accessory bag ass'y

#### (U.S.A. model)

29340594	Instruction manual
292064A	FM antenna
29365006-2	Warranty card
29358002	Service station list
290100006	250x350 mm, Poly-vinyl bag

### REF. NO. PARTS NO. DESCRIPTION

#### (120 V model)

29340594	Instruction manual
292064A	FM antenna
29100006	250x350 mm, Poly-vinyl bag

#### (West Germany model)

29340597	Instruction manual
292064A	FM antenna
29365005-3	Warranty card
29100006	250x350 mm, Poly-vinyl bag

#### (220 V model)

29340597	Instruction manual
292064A	FM antenna
29100006	250x350 mm, Poly-vinyl bag

#### (120/220 V model)

29340597	Instruction manual
292064A	FM antenna
25055040	CV-K-2, Conversion plug

10	29355045	Sensor tag (Tuning knob)
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## ALIGNMENT PROCEDURES

### INSTRUMENTS REQUIRED

1. DC Voltmeter
2. AM Sweep Generator
3. AM/FM Signal Generator
4. AC VTVM
5. Oscilloscope
6. Monitorscope
7. Distortion Analyzer
8. Stereo Modulator
9. Frequency Counter

### GENERAL ALIGNMENT CONDITIONS

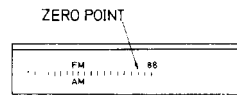
1. Signal input should kept as low as possible.
2. Standard modulation is 400 Hz 30% (AM), 1 kHz 100% (FM MONO), pilot 9% sub and main 91% (FM STEREO).
3. Standard knob position
 

SPEAKERS	..... A
BASS, TREBLE & BALANCE	..... Center
MODE	..... STEREO
LOUDNESS	..... OFF
TAPE 1, 2	..... OFF (SOURCE)



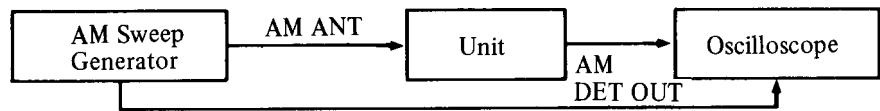
**(1) Attachment of dial pointer**

1. Close the variable capacitor completely.
2. Set the radio dial pointer to zero point on dial scale and secure the stringing and pointer with the bond.



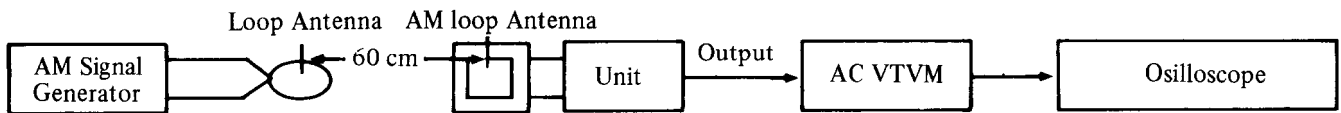
**(2) AM IF ALIGNMENT**

1. Set SELECTOR switch to AM.
2. Set radio dial to quiet point.



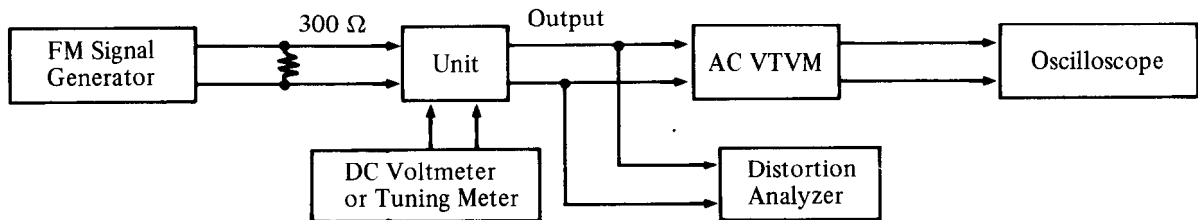
Set signal	Adjust	Oscilloscope	Remarks
455 kHz	X151	Maximum Symmetrical Response	Usually not necessary to adjust

**(3) AM RF ALIGNMENT**



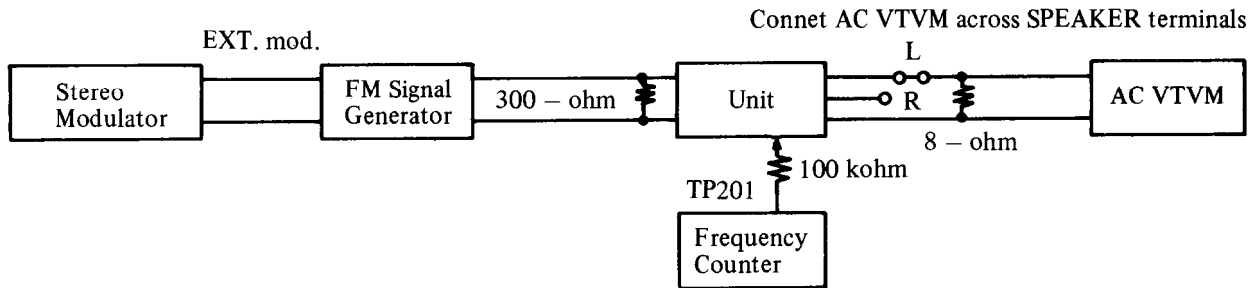
Step	Set Signal	Set Radio Dial	Adjust	VTVM reading	Remarks
1	515 kHz 400 Hz 30%	Lower end (515 kHz)	L152	Maximum	Repeat steps 1 and 2 as necessary
2	1680 kHz 400 Hz 30%	Upper end (1680 kHz)	TC4	Maximum	
3	600 kHz 400 Hz 30%	600 kHz	L151	Maximum	Repeat steps 3 and 4 as necessary
4	1400 kHz 400 Hz 30%	1400 kHz	TC2	Maximum	

**(4) FM ALIGNMENT**

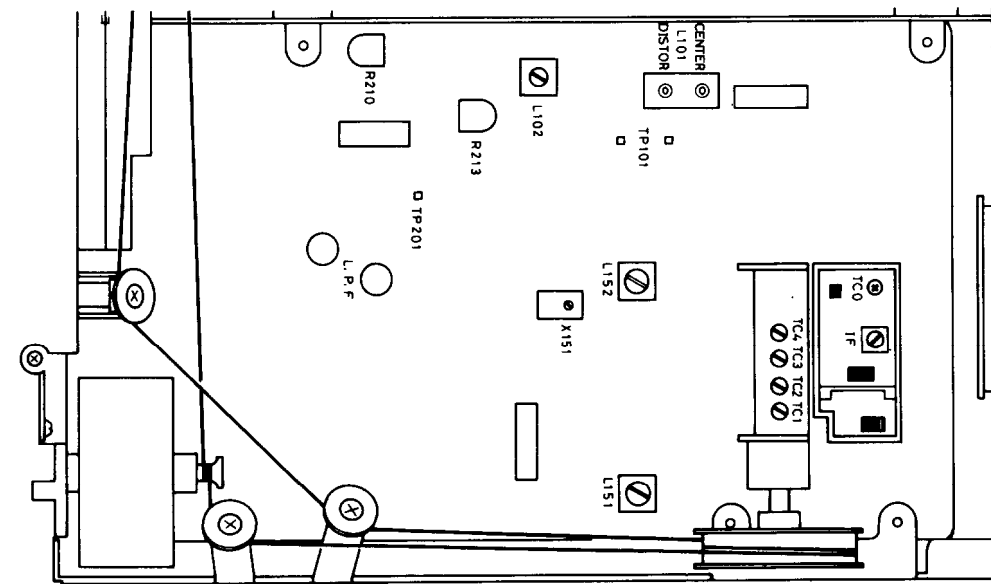


Step	FM Signal Generator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks
1	No signal	Quiet Point	L101 Back side	Voltage or Tuning Indicator	Center	Repeat Steps 1 and 2 as necessary
2	98 MHz 65 dBf 1 kHz 75 kHz devi.	98 MHz	L101 Front side	Distortion Analyzer	Minimum	
3	104 MHz 1 kHz 75 kHz devi.	104 MHz	TC0 TC1 TC3	AC VTVM	Maximum	
4	98 MHz, 65 dBf 1 kHz 75 kHz devi.	98 MHz	IF	Distortion Analyzer	Minimum	

(5) MULTIPLEX ALIGNMENT



Step	FM Signal Generator	Stereo Modulator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks
1	98 MHz no mod. 65 dBf	—	98 MHz	R213	Frequency Counter	76,000±76Hz	
2	STEREO INDICATOR should light up when stereo program is being received.						
3	98 MHz EXT. Mod. 65 dBf	Pilot Sig. 9% Main & Sub Sig. 1 kHz Lch 91%	98 MHz	R210	AC VTVM Right ch.	Minimum	Repeat Steps 3 & 4 as necessary same separation
4	Same as above	Pilot Sig. 9% Main & Sub Sig. 1 kHz Rch 91%	98 MHz		AC VTVM Left ch.	Minimum	



Adjustment points

# TUNER PC BOARD-PARTS LIST

## FM/AM TUNER AND EQUALIZER AMPLIFIER PC BOARD (NARF-1325c/f)

CIRCUIT NO.	PARTS NO.	DESCRIPTION	CIRCUIT NO.	PARTS NO.	DESCRIPTION
	<b>ICs</b>			<b>Resistors</b>	
Q103	222608	$\mu$ PC1167C2, FM IF	R210	5215048	N08HR200KBC, Semi-fixed
Q104	222453	HA-1196, Stereo decoder	R213	5215045	N08HR10KBC, Semi-fixed
Q107	222465	NJM-4558D, Servo lock amplifier		<b>Switches</b>	
Q112	222670	BA6124, Signal meter driver	S805-S808	25035305	NPS-442-L269, Source selector
Q150	222497	LA1240, AM radio system	S809	25065126	NSS-2259, De-emphasis switch (W)
Q301, Q401	222534	NJM-4559DX, Equalizer amplifier			
	<b>Front end</b>				
	240051	FF721U			Note: W: Only 120/220 V model
	<b>Transistors</b>				
Q101	2210823	2SC1675 (L1)			
Q105, Q106	2211255	2SC1815 (GR)			
Q108-Q110	2211255	2SC1815 (GR)			
Q151	2211255	2SC1815 (GR)			
	<b>Diodes</b>				
D103-D105	223145	1S2076TD			
D106	223132	1K60			
D155	223145	1S2076TD			
	<b>Coils</b>				
L103, L104	233107	NMC-5002			
L151	232099	NMA-3041			
L152	232073	NMO-2008			
	<b>Transformers</b>				
L101	233270	NFIF-6040			
L153	232041	NIT-0509			
	<b>Ceramic filters</b>				
X101, X103	3010003	SFE-10.7MA8			
X151	3010053	SFL-455B			
	<b>Capacitors</b>				
C114	352784799	0.47 $\mu$ F, 50 V, Elect.			
C115	352780109	1 $\mu$ F, 50 V, Elect.			
C116	352741009	10 $\mu$ F, 16 V, Elect.			
C118	352780109	1 $\mu$ F, 50 V, Elect.			
C119	352750479	4.7 $\mu$ F, 25 V, Elect.			
C120	352741009	10 $\mu$ F, 16 V, Elect.			
C154	352750479	4.7 $\mu$ F, 25 V, Elect.			
C155	352780339	3.3 $\mu$ F, 50 V, Elect.			
C158, C163	352741009	10 $\mu$ F, 16 V, Elect.			
C165	370133614	360pF $\pm$ 5%, 100 V, APS			
C178	352741009	10 $\mu$ F, 16V, Elect.			
C202-C205	352780229	2.2 $\mu$ F, 50 V, Elect.			
C206	372524714	470pF $\pm$ 5%, 50 V, St			
C207	352780339	3.3 $\mu$ F, 50 V, Elect.			
C208	352780229	2.2 $\mu$ F, 50 V, Elect.			
C209	352782299	0.22 $\mu$ F, 50 V, Elect.			
C216	352744719	470 $\mu$ F, 16 V, Elect.			
C221	352780109	1 $\mu$ F, 50 V, Elect.			
C222	352742209	22 $\mu$ F, 16 V, Elect.			
C224	352784799	0.47 $\mu$ F, 50 V, Elect.			
C225	352750479	4.7 $\mu$ F, 25 V, Elect.			
C227	352784799	0.47 $\mu$ F, 50 V, Elect.			
C251, C253	352741009	10 $\mu$ F, 16 V, Elect.			
C302, C402	352780229	2.2 $\mu$ F, 50 V, Elect.			
C305, C405	352721019	100 $\mu$ F, 6.3 V, Elect.			
C308, C408	352780229	2.2 $\mu$ F, 50 V, Elect.			
C311, C312	352780339	3.3 $\mu$ F, 50 V, Elect.			

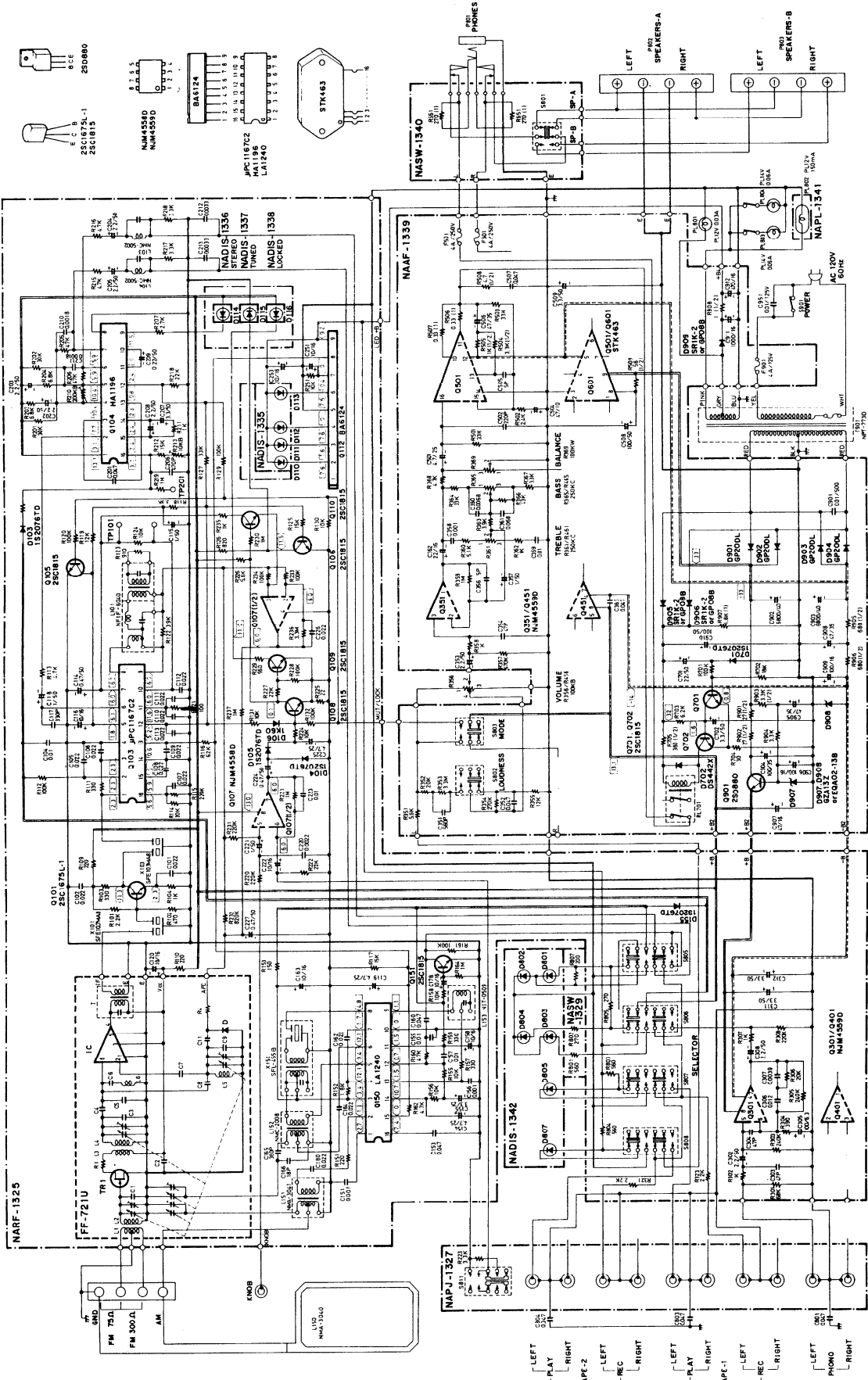
# TUNER PC BOARD-PARTS LIST

## FM/AM TUNER AND EQUALIZER AMPLIFIER PC BOARD (NARF-1325d)

CIRCUIT NO.	PARTS NO.	DESCRIPTION	CIRCUIT NO.	PARTS NO.	DESCRIPTION
<b>ICs</b>			<b>Resistors</b>		
Q103	222608	$\mu$ PC1167C2, FM IF	R210	5215048	N08HR200KBC, Semi-fixed
Q104	222453	HA-1196, Stereo decoder	R213	5215045	N08HR10KBC, Semi-fixed
Q107	222465	NJM-4558D, Servo lock amplifier	<b>Switches</b>		
Q112	222670	BA6124, Signal meter driver	S805-S808	25035305	NPS-442-L269, Source selector
Q150	222497	LA1240, AM radio system			
Q301, Q401	222534	NJM-4559DX, Equalizer amplifier			
<b>Front end</b>					
	240052	FF721E			
<b>Transistors</b>					
Q101	2210832	2SC1675 (L-1)			
Q105, Q106	2211255	2SC1815 (GR)			
Q108-Q110	2211255	2SC1815 (GR)			
Q151	2211255	2SC1815 (GR)			
<b>Diodes</b>					
D103-D105	223145	1S2076TD			
D106	223132	1K60			
D155	223145	1S2076TD			
<b>Coils</b>					
L102	233236	NMC-6027			
L103, L104	233107	NMC-5002			
L151	232099	NMA-3041			
L152	232073	NMO-2008			
<b>Transformers</b>					
L101	233270	NFIF-6040			
L153	232041	NIT-0509			
<b>Ceramic filters</b>					
X101	3010070	SFE-10.7MS3G-A			
X103	3010006	SFE-10.7MA8-A			
X151	3010053	SFL-455B			
<b>Capacitors</b>					
C114	352784799	0.47 $\mu$ F, 50 V, Elect.			
C115	352780109	1 $\mu$ F, 50 V, Elect.			
C116	352741009	10 $\mu$ F, 16 V, Elect.			
C118	352780109	1 $\mu$ F, 50 V, Elect.			
C119	352750479	4.7 $\mu$ F, 25 V, Elect.			
C120	352741009	10 $\mu$ F, 16 V, Elect.			
C154	352750479	4.7 $\mu$ F, 25 V, Elect.			
C155	352780339	3.3 $\mu$ F, 50 V, Elect.			
C158, C163	352741009	10 $\mu$ F, 16 V, Elect.			
C165	370133614	360pF $\pm$ 5%, 100 V, APS			
C178	352741009	10 $\mu$ F, 16 V, Elect.			
C202-C205	352780229	2.2 $\mu$ F, 50 V, Elect.			
C206	372524714	470pF $\pm$ 5%, 50 V, St			
C207	352780339	3.3 $\mu$ F, 50 V, Elect.			
C208, C209	352780229	2.2 $\mu$ F, 50 V, Elect.			
C209	352782299	0.22 $\mu$ F, 50 V, Elect			
C216	352744719	470 $\mu$ F, 16 V, Elect.			
C221	352780109	1 $\mu$ F, 50 V, Elect.			
C222	352742209	22 $\mu$ F, 16 V, Elect.			
C224	352784799	0.47 $\mu$ F, 50 V, Elect.			
C225	352750479	4.7 $\mu$ F, 25V, Elect.			
C227	352784799	0.47 $\mu$ F, 50 V, Elect.			
C251, C253	352741009	10 $\mu$ F, 16 V, Elect.			
C302, C402	352780229	2.2 $\mu$ F, 50 V, Elect.			
C305, C405	352721019	100 $\mu$ F, 6.3 V, Elect.			
C308, C408	352780229	2.2 $\mu$ F, 50 V, Elect.			
C311, C312	352780339	3.3 $\mu$ F, 50 V, Elect.			

# SCHEMATIC DIAGRAM

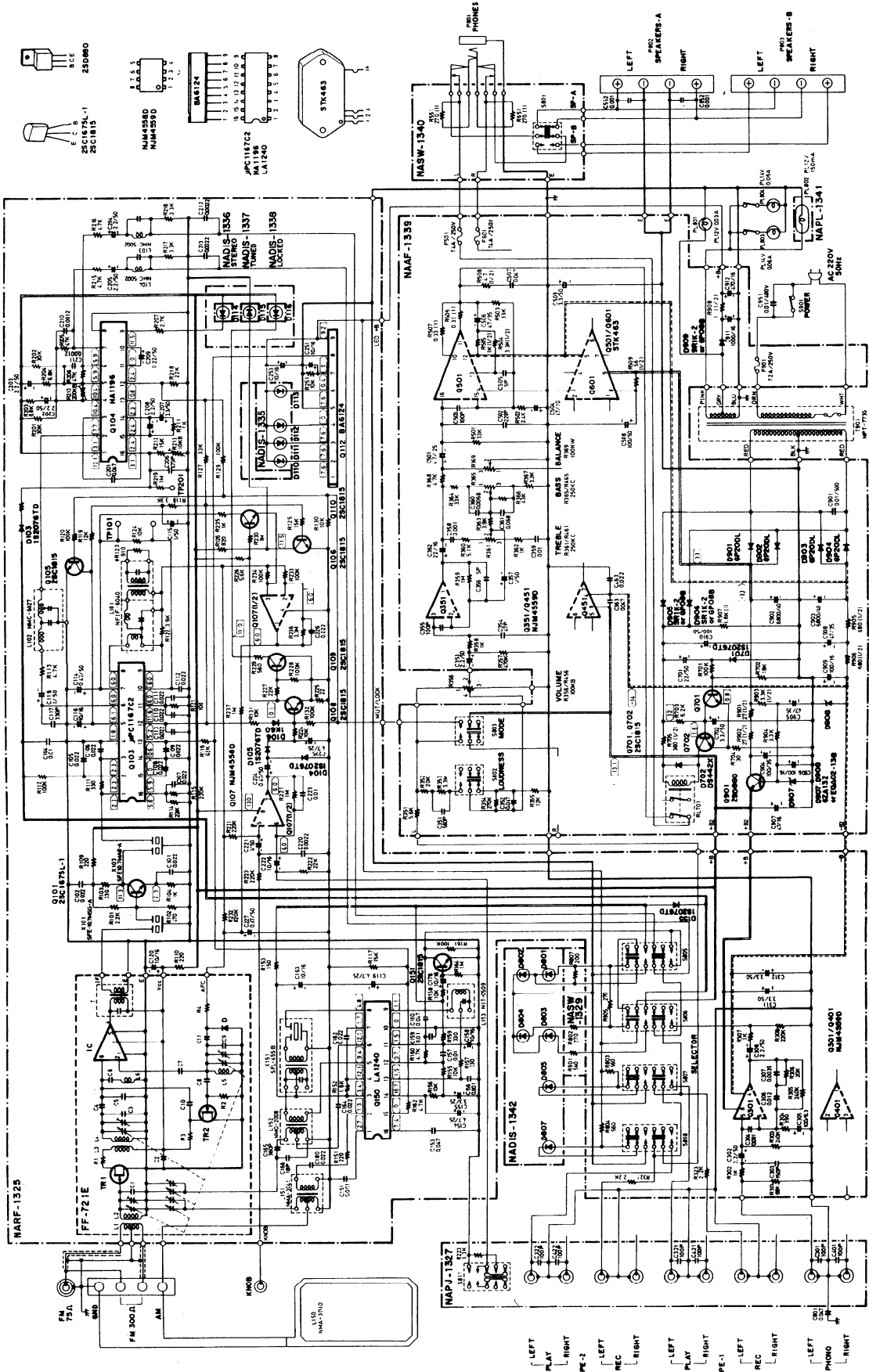
(D model)



NOTES  
 \*ALL RESISTORS ARE IN OHMS, 1/4WATT UNLESS OTHERWISE NOTED.  
 \*ALL CAPACITORS ARE IN  $\mu$ F, 50MV UNLESS OTHERWISE NOTED.  
 \*ELECTROLYTIC CAPACITOR (—|—) ARE IN  $\mu$ F/WV.  
 \*VOLTAGE (MEASURED WITH VTVM.)  
 ( ) V DC VOLTAGE (NO INPUT SIGNAL)  
 ( ) V DC VOLTAGE (FM STEREO)

- S801 SPEAKER 1-A 2-B(B-A)
- S802 LOUDNESS 1-OFF 2-ON
- S803 MUTE/LOCK 1-ON 2-OFF
- S805 SELECTOR 1-STEREO 2-MONO
- S806 SELECTOR 1-FM 2-AM
- S807 T. MONI-1 1-TUNER 2-PHONO
- S808 T. MONI-2 1-SOURCE 2-TAPE-2
- S811 SENSOR 1-HIGH 2-NORMAL 3-LOW
- S901 POWER 1-ON 2-OFF

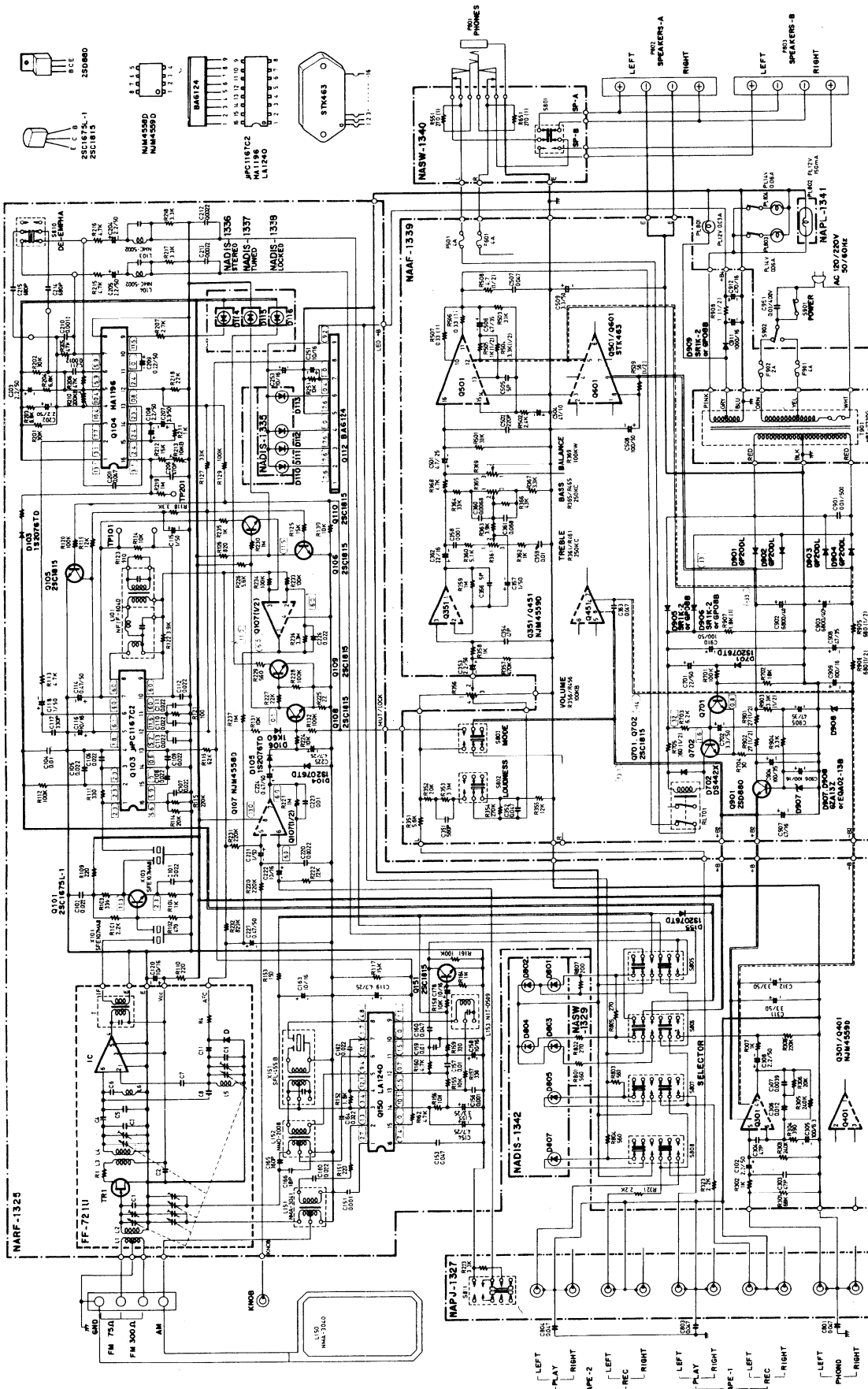
**SCHEMATIC DIAGRAM**  
(G model)



NOTES  
 \*ALL RESISTORS ARE IN OHMS, 1/4 WATT UNLESS OTHERWISE NOTED.  
 \*ALL CAPACITORS ARE IN  $\mu$ F, 50V UNLESS OTHERWISE NOTED.  
 \*ELECTROLYTIC CAPACITOR (2-4-) ARE IN  $\mu$ F/VV.  
 \*VOLTAGE (MEASURED WITH VTVM).  
 ( ) V DC VOLTAGE (NO INPUT SIGNAL)

- S801 SPEAKER 1-A 2-B(8\*4)
- S802 LOUDNESS 1-OFF 2-ON
- S803 MUTE/LOCK 1-ON 2-OFF
- S805 MODE 1-STEREO 2-MONO
- S806 SELECTOR 1-FM 2-AM
- S807 T. MONI-1 1-TUNEL 2-TAPE-1
- S808 T. MONI-2 1-SOURCE 2-TAPE-2
- S811 SENSOR 1-HIGH 2-NORMAL 3-LOW
- S901 POWER 1-ON 2-OFF

# SCHEMATIC DIAGRAM (W model)



- S801 SPEAKER 2-B(B+A)  
 S802 LOUDNESS 1-OFF 2-ON  
 S803 MUTE/LOCK 1-ON 2-OFF  
 S905 SELECTOR 1-FM 2-AM  
 S906 SELECTOR 1-TIMER 2-PHONO  
 S907 T. MONI-1 1-SOURCE 2-TAPE-1  
 S908 T. MONI-2 1-SOURCE 2-TAPE-2
- S810 DE-EMPHA 1-50US 2-75US  
 S811 SENSOR 1-HIGH 2-NORMAL 3-LOW  
 S901 POWER 1-ON 2-OFF  
 S902 AC SEL. 1-220V 2-120V
- NOTES  
 \* ALL RESISTORS ARE IN OHMS, \*M WATT UNLESS OTHERWISE NOTED  
 \* ALL CAPACITORS ARE IN  $\mu$ F, \*50WV UNLESS OTHERWISE NOTED  
 \* ELECTROLYTIC CAPACITOR (E) ARE IN  $\mu$ F/WV  
 \* VOLTAGE (MEASURED WITH VTVM)  
 \* V DC VOLTAGE (NO INPUT SIGNAL)  
 \* V AC VOLTAGE (FM STEREO)

MODEL TX-21

SUBSTITUTIVE PARTS LIST

NOTE: USE THE REGULAR PARTS WHEN REPLACEMENT

TYPE	CIRCUIT NO.	DESCRIPTION	REGULAR PARTS	SUBSTITUTIVE PARTS	APPLICATION
UD	Q107	IC	NJM4558D	NJM4559D	16911-17410
UD	Q103	IC	MPC1167C2	MPC1167C2(RED)	15911-16310

MODEL TX-21

SUBSTITUTIVE PARTS LIST

NOTE: USE THE REGULAR PARTS WHEN REPLACEMENT

TYPE	CIRCUIT NO.	DESCRIPTION	REGULAR PARTS	SUBSTITUTIVE PARTS	APPLICATION
UD	Q107	IC	NJM4558D	NJM4559D	16911-17410
UD	Q103	IC	MPC1167C2	MPC1167C2(RED)	15911-16310
UD	Q107	IC	NJM4558D	NJM4559D	18211-19510
UD	Q103	IC	MPC1167C2	MPC1167C	18211-19510
UD	Q103	IC	MPC1167C2	MPC1167C	19511-20510





**INDICATOR PC BOARDS (NADIS-1336/1337/1338)**

<b>CIRCUIT NO.</b>	<b>PARTS NO.</b>	<b>DESCRIPTION</b>
	225082	SLP-155B-01, L.E.D., red
	225110	SLP-255B, L.E.D., green

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