

ONKYO® SERVICE MANUAL

QUARTZ SYNTHESIZED FM STEREO/AM TUNER MODEL T-4310R



Black model

BMP	230V AC, 50Hz
BMW	120V/220V AC, 50/60Hz
BMD	120V AC, 60Hz

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK $\triangle$ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

TABLE OF CONTENTS

Specifications	2
Service procedures	2
Block diagram	3
Exploded view	4
Parts list	5
Microprocessor connection diagram	6
Microprocessor terminal description	7
Packing view	8
Adjustment procedures	9
Printed circuit views from bottom side	11
Schematic diagram	13
Printed circuit board-parts list	21

ONKYO®
AUDIO COMPONENTS

SPECIFICATIONS

FM

Tuning range:	87.50 – 108.00 MHz (25 kHz/50 kHz steps)
Usable sensitivity	
Mono:	11.2 dBf, 1.0 μ V, 75 Ohms, IHF 0.9 μ V, 75 Ohms, DIN
Stereo:	17.2 dBf, 2.0 μ V, 75 Ohms, IHF 20 μ V, 75 Ohms, DIN
50dB quieting sensitivity	
Mono:	16.1 dBf, 1.7 μ V, 75 Ohms
Stereo:	36.1 dBf, 17 μ V, 75 Ohms
Capture ratio:	1.5 dB
Image rejection ratio:	80 dB
U.S.A. & Canadian models:	40 dB
IF rejection ratio:	90 dB
Signal-to-noise ratio	
Mono:	76 dB, IHF
Stereo:	66 dB, IHF
Alternate channel attenuation:	60 dB, IHF
Selectivity:	60 dB, DIN (Narrow) ($\pm$ 300 kHz, 40 kHz dev)
AM suppression ratio:	50 dB
Total Harmonic Distortion	
Mono:	0.1% (Normal)
Stereo:	0.2% (Normal)
Frequency response:	30 – 15,000 Hz ($\pm$ 1.5 dB)
Stereo separation:	40 dB at 1 kHz (Normal) 30 dB at 70 – 10,000 Hz
Output voltage:	0.75 V
U.S.A. model:	0.45 V
Muting level:	17.2 dBf, 2.0 μ V, 75 Ohms

AM

Tuning range	
European models:	522 – 1611 kHz (9 kHz steps)
U.S.A. & Canadian models:	530 – 1710 kHz (10 kHz steps)
Worldwide models:	531 – 1602 kHz (9 kHz steps) 530 – 1710 kHz (10 kHz steps)
Usable sensitivity:	25 μ V
Image rejection ratio:	40 dB
IF rejection ratio:	40 dB
Signal-to-noise ratio:	40 dB
Total Harmonic Distortion:	0.7%
Output voltage:	150 mV

General

Power supply	
European & Australian models:	AC 230 V, 50 Hz
U.S.A. & Canadian models:	AC 120 V, 60 Hz
Worldwide models:	AC 120 V and 220 V switchable, 50 Hz/60 Hz
Dimensions (W $\times$ H $\times$ D):	455 $\times$ 90 $\times$ 317 mm 17-15/16" $\times$ 3-9/16" $\times$ 12-1/2"
Weight:	3.9 kg, 8.6 lbs.

Specifications and features are subject to change without notice.

SERVICE PROCEDURES

1. Safety-check out

(Only U.S.A. model)

After correcting the original service problem, perform the following safety check before releasing the set to the customer. Connect the insulating-resistance tester between the plug of power supply cord and chassis.

Specifications: 3.3Mohm $\pm$ 10% at 500V.

2. Memory preservation

This unit does not require memory preservation batteries. A built-in memory power back-up system preserves contents of the memory during power failures and even when the unit is unplugged. The unit must be plugged in and the power switch turned on and off once in order to charge the back-up system. Note that since this is not a permanent memory, the power switch must be turned on and off a few times each month to keep the back-up system operative.

The period of time during which memory contents are preserved after power has last been turned off varies depending on climate and placement of the unit. On the average, memory contents are protected over a period of 3 to 4 weeks (a minimum of 2 weeks) after the last time power has been turned off. This period is shorter when the unit is exposed to very high humidity or used in an area with an extremely humid climate.

3. Voltage Selector (Back Panel)

W models are equipped with a voltage selector to confirm 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. This switch is set to 220V at the factory. 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. Models without a voltage selector can only be used in areas where the power supply is the same as that of the unit.

4. Tuning Step Frequency Switch (Bottom board)

W models are equipped with a switch for the AM (9kHz/10kHz) band. The switch should be set to the proper steps for the radio broadcast frequencies in your area.

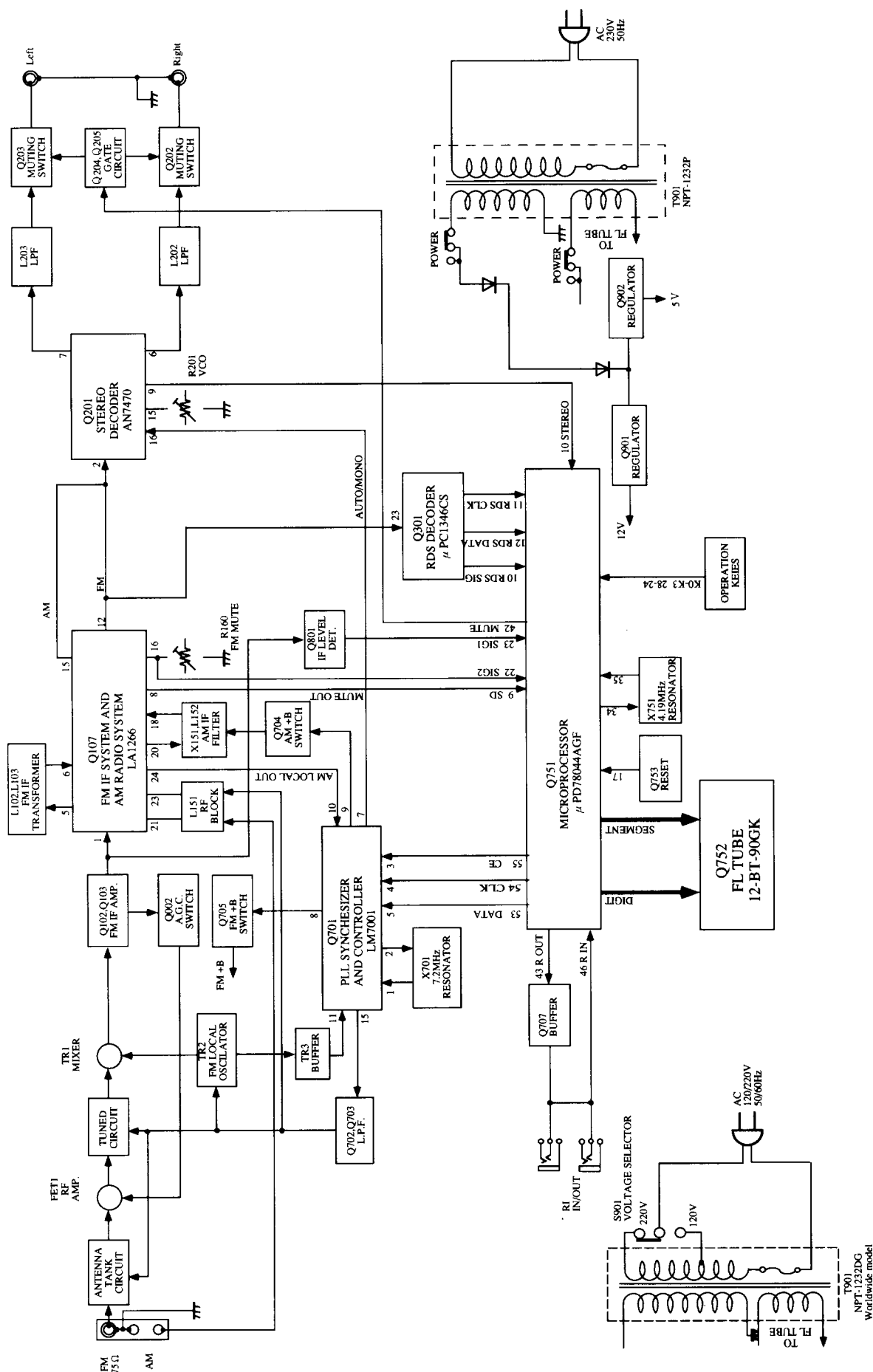
5. Changing the band step

With the exception of the models below, a BAND STEP selector switch is not provided.

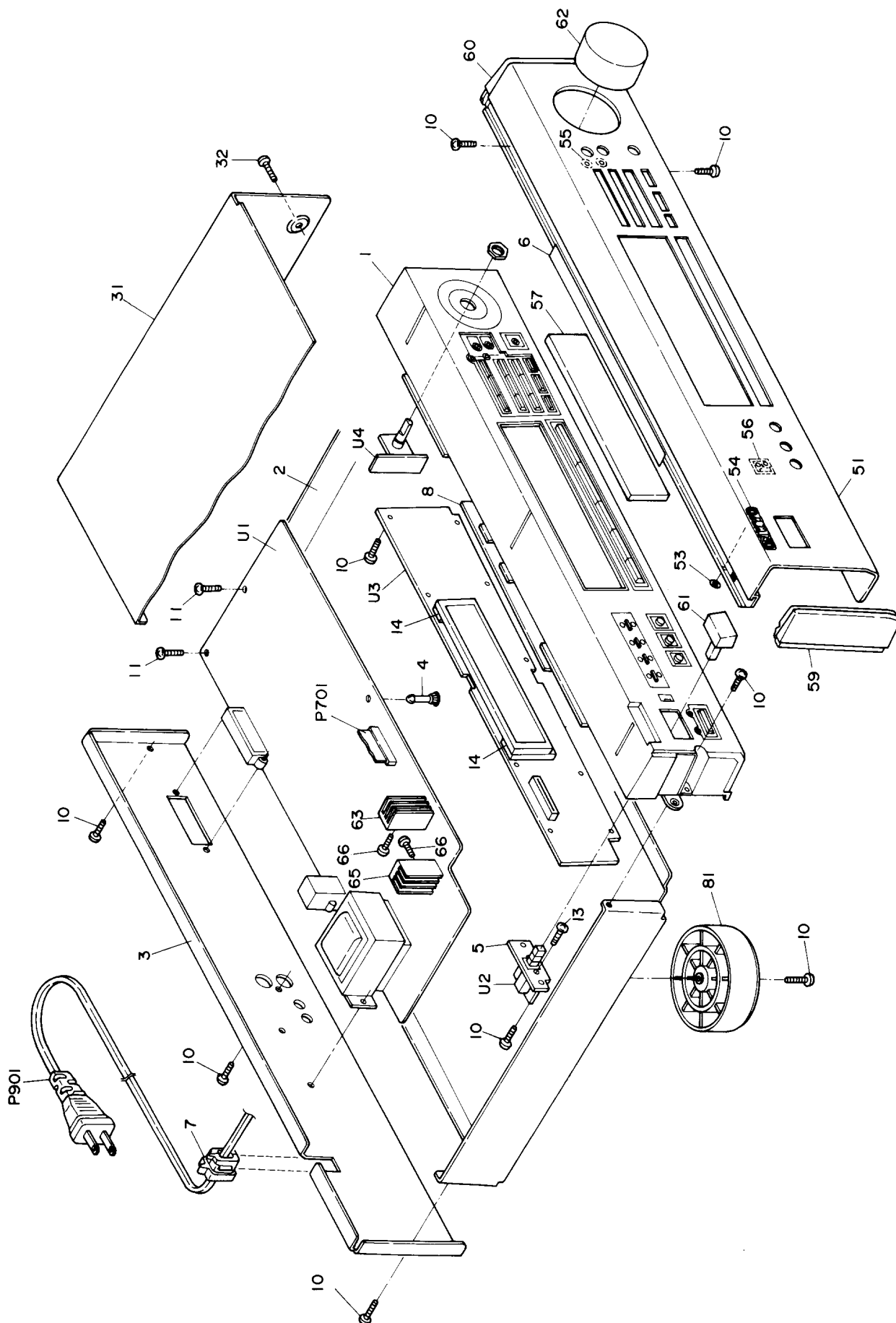
AM

MODEL	BAND STEP	I702
120V	10kHz $\rightarrow$ 9kHz	Short
Others	9kHz $\rightarrow$ 10kHz	Open

BLOCK DIAGRAM



EXPLODED VIEW

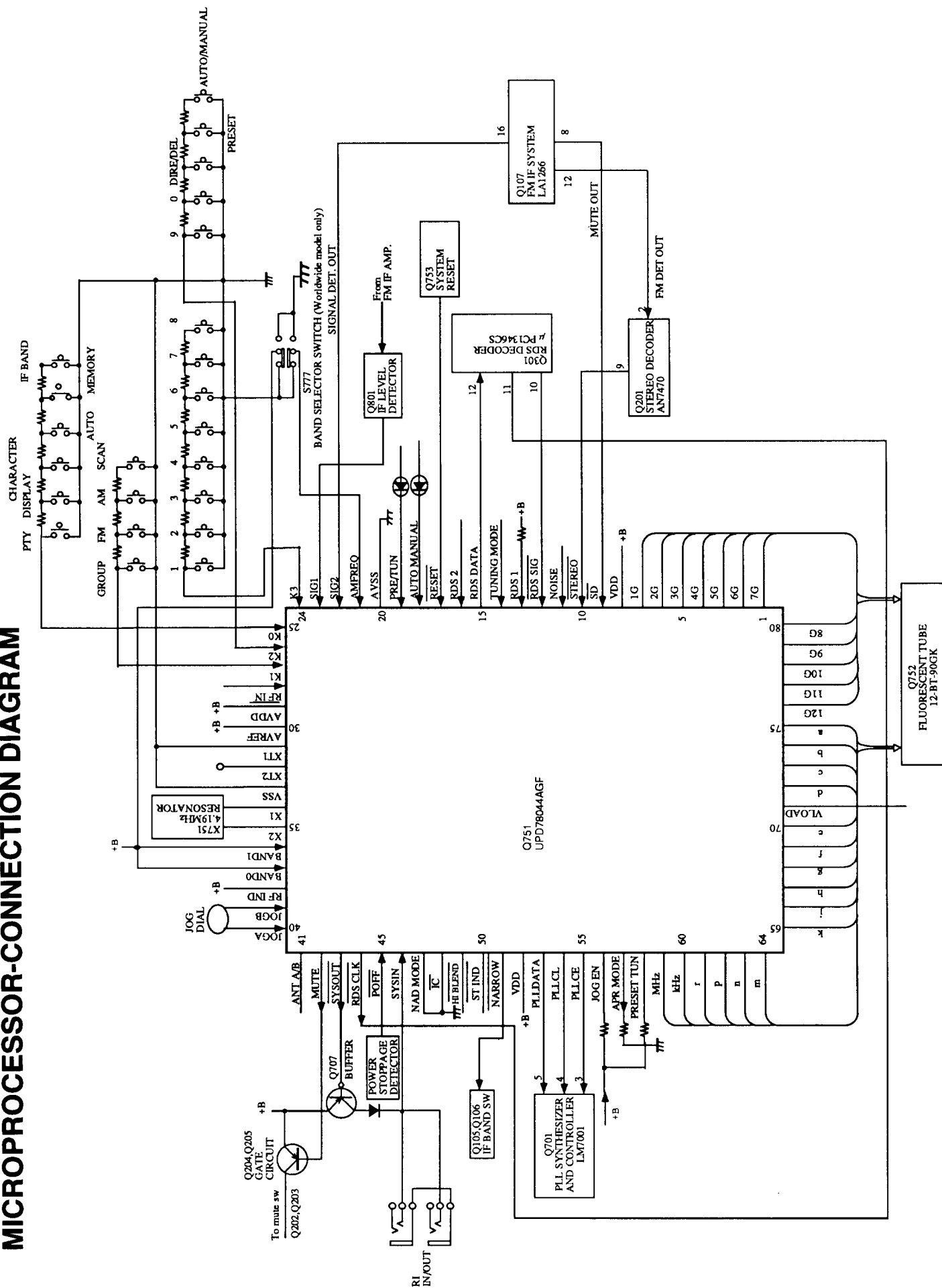


EXPLODED VIEW PARTS LIST

REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION
1	27110847AY	Front bracket	P701	2041253512Y	NCFC1-253512, Flexible flat cable
2	27100230BY	Chassis	P901	253191HIT	△ AS-UC-7#18, AC cord <D>
3	27122045AY	Rear panel <D>		253195MARY	△ AS-CEE, AC Cord <P><W>
	27122102Y	Rear panel <PT>	U1	1A581573-1Y	NARF-5173-1, Main circuit pc board ass'y <D><PT>
	27122046AY	Rear Panel <P>		1A581573-1AY	NARF-5173-1A, Main circuit pc board ass'y <P>
	27122047AY	Rear Panel <W>		1A581573-1BY	NARF-5173-1B, Main circuit pc board ass'y <W>
4	27190511	Holder	U2	1A581574-1Y	NASW-5174-1, Power switch pc board ass'y
5	27141640AY	Bracket (POWER)	U3	1A581575-1Y	NADIS-5175-1, Displaycircuit pc board ass'y <D><PT>
7	27300750	△ #2271, Cord bushing		1A581575-1AY	NADIS-5175-1A, Display circuit pc board ass'y <P>
8	28133334Y	Back plate, filter"		1A581575-1BY	NADIS-5175-1B, Display circuit pc board ass'y <W>
10	838130088	3TTTB+8B, Self-tapping screw	U4	1A581576-1Y	NASW-5176-1, Encordercircuit pc board ass'y
11	938130088	3TTTB+8B, Self-tapping screw			
13	82143006	3P+6FN(BC), Pan head screw			
14	27190953Y	Holder, FL tube			
31	28184488	Top cover			
32	838430088	3TTTB+8B(BC), Self-tapping screw			
51	1A581121Y	Front panel Ass'y			
53	8910301	CS-3(SUS), CS Ring			
54	28135199	Badge			
57	28191702Y	Clear plate			
59	28125273Y	End cap(L)			
60	28125274Y	End cap(R)			
61	28324140Y	Knob (Power)			
62	28325101	Knob (Tuning)			
63	2222Y7217	Heat sink, Q901			
65	27160211Y	Heat sink, Q902			
66	82143006	3P+6FN(BC), Pan head screw			
81	27175292Y	Leg ass'y			

NOTE: THE COMPONENTS IDENTIFIED BY MARK△ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

MICROPROCESSOR-CONNECTION DIAGRAM



TERMINAL DESCRIPTION

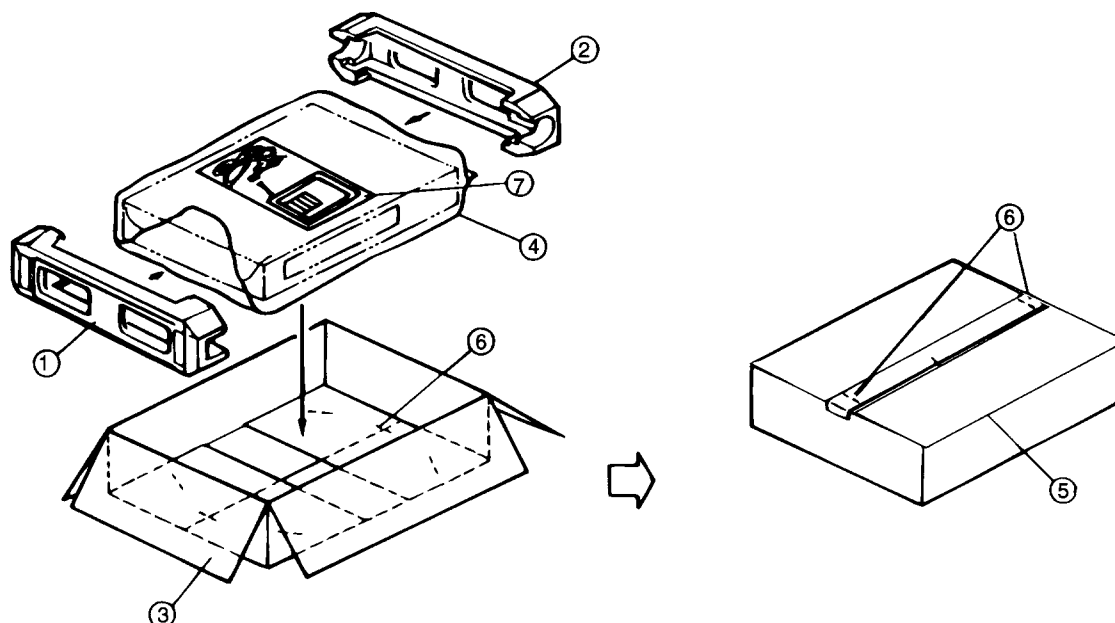
Pin No.	Function	I/O	Description
17	7G-1G	O	Grid output terminals for fluorescent tube.
8	VDD	-	Power supply terminal.
9	SD	I	Broadcast detection input more than the muting level.
10	STEREO	I	Stereo broadcast detection input
11	NOISE	I	Noise detection input
12	RDSSIG	I	RDS broadcast detection input
13	RDS1	I	Initializing input for RDS operation
14	TUNING MODE	I	Initializing input for tuning mode
15	RDS DATA	I	Connect to the terminal DATA of RDS data decoder IC _μ PC1346CS
16	RDS2	I	Initializing input for RDS operation
17	RESET	I	System reset terminal
18	AUTO/MANU	O	Tuning indicator output
19	PRE/TUN	O	PRESET indicator output
20	AVSS		Ground terminal of A/D converter
21	AMFREQ	I	Initializing input for AM band step.
22	SIG2	I	Signal strength level input
23	SIG1	I	Signal strength level input
24-27	K3-K0	I	Operation key connection terminals
28	RFIN	I	RF mode detect terminal
29	AVDD		Analog power supply terminal of A/D converter
30	AVREF	I	Reference voltage input of A/D converter
31	XT1	I	Resonator terminals for sub system
32	XT2		Resonator terminals for sub system . Not used.
33	VSS		Ground terminal
34	X1	I	Resonator terminals for main system
35	X2		Connect the 4.19MHz ceramic resonator.
36	BAND1	I	Initializing input for FM band step.

Pin No.	Function	I/O	Description
37	BAND0	I	Initializing input for FM band step.
38	RFIN	I	RF mode LED output. Not used.
39	JOGB	I	Jog dial signal B
40	JOGA	I	Jog dial signal A
41	ANT A/B	O	Ant A/B selector output. Not used.
42	MUTE	O	Muting control output
43	SYSOUT	O	System code output
44	RDSCLK	I	Connect to the terminal CLK of RDS data decoder.
45	POFF	I	Power stoppage detection input
46	SYSIN	I	System code input
47	NAD MODE	I	Initializing input for memory system
48	IC		Connect to the ground terminal
49	HI BLEND	O	Hi-blend control output. Not used.
50	ST INDD	O	Stereo LED indicator output
51	NARROW	O	NARROW indicator output
52	VDD		Power supply terminal
53	PLLDATA	O	Connect to the terminal DATA of PLL IC LM7001.
54	PLLCL	O	Connect to the terminal CL of PLL IC.
55	PLLCE	O	Connect to the terminal CE of PLL IC.
56	JOGEN	I	Initializing input for Jog operation.
57	APR MODE	I	Initializing input for APR mode.
58	PRESET TUN	I	Initializing input for PRESET tuning.
59-70	P16-P5	O	Segment output terminals for fluorescent tube.
71	VLOAD		Pull-down resistor connection terminal of FL controller and driver.
72-75	P4-P1	O	Segment output terminals for fluorescent tube.
76-80	I2G-8G	O	Grid output terminals for fluorescent tube

INITIALIZING OF FM/AM BAND

BAND 0	BAND 1	AM FREQ	Region	FM		AM	
				Frequency range	/W step	Frequency range	Step
0	1	0	Europe	87.5~108.00MHz	50/25kHz	522~1611kHz	9kHz
1	0	0	Worldwide	87.5~108.00MHz	50/25kHz	531~1602kHz	9kHz
1	1	1	120V model	87.9~107.9MHz	50/25kHz	530~1710kHz	10kHz
0	0	0	Japan	76.0~90.0MHz	100kHz	522~1611kHz	9kHz

PACKING VIEW



REF.NO.	PART NO.	DESCRIPTION
1	29091647Y	Pad (L)
2	29091648Y	Pad (R)
3	29052857Y	Master carton box
4	29100037-1Y	Styren bag
5	29110071 or 29110098	PP Tape
6	282321 or 282301	Staple
7	Accessory bag ass'y	
	29342079Y	Instruction manual (E)
	29342081Y	Instruction manual (V) <PV>
	29365020L	Warranty Card V <PV>
	29365019BY	Warranty Card E <D>
	29342115Y	Instruction manual U3 <PT><W>
	29342080Y	Instruction manual U6 <P>
	29342171Y	Instruction manual U7 <P>
	29355133AY	Instruction manual (DBP) <P><PV>
	29100097-1Y	Styren bag
	232140	NMA-3057, AM loop antenna
	292111	FM antenna <D>
	292112Y	FM antenna <PT><W><P>
	2010244Y	Connection cord
	2010200	Connection cord RI
	25065462Y	FM antenna adaptor <PT><W>
	25055018	CV-K-1, Conversion plug <W>
	29358002K	Service station list<D>
	29360404Y	SN sheet
	NOTE : <P>: 230V model only	
	<W>: Worldwide model only	
	<D> : 120V model only	

ADJUSTMENT PROCEDURES

Preparation

• Input

FM mono: 1kHz, 75kHz devi., 60dB/μV (65dBf)

FM stereo: 1kHz, L+R 67.5kHz devi.: Pilot signal 19kHz
7.5kHz devi.

AM; 400Hz, 30% mod.,

1. FM ADJUSTMENT

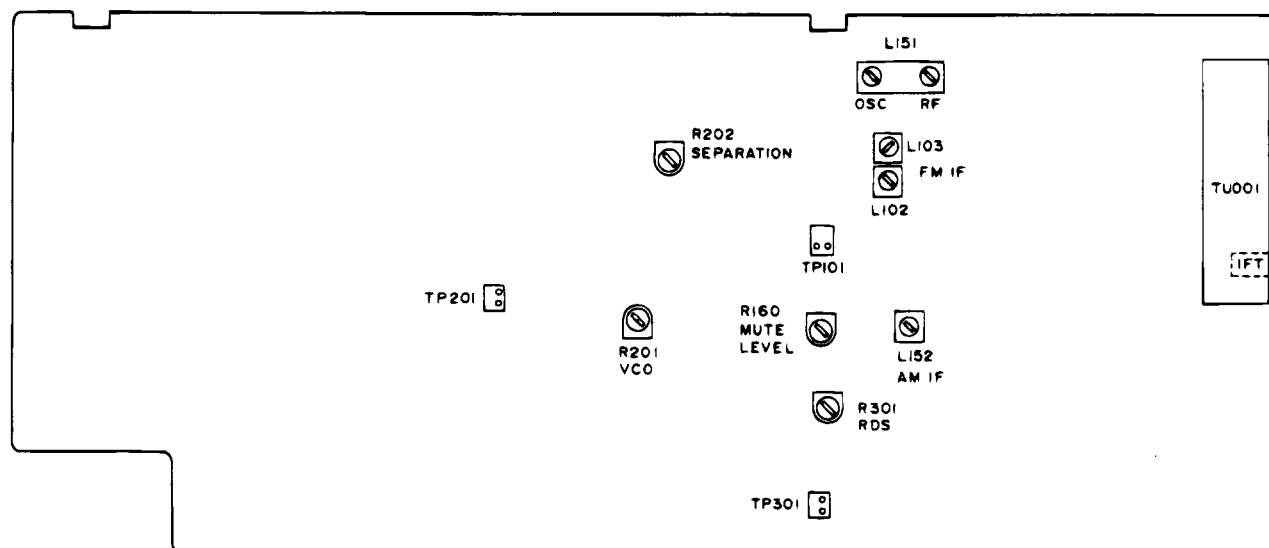
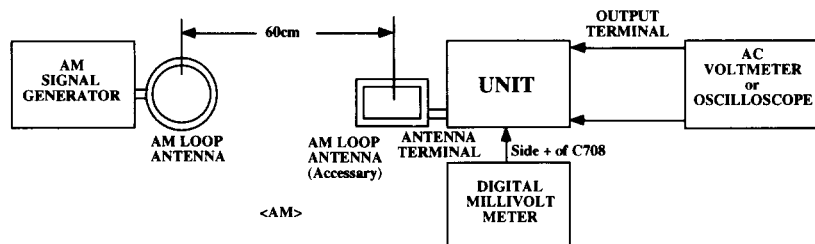
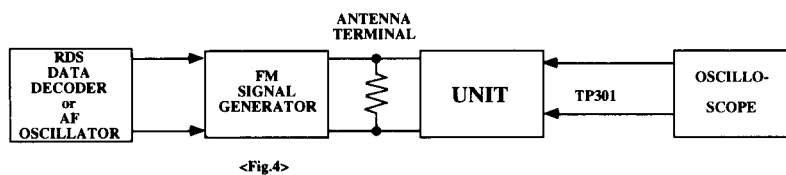
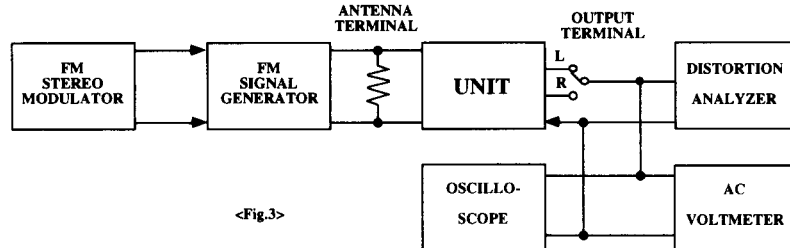
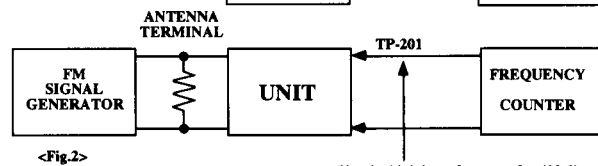
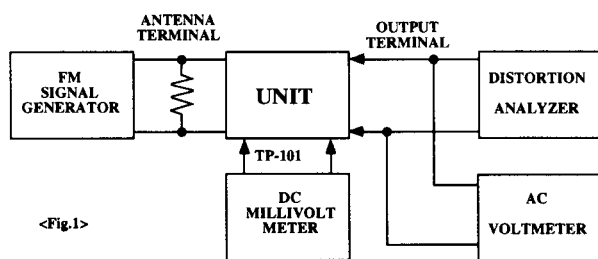
Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Tuning frequency	Output indicator	Adjustment point	Adjust for	Remarks
FM IF/RF	1	Fig.1	99.1MHz, (99.0MHz) 1kHz 75kHz devi. 65dBf(60dB μ)	—	99.1MHz (99.0MHz)	DC voltmeter	L102	0±20mV	IF BAND switch: NORMAL FM MUTE/MODE switch:OFF/MONO Repeat the steps 1 and 3 until no further adjustment is necessary.
	2					AC voltmeter	IFT on the front end	Maximum	
	3					Distortion analyzer	L103	Minimum	
Muting Level	1	Fig.1	99.1MHz (99.0MHz), 1kHz 22.5kHz devi. 19.2dBf(14dB μ)	—	99.1MHz (99.0MHz)	Oscilloscope	R160	Signal output	FM MUTE/MODE switch:ON/STEREO IF BAND switch: NARROW
	2		18.2dBf(13dB μ)					No signal	
VCO	1	Fig.2	99.1MHz (99.0MHz),1kHz 75kHz,devi, 65dBf(60dB μ)		99.1MHz (99.0MHz)	Frequency counter	R201	19,000±10Hz	IF BAND switch: NORMAL FM MUTE/MODE switch:ON/STEREO
Stereo Distortion		Fig.3	99.1MHz (99.0MHz) Ext. mod. 65dBf(60dB μ)	Channel L or R 1kHz	99.1MHz (99.0MHz)	Distortion analyzer	IFT on the front end	Minimum	FM MUTE/MODE switch:ON/STEREO Don't turn more than ±90°
Stereo Separation (Except "D" type)	1	Fig. 3	99.1MHz (99.0MHz) Ext. mod. 65dBf(60dB μ)	Channel L 1kHz	99.1MHz (99.0MHz)	Channel R AC voltmeter	R202	Minimum	Maximum and same separation
	2			Channel R 1kHz		Channel L AC voltmeter		Minimum	
RDS		Fig.4	99.1MHz (99.0MHz) Ext. mod.60dB	RDS data or 57kHz 3% devi.	99.1MHz (99.0MHz)	Oscilloscope	R301	Maximum	

2. AM ADJUSTMENT

Step	AM SG output	Tuning Frequency	Output Indicator	Adjustment Point	Adjust for
1		522kHz or (530kHz)	Digital DC voltmeter	OSC coil on RF block L151	1.2±0.2V
2	603kHz (600kHz) 400Hz 30% mod. 60dB/m	603kHz (600kHz)	AC voltmeter	RF coil on RF block L151	Maximum
3	999kHz (1000kHz) 400Hz 30% mod. 60dB/m	999kHz (1000kHz)	AC voltmeter	L152	Maximum

Reference Specification

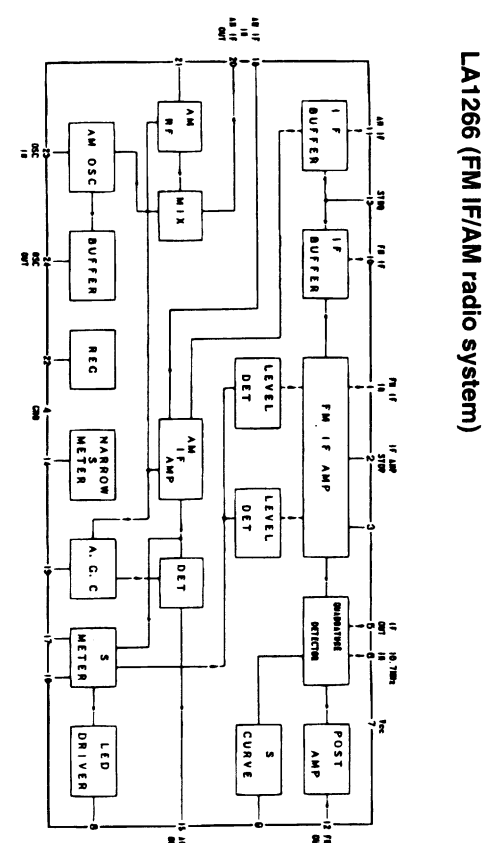
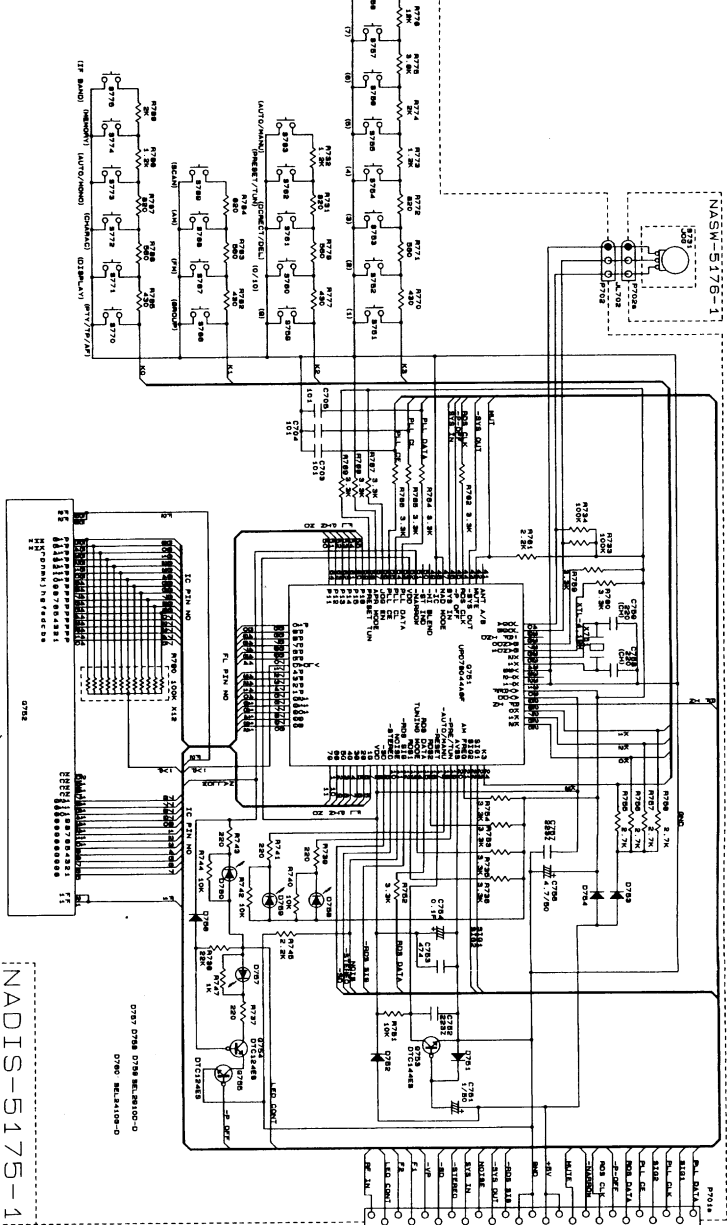
FM tuned voltage : 87.5MHz ~108.0MHz
1.6±0.4V ~ 8.0±0.4V
AM tuned voltage : 522kHz ~ 1611kHz
1.2±0.4V ~ 6.7V±0.4V (230V model)
AM tuned voltage : 531kHz ~ 1602kHz
1.2±0.5V ~ 6.7V±0.5V (Worldwide model)
Muting level 14±2dB
Muting width 35±10kHz
Auto stop level AM less than 65dB/m
FM less than 17dB μ
Stereo indicator level 14±4dB μ



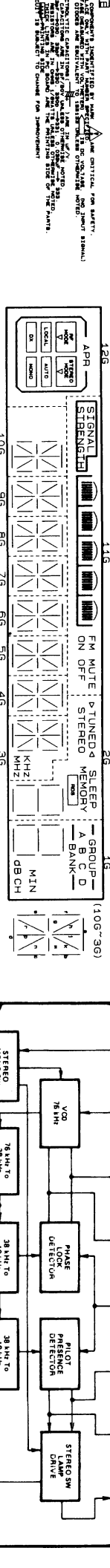
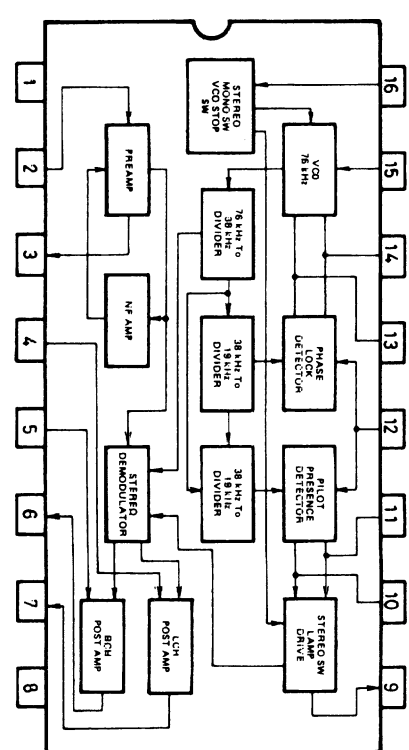
NARF-5173-1

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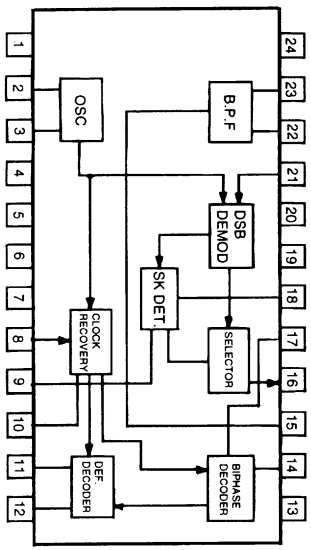
CHEMATIC DIAGRAM -120V model-



AN7470 (FM stereo decoder)



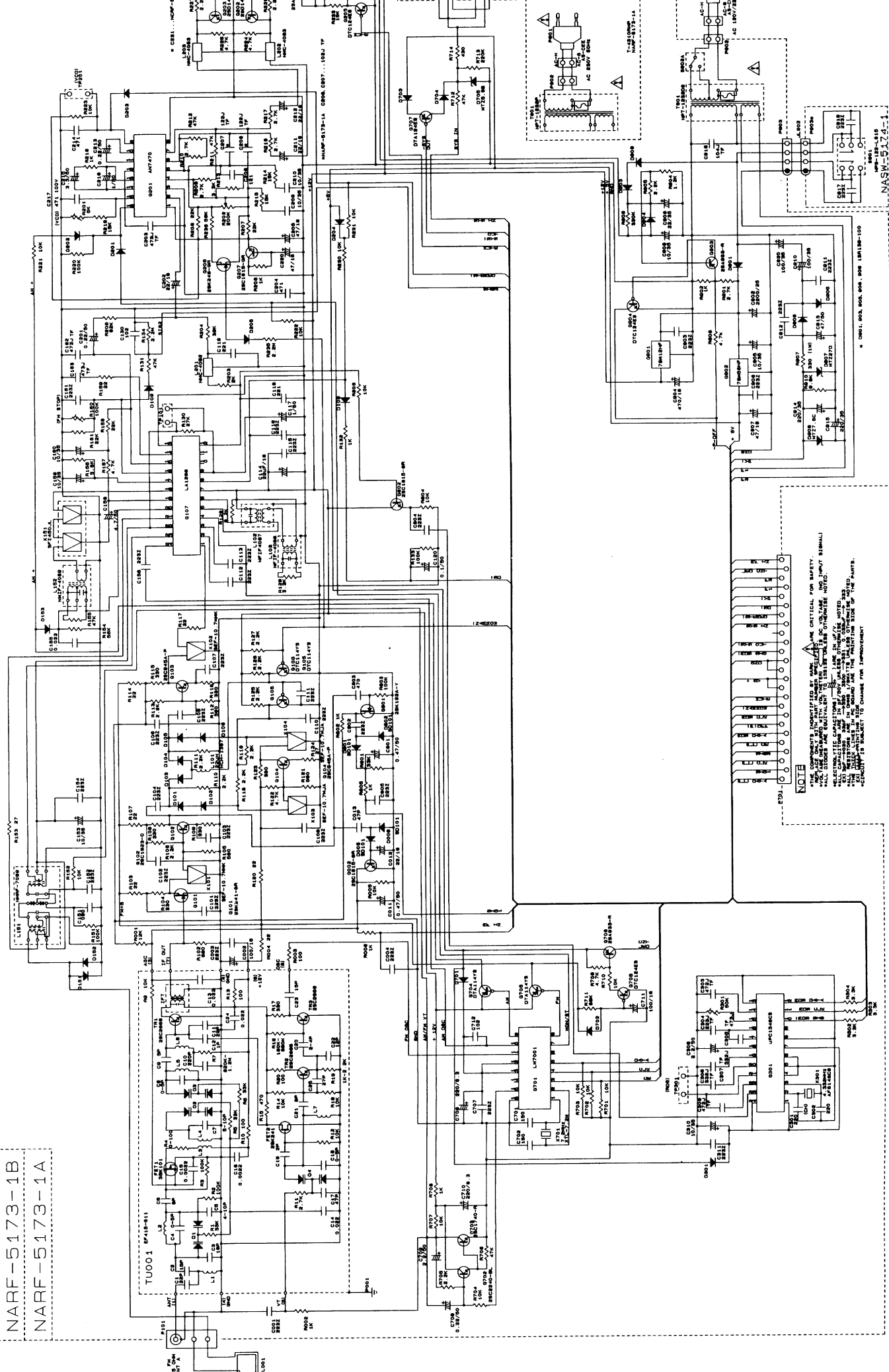
μPC1346CS (RDS Decoder)



SCHEMATIC DIAGRAM -230V/Worldwide model-

NARF-5173-1B

NARF-5173-1A



A

B

C

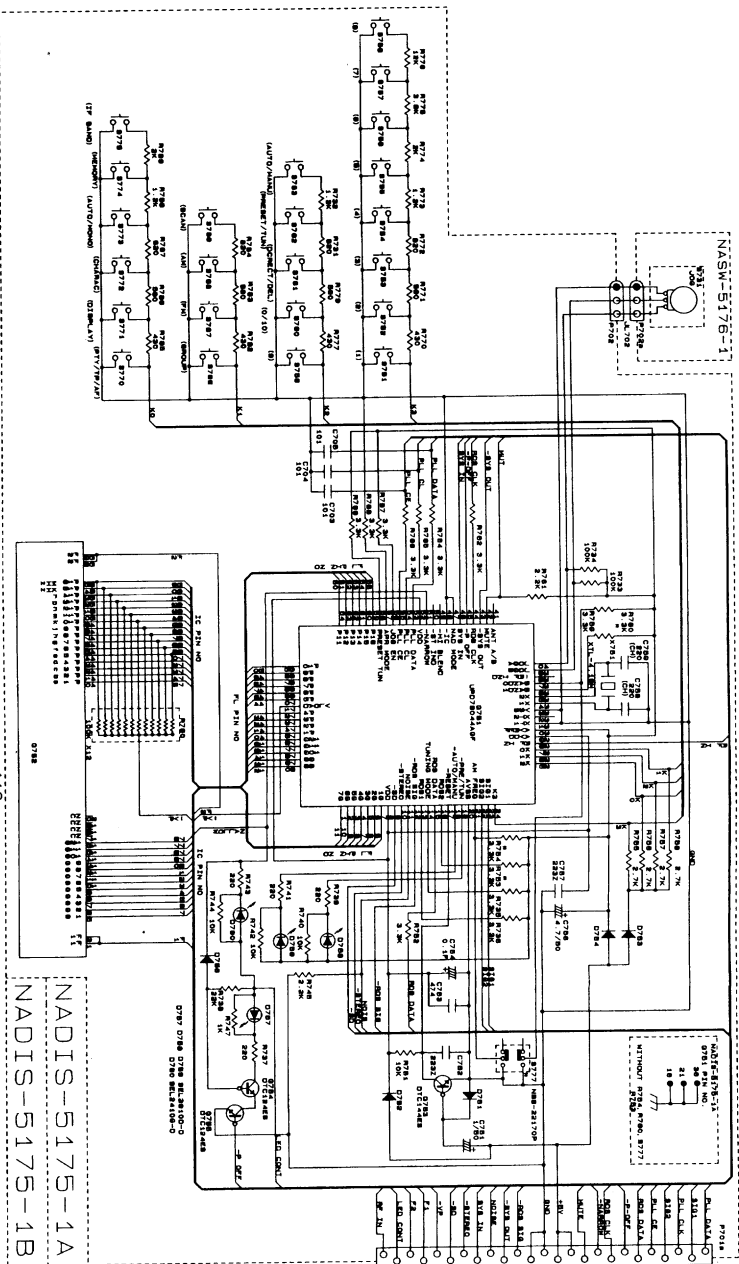
D

E

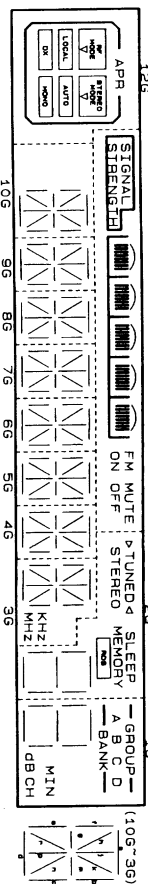
F

G

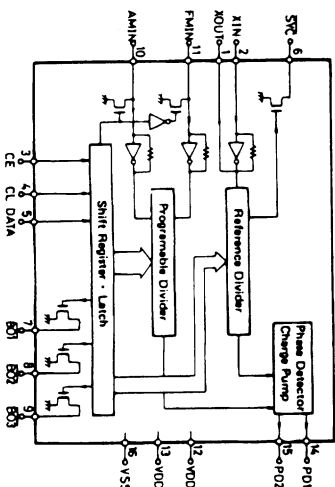
SCHEMATIC DIAGRAM -230V/Worldwide model-



NOTE: THE COMPONENTS IDENTIFIED BY A TRIANGLE ARE CRITICAL FOR PROPER OPERATION. IF THESE COMPONENTS ARE REPLACED, THE UNIT MUST BE RECALIBRATED. THE RECALIBRATION PROCEDURE IS DESCRIBED IN THE SERVICE MANUAL. THE RECALIBRATION PROCEDURE IS DESCRIBED IN THE SERVICE MANUAL. THE RECALIBRATION PROCEDURE IS DESCRIBED IN THE SERVICE MANUAL.



LM7001 (PLL frequency synthesizer)



FM	Q002	E	C	B
AM	0.00	4.68	0.00	
FM	Q102	1.34	9.12	2.09
AM	0.00	0.00	0.00	
FM	Q103	1.42	8.88	2.07
AM	0.00	0.00	0.00	
FM	Q104	0.38	5.47	1.06
AM	0.00	0.00	0.00	
FM	Q105	0.00	6.57	0.00
AM	0.00	0.00	0.00	
FM	Q106	0.00	0.00	8.78
AM	0.00	0.00	0.00	
FM	Q202	0.00	0.00	0.68
AM	0.00	0.00	0.00	
FM	Q203	0.00	0.00	0.67
AM	0.00	0.00	0.00	

FM	Q204	E	C	B
AM	0.00	11.92	11.90	11.22
FM	Q205	0.00	11.93	0.00
AM	0.00	0.00	0.00	14.90
FM	Q207	0.00	14.87	0.93
AM	0.00	0.00	0.00	4.93
FM	Q207	11.15	11.92	11.87
AM	0.00	11.16	11.93	11.87
FM	Q702	0.61	11.15	1.09
AM	0.00	0.60	11.35	1.09
FM	Q703	0.00	3.80	0.60
AM	0.00	0.00	5.81	0.60
FM	Q704	11.90	0.00	11.84
AM	0.00	11.92	11.90	0.00
FM	Q705	11.90	10.61	0.00
AM	0.00	11.92	0.00	11.85
FM	Q706	5.68	5.59	4.96
AM	0.00	5.69	1.95	5.68

FM	Q707	E	C	B
AM	0.00	5.30	0.00	
FM	Q708	0.00	5.31	0.00
AM	0.00	0.00	0.00	
FM	Q802	2.57	11.91	
AM	0.00	2.54	11.92	
FM	Q903	3.25	0.00	
AM	0.00	3.75	0.00	
FM	Q904	0.00	4.48	
AM	0.00	0.00	0.00	
FM	Q101	8.10	0.00	
AM	0.00	0.00	0.00	
FM	Q206	8.98	8.98	
AM	0.00	8.99	8.98	
FM	Q801	5.16	0.00	
AM	0.00	0.00	0.00	

FM	Q107	1	2	3	4	5	6	7	8	9	10	11	12
AM	0.00	2.53	2.53	0.00	11.91	11.91	11.91	4.79	4.80	4.11	2.46	2.80	3.16
FM	Q201	11.16	2.56	6.04	8.98	3.97	4.00	0.00	9.88	2.57	2.58	2.57	
AM	0.00	11.16	2.56	6.05	8.99	3.97	4.00	0.00	11.15	2.58	2.58	2.58	
FM	Q301	4.98	2.38	2.17	0.00	0.00	4.98	0.00	4.90	4.95	2.52	2.56	
AM	0.00	4.98	2.38	2.18	0.00	0.00	4.98	0.00	4.98	4.98	2.46	2.54	
FM	Q701	0.71	1.67	0.00	0.00	0.00	0.00	7.96	0.00	11.83	0.00	2.90	4.92
AM	0.00	0.71	1.67	0.00	0.00	0.00	0.00	9.20	11.85	0.00	1.81	0.00	4.94
FM	Q107	0.00	1.3	14	15	16	17	18	19	20	21	22	23
AM	0.00	0.00	1.51	1.54	1.56	0.49	0.00	2.53	1.56	0.00	4.00	4.00	3.20
FM	Q201	2.57	2.57	0.40	0.74								
AM	0.00	2.57	2.58	0.00	8.65								
FM	Q301	0.00	2.53	1.43	2.52	2.49	2.51	2.52	2.52	2.52	2.16	2.22	4.98
AM	0.00	2.53	1.43	2.49	2.49	2.52	2.52	2.52	2.52	2.52	2.21	2.21	4.98
FM	Q701	4.94	1.05	1.08	0.00								
AM	0.00	4.94	1.05	1.08	0.00								

NORMAL NARROW

	Q753	Q754	Q754	Q755		Q901	Q902
E	0.00	0.00	0.00	0.00	0.00	0.00	1
C	4.93	4.93	5.38	0.00	0.00	1.17	0.00
B	0.00	0.00	1.16	0.00	3.19	1.29	4.53
FM	AM	FM	AM	FM	AM	FM	AM

FM	VP	-28.40	FM	F1	F2	4.7	AC
AM	-28.90	AM				4.7	AC

PRINTED CIRCUIT BOARD-PARTS LIST

MAIN CIRCUIT PC BOARD(NARF-5173-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Front end	
TU001	240088Y	FE337-A07 <D><W>
TU001	240089Y	FE415-G11 <PT><P>
	ICs	
Q107	22240039	LA1266
Q201	22240242	AN7470
Q301	22240679	MPC1346CS
Q701	22240090	LM7001
Q901	222780125NEC	78M12HF
Q902	222780565JRC	78M56
	Transistors	
Q002	2211255 or	2SC1815-GR or
	2214915	2PC1815-GR
Q101	2212195	2SK241-GR
Q102	2211723	2SC1923-O
Q103,Q104	2210746	2SC945A-P
Q105,Q106	221281	DTC114YS
Q202,Q203	2212794	2SD1468-R
Q204	2213074	2SA933-R
Q205	2213160	DTC124ES
Q206	2211945	2SK246-GR
Q207	2211255 or	2SC1815-GR or
	2214915	2PC1815-GR
Q702	2211406	2SC2240-BL
Q703	2211183	2SC1740-R
Q704,Q705	2213090	DTA114YS
Q706	2213074	2SA933-R
Q707	2212600	DTA124ES
Q708	2213160	DTC124ES
Q801	2212274	2SK192A-Y
Q802	2211255 or	2SC1815-GR or
	2214915	2PC1815-GR
Q903	2213074	2SA933-R
Q904	2213160	DTC124ES
	Diodes	
D005,D006	223191	SD101
D101-D106	223163 or	1SS133 or
	223205	1SS270A
D108,D109	223163 or	1SS133 or
	223205	1SS270A
D151-D153	223163 or	1SS133 or
	223205	1SS270A
D201-D205	223163 or	1SS133 or
	223205	1SS270A
D301	223163 or	1SS133 or
	223205	1SS270A
D701-D704	223163 or	1SS133 or
	223205	1SS270A
D705	224450562	MTZ5.6B
D801,D802	223191	SD101

CIRCUIT NO.	PART NO.	DESCRIPTION
D901,D903	22380032	1SR139-100
D904	223163 or	1SS133 or
	223205	1SS270A
D905,D906	22380032	1SR139-100
D907	224452704	MTZ27D
D908	224450753	MTZ7.5C
D909	22380032	1SR139-100
	Transformers	
L102	233469Y	NFIF-4087
L103	233470Y	NFIF-4088
L152	232166Y	NMIF-4089
T901	2301075Y	△ NPT-1232D <D><W>
T901	2301076Y	△ NPT-1232P <PT><P>
	Coils	
L101	233411K220	NCH-1387
L151	231226Y	NMRF-7069
L201	232164Y	NMC-4082 <PT>
L202,L203	232165Y	NMC-4083
	Ceramic filters	
X101,X102	3010137	SFE-10.7MMK
X103,X104	3010087 or	SFE-10.7MJA or
	3010087	SFE-10.7MJA
X151	3010123	SFZ450JL
	Resonators	
X301	3010203	AF6146CG
X701	3010158 or	XTL-7.2M or
	3010141	XTL-7.2M
	Capacitors	
C002	354741019	100μ F, 16V, Elect.
C011	354784799	0.47μ F, 50V, Elect.
C012	354742209	22μ F, 16V, Elect.
C114	354742209	22μ F, 16V, Elect.
C117	354780109	1μ F, 50V, Elect.
C120	354781099	0.1μ F, 50V, Elect.
C153	354761009	10μ F, 35V, Elect.
C158	354780479	4.7μ F, 50V, Elect.
C159,C160	354761009	10μ F, 35V, Elect.
C162	374724724	4700pF±5%, 50V, Plastic
C163	374724734	0.047μ F±5%, 50V, Plastic
C201	354782299	0.22μ F, 50V, Elect.
C202	354742209	22μ F, 16V, Elect.
C203	374724734	0.047μ F±5%, 50V, Plastic
C205	354744719	470μ F, 16V, Elect.
C206,C207	374721524	1500pF±5%, 50V, Plastic <D><W>
C206,C207	374721024	1000pF±5%, 50V, Plastic <PT><P>
C209,C210	354761009	10μ F, 35V, Elect.
C211,C212	354742209	22μ F, 16V, Elect.
C213	354782299	0.22μ F, 50V, Elect.
C215	354780339	3.3μ F, 50V, Elect.
C216	354780109	1μ F, 50V, Elect.

CIRCUIT NO.	PART NO.	DESCRIPTION
C217	370134714	470pF±5%, 100V, Plastic
C220	354744709	47μ F, 16V, Elect.
C230	354780109	1μ F, 50V, Elect.
C303	374724724	4700pF±5%, 50V, Plastic
C304	374722234	0.022μ F±5%, 50V, Plastic
C305	374724734	0.047μ F±5%, 50V, Plastic
C306	354780229	2.2μ F, 50V, Elect.
C307,C308	374723324	3300pF±5%, 50V, Plastic
C309	374724724	4700pF±5%, 50V, Plastic
C310	354761009	10μ F, 35V, Elect.
C706	354722219	220μ F, 6.3V, Elect.
C708	354782299	0.22μ F, 50V, Elect.
C709	354780229	2.2μ F, 50V, Elect.
C710	354742219	220μ F, 16V, Elect.
C711	354741019	100μ F, 16V, Elect.
C801	354784799	0.47μ F, 50V, Elect.
C902	354752229	2200μ F, 25V, Elect.
C904	354744719	470μ F, 16V, Elect.
C905	354761009	10μ F, 35V, Elect.
C907	354744709	47μ F, 16V, Elect.
C908	354761009	10μ F, 35V, Elect.
C909	354762209	22μ F, 35V, Elect.
C910	354761019	100μ F, 35V, Elect.
C913	354784709	47μ F, 50V, Elect.
C914,915	354762219	220μ F, 35V, Elect.
C916	374721044	0.1μ F±5%, 50V, Plastic
C920	354761019	100μ F, 35V, Elect.
	Resistors	
R160	5210266	N06HR100KBC, Trim
R201	5210261	N06HR5KBC, Trim
R202	5210267TY	N06HR200KBC, Trim <PT><P>
R301	5210265	N06HR50KBC, Trim
R907	443623314	330Ω±5% 1W, Metal oxide
R921	431523355	3.3MΩ±10%, 1/2W, Solid <D><W>
	Plugs	
P902	25055675	NPLG-2P-631
TP101	25055038	NPLG-2P29
TP201	25055038	NPLG-2P29
TP301	25055038	NPLG-2P29
	Terminals	
P101	25060214Y	NTM-4PDML136
P101	25060117Y	NTM-2PDML051 <PT>
P103	25045333	NPJ-2PDBL185
P105	25045439Y	NPJ-1PDBL263
P106	25045439Y	NPJ-1PDBL263
P701	25050857Y or 25050965Y	NSCT-25P652 or NSCT-25P752
	Wire trap	
P903	25051108	NSCT-4P895

POWER SWITCH PC BOARD (NASW-5174-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
		Wire trap
P903a	25051108	NSCT-4P895
		Switch
S901	25035663Y	NPS-122-L615, Push switch

DISPLAY CIRCUIT PC BOARD (NADIS-5175-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
		ICs
Q751	22240842	MPD78044AGF-085
		FL tube
Q752	212140A	12-BT-90GK
		Transistors
Q753	221282	DTC144ES
Q754,Q755	2213160	DTC124ES
		Diodes
D751-D754	223163 or 223205	1SS133 or 1SS270A
D756	223163 or 223205	1SS133 or 1SS270A
D757-D759	225206D or 225206C	SEL2910D-D or SEL2910D-C
D760	225318D or 225318C or 225205D	SEL2410G-D or SEL2410G-C or SEL2310G-D
		Resonator
X751	3010224	XTL-4.19M
		Capacitors
C751	354780109	1μ F, 50V, Elect.
C753	375524744	0.47μ F±5%, 50V, Plastic
C754	3000076	0.1F, 5.5V, Super
C756	354780479	4.7μ F, 50V, Elect.

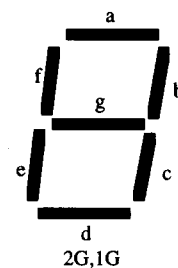
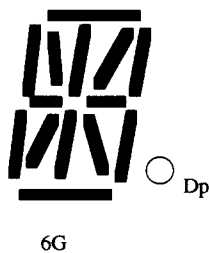
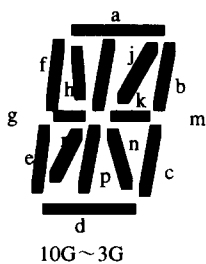
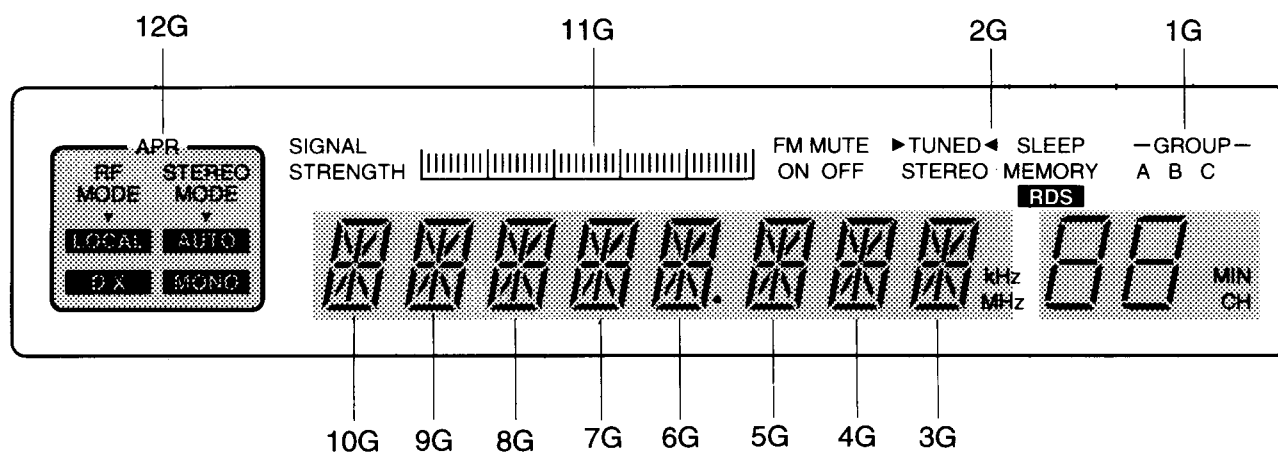
		Resistor
R790	49163104412	100Kx12, 1/10W, Array
		Switches
S751-S763	25035664Y	NPS-111-S616
S766-S775	25035664Y	NPS-111-S616
		Wire trap
P701a	25050857Y or 25050965	NSCT-25P652 or NSCT-25P752
P702	25051107	NSCT-3P894

ENCODER PC BOARD (NASW-5176-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
		Encoder
S731	24190044	Encoder
		Wire trap
P702a	25051107	NSCT-3P894

NOTE: THE COMPONENTS IDENTIFIED BY MARK  ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

FL TUBE VIEW



ANODE CONNECTION

	12G	11G	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G
P1	APR	S1	a	a	a	a	a	a	a	a	a	a
P2	S2	B1	b	b	b	b	b	b	b	b	b	b
P3	S3	B2	c	c	c	c	c	c	c	c	c	c
P4	AUTO	B3	d	d	d	d	d	d	d	d	d	d
P5	MONO	B4	e	e	e	e	e	e	e	e	e	e
P6	S4	B5	f	f	f	f	f	f	f	f	f	f
P7	LOCAL	FM MUTE	g	g	g	g	g	g	g	g	g	g
P8	DX	ON	h	h	h	h	h	h	h	h	SLEEP	-GROUP-
P9	-	OFF	j	j	j	j	j	j	j	j	MEMORY	A
P10	-	-	k	k	k	k	k	k	k	k	RDS	B
P11	-	-	m	m	m	m	m	m	m	m	TUNED	C
P12	-	-	n	n	n	n	n	n	n	n	STEREO	-BANK-
P13	-	-	p	p	p	p	p	p	p	p	-	MIN
P14	-	-	r	r	r	r	r	r	r	r	-	dB
P15	-	-	-	-	-	-	Dp	-	-	kHz	-	CH
P16	-	-	-	-	-	-	-	-	-	MHz	-	CH

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