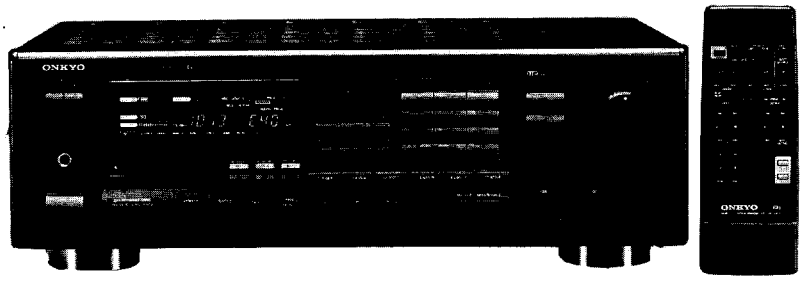
Ref. No. 0M3430

ONKYO SERVICE MANUAL

QUARTZ SYNTHESIZED TUNER AMPLIFIER

MODEL TX-905



Black model

BHMD, BHMDN, BHMDC	120V AC, 60Hz

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS INDENTIFIED BY MARK ⚠ 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

ONKYO®
AUDIO COMPONENTS

SPECIFICATIONS

AMPLIFIER SECTION

Power Output:	Stereo mode 60 watts per channel min. RMS. at 8 ohms, both channels driven, from 20Hz to 20,000Hz, with no more than 0.08% total harmonic distortion. Multi source mode 55 watts per channel min. RMS. at 8 ohms both channels driven, from 20Hz to 20,000Hz, with no more than 0.08% total harmonic distortion. (FRONT) 12 watts per channel min. RMS. at 8 ohms 1,000Hz with no more than 0.8% total harmonic distortion. (REMOTE)
Total Harmonic Distortion:	0.08% at rated power (FRONT)
IM distortion:	0.08% at rated power (FRONT)
Damping Factor:	60 at 8 ohms (FRONT)
Sensitivity and Impedance:	Phono: 2.5mV/50 kohms CD/Tape Play: 150mV/50 kohms Tape Rec: 150mV/2.2 kohms
Phono Overload:	120mV RMS. at 1,000 Hz, 0.08% THD.
Frequency Response:	20 to 30,000 Hz, +/–1 dB
RIAA Deviation:	20 to 20,000 Hz, +/–0.8 dB
Tone Control:	BASS: +/–10 dB at 100 Hz TREBLE: +/–10 dB at 10,000 Hz
Signal to Noise Ratio:	PHONO: 80 dB (IHF A, 5mV input) CD/TAPE: 100 dB (IHF A)
Muting:	– ∞ dB

VIDEO SECTION

Signal sensitivity and impedance
VDP/VCR normal input, output: 1 Vp-p, 75 ohms

TUNER SECTION

FM:

Tuning Range:	87.5 – 108.0MHz (100kHz steps)
Usable Sensitivity:	Mono: 11.2dBf, 2.0μV Stereo: 17.2dBf, 4.0μV
50dB Quieting Sensitivity:	Mono: 17.2dBf, 4.0μV Stereo: 37.2dBf, 40μV
Capture Ratio:	1.5dB
Image Rejection Ratio:	40dB
IF Rejection Ratio:	90dB
Signal-to-Noise Ratio:	Mono: 73dB Stereo: 67dB
Alternate Channel Attenuation:	55dB
AM Suppression Ratio:	50dB
Harmonic Distortion:	Mono: 0.15% Stereo: 0.25%
Frequency Response:	30 – 15,000Hz ±1.5dB
Stereo Separation:	45dB at 1kHz/30dB at 100 – 10,000Hz
Muting Level:	17.2dBf, 4μV

AM:

Tuning Range:	530 – 1710kHz (10kHz steps)
Usable Sensitivity:	30μV
Image Rejection Ratio:	40dB
IF Rejection Ratio:	40dB
Signal-to-Noise Ratio:	40dB
Harmonic Distortion:	0.7%

GENERAL

Power Supply:	AC120V, 60Hz
Dimensions (W × H × D):	455 x 150 x 331.5 mm 17-15/16" × 5-7/8" × 13-1/16"
Weight:	9.7 kg, 21.4 lbs

Specifications and features are subject to change without notice.

SERVICE PROCEDURES

1. Replacing the fuses

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

Circuit no.	Part no.	Description
F901	252051	⚠6A ST-6,Primary fuse
F904,F905	252051	⚠6A ST-6,Secondary fuse

2. Change of FM/AM band step.

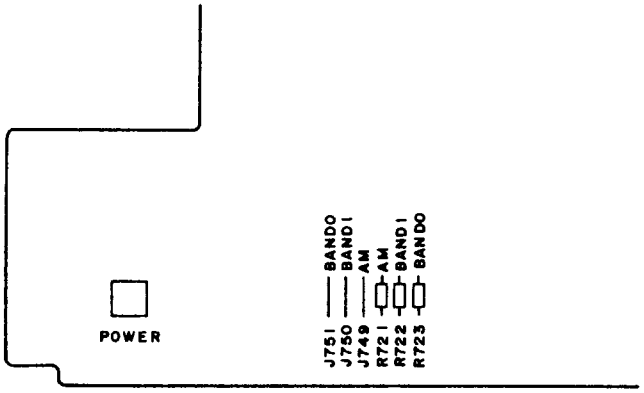
(FM)

BAND STEP	R723	J751
100kHz→50kHz	Addition	Open
50kHz→100kHz	Eliminated	Short

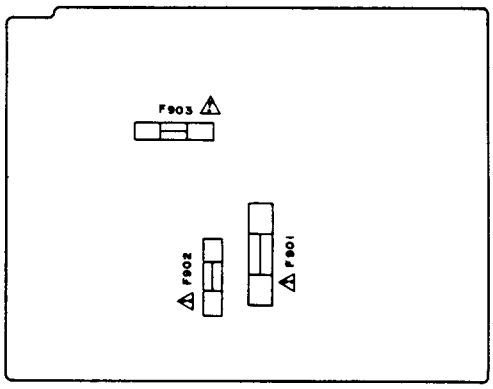
(AM)

BAND STEP	R721	J749
10kHz→ 9kHz	Eliminated	Short
9kHz→10kHz	Addition	Open

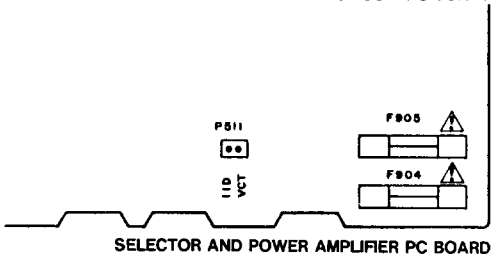
In R721 and R722 Carbon resistor 100kΩ (Part No.417341044) are used.



DISPLAY CIRCUIT PC BOARD



POWER SUPPLY CIRCUIT PC BOARD



SELECTOR AND POWER AMPLIFIER PC BOARD

3. 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.

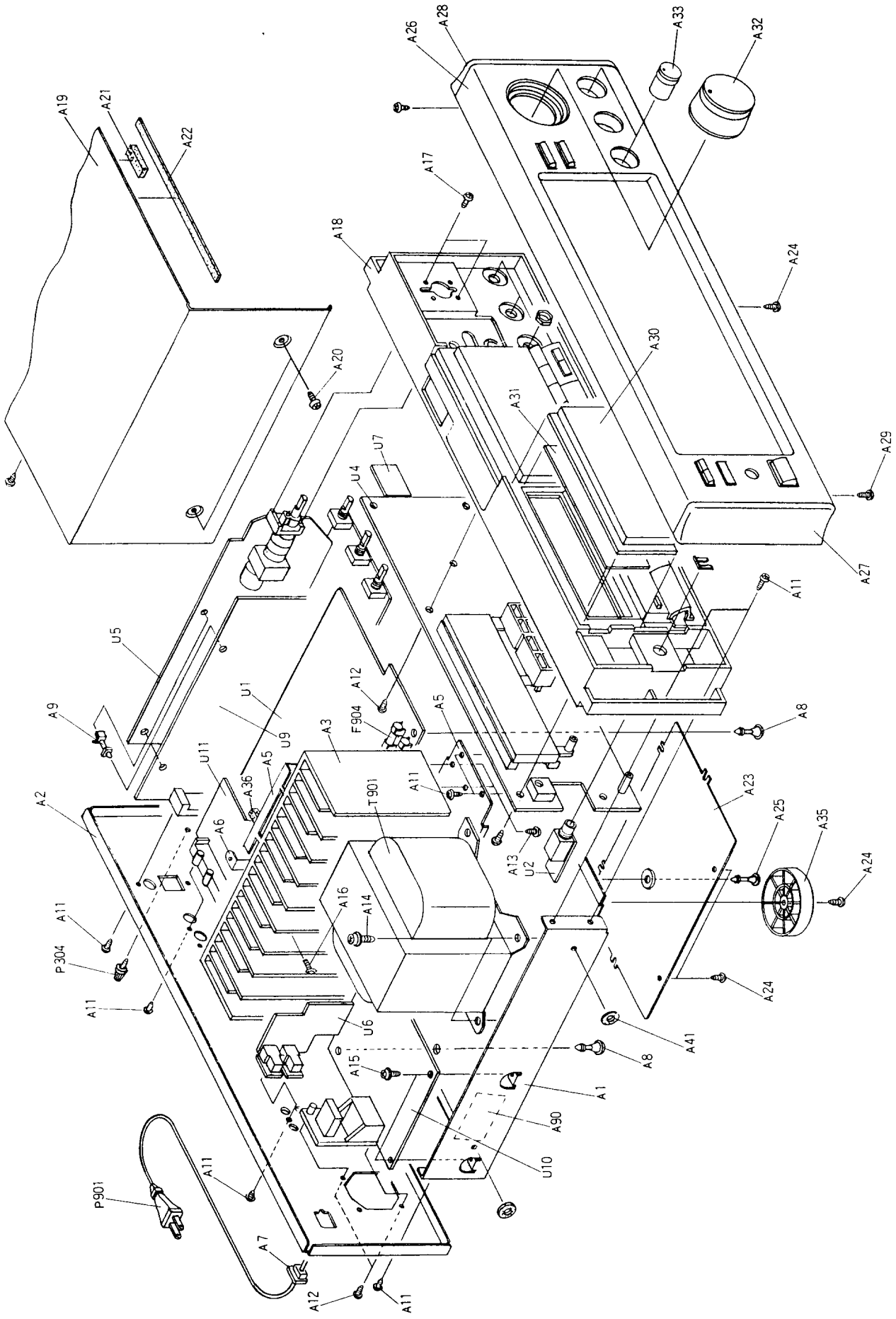
4. Safety-check out

(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 terminal GND on the back panel. Specifications: 3.3 Mohm ±10% at 500V.

EXPLODED VIEW



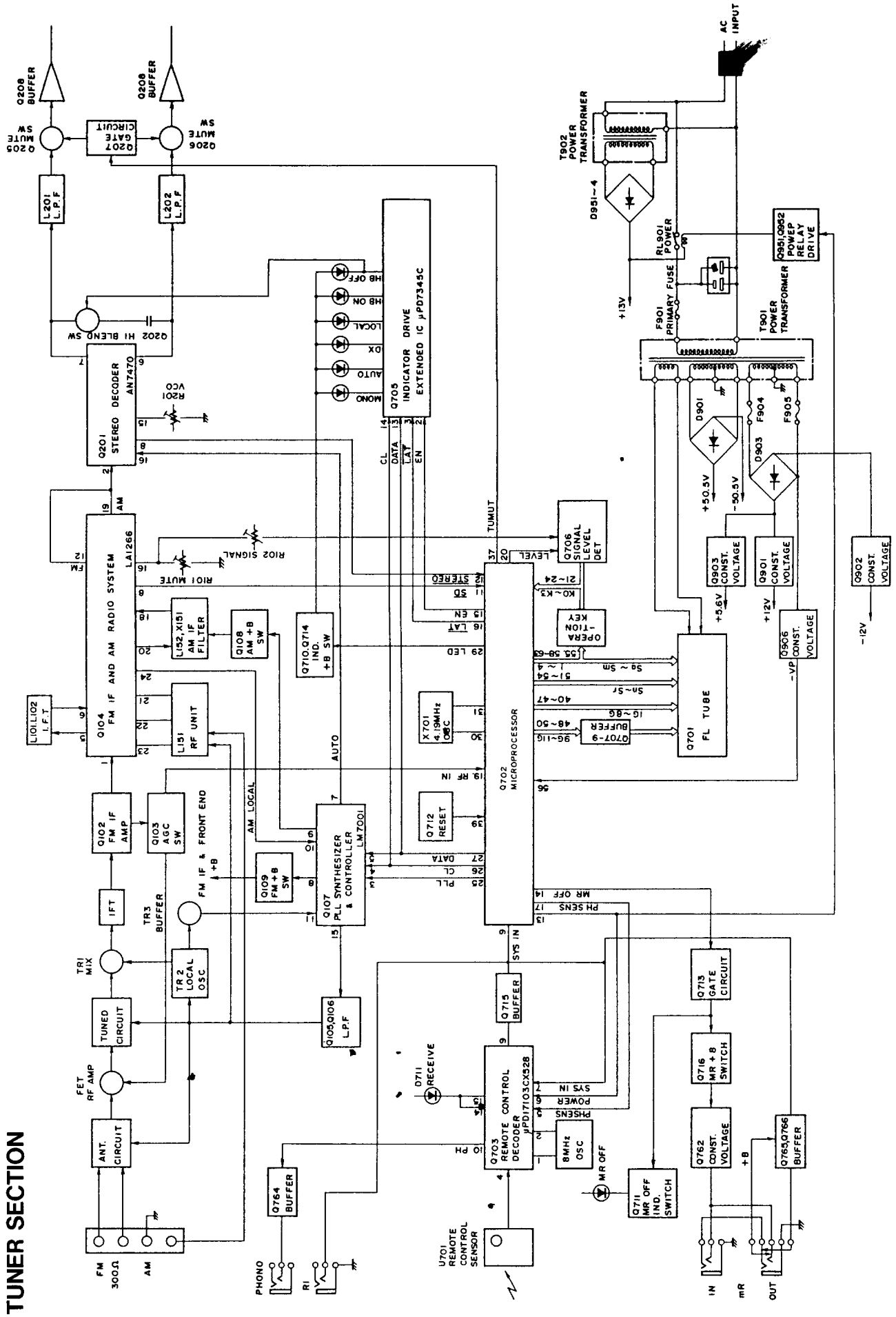
PARTS LIST

REF.NO.	PART NO.	DESCRIPTION
A1	27100239AY	Chassis
A2	27121649Y	Back panel
A3	27160287	Radiator
A4	27141474AY	Bracket SH
A5	27130653Y	Bracket H
A6	27141498Y	Bracket S
A7	27300750	⚠ Bushing
A8	27190657	KGLS-18RT,Holder
A9	27190062	KGLS-12S,Holder
A10	801433	3SMS10W.SW+14B(BC),Sems self-tapping screw
A11	834430088	3TTS+8B(BC),Self-tapping screw
A12	833430080	3TTP+8B(BC),Self-tapping screw
A13	834430108	3TTS+10B(BC),Self-tapping screw
A14	830440089	4TTC+8C(BC),Self-tapping screw
A15	831130088	3TTW+8B,Self-tapping screw
A16	82143015	3P+15FN(BC),Pan head screw
A17	82143006	3P+6FN(BC),Pan head screw
A18	27110734Y	Front bracket ass'y
A19	28184476AY	Top cover
A20	834430088	3TTS+8B(BC),Self-tapping screw
A21	28140020	4×10×40,Cushion
A22	28141132	6×60×40,Cushion
A23	27170280AY	Bottom panel
A24	834430088	3TTS+8B(BC),Self-tapping screw
A25	27190657	KGLS-18RT,Holder
A26	1A398701K	Front panel ass'y
A27	28125234BY	End cap L
A28	28125235BY	End cap R
A29	833430080	3TTP+8B(BC),Self-tapping screw
A30	28191596A	Clear plate
A31	28133262Y	Back plate
A32	28324372	Knob VOLUME
A33	28324376A	Knob TONE
A35	27175251 or	Leg
	27175251-1	Leg
A36	28140546	0.5×390×10,Cushion
A38	27141474A	Bracket,shield

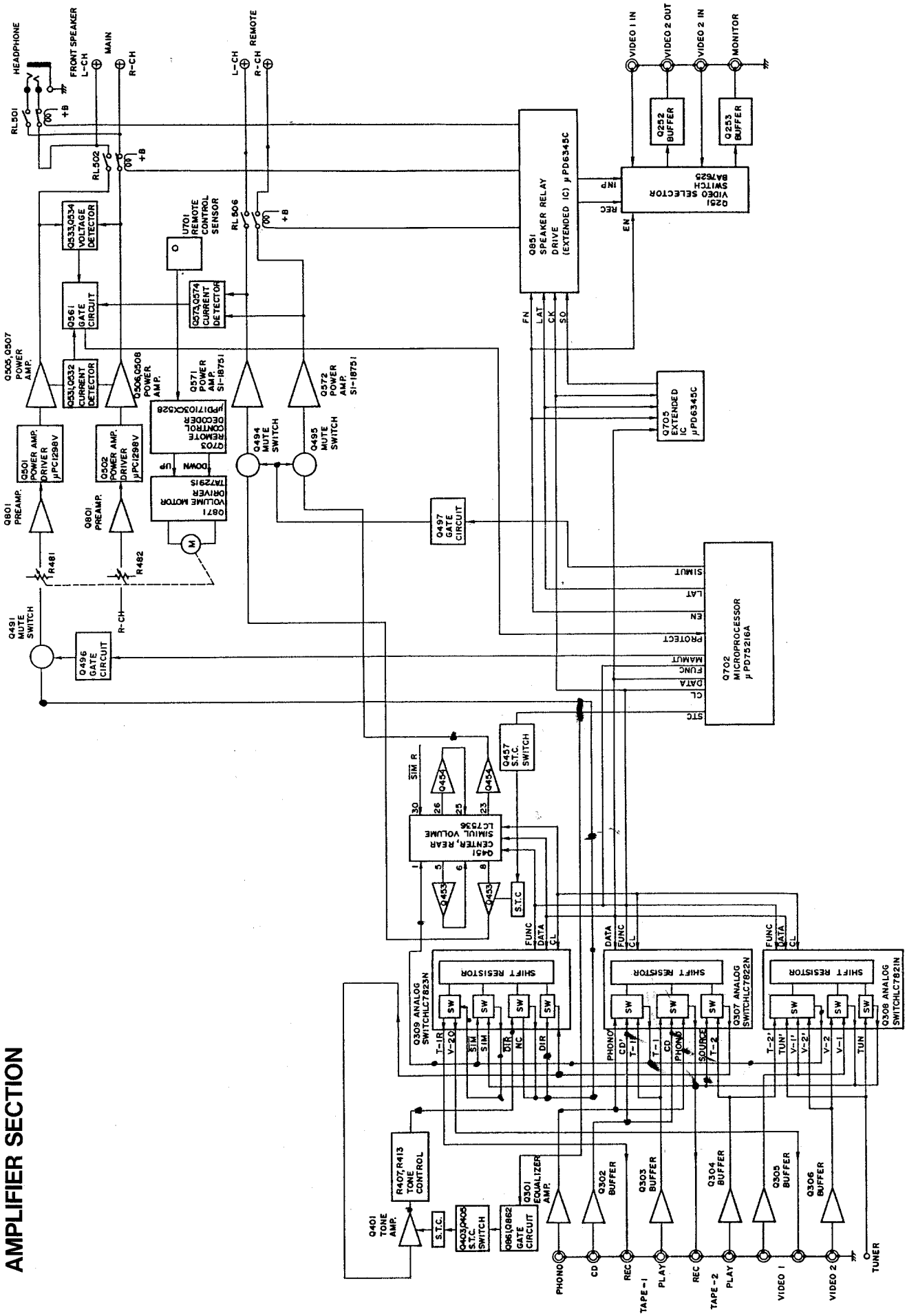
REF.NO.	PART NO.	DESCRIPTION
F901	252051	⚠ 6A ST-6,Primary fuse
F904	252051	⚠ 6A ST-6,Secondary fuse
F905	252051	⚠ 6A ST-6,Secondary fuse
F905b	29360626-1	Rating label, fuse
JL701	2041322010	NCFC1-322010,Flat cable
P304	25060044	Terminal GND
P901	253163Y or	⚠ AS-UC-6 #18,
	253174Y	⚠ Power supply cord
Q505,Q506	2202528,	2SC4468-Y(ONK),
	2202529 or	2SC4468-P(ONK) or
	2202293	2SC3182N-O,Power amplifier transistors
Q507,Q508	2202518,	2SA1695-Y(ONK),
	2202519 or	2SA1695-P(ONK) or
	2202283	2SA1265N-O,Power amplifier transistors
T901	2300674	⚠ NPT-1112D,Power transformer
U1	1A398587-6	NAAF-4187-6,Selector and power amplifier pc board ass'y
U2	1A398588-6	NAETC-4188-6,Headphone terminal pc board ass'y
U4	1A398589-6	NADIS-4189-6,Display circuit pc board ass'y
U5	1A398590-6	NAAF-4190-6,Volume circuit pc board ass'y
U6	1A398591-6	NADG-4191-6,RI/MR terminal pc board ass'y
U7	1A398592-6	NASW-4192-6,Operation switch pc board ass'y
U9	1A398594-6	NARF-4194-6,Tuner circuit pc board ass'y
U10	1A398595-6	NAPS-4195-6,Power supply circuit pc board ass'y
U11	1A398596-6	NAAF-4196-6,Video and sub amplifier pc board ass'y

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

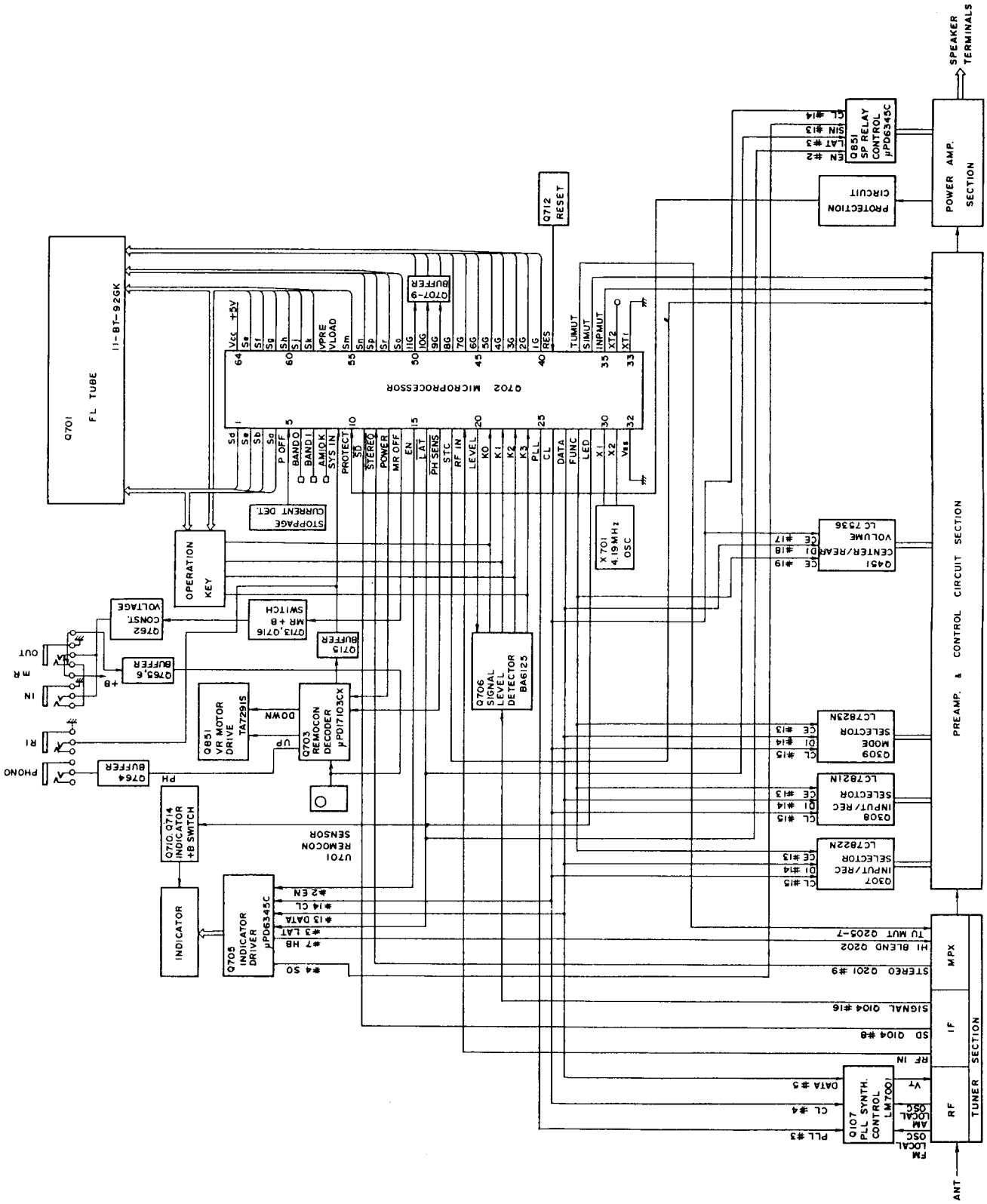
BLOCK DIAGRAM
TUNER SECTION



AMPLIFIER SECTION



MICROPROCESSOR DESCRIPTIONS



Terminal Description

<table>
<tr><th>Pin No.</th><th>Symbol</th><th>Description</th></tr>
<tr><td>1</td><td>Sd</td><td rowspan="4">Segment and key scan output terminals.
"H" when active.</td></tr>
<tr><td>2</td><td>Sc</td></tr>
<tr><td>3</td><td>Sb</td></tr>
<tr><td>4</td><td>Sa</td></tr>
<tr><td>5</td><td>POFF</td><td>This is the input terminal for detection of the stoppage of electric current."L" when the stoppage of electric current.</td></tr>
<tr><td>6</td><td>BAND0</td><td rowspan="2">Initializing input terminal for region setting of FM band.</td></tr>
<tr><td>7</td><td>BAND1</td></tr>
<tr><td>8</td><td>AM 10K</td><td>Initializing input terminal for region setting of AM band.</td></tr>
<tr><td>9</td><td>SYS IN</td><td>System code input terminal."H" when active.</td></tr>
<tr><td>10</td><td>PROTECT</td><td>Protection circuit operation detection input terminal. "H" when active.</td></tr>
<tr><td>11</td><td>SD</td><td>Broadcast detection input terminal."L" when active.
Control the stop of auto tuning and output TU MUT(#37).</td></tr>
<tr><td>12</td><td>STEREO</td><td>Stereo broadcast detection input terminal.
"L" when stereo broadcast.</td></tr>
<tr><td>13</td><td>POWER</td><td>Power control output terminal."H" when the power turns on.</td></tr>
<tr><td>14</td><td>MR</td><td>MR control output terminal. "H" when MR turns on.</td></tr>
<tr><td>15</td><td>EN</td><td>Connect the terminal EN of the extended IC μ PD6345C.(Q705,Q851)</td></tr>
<tr><td>16</td><td>LAT</td><td>Connect the terminal LAT of the extended IC μ PD6345C.</td></tr>
<tr><td>17</td><td>PHONO</td><td>Phono control output terminal.</td></tr>
<tr><td>18</td><td>S.TONE</td><td>SELECTIVE TONE control output terminal.
"H" when this switch turns on.</td></tr>
<tr><td>19</td><td>RF IN</td><td>RF mode input terminal.
<table>
<tr><th>RF IN</th><th>RF MODE</th></tr>
<tr><td>L</td><td>LOCAL</td></tr>
<tr><td>H</td><td>DX</td></tr>
</table>
Control the terminals LOCAL and DX of the extended IC.</td></tr>
<tr><td>20</td><td>LEVEL</td><td>Signal level input control output terminal.The signal level is inputed to terminals K0-K3 when this terminal is the high level.</td></tr>
<tr><td>21
22
23
24</td><td>K0
K1
K2
K3</td><td>Key scan input terminals when pin 20 is low."H" when active.
Signal level input terminal when pin 20 is high.
<table>
<tr><th>Key input of L</th><th>Signal level</th></tr>
<tr><td>none</td><td>LEVEL0</td></tr>
<tr><td>K0</td><td>LEVEL1</td></tr>
<tr><td>K0,K1</td><td>LEVEL2</td></tr>
<tr><td>K0,K1,K2</td><td>LEVEL3</td></tr>
<tr><td>K0,K1,K2,K3</td><td>LEVEL4</td></tr>
</table></td></tr>
<tr><td>25</td><td>PLL</td><td>Connect to the terminal CE of PLL IC (LM7001 Q107).</td></tr>
<tr><td>26</td><td>CL</td><td>Connect to the terminal CL of PLL IC,terminal CL of analogue switches(Q307,308, Q309,Q601,Q692),terminal SECK of digital delay (Q661) and terminal CLK of electro volume. (Q451)</td></tr>
<tr><td>27</td><td>DATA</td><td>Connect to the terminal DATA of PLL IC,terminal DI of analogue switches,terminal SEDATA of digital delay,terminal SIN of extended IC and terminal CLK of electro volume. (Q451)</td></tr>
</table>

FM band setting

BAND1	BAND0	REGION	FREQUENCY RANGE	CH. SPACE
0	0	U.S.A.	87.5-108.0MHz	50kHz
0	1	Europe	87.50-108.00MHz	50kHz
1	0	Saudi Arabia	87.50-108.00MHz	50kHz
1	1	Japan	76.0-90.0MHz	100kHz

AM band setting

AM10K	REGION	FREQUENCY RANGE	CH. SPACE
1	U.S.A.	530-1710kHz	10kHz
0	Saudi Arabia	531-1602kHz	9kHz
0	Europe	522-1611kHz	9kHz

Pin No.	Symbol	Description
28	CE	Connect to the terminal CE of analogue switches and terminal CE of electro volume.
29	LED	LED indicator control output terminal.
30	X1	Ceramic oscillator connection terminal for main system clock.
31	X2	Connect to the 4.19MHz ceramic oscillator.
32	VSS	Ground terminal.
33	XT1	Ceramic oscillator connection terminal for sub system clock.
34	XT2	Not used.
35	INP MUT	Audio muting output terminal when input selector change over.
36	SIM MUT	SIM muting output terminal when input selector change over.
37	TU MUT	Tuner muting output terminal."H" when active.
38	REQ/MODE	Connect to the terminal REQ of digital delay.
39	RESET	Reset input terminal."L"when active.
40	D1	Digit output terminals."H" when active.
41	D2	
42	D3	
43	D4	
44	D5	
45	D6	
46	D7	
47	D8	
48	D9	
49	D10	
50	D11	
51	So	Segment output terminals."H" when active.
52	Sr	
53	Sp	
54	Sn	
55	Sm	
56	VLOAD	Pull-down resistor connection terminal of FIP controller/driver.
57	VPRE	Power supply terminal of output buffer of FIP controller/driver.
58	Sk	Segment and key scan output terminals. "H" when active.
59	Sj	
60	Sh	
61	Sg	
62	Sf	
63	Se	
64	VDD	Power supply terminal.(+5V)

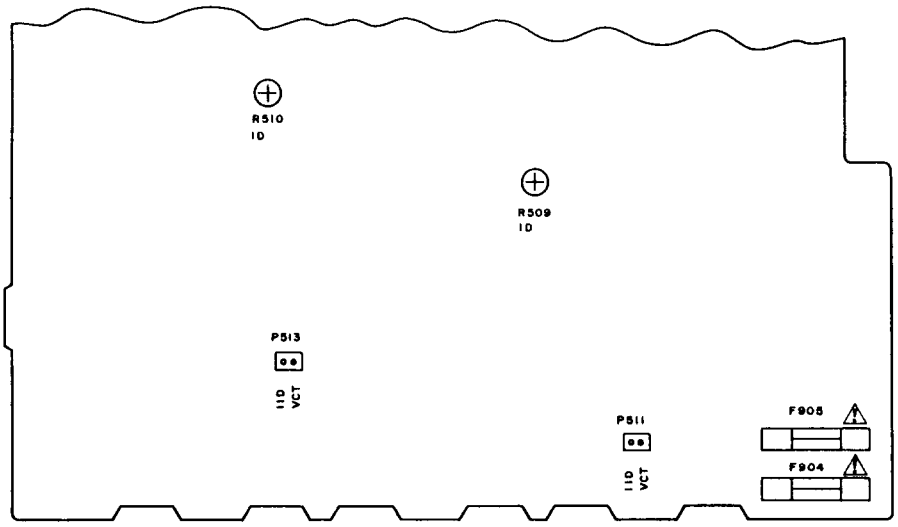
Key Matrix

	No.	24	23	22	21
No.		K3	K2	K1	K0
4	Sa	SLEEP	SPEAKER REMOTE	SPEAKER MAIN	POWER
3	Sb	DELAY TIME	SURROUND MODE	CENTER MODE	MR
2	Sc	TAPE-2	TAPE-1	VIDEO-2	VIDEO-1
1	Sd	CD	PHONO	AM	FM
63	Se		S.DIRECT	SIM	REC OUT
62	Sf	4	3	2	1
61	Sg	8	7	6	5
60	Sh	CLASS SCAN	D.TUNING	0	9
59	Sj	UP	DOWN	MEMORY	MUTE/MODE
58	Sk	CLASS-D	CLASS-C	CLASS-B	CLASS-A
55	Sm	CENTER OFF	SELECTIVE TONE	CLASS-F	CLASS-E

ADJUSTMENT PROCEDURES

• Preparation

1. Input
   FM mono: 1kHz, 75kHz devi., 60dB/μV
   FM stereo: 1kHz, 75kHz devi., 60dB/μV
   Pilot signal 19kHz 7.5kHz devi.
   AM: 400Hz 30% mod.
2. Outputs
   Connect the non-inductive type resistors of 8ohms to the main speaker, remote speaker, and rear speaker terminals unless otherwise noted.
3. Standard Knob Position
   TAPE MONITOR 2 ·····OFF
   VOLUME·····Maximum
   BASS/TREBLE/BALANCE/INPUT
   BALANCE·····Center
   MUTING·····OFF
   REC SELECTOR·····SOURCE
   INPUT SELECTOR·····CD
   SPEAKERS ·····ON
   S.T.C.·····OFF



SELECTOR AND POWER AMPLIFIER PC BOARD

Amplifier section

Idling Current Adjustment

Connect the DC voltmeter to the terminals IID and VCT on the pre.,and main amplifier pc board. Adjust the semi-fixed resistors R509, and R510 so that indication of voltmeter is 5 ± 0.5mV.

NOTE: Adjust after switching on for 5 minutes.

ction

n	Step	Connection of instrument	FM SG output	Stereo modulator output	Tuning frequency	Output indicator	Adjustment point	Adjust for	Remarks
	1	Fig. 1	99.1MHz 1kHz, 75kHz devi. 65dBf (60dB)		99.1MHz	DC voltmeter	L101	0±20mV	FM MUTE/MODE switch: ON/STEREO Repeat the steps 1 and 3 until no further adjustment is necessary.
	2					AC voltmeter	IFT on the front end	Maximum	
	3					Distortion analyzer	L102	Minimum	
		Fig. 2	99.1MHz 1kHz, 75kHz devi. 65dBf (60dB)		99.1MHz	Frequency counter	R201	19kHz±10Hz	
on		Fig. 3	99.1MHz, Ext mod., 65dBf (60dB)	Channel L or R 1kHz	99.1MHz	Distortion analyzer	IFT on the front end	Minimum	Don't turn more than ±180°
on	1	Fig. 3	99.1MHz Ext. modulation 65dBf (60dB)	Channel L 1kHz	99.1MHz	Channel R AC voltmeter	R202	Minimum	Maximum and same separation.
	2			Channel R 1kHz		Channel L AC voltmeter		Minimum	
		Fig. 3	99.1MHz 17.2dBf (12dB)<120V model> 19.2dBf (14dB)<Other model>		99.1MHz	AUTO indicator	R101	Light on	
		Fig. 3	99.1MHz 35dBf (30dB)<120V model> 33dBf (28dB)<Other models>		99.1MHz	4th Signal indicator	R102	Light on	

ction

AM SG output	Tuning frequency	Output indicator	Adjustment point	Adjust for
	530kHz (522kHz)	Digital DC voltmeter	OSC coil on RF block L151	1.2±0.1V (1.3±0.1V)
600kHz (603kHz) 400Hz, 30% mod. 60dB/m	600kHz (603kHz)	AC voltmeter	RF coil on RF block L151	Maximum
990kHz 400Hz, 30% mod. 60dB/m	990kHz	AC voltmeter	L152	Maximum

( ):9kHz step model

Reference Specifications

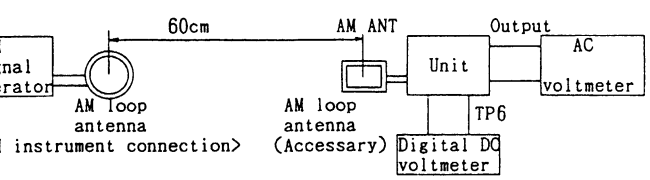
FM tuned voltage: 87.5MHz – 108.00MHz
1.6±0.4V – 8.0±0.4V

AM tuned voltage:
530kHz 1.2±0.5V
1710kHz 7.0±0.5V
} 120V model

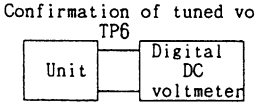
522kHz 1.3±0.4V
1611kHz 7.5±0.4V
} 230/240 model

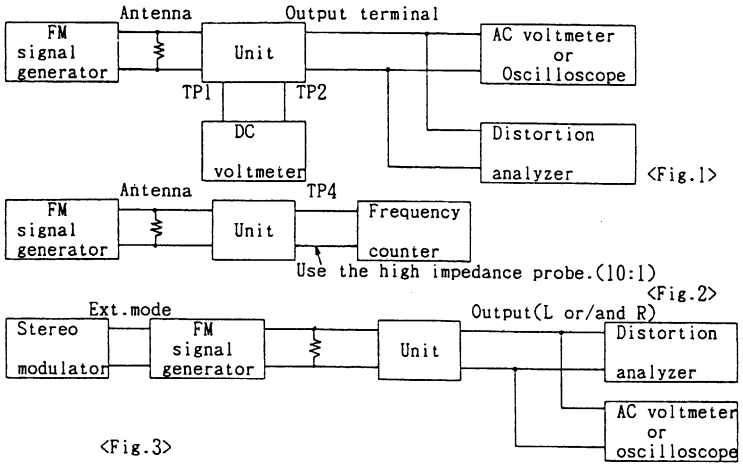
531kHz 1.3±0.4V
1602kHz 7.5±0.4V
} Worldwide models

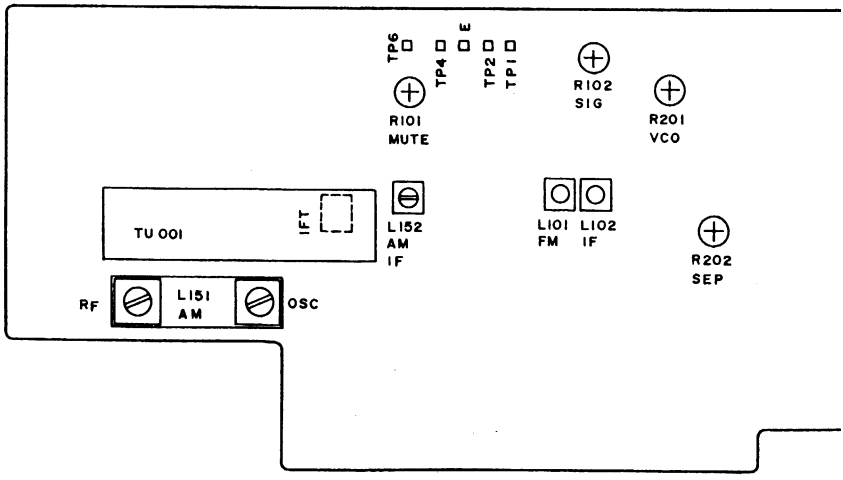
Auto stop level: AM: Less than 65dB/m
FM: Less than 16dB/μ



Confirmation of tuned voltage







Tuner circuit pc board

PRINTED CIRCUIT BOARD PARTS LIST

CAUTION: Replacement for transistor of mark ☆, if must be made from the same beta group (HI original type.

SELECTOR AND POWER AMPLIFIER PC BOARD (NAAF-4187-6)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q301	22240191	NJM4565D-D
Q302-Q306	22240247	BA15218N
Q307	22240270	LC7822N
Q308	22240280	LC7821N
Q309	22240339	LC7823N
Q401,Q402	22240247 or	BA15218N or
	22240293	NJM4558L-D
Q501,Q502	22240311	μPC1298V
Q801	22240247	BA15218N
Q851	22240211	μPD6345C
Q901	222780122NEC	78M12
Q902	222790125	79M12
Q903	222780565JRC	78M56
	Transistors	
Q403-Q406	2211945	2SK246-GR
Q491-Q494	2213631 or	RN1241-A or
	2213632	RN1241-B
Q496,Q497	2213510	DTA114ES
Q503,Q504	2213284	2SC1740S-R
Q505,Q506	2202528,	☆ 2SC4468-Y(ONK),
	2202529 or	☆ 2SC4468-P(ONK) or
	2202293	☆ 2SC3182N-O
Q507,Q508	2202518,	☆ 2SA1695-Y(ONK),
	2202519 or	☆ 2SA1695-P(ONK) or
	2202283	☆ 2SA1265N-O
Q531-Q534	2211732 or	2SC1845-F or
	2211733	2SC1845-E
Q561	2211792 or	2SA992-F or
	2211793	2SA992-E
Q861,Q905	221282	DTC144ES
Q862	2213510	DTA114ES
Q904	2213830	DTB113ZS
Q906	2213354	2SA933S-R
	Diodes	
D401-D404	223163 or	1SS133 or
D501,D502	223205	1SS270A
D561	224450512	MTZ5.1B
D851,D905	223163 or	1SS133 or
	223205	1SS270A
D901	22380038	RBV602
D903	22380048	RBA402
D904,D906	22380032,	1SR139-100,
D908,D909	22380035 or	GP104003E or
	22380046	AM01Z
D907	224451302	MTZ13B
D910	224452704	MTD27D
D911,D912	223163 or	1SS133 or
D991-D994	223205	1SS270A
	Coils	
L501,L502	231176	S-1.3C

CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors	
C303,C304	354780229	2.2μF,50V,Elect.
C307,C308	354721019	100μF,6.3V,Elect.
C309,C310	374726224	6200pF±5%,50V,Plastic
C311,C312	374721824	1800pF±5%,50V,Plastic
C313,C314	354761009	10μF,35V,Elect.
C315,C316	354744709	47μF,16V,Elect.
C401,C402	354761009	10μF,35V,Elect.
C403,C404	354744709	47μF,16V,Elect.
C405,C406	374721534	0.015μF±5%,50V,Plastic
C409,C410	374721534	0.015μF±5%,50V,Plastic
C413-C416	374721044	0.1μF±5%,50V,Plastic
C417-C420	374721024	1000pF±5%,50V,Plastic
C441,C442	354761009	10μF,35V,Elect.
C491,C492	354761009	10μF,35V,Elect.
C501,C502	354761009	10μF,35V,Elect.
C507,C508	354742219	220μF,16V,Elect.
C513,C514	374726834	0.068μF±5%,50V,Plastic
C515,C516	374724734	0.047μF±5%,50V,Plastic
C517-C520	354700109	1μF,160V,Elect.
C533,C851	354721019	100μF,6.3V,Elect.
C801,C802	354761009	10μF,35V,Elect.
C905,C906	3504245	8200μF,50V,Elect.
C909,C910	3504213	4700μF,35V,Elect.
C913,C914	354761009	10μF,35V,Elect.
C915	354751029	1000μF,25V,Elect.
C917	354761009	10μF,35V,Elect.
C918	354761019	100μF,35V,Elect.
C919	354781019	100μF,50V,Elect.
C921	354754719	470μF,25V,Elect.
	Resistors	
R393	5104225	N11RGLC250KWT22Z,Variable
R407,R408	5104230	N14RLC100KWT22Z,Variable
R413,R414	5104230	N14RLC100KWT22Z,Variable
R509,R510	5210261	N06HR 5KBC,Semi-fixed
R515,R516	442520824	8.2Ω ±5%,1/2W,Metal oxide film
R517,R518	441620824	8.2Ω ±5%,1W,Metal oxide film
R519,R520	4500031	0.22Ω,5W,Metal plate
R521,R522	442520824	8.2Ω ±5%,1/2W,Metal oxide film
R523,R524	441620824	8.2Ω ±5%,1W,Metal oxide film
R525-R528	442524794	0.47Ω ±5%,1/2W,Metal oxide film
R529,R530	441623914	390Ω ±5%,1W,Metal oxide film
R531,R532	442522224	2.2kΩ ±5%,1/2W,Metal oxide film
R902	441524794	0.47Ω ±5%,1/2W,Metal oxide film
R903	442523304	33Ω ±5%,1/2W,Metal oxide film
R906	441721804	18Ω ±5%,2W,Metal oxide film
R907	441721514	150Ω ±5%,2W,Metal oxide film
R908	442524704	47Ω ±5%,1/2W,Metal oxide film
R911	442523314	330Ω ±5%,1/2W,Metal oxide film
R912	442522204	22Ω ±5%,1/2W,Metal oxide film
R913	442524794	0.47Ω ±5%,1/2W,Metal oxide film

NOTE: <D>: Only 120V model
<P>: Only 230V/240V models
<W>: Only Worldwide model

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CIRCUIT NO.	PART NO.	DESCRIPTION
	Relaies	
RL501	25065396	NRL-2P1.25A-DC24-067
RL502	25065339	NRL-2P5A-DC24-046
	Terminals	
P301-P303	25045300	NPJ-6PDBL159
P501	25060159	NTM-8PDMN085
	Plugs	
P201	25055502	NPLG-16P477
P491	25055583	NPLG-7P554
P511,P512	25055493	NPLG-2P468
P601	25055496	NPLG-4P471
P602	25055500	NPLG-12P475
P603	25055499	NPLG-10P474
	Socket	
JL701a	25050727	NSCT-30P531
	Fuses	
F904,F905	252051	⚠ 6A ST-6
	Fuseholders	
F904a,F905a	250113	⚠ SN5051
	Clamp	
P991	260224	CP-1S

HEADPHONE TERMINAL PC BOARD (NAETC-4188-6)

CIRCUIT NO.	PART NO.	DESCRIPTION
P504	25045255	YKB21-5009,Terminal,headphone

DISPLAY CIRCUIT PC BOARD (NADIS-4189-6)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q702	22240624	μPD75212ACW-A30
Q703	22240466	μPD17103CX-531
Q705	22240211	μPD6345C
Q706	22240341	BA6125
	FL tube	
Q701	212115	11-BT-107GK
	Transistors	
Q707-Q709	2213284	2SC1740S-R
Q710-Q712	221282	DTC144ES
Q713	2213640	DTC123JS
Q714,Q716	2213830	DTB113ZS
Q715	2213510	DTA114ES
	Opto. receiving module	
U701	24130003	GP1U50XS
	L.E.Ds	
D705	225137CG,	SEL2413E-CG,
D707,D709	225137DG or	SEL2413E-DG or
	225137DY	SEL2413E-DY
D706,D708	225142	SEL2913K
D710-D712	225142	SEL2913K

CIRCUIT NO.	PART NO.	DESCRIPTION
	Diodes	
D701,D702	224450623	MTZ6.2C
D713	223163 or	1SS133 or
D715-D738	223205	1SS270A
D740-D742	223163 or	1SS133 or
D744-D748	223205	1SS270A
D743,D762	224450562	MTZ5.6B
D752-D754	223163 or	1SS133 or
D758	223205	1SS270A
	Coil	
L701	233411K220	NCH-1387
	Ceramic oscillators	
X701	3010163	CST4.19MGW
X702	3010154 or	CST8.00MT or
	3010190	CST8.00MTW
	Capacitors	
C701	353780109	1μF,50V,Elect.
C703,C704	353741009	10μF,16V,Elect.
C705	353780109	1μF,50V,Elect.
C707	375524744	0.47μF±5%,50V,Plastic
C708	3000057	0.1F,5.5V,Super
C710	353780109	1μF,50V,Elect.
C711	353721019	100μF,6.3V,Elect.
C715	353780109	1μF,50V,Elect.
	Switches	
S701-S703	25035548	NPS-111-S510
S705	25035548	NPS-111-S510
S709-S718	25035548	NPS-111-S510
S721-S742	25035548	NPS-111-S510
	Socket	
JL701b	25050728	NSCT-30P532
	Plug	
P702b	25055512	NPLG-5P487
	Holders	
Q702a	27190842	LED 9
D711a	27190843	LED 1

VOLUME CIRCUIT PC BOARD(NAAF-4190-6)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q451	22240468	LC7536
Q453,Q454	22240247 or	BA15218N or
	22240293	NJM4558L-D
Q871	22240239	TA7291S
	Diode	
D871	223163 or	1SS133 or
	223205	1SS270A
	Sockets	
P612	2000589A	NSAS-6P545
P601a	25050443	NSCT-4P267
P602a	25050447	NSCT-12P271
P603a	25050446	NSCT-10P270

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<W>: Only Worldwide model

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CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors	
C451,C452	354780229	2.2 μ F,50V,Elect.
C457,C458	354761009	10 μ F,35V,Elect.
C459,C460	354780229	2.2 μ F,50V,Elect.
C461,C462	354761009	10 μ F,35V,Elect.
C467,C468	354744709	47 μ F,16V,Elect.
C871	354721019	100 μ F,6.3V,Elect.
	Resistor	
R481,R482	5142006A	N16RGL100KBT25F,Variable

RI/MR TERMINAL PC BOARD (NADG-4191-6)

CIRCUIT NO.	PART NO.	DESCRIPTION
	IC	
Q762	222780053	78L05
	Transistors	
Q764-Q766	221282	DTC144ES
	Diodes	
D761,D762	223163 or	1SS133 or
D764,D765	223205	1SS270A
	Capacitors	
C767	354761009	10 μ F,35V,Elect.
C770	374724724	4700pF±5%,50V,Plastic
	Terminals	
P761	25045172	HSJ-1003-01-020
P762	25045293	HSJ-1003-01-012
	Socket	
P951a	25050444	NSCT-6P268

OPERATION SWITCH PC BOARD (NASW-4192-6)

CIRCUIT NO.	PART NO.	DESCRIPTION
S719,S745	25035548	NPS-111-S510,Switches
P702	25050456	NSCT-5P280,Socket

TUNER CIRCUIT PC BOARD (NARF-4194-6)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Front end	
TU001	240088	FE337-A07
	ICs	
Q104	22240039	LA1266
Q107	22240090	LM7001
Q201	22240242	AN7470
Q208	22240247 or	BA15218N or
	22240293	NJM4558L-D
	Transistors	
Q102	2211723	2SC1923-O
Q103,Q106	2213284	2SC1740S-R
Q105	2212445	2SK365-GR
Q108,Q109	2213510	DTA114ES
Q202	2211945	2SK246-GR
Q205,Q206	2212794	2SD1468-R
Q207	2213510	DTA114ES

CIRCUIT NO.	PART NO.	DESCRIPTION
	Diodes	
D101,D102	223132	1K60
D103	224450512	MTZ5.1B
D201,D202	223163 or	1SS133 or
D205-D207	223205	1SS270A
	Coils and transformers	
L101	233401	NFIF-4072
L102	233402	NFIF-4073
L103	233411M022	NCH-1375
L151	232148	NMRF-7050
L152	232139	NMIF-4062
L201,L202	233355A	NMC-4059
	Ceramic filters	
X101,X103	3010071	SFE10.7MA5(RED)
X151	3010123	SFZ-450JL
X152	3010076	BFU-450C
	Crystal oscillator	
X104	3010158 or	XTL-7.2M
	3010141	
	Capacitors	
C001,C107	354741019	100 μ F,16V,Elect.
C106	354784799	0.47 μ F,50V,Elect.
C107	354742209	22 μ F,16V,Elect.
C108	354741019	100 μ F,16V,Elect.
C112	354780229	2.2 μ F,50V,Elect.
C113	354784799	0.47 μ F,50V,Elect.
C117	374723334	0.033 μ F±5%,50V,Plastic
C118	354780229	2.2 μ F,50V,Elect.
C119	353782299	0.22 μ F,50V,Elect.
C123	354721019	100 μ F,6.3V,Elect.
C124	354741019	100 μ F,16V,Elect.
C154	354780479	4.7 μ F,50V,Elect.
C155-C157	354761009	10 μ F,35V,Elect.
C159	374724734	0.047 μ F±5%,50V,Plastic
C160	374721034	0.01 μ F±5%,50V,Plastic
C161	354782299	0.22 μ F,50V,Elect.
C201	354744719	470 μ F,16V,Elect.
C202	354742209	22 μ F,16V,Elect.
C205	354782299	0.22 μ F,50V,Elect.
C206	354780109	1 μ F,50V,Elect.
C207	354780339	3.3 μ F,50V,Elect.
C208	370134714	470pF±5%,100V,Plastic
C209	374724734	0.047 μ F±5%,50V,Plastic
C211,C212	374721824	1800pF±5%,50V,Plastic
C213,C214	354742209	22 μ F,16V,Elect.
C215,C216	354761009	10 μ F,35V,Elect.
C219,C220	374726224	6200pF±5%,50V,Plastic
C221	374721034	0.01 μ F±5%,50V,Plastic
C222	354780229	2.2 μ F,50V,Elect.
C223	374721024	1000pF±5%,50V,Plastic
C224	374724734	0.047 μ F±5%,50V,Plastic
C225,C226	354761009	10 μ F,35V,Elect.

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CIRCUIT NO.	PART NO.	DESCRIPTION
	Resistors	
R101	5210266	N06HR 100KBC,Semi-fixed
R102,R202	5210267	N06HR 200KBC,Semi-fixed
R201	5210261	N06HR 5KBC,Semi-fixed
	Terminal	
P101	25060160	NTM-4PDMN086
	Socket	
P201	25050449	NSCT-16P273

POWER SUPPLY CIRCUIT PC BOARD (NAPS-4195-6)

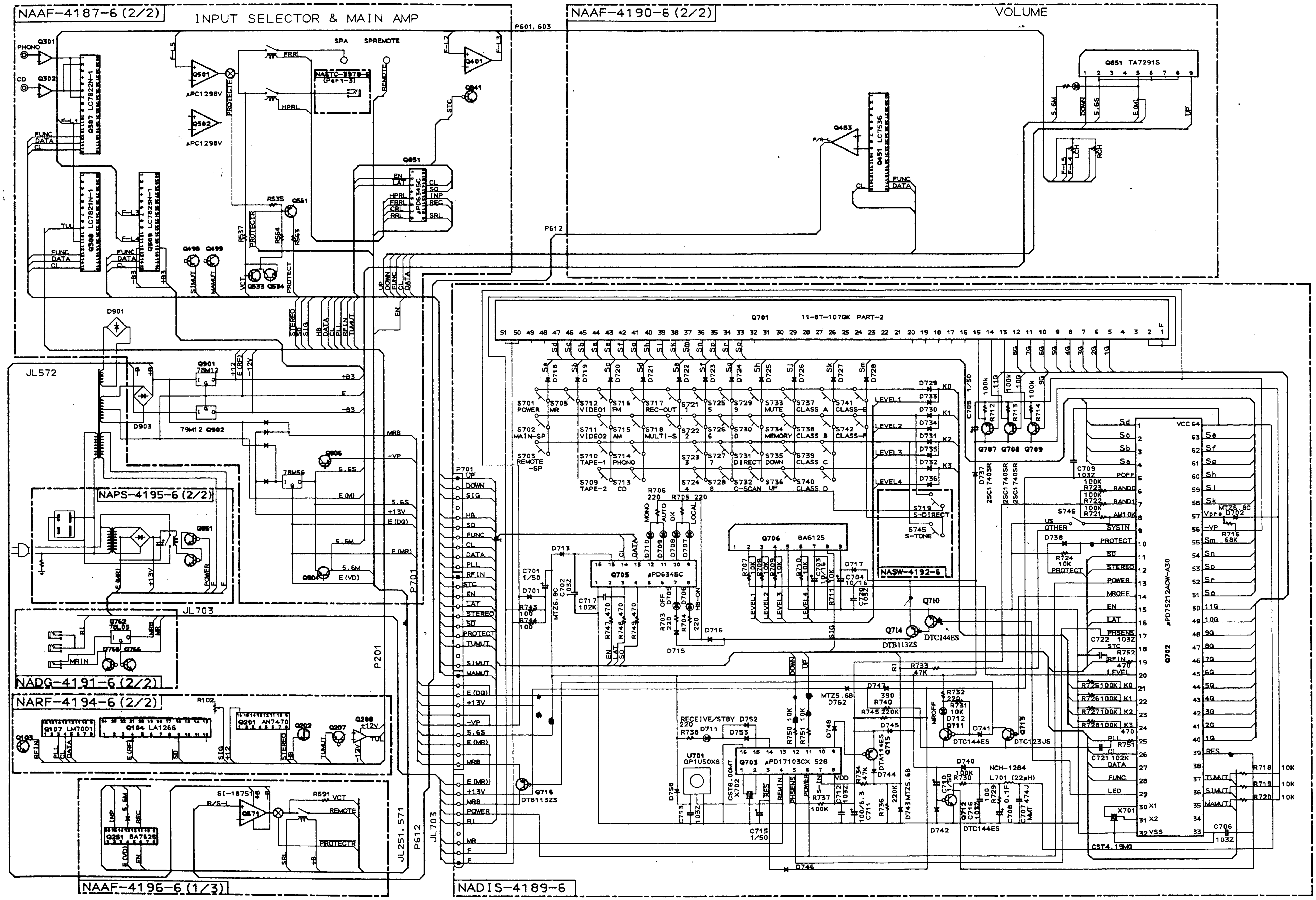
CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistors	
Q951	221282	DTC144ES
Q952	2213650	DTD113ZS
	Diodes	
D951-D954	22380032, 22380035 or 22380046	1SR139-100, GP104003E or AM01Z
D955	223163 or	1SS133 or
D995,D996	223205	1SS270A
	Power transformer	
T902	2300670	⚠ NPT-1111D
	Capacitors	
C901	3500065A	⚠ DE7150FZ103PAC400V/125V,IS
C952	354761019	100 μ F,35V,Elect.
	Resistors	
R901	431523355	⚠ 3.3MΩ ±20%,1/2W,Solid
R951	442520824	8.2Ω ±5%,1/2W,Metal oxide film
	Socket	
P902	25050409	⚠ NSCT-4P234
	Relay	
RL901	25065248	⚠ NRL-1P15A-DC12-29
	Fuse	
F901	252051	⚠ 6A ST-6
	Fuseholders	
F901a	250113	⚠ SN5051
	Plug	
P951	25055497	NPLG-6P472

VIDEO AND SUB AMPLIFIER PC BOARD (NAAF-4196-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	IC	
Q251	22240373	BA7625
Q571,Q572	22240467	SI-18751
	Transistors	
Q252,Q253	2213354	2SA933S-R
Q573,Q574	2211732 or 2211733	2SC1845-F or 2SC1845-E
	Diodes	
D251	223163 or	1SS133 or
D253,D254	223205	1SS270A
D506	223163 or	1SS133 or
D571,D572	223205	1SS270A
	Coils	
L571,L572	231176	S-1.3C
	Capacitors	
C251,C252	354780229	2.2 μ F,50V,Elect.
C253,C254	354724719	470 μ F,6.3V,Elect.
C255	354721019	100 μ F,6.3V,Elect.
C571,C572	354761009	10 μ F,35V,Elect.
C577,C578	354741019	100 μ F,16V,Elect.
C581,C582	374724734	0.047 μ F±5%,50V,Plastic
C591,C592	354780229	2.2 μ F,50V,Elect.
	Resistors	
R581,R582	442520824	8.2Ω ±5%,1/2W,Metal oxide film
R583,R584	4000059	0.22Ω,2W,Metal plate
	Relay	
RL506	25065339	NRL-2P5A-DC24-046
	Terminal	
P251	25045339	NPJ-4PDYE190
	Plug	
P612a	25055133	NPLG-5P117
	Sockets	
JL251	25050270	NSCT-6P98
JL571	25050272	NSCT-8P100
JL572	25050267	NSCT-3P95

A | B | C | D | E | F | G | H

HEMATIC DIAGRAM
NECTION DIAGRAM OF MICROPROCESSOR



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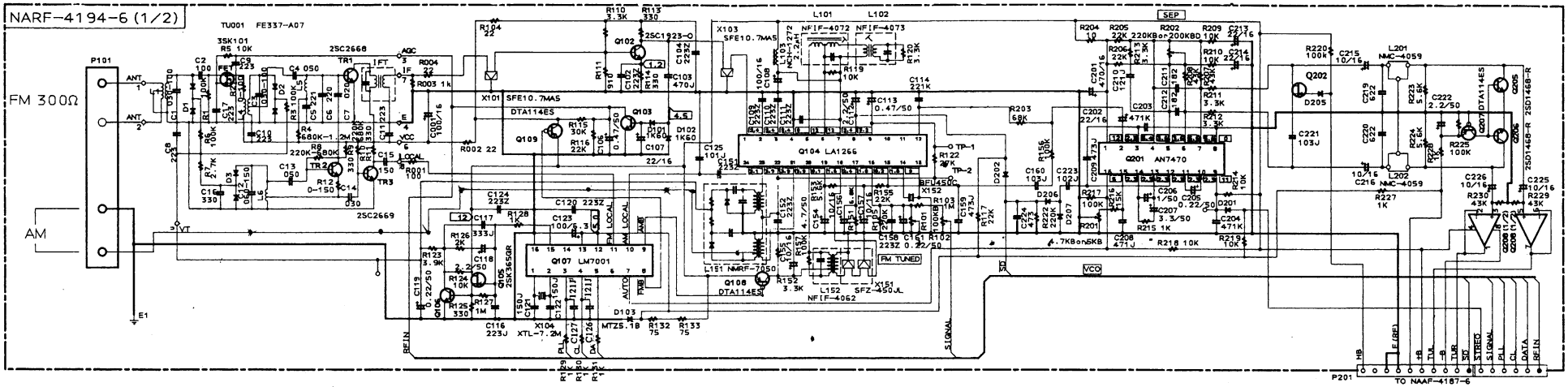
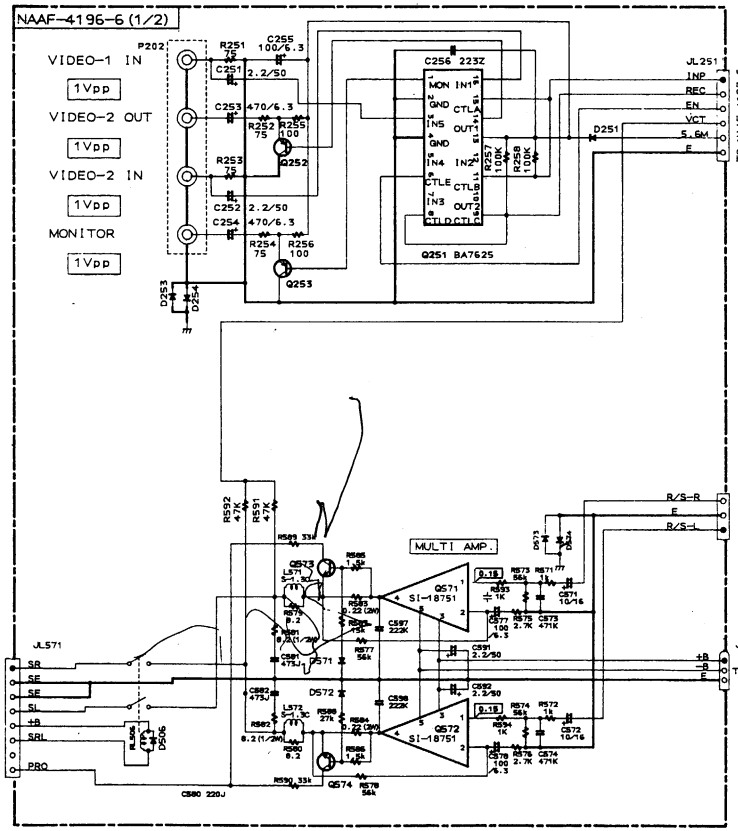
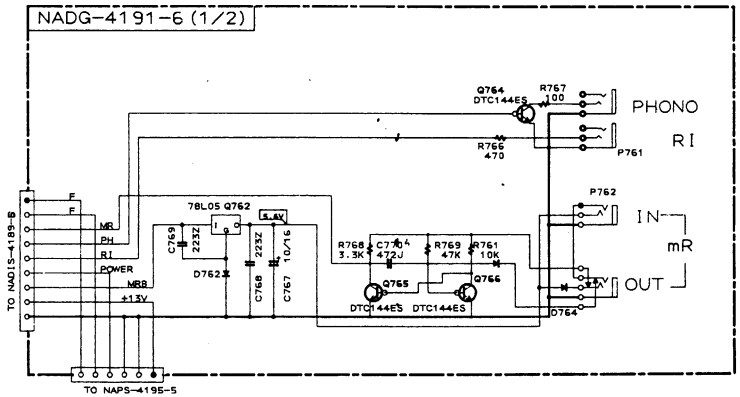
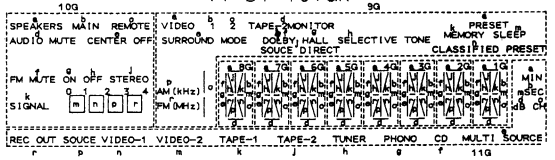
SCHEMATIC DIAGRAM

TUNER AND VIDEO SECTION

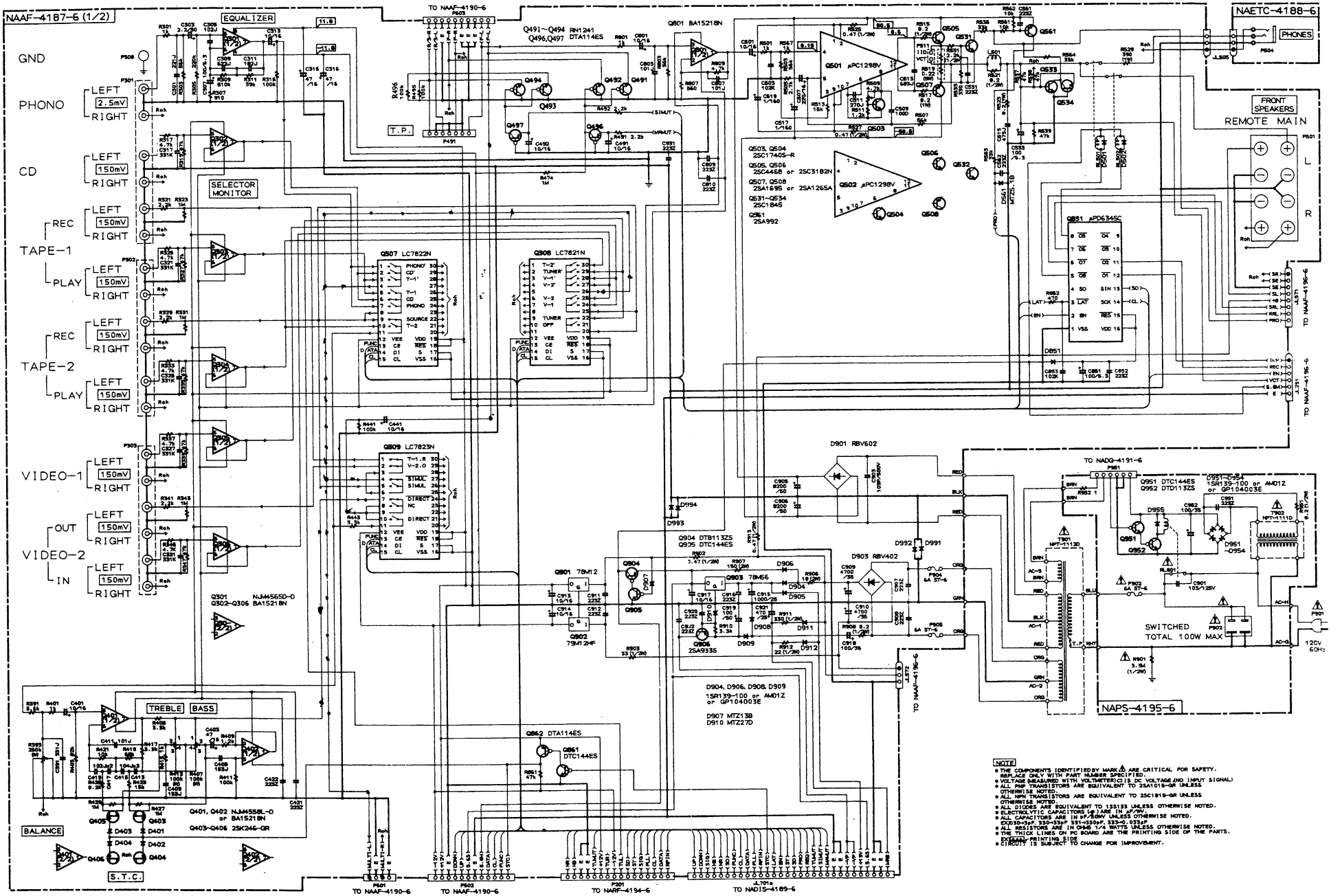








HEMATIC DIAGRAM
IO SECTION



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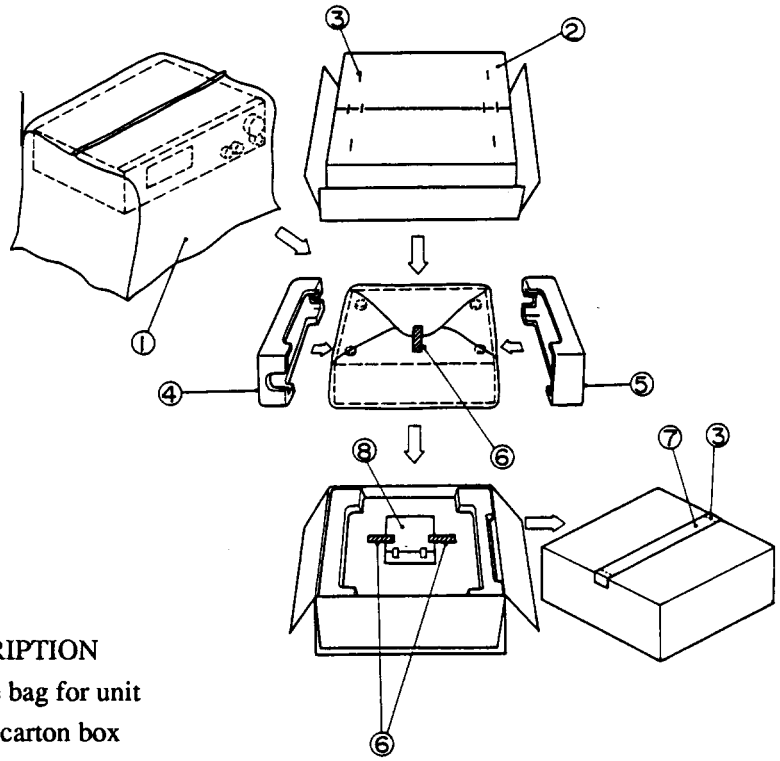
PACKING VIEW



REF.NO.	PART NO.	DESCRIPTION
1	29100034	Styrene bag for unit
2	29052488Y	Master carton box
3	282301	Sealing hook
4	29091449B	Pad R
5	29091448B	Pad L
6	261504	Adhesive tape
7	29110071	Damplon tape
8	Accessary bag ass'y	
	29341769	Instruction manual
	29341770	Instruction manual <C>
	292111	FM antenna
	232140	NMA-3057,AM loop antenna
	2010200	Connection cord
	3010054	UM-3,Two batteries
	24140241	RC-241C,Remote control transmitter
	29365019A	Warranty card <N>
	29358002J	Service station list <N>
	29100097	Styrene bag for accessary

NOTE: <N>:U.S.A. model
<C>:Canadian model

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