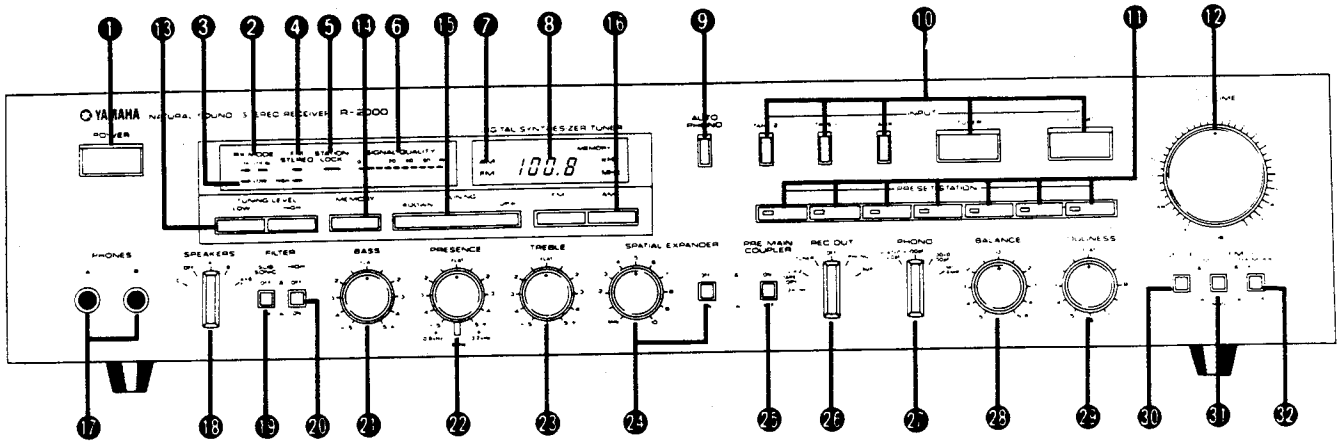
STEREO RECEIVER

R-2000

SERVICE MANUAL

■FRONT PANEL



❶ POWER SWITCH
❷ RX MODE INDICATOR
❸ TUNING LEVEL INDICATOR
❹ FM STEREO INDICATOR
❺ STATION LOCK INDICATOR
❻ SIGNAL QUALITY INDICATOR
❼ AM/FM INDICATOR
❽ DIGITAL FREQUENCY READOUT
❾ AUTO PHONO SWITCH
❿ INPUT SELECTOR BUTTONS
⓫ PRESET STATION BUTTONS
⓬ VOLUME CONTROL
⓭ TUNING LEVEL BUTTONS
⓮ MEMORY BUTTON
⓯ TUNING BUTTON
⓰ BAND SELECT BUTTONS
⓱ PHONES JACKS
⓲ SPEAKERS SELECTOR
⓳ SUBSONIC FILTER SWITCH
⓴ HIGH FILTER SWITCH
㉑ BASS CONTROL
㉒ PRESENCE CONTROL
㉓ TREBLE CONTROL
㉔ SPATIAL EXPANDER CONTROL
㉕ PRE-MAIN COUPLER SWITCH
㉖ REC OUT SELECTOR
㉗ PHONO SELECTOR
㉘ BALANCE CONTROL
㉙ LOUDNESS CONTROL
㉚ MODE SWITCH
㉛ FM MUTING SWITCH
㉜ RX MODE SWITCH

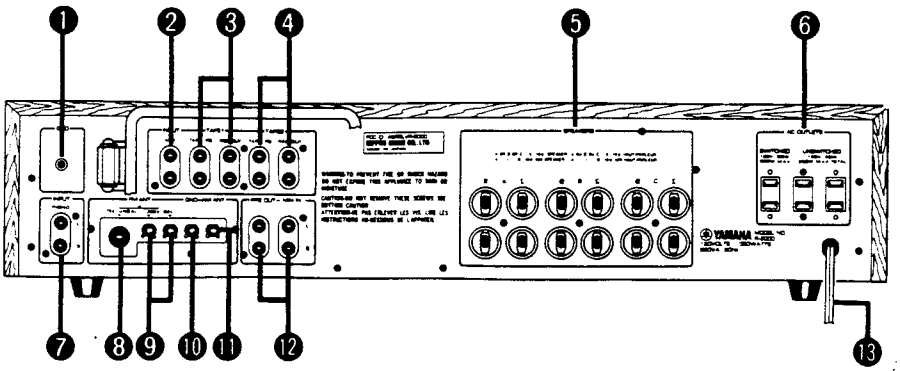
■CONTENTS

004433

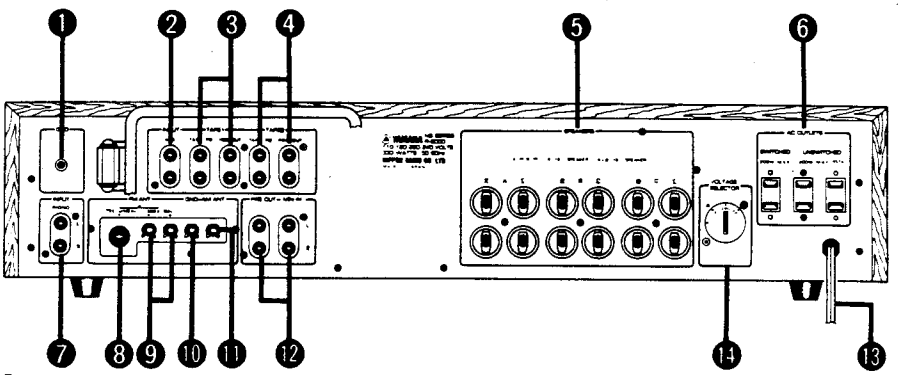
SINCE 1887 YAMAHA
NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN

■REAR PANEL

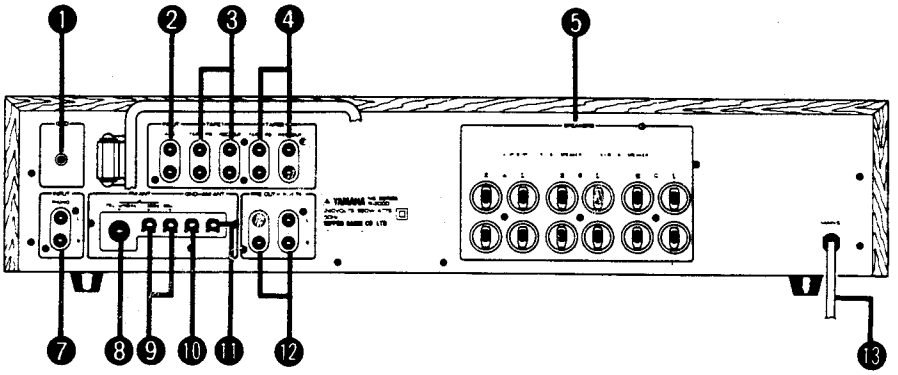
▼ U.S.A. & CANADIAN MODELS



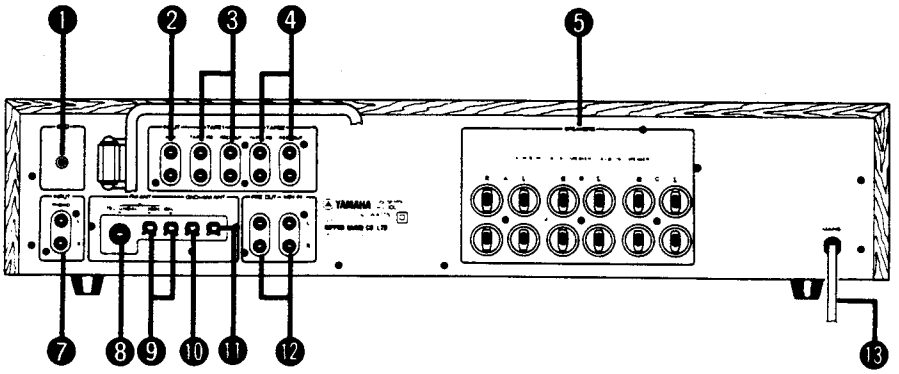
▼ GENERAL MODEL



▼ BRITISH & AUSTRALIAN MODELS



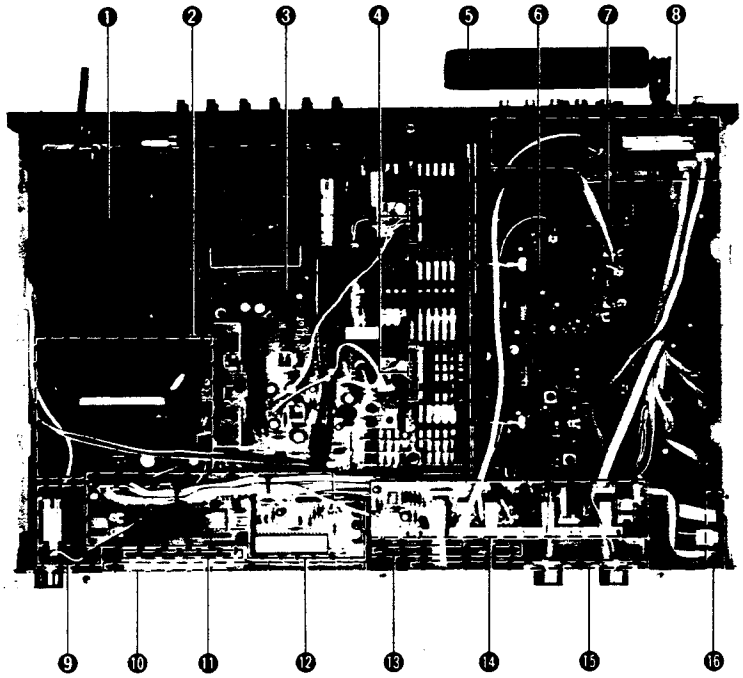
▼ NORTH EUROPEAN MODEL



❶ GROUND TERMINAL
❷ AUX INPUT JACKS
❸ TAPE 1 PB/REC JACKS
❹ TAPE 2 PB/REC JACKS
❺ SPEAKERS TERMINAL
❻ AC OUTLETS
❼ PHONO INPUT JACKS
❽ FM ANTENNA TERMINAL (75Ω)
❾ FM ANTENNA TERMINAL (300Ω)
❿ AM GROUND TERMINAL
⓫ AM ANTENNA TERMINAL
⓬ PRE OUT/MAIN IN JACKS
⓭ POWER CORD
⓮ VOLTAGE SELECTOR

■INTERNAL VIEW

▼ TOP VIEW



❶ POWER TRANSFORMER GA6465 (U)
GA6466 (C)
GA6468 (R)
GA6467 (G)
GA6469 (A, B)
❷ ELECTROLYTIC CAPACITOR CIRCUIT BOARD (Power supply)
❸ MAIN CIRCUIT BOARD [1]
❹ I AMP CIRCUIT BOARD
❺ AM LOOP ANTENNA
❻ TUNER CIRCUIT BOARD
❼ FRONT END PACK PK101
❽ MAIN CIRCUIT BOARD [3] (Pin Jacks)
❾ CONTROL CIRCUIT BOARD [6] (Phones Jacks)
❿ CONTROL CIRCUIT BOARD [2]
⓫ CONTROL CIRCUIT BOARD [4]
⓬ CONTROL CIRCUIT BOARD [1]
⓭ MAIN CIRCUIT BOARD [4]
⓮ MAIN CIRCUIT BOARD [2]
⓯ CONTROL CIRCUIT BOARD [3]
⓰ CONTROL CIRCUIT BOARD [5]

■DISASSEMBLY PROCEDURES

1. Top Cover Removal

Remove the screws ① and ② in photo 1 from both right and left sides, then remove the top cover.

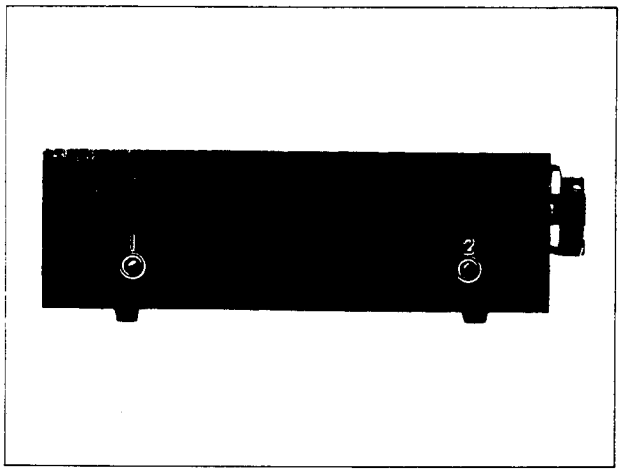


Photo 1

2. Bottom Cover Removal

Remove the screws ① to ⑬ in photo 2 and then remove the bottom cover.

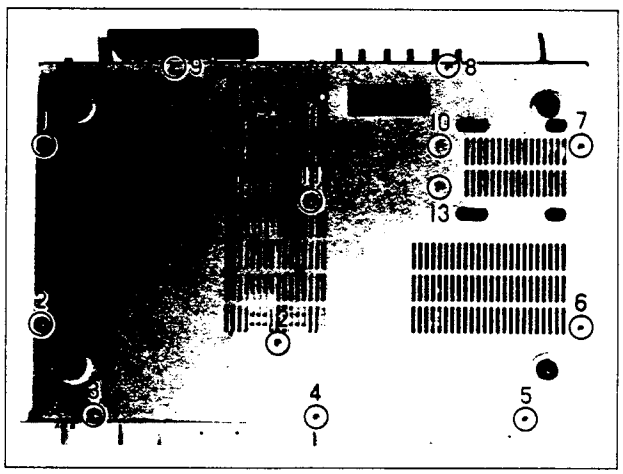


Photo 2

3. Front Panel Removal

a. Loosen the set screws of SPEAKERS, REC OUT, PRESENCE and PHONO knobs with a 1.5 mm hexagon wrench, then pull out each knob.
b. Remove the screws ① to ③ in photo 3 and remove the front panel.
* Remove the screws ③ to ⑤ in photo 2 when the front panel is removed.

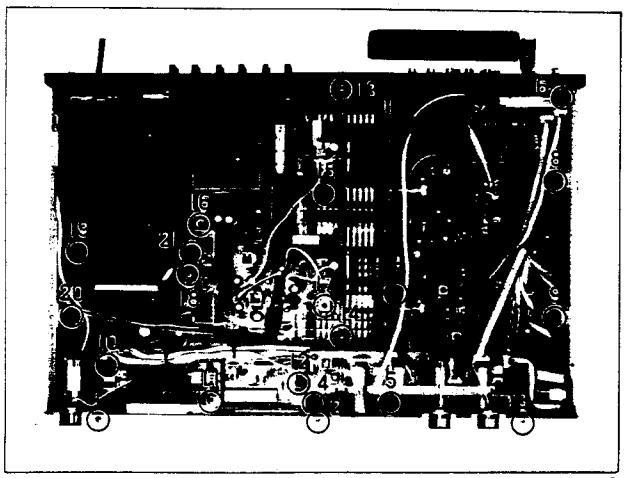


Photo 3

4. Main C. Board [2] Removal

a. Detach the connectors and PHONO, TUNER indicator lamps which are attached to the Main C. Board.
* Refer to Fig. 1.

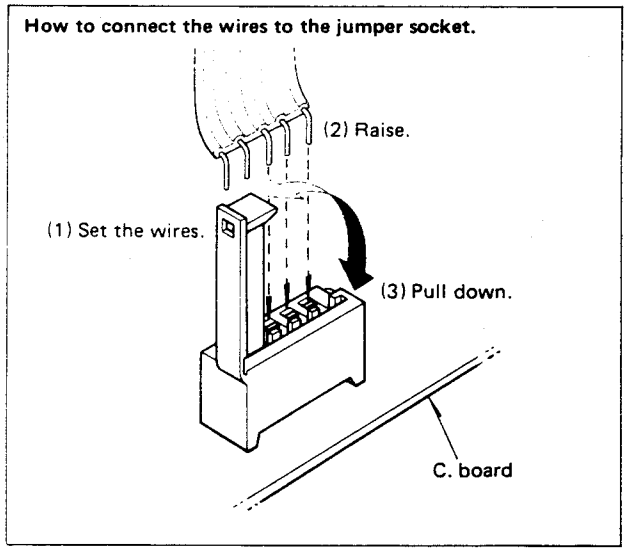


Fig. 1

b. Remove the screws ① and ③ in photo 4 and then remove the Main C. Board [2].

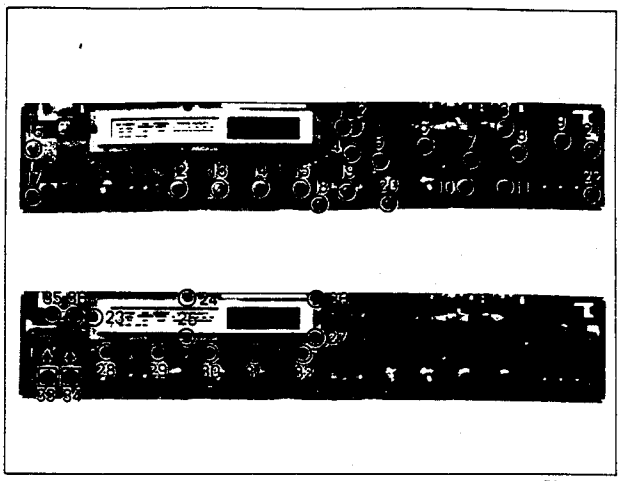


Photo 4

5. Main C. Board [4] Removal

a. Remove the plastic rivets ④ and ⑤ in photo 4 and then remove the Main C. Board [4].
b. Detach the lead wires which are attached to the Main C. Board [4].

6. Control C. Board [3] Removal

a. Remove the Main C. Board. (Refer to step 4 and 5.)
b. Remove the plastic rivets ④ to ⑧ in photo 4 and then remove the Control C. Board [3].
c. Detach the lead wires which are attached to the Control C. Board [3].

7. Control C. Board [5] Removal

a. Detach the lead wires which are attached to the Control C. Board [5].
b. Remove the nut ⑨ in photo 4 and remove the Control C. Board [5].

8. Main C. Board [3] Removal

a. Remove the connectors and Remoto Rotary Switch.
* How to detach and attach the remoto rotary switch.

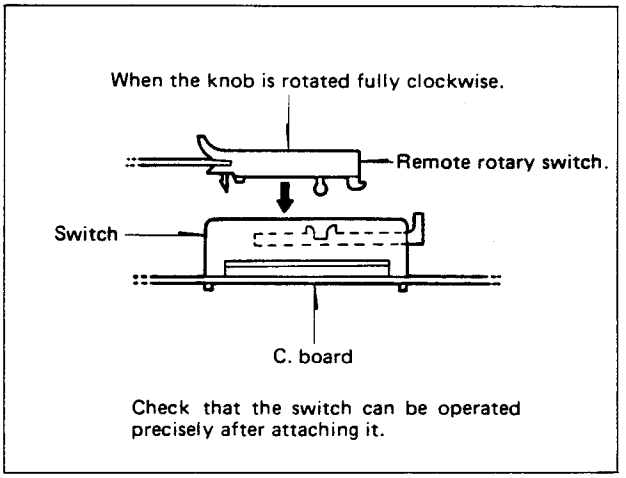


Fig. 2

b. Detach the lead wires which are attached to the Main C. Board [3].
c. Remove the screws ⑥ in photo 3 and ① to ④ in photo 5 and then remove the Main C. Board [3].

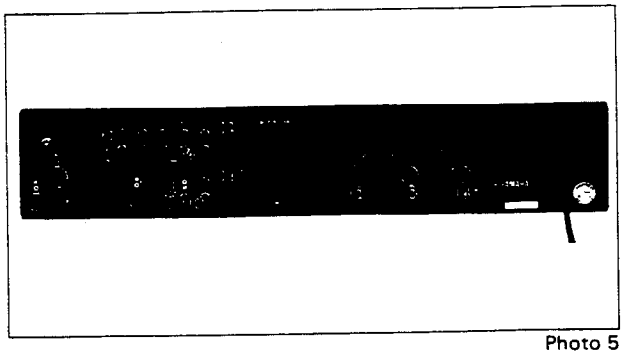


Photo 5

9. Tuner C. Board Removal

a. Detach the connector, remote rotary switch and lead wires which are attached to the Tuner C. Board.
b. Remove the nuts ⑩ to ⑮ in photo 4 and screws ⑯ to ㉒ in photo 4 and then remove the sub schassis unit toward yourself.
c. Remove the screws ⑦ to ⑨ in photo 3 and the screws ⑥ to ⑪ in photo 5 and then pull out the Tuner C. Board to the front side.

10. Control C. Board [1] Removal

a. Remove the Control C. Board [1]. (Refer to step 10.)
b. Remove the plastic rivet ㉓ to ㉗ in photo 4 and then remove the holder unit.
c. Remove the Control C. Board from the sub schassis unit.
d. Detach the lead wires which are connected to the Control C. Board [1].

11. Control C. Board [3] Removal

a. Remove the Control C. Board [1] and [4]. (Refer to step ⑩ and ⑪.)
b. Remove the plastic rivet ㉘ to ㉜ in photo 4 and remove the Control C. Board [3].
c. Detach the lead wires which are connected to the Control C. Board [3].

12. I AMP. C. Board Removal

a. Detach the lead wires which are connected to the I AMP. C. Board.
b. Remove the screws ⑬ and ⑭ in photo 3 and then remove the heat sink.
c. Remove the screws ① to ⑦ in photo 6 and then remove the I AMP. C. Board. (L and R channel are common.)

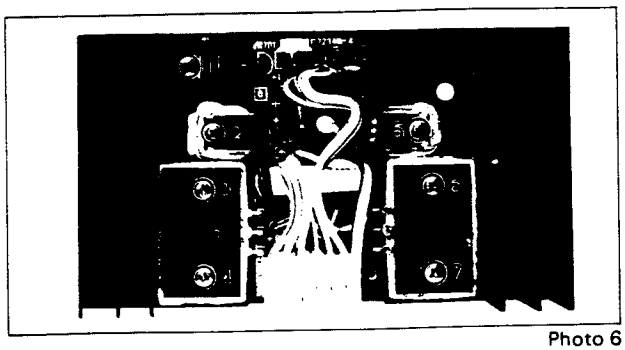


Photo 6

13. Main C. Board Removal

a. Detach the lead wires, connectors and remote rotary switch which are connected to each C. Boards.
b. Remove the sub schassis unit toward yourself to according to step 9 (b).
c. Remove the heat sink according to step 12 (b).
d. Remove the screws ⑮ to ⑱ in photo 3 and the screws ⑫ and ⑭ in photo 5 and then remove the Main C. Board gently.

14. Electrolytic Capacitor C. Board Removal

a. Remove the screws ⑲ to ㉑ in photo 3 and then remove the Electrolytic Capacitor C. Board.
b. Detach the lead wires which are connected to the Electrolytic Capacitor C. Board.

15. Power Transformer Removal

a. Detach the lead wires of the Power Transformer.
b. Remove the bottom cover according to step 2.
c. Remove the screws ① to ④ in photo 7 and then remove the Power Transformer.

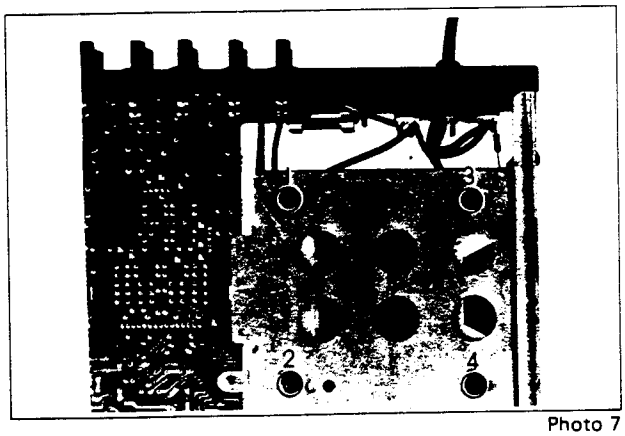


Photo 7

16. Phones Jack (Control C. Board [6]) Removal

a. Remove the screws ㉟ and ㊱ in photo 4 and then remove the power switch.
b. Pull out the phone jack stopper ㉝ and ㉞ to the war directed by allows in photo 4 and then remove the Control C. Board [6].
c. Detach the lead wires which are connected to the Control C. Board [6].

■MEASUREMENT AND ADJUSTMENT

1. FM TUNER ADJUSTMENT

- Before adjusting connect the auxiliary center meter (Ji00036 or similar one) between S and NVCC.
- Set the switches to the following positions.
  - Band select. . . . . FM
  - RX MODE . . . . . AUTO
  - TUNING LEVEL . . . . . HIGH
  - MUTING . . . . . ON
- During adjustments, use a low-pass filter.
- Start adjustment, after waiting 5 minutes following power switch-on.
- Do not forget to keep the bottom cover on.
- Abbreviation of Instruments
  - FM S.G. : FM Signal generator
  - DM : Digital multimeter
  - OSC. : Oscilloscope
  - DIST.M. : Distortion meter
  - F.C. : Frequency counter
  - ST SG : Stereo Signal generator

ADJUSTING POINTS

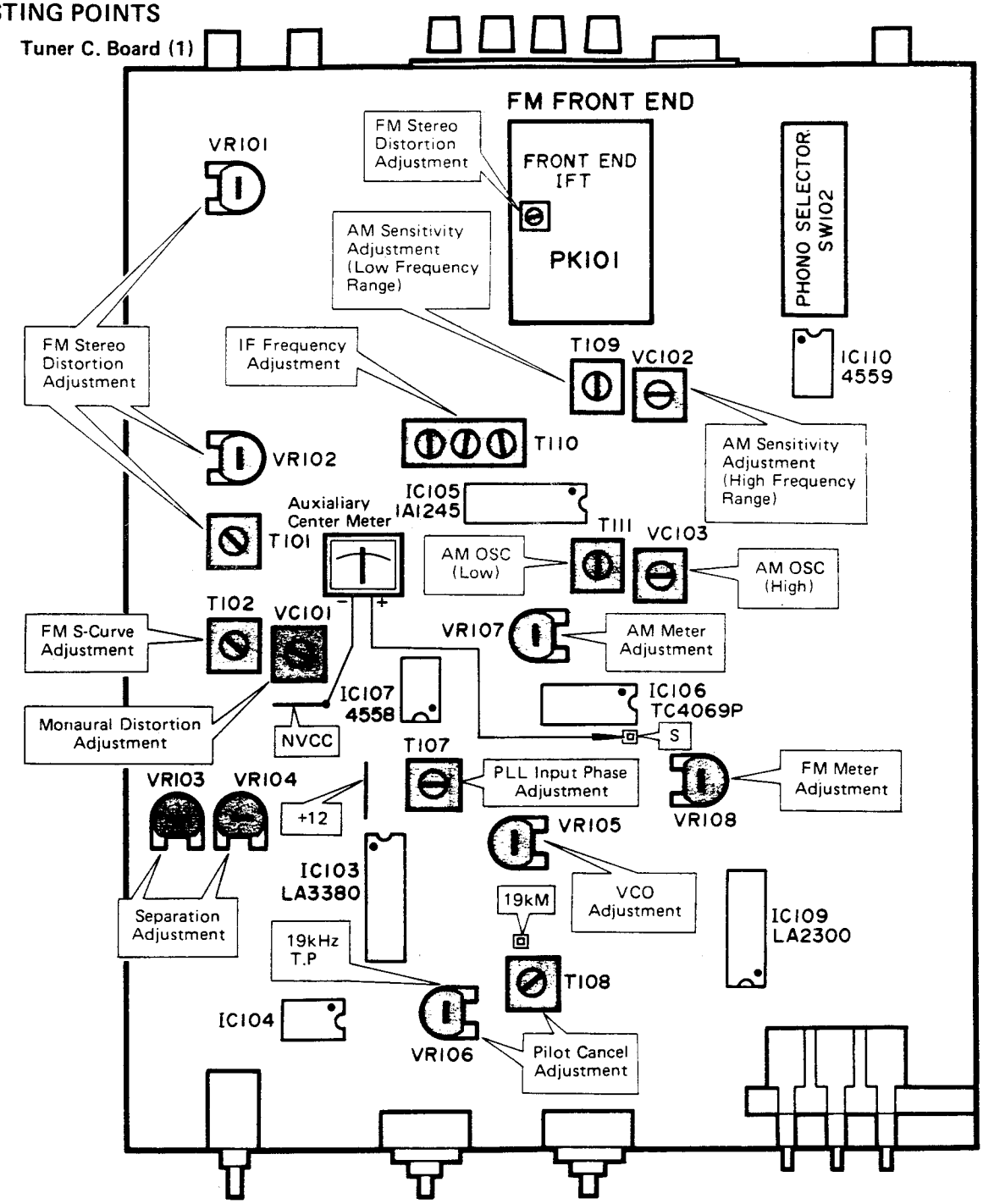


Fig. 3

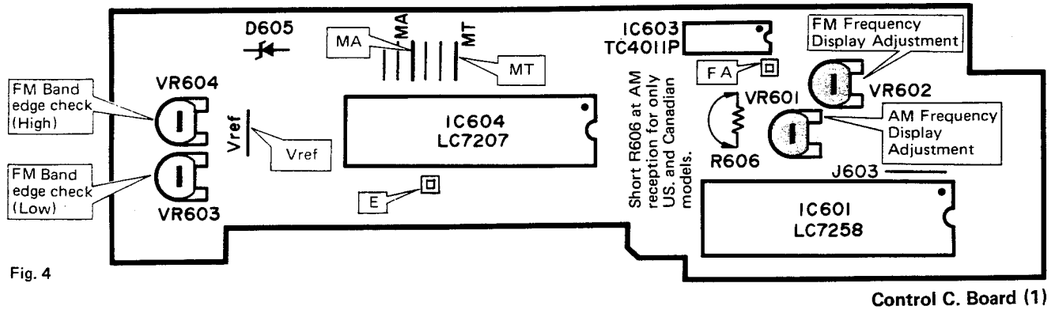


Fig. 4

Control C. Board (1)

Step	Adjustment item	Terminals to be connected	Instrument required	Adjustment location	Adjustment method	Rating or standard	Remarks
1	External VR setting	MT, Vref, E (control c. board)	Connect VR between Vref and E. Connect the center tap of VR to MT. (Refer to Fig. 5)				Tune manually with this VR when adjusting.
2	Manual set	MA E	Short wire		Short MA (TP) and E for a moment. (Refer to Fig. 5)		Set MA to L level once.
3	S curve adjustment	FM antenna terminal (300Ω balanced ANT) S, E terminal	OSC DM FM SG/ST SG DIST. M	T102 (discriminator coil)	At detuned point MUTE / DX LOCAL ON / 4.5～5.0V OFF / 4.0～5.5V		
4	Tuning point setting	FM antenna terminal	FM SG 98MHz Antenna input:70dBμ	External VR	Adjust VR so that the voltage between S and E is 4.5～5.0V		Check that JF MODE switch becomes Local.
5	Monaural distortion adjustment	FM antenna terminal output	FM SG 98MHz Antenna input:70dBμ Monaural:1kHz 100% modulation OSC DM DIST. M	VC101 (trimmer)	Reduce distortion to minimum.	Less than –60dB (–70dB)	Check that JF MODE Switch becomes Local.
6	VCO adjustment	FM antenna terminal output 19kM, ME	FM SG 98MHz non-modulation F.C. 1MΩ resistor	VR105	Set to 19kHz when forcing the set into the stereo mode. (Refer to Fig. 6)	19kHz ±20Hz (±10Hz)	Check that JF MODE Switch becomes Local.
7	PLL input phase adjustment	Same as step 6	FM SG 98MHz Antenna input:70dBμ Stereo L,R:1kHz 100% modulation DM	T107	Adjust so that L and R output are at maximum.		Check that JF MODE Switch becomes Local.
8	Stereo distortion adjustment	Same as step 6	FM SG 84MHz Antenna input:70dBμ Stereo L,R:1kHz 100% modulation OSC DM DIS. M	T101 VR101 VR102 Front end IFT	Reduce distortion to minimum	Less than –60dB (–70dB)	Check that JF MODE Switch becomes Local.
9	Separation adjustment	Same as step 6	Same as step 8	VR103 (L→R) VR104 (R→L)	Adjust so that separation is at maximum.	More than 40dB (58dB)	Check that JF MODE Switch becomes Local.
10	Pilot canceling adjustment	Same as step 6	Same as step 8 Pilot:9% modulation	T108 VR106	Observe wave forms on oscilloscope and adjust so that leak level is reduced to minimum.	Less than –50dB (–60dB)	Check that JF MODE Switch becomes Local.
11	Signal meter full scale adjustment	Same as step 6	Same as step 8 Stereo L,R:1kHz 100% modulation	VR108	Adjust so that LED of signal meter is at full scale.		Check that LED is not out at detuned point.
12	S curve offset check	Same as step 3				Adjust over again from step 3 when S curve offset is not found to be within specified value . Check that IF MODE Switch becomes AUTO.	

Step	Adjustment item	Terminals to be connected	Instrument required	Adjustment location	Adjustment method	Rating or standard	Remarks
13	Frequency display adjustment (IF offset)	Same as step 4	FM SG 98MHz Antenna input:70dBμ Stereo (frequency accuracy:within ± 5kHz)	VR602	Tune so that the voltage between S and E becomes 4.5V ～ 5V. Four figure display; The best point is found when the number of tenth figure changes. Five figure display; Connect 22kΩ between FA and E. The best point is found when the on and off of the display of 100k figure is stopped. North European, British models. (Refer to Fig. 5)		
14	Band edge check (receiving frequency range check)	Same as step 4	Same as step 13 * Connect J603 to control c. board and detach after adjustment except North European and British models.	VR603 VR604	Set to the highest frequency with external VR. Adjust VR604 so that display frequency becomes 108.35MHz. Next, memorize in CH1 and read. Adjust with VR603 so that display becomes 87.35MHz.		
15	Auto reception check	Same as step 4	FM SG 98MHz Antenna input:70dBμ		Press UP and DOWN switch. Receive 87.5MHz and 108MHz station.		
16	Tuning level check	Same as step 4	FM SG 98MHz Antenna input:20dBμ		Check that Tuning LEVEL switch is not stopped at HIGH when the set is auto tuned.		

** Specified values are ones that are able to be measured with YHP4333A (except step 1, 7 and 14).*
** Step 1 shows the circuit for easy adjustment that holds an optional frequency.*
** Step 2 means the rest operation to operate manually.*

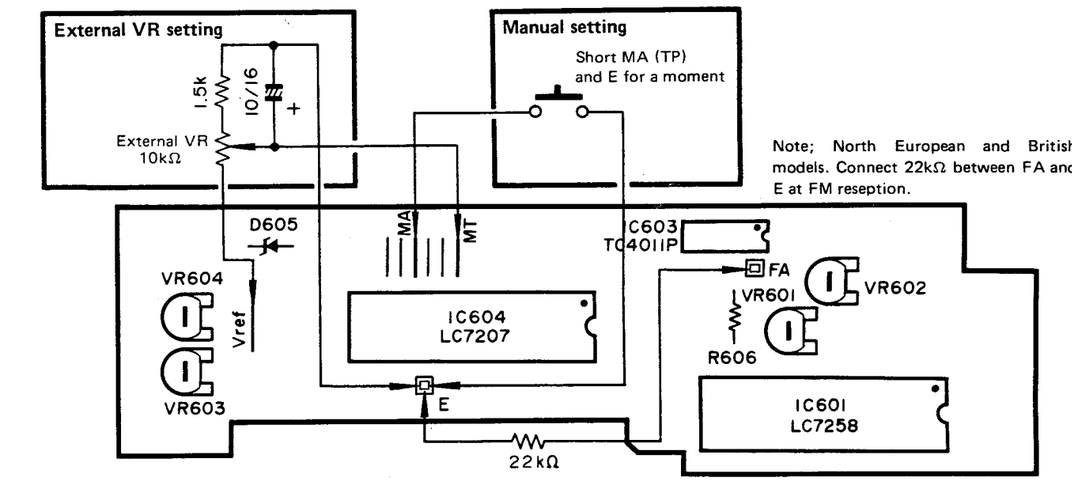


Fig. 5

VCO Adjustment

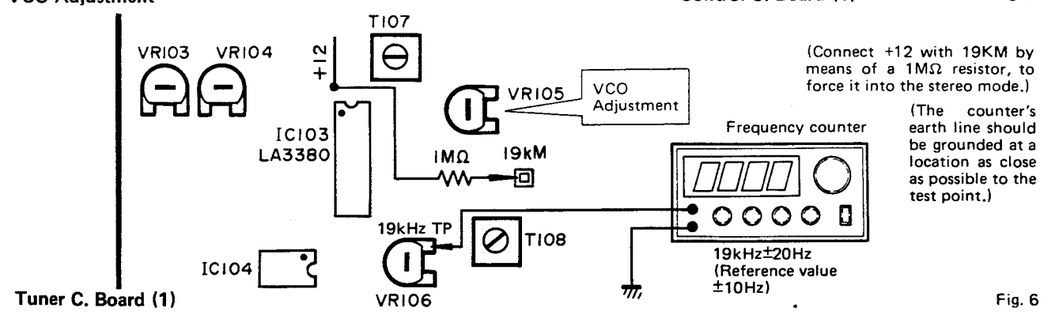


Fig. 6

2. AM TUNER ADJUSTMENT

- This is to be carried out after adjustment of the FM tuner section has been completed.
- As a rule, the local oscillator coil is not to be turned.
- Connect the AM loop antenna to the AM ANT terminals.

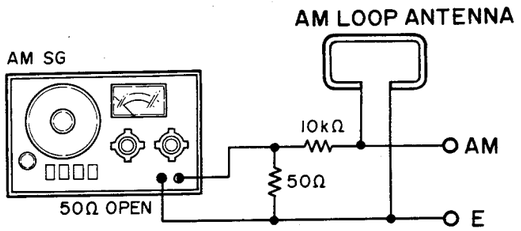
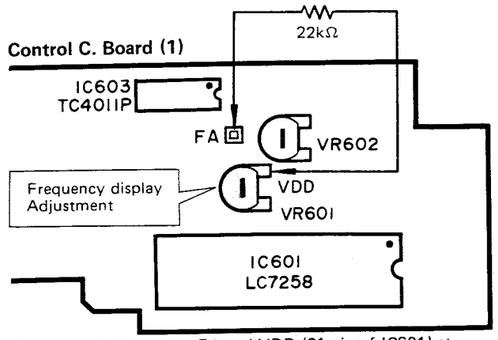


Fig. 7

- Set BAND SELECTOR to AM.
- Abbreviation of instruments
  AM S.G. . . . AM signal generator



Connect 22kΩ between FA and VDD (21 pin of IC601) at AM reseption.

Fig. 8

Step	Adjustment item	Terminals to be connected	Instrument required	Adjustment location	Adjustment method	Rating or standard	Remarks
1	External VR setting MANUAL setting				Perform Steps 1 & 2 of FM section adjustment		
2	S-curve center check	S-E terminal	OSG DM		At detuned point	4.2V ± 1V	
3	IF frequency adjustment	Connect dummy antenna to ANT terminal output L or R	AM SG 450.00kHz 100dBμ ~ 120dBμ	T110	Adjust so that the detector output is at maximum.		Refer to Fig. 7
4	Lowest receiving frequency adjustment	Same as step 3		T111	Preset to CH1 and read. Display 515kHz	± 1kHz	
5	Highest receiving frequency adjustment	Same as step 3		VC103	Set manually. Set the manual VR at maximum. Display 1620kHz	± 1kHz	
6	Low frequency range sensitivity adjustment	Same as step 3	600kHz 40 ~ 50dBμ	T109	Set the sensitivity at maximum		
7	High frequency range sensitivity adjustment	Same as step 3	1450kH 40 ~ 50dBμ	VC102	Same as step 6		
8	Tuning range sensitivity difference	Same as step 3	Repeat from step 4 to 7		Same as step 6		
9	Signal meter full scale adjustment	Same as step 3	950kHz 80dBμ	VR107	Set the signal meter to full scale (LED indicator lights up.)	LED indicator puts out at detuned point.	
10	Frequency display adjustment	Same as step 3	950.00kHz	VR601	Tune so that the voltage between S and E is 4.5 ~ 5.0V. Connect 22kΩ between FA and VDD (21 PIN of IC601). Adjust so that the on and off of 1kHz figure stops. (Refer to Fig. 8)		For U.S. & Canadian models, short R606 (2.2MΩ) on the control circuit board and set to 1kHz display and then adjust.
11	Auto reception check	Same as step 3	950.00kHz		Press UP and DOWN switch. Receive 525kHz and 1605kHz station.		

** Use the dummy antenna shown in Fig. 4. (Do connect the loop antenna.)*

3. Audio section adjustment

- After the power switch is ON. Wait 5 minutes before measuring to be sure of the most stable operation.
- Connect dummy load (8Ω) to the speaker terminals.

a. DC offset voltage adjustment

- Test point : TP 1 – Earth (L and R channels)
- Adjustment volume : VR406 (Main amp. P.C.B)
- Adjustments
  Ovserve L and R channels on the digital multimeter at the same time and adjust VR. Set to the point that DC offsets of Both channels are at minimum.
  Less than 0 ± 100mV

* When adjusting VR406, DC offsets of both channels changes, so set to the point that the balance of L and R channels is best.

b. Idling current adjsutment

- Test point : TP1 – TP2 (I amp. P.C.B. L and R channels)
- Adjustment volume : VR701 (I amp. P.C.B. L and R channels)
- Adjustment

Adjustment VR701 and then set the voltage between TP1 and TP2 to 6 ± 3mV on digital multimeter.

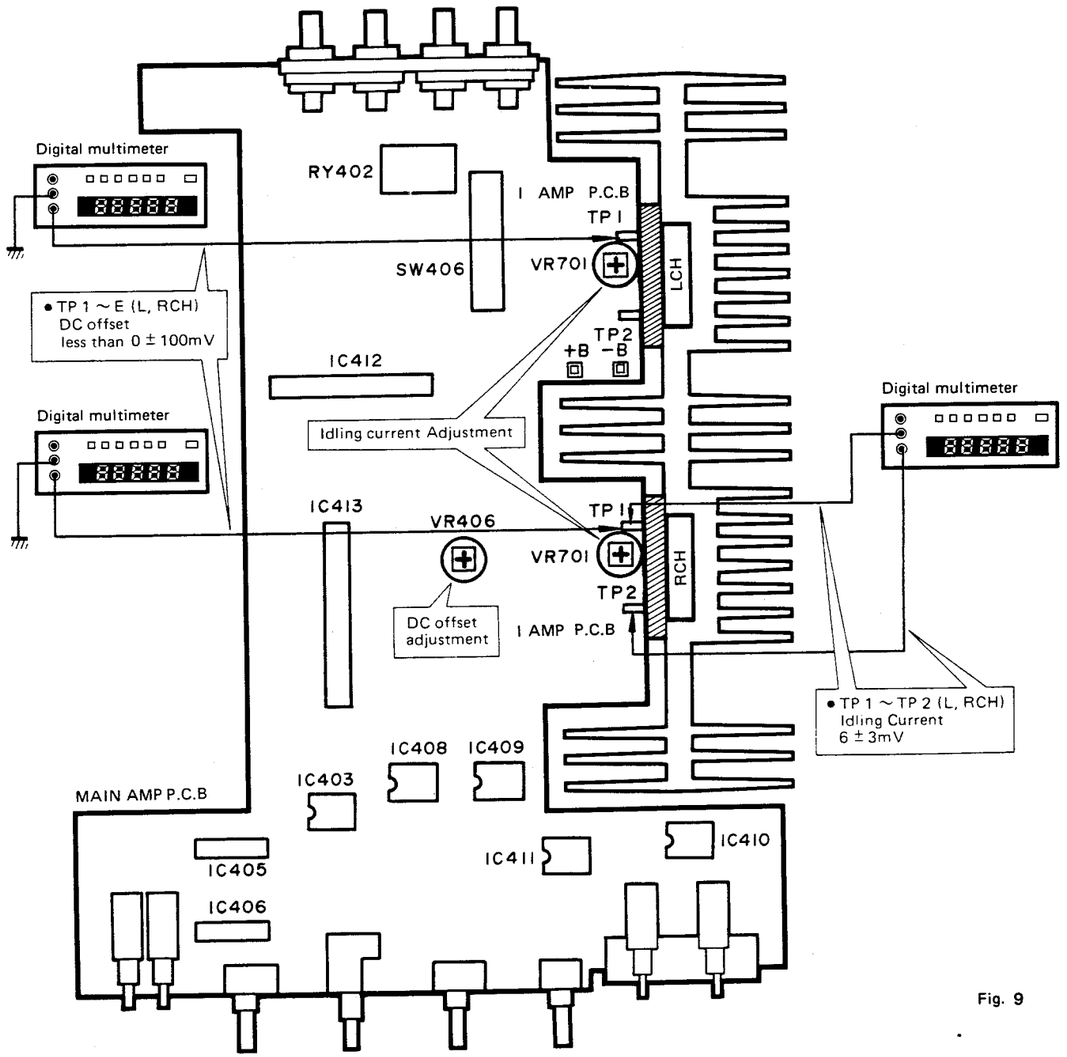


Fig. 9

■SPECIFICATION

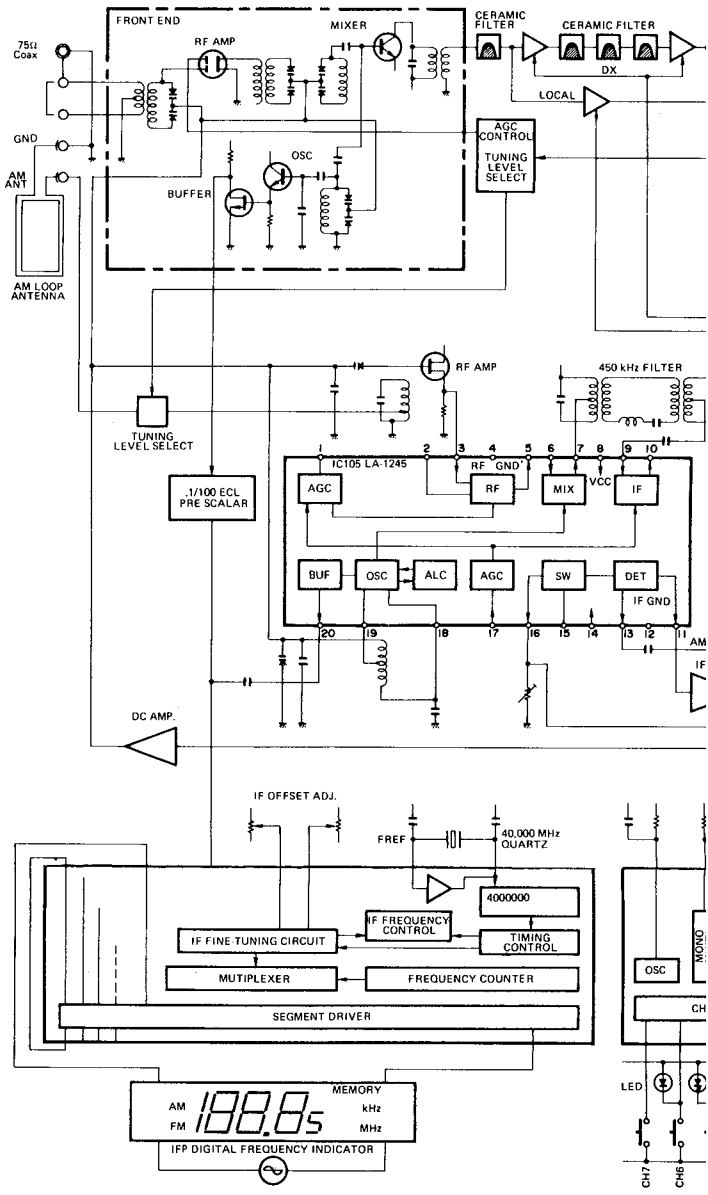
• AUDIO SECTION	
Minimum RMS Output Power per Channel	
8Ω, 20 to 20,000Hz, 0.015% THD	150W (21.8dBW)
8Ω, 1kHz, 0.01% THD	165W (22.2dBW)
8Ω, 20 to 20,000Hz, 0.005% THD, Main In	150W (21.8dBW)
Dynamic Headroom (8Ω)	3dB
Total Harmonic Distortion (20 to 20,000Hz)	
Phono MM to Rec Out (3V output)	0.005%
Phono MC to Rec Out (3V output)	0.01%
Aux/Tape to Pre Out (2V output)	0.005%
Aux/Tape to Sp Out (8Ω, 1W)	0.005%
Main In to Sp Out (8Ω, 1W)	0.005%
IM Distortion Ratio	
Aux/Tape to Sp Out (8Ω, 75W)	0.01%
Power Bandwidth	
(8Ω, 75W 0.02% THD)	5 to 40,000Hz
Damping Factor (8Ω, 1kHz)	Better than 60
Frequency Response	
(Aux/Tape to Sp Out, 8Ω)	5 to 50,000Hz, −1dB
(Main In, DC to 100,000Hz)	−1dB
RIAA Deviation	
Phono MM (20 to 20,000Hz)	±0.2dB
Phono MC (30 to 20,000Hz)	±0.3dB
Input Sensitivity/Impedance	
Phono MM	2.5mV/47kΩ, 100pF or 220pF
	2.5mV/100kΩ, 100 pF
Phono MC	100μV/100Ω
Aux/Tape	120mV/47kΩ
Main In	1V/47kΩ
Input Sensitivity (New IHF)	
Phono MM	0.2mV
Phono MC	8.2μV
Aux/Tape	9.8mV
Maximum Input Level (0.01% THD)	
Phono MM (20 to 20,000Hz)	250mV
Phono MM (1kHz)	280mV
Phono MC (1kHz)	11mV
Output Level/Impedance	
Rec Out (Phono)	120mV/470Ω
Pre Out	1V/430Ω
Headphone Output	780mW (0.015% THD)
Signal-to-Noise Ratio (IHF A Network)	
Phono MM (5mV, Input Shorted)	90dB
Phono MC (500μV, Input Shorted)	84dB
Aux/Tape (Input Shorted)	100dB
Main In (Input Shorted)	120dB
Signal-to-Noise Ratio (New IHF)	
Phono MM	80dB
Phono MC	77dB
Aux/Tape	87dB
Main In	100dB
Residual Noise (IHF A Network)	50μV
Channel Separation (1kHz, vol −30dB, 5.1kΩ)	
Aux/Tape to Other Channel	−64dB
Phono MM to Other Channel	−64dB
Tone Control Characteristics	
Bass (boost/cut)	±11dB at 80Hz
Treble (boost/cut)	±12dB at 10kHz
Center Frequecies Bass	80Hz
Treble	10kHz
Presence Control Range	±8dB (Center Frequency)
Center Frequency	0.8/1.6/3.2kHz
Filter Characteristics	
Low (Subsonic)	15Hz, −12dB/oct
High	8kHz, −6dB/oct
Continuous Loudness Control (Level-Related Equalization)	
Max. Attenuation	−20dB at 1kHz
Rec. Output Level/Impedance (Fixed)	
FM (100% mod. 1kHz)	500mV/1.8kΩ
AM (30% mod. 1kHz)	150mV/1.8kΩ

• FM SECTION		
Tuning Range		87.6 to 108MHz
50dB Quieting Sensitivity		
Mono (DX)		2.8μV (14.2dBf)
Stereo (DX, Auto Blend)		25μV (33.2dBf)
Usable Sensitivity		
IHF Mono (1kHz 100% mod.)		
(300Ω)		2.0μV (11.3dBf)
(75Ω)		1.0μV (11.3dBf)
(1kHz, 30% mod.)		
300Ω		1.6μV (9.3dBf)
75Ω		0.8μV (9.3dBf)
Image Response Ratio (98MHz)		70dB
IF Response Ratio (98MHz)		100dB
Spurious Response Ratio (98MHz)		100dB
AM Suppression Ratio (IHF)		65dB
Capture Ratio (IHF)		Local 1.2dB, DX 2.5dB
Alternate Channel Selectivity (IHF)		Local 30dB, DX 82dB
Selectivity (Two Signals)		DX 68dB
Signal-to-Noise Ratio, Mono		85dB
Stereo		81dB
Distortion		
Mono 100Hz		Local 0.06%, DX 0.1%
1kHz		Local 0.06%, DX 0.5%
6kHz		Local 0.08%, DX 0.7%
Stereo 100Hz		Local 0.07%, DX 0.1%
1kHz		Local 0.07%, DX 0.5%
6kHz		Local 0.09%, DX 0.8%
Intermodulation Distortion (IHF)		
Mono		Local 0.07%, DX 0.5%
Stereo		Local 0.08%, DX 1.0
Stereo Separation (Local)	50Hz	50dB
	1kHz	50dB
	10kHz	45dB
Frequency Response		
50Hz to 10kHz		±0.3dB
30Hz to 15kHz		+0.3/−0.5dB
Subcarrier Product Ratio		65dB
Muting Threshold (DX)		2.8μV (14.2dBf)
Auto-DX Threshold		32μV (35.3dBf)
Tuning Level Threshold		56μV (40.2dBf)
• AM SECTION		
Tuning Range		525 to 1,605kHz
Usable Sensitivity (Loop Antenna)		200μV (46dBμ/m)
Selectivity		30dB
Signal-to-Noise Ratio		50dB
Image Response Ratio		40dB
Spurious Response Ratio		50dB
Distortion (1kHz)		0.3%
Tuning Level Threshold		3mV (70dBμ/m)
• GENERAL		
Semiconductors		
U.S., Canada and General		75 Transistors, 33ICs, 7FETs, 70 Diodes, 22 LEDs
Northern Europe, British and Australia		78 Transistors, 33ICs, 7FETs, 77 Diodes, 22 LEDs
Power Supply		
U.S. and Canada		120V, 60Hz
General		110–120V/220–240V, 50/60Hz
Northern Europe		220V, 50Hz
Britain and Australia		240V, 50Hz
Power Consumption		
U.S. and Canada		550W
Northern Europe, Britain and Australia		920W
General		330W
Dimensions (W x H x D)		540 x 122 x 385.6 mm (21-1/4" x 4-3/4" x 15-1/4")
Weight		
U.S. and Canada		13.3kg (29lbs. 5oz.)
Northern Europe		13kg (28lbs. 10oz.)
British, Australia and General		13.1kg (28lbs. 14oz.)

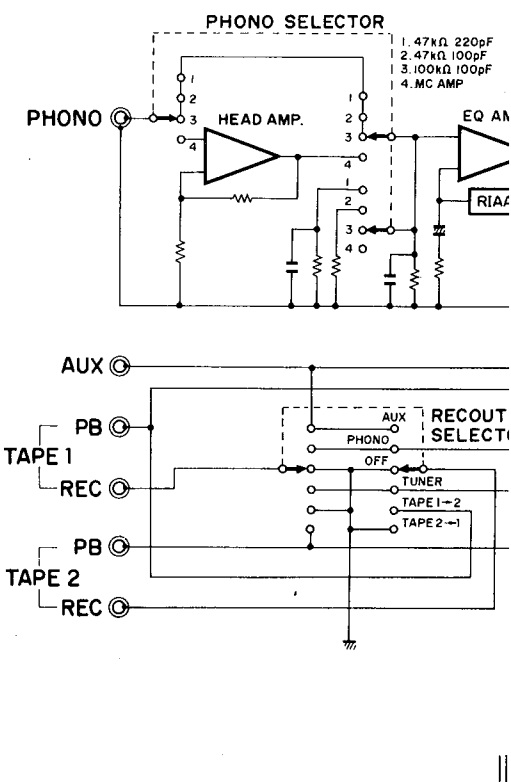
Specifications subject to change without notice.

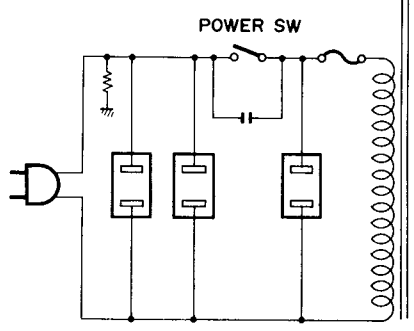
■BLOCK DIAGRAM

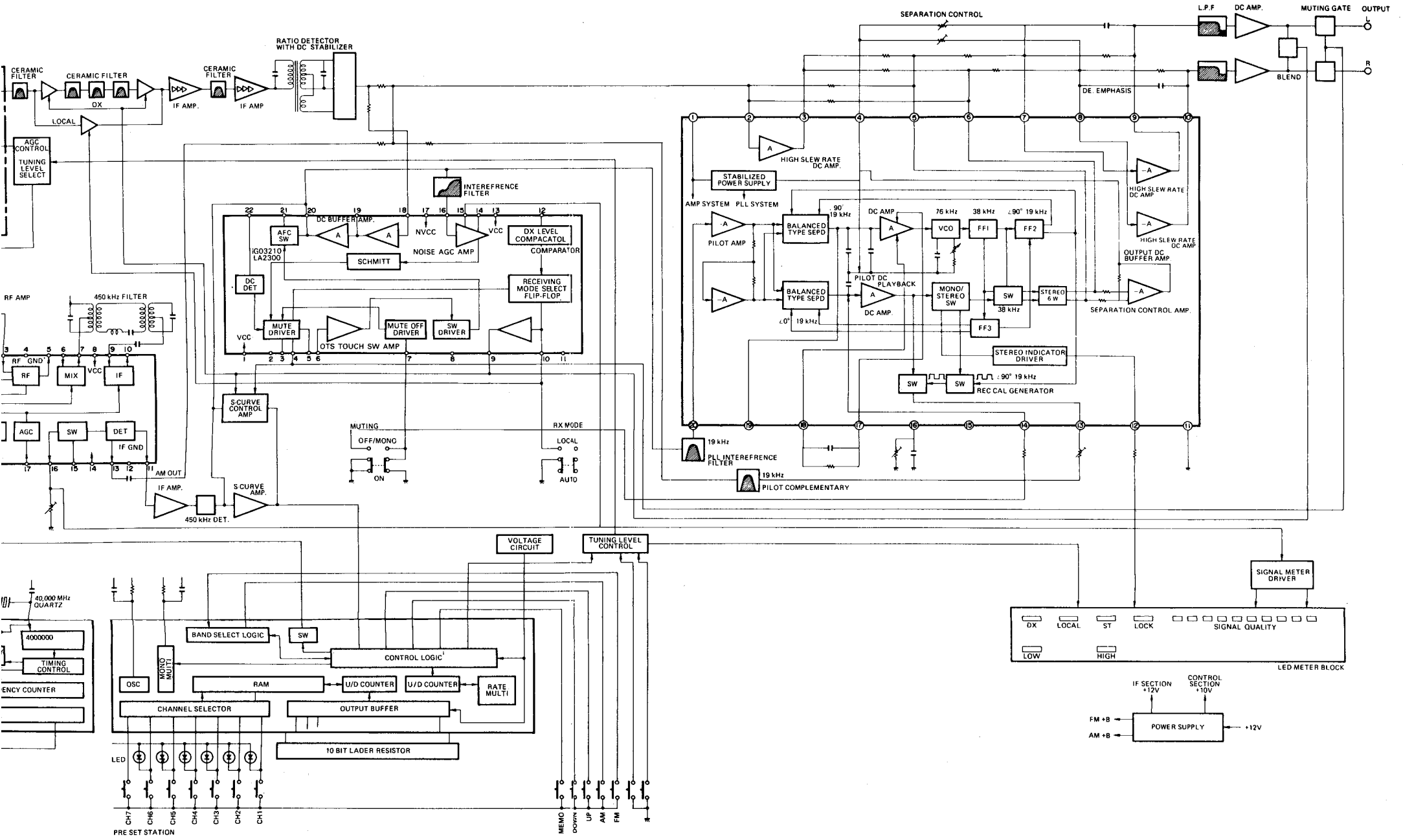
Tuner Section

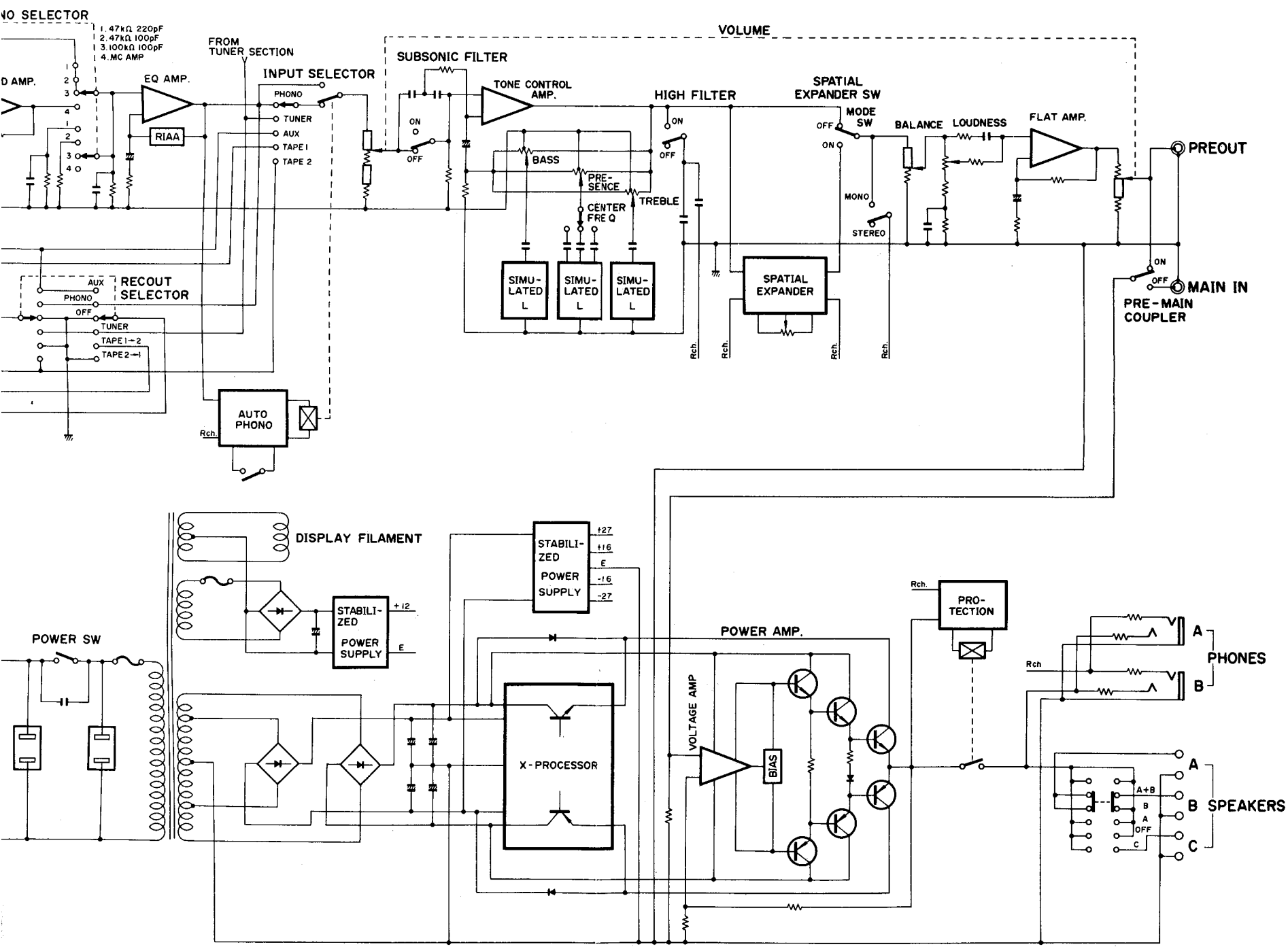


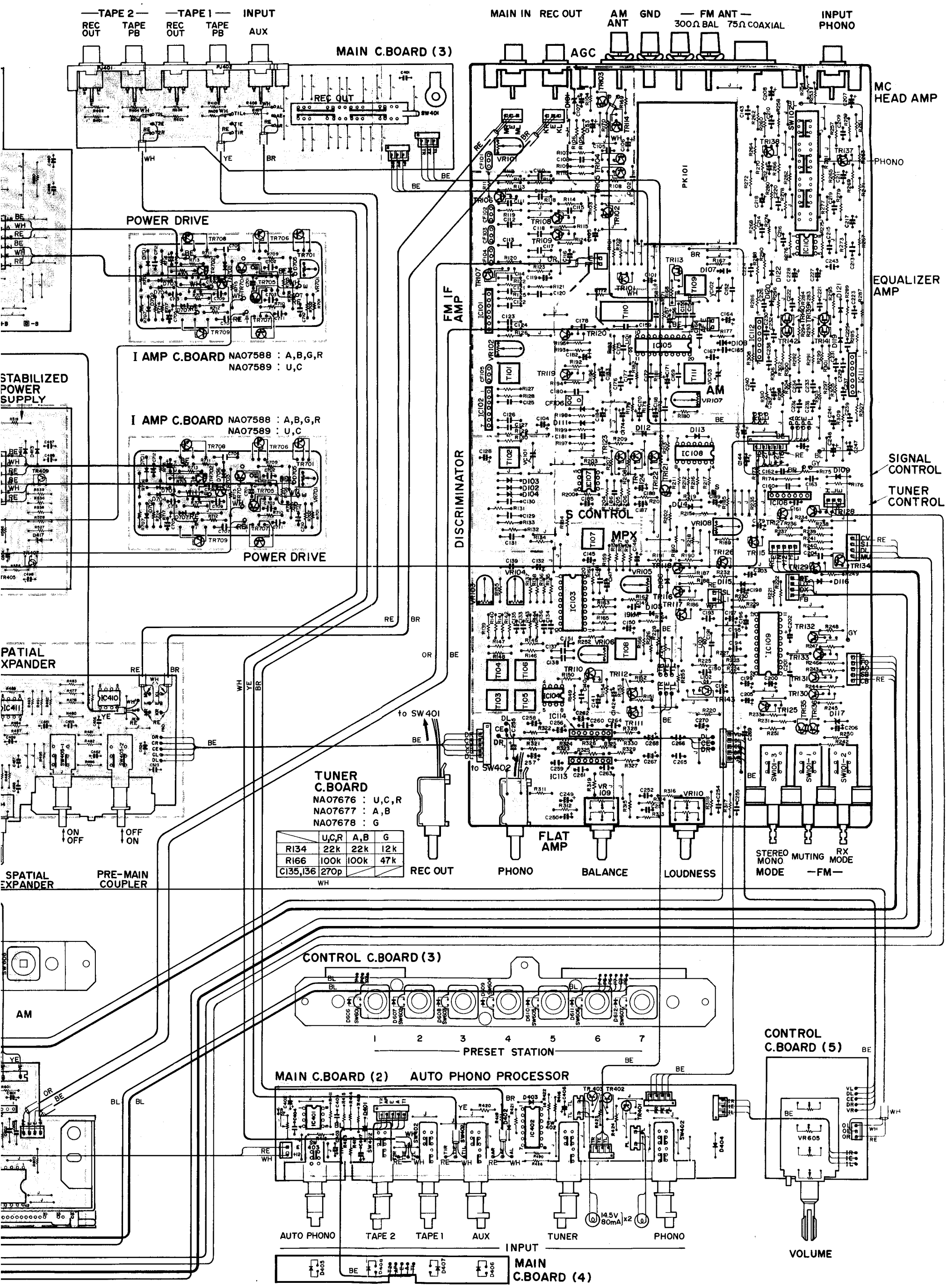
Audio Section





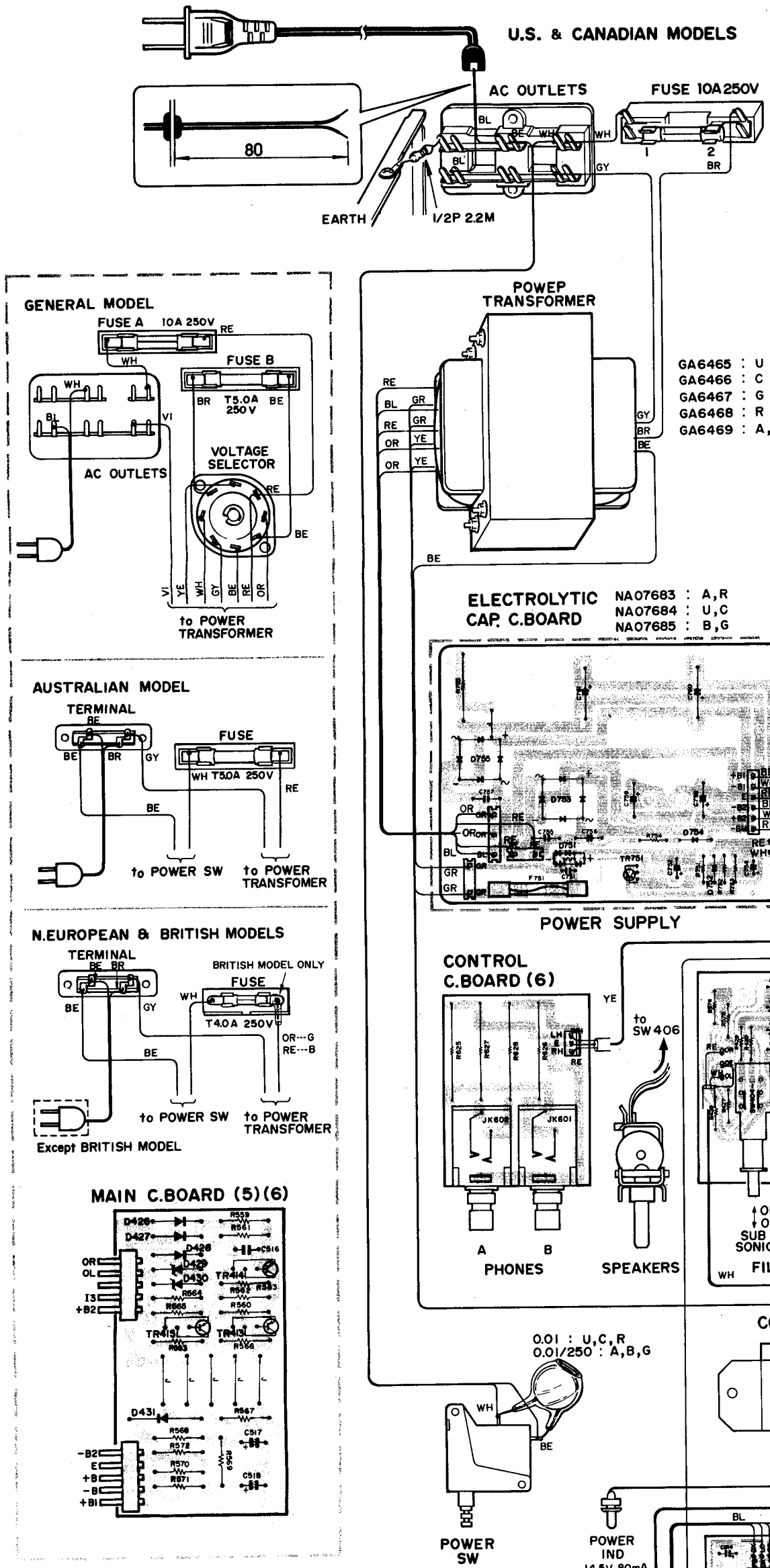

CERAMIC FILTER
CERAMIC FILTER
CERAMIC FILTER
DX
LOCAL
IF AMP.
IF AMP
RATIO DETECTOR WITH DC STABILIZER
AGC CONTROL
TUNING LEVEL SELECT
INTEREFRENCE FILTER
DC BUFFER AMP.
AFC SW
NVCC
VCC
DX LEVEL COMPACATOL
iG03210
LA2300
NOISE AGC AMP
COMPARATOR
SCHMITT
DC DET
RECEIVING MODE SELECT FLIP-FLOP
MUTE DRIVER
MUTE OFF DRIVER
SW DRIVER
OTS TOUCH SW AMP
RF AMP
450 kHz FILTER
RF
MIX
IF
AGC
SW
DET
IF GND
AM OUT
IF AMP.
450 kHz DET.
S-CURVE AMP.
S-CURVE CONTROL AMP
MUTING
OFF/MONO
ON
RX MODE
LOCAL
AUTO
SEPARATION CONTROL
DE. EMPHASIS
HIGH SLEW RATE DC AMP.
STABILIZED POWER SUPPLY
AMP SYSTEM
PLL SYSTEM
PILOT AMP
BALANCED TYPE SEPD
DC AMP.
76 kHz
38 kHz
VCO
FF1
FF2
PILOT DC PLAYBACK
MONO/ STEREO SW
SW
STEREO 6 W
FF3
OUTPUT DC BUFFER AMP.
SEPARATION CONTROL AMP.
STEREO INDICATOR DRIVER
REC CAL GENERATOR
19 kHz
PLL INTEREFRENCE FILTER
PILOT COMPLEMENTARY
L.P.F
DC AMP.
MUTING GATE
OUTPUT
BLEND
R
VOLTAGE CIRCUIT
TUNING LEVEL CONTROL
SIGNAL METER DRIVER
40.000 MHz QUARTZ
4000000
TIMING CONTROL
BAND SELECT LOGIC
SW
CONTROL LOGIC
OSC
MONO MULTI
RAM
U/D COUNTER
U/D COUNTER
RATE MULTI
CHANNEL SELECTOR
OUTPUT BUFFER
10 BIT LADER RESISTOR
LED
CH7
CH6
CH5
CH4
CH3
CH2
CH1
PRE SET STATION
MEMO
DOWN
UP
AM
FM
DX
LOCAL
ST
LOCK
SIGNAL QUALITY
LOW
HIGH
LED METER BLOCK
IF SECTION +12V
CONTROL SECTION +10V
FM +B
AM +B
POWER SUPPLY
+12V


NO SELECTOR
1.47kΩ 220pF
2.47kΩ 100pF
3.100kΩ 100pF
4.MC AMP
D AMP.
EQ AMP.
RIAA
FROM TUNER SECTION
INPUT SELECTOR
PHONO
TUNER
AUX
TAPE 1
TAPE 2
VOLUME
SUBSONIC FILTER
TONE CONTROL AMP.
HIGH FILTER
SPATIAL EXPANDER SW
MODE SW
BALANCE
LOUDNESS
FLAT AMP.
PREOUT
ON
OFF
BASS
PRE-SENCE
TREBLE
CENTER FREQ
MONO
STEREO
SIMU-LATED L
SIMU-LATED L
SIMU-LATED L
SPATIAL EXPANDER
Rch.
ON
OFF
MAIN IN
PRE-MAIN COUPLER
RECOUT SELECTOR
AUX
PHONO
OFF
TUNER
TAPE 1—2
TAPE 2—1
AUTO PHONO
DISPLAY FILAMENT
STABILI-ZED POWER SUPPLY
+12
E
STABILI-ZED POWER SUPPLY
+27
+16
E
-16
-27
POWER SW
POWER AMP.
VOLTAGE AMP
BIAS
X-PROCESSOR
PRO-TECTION
Rch
A
B
PHONES
A
B
C
SPEAKERS
A+B
B
A
OFF



	U,C,R	A,B	G
R134	22k	22k	12k
R166	100k	100k	47k
C135,136	270p		

■WIRING DIAGRAM



U : U.S. MODEL
C : CANADIAN MODEL
A : AUSTRALIAN MODEL
B : BRITISH MODEL
G : N.EUROPEAN MODEL
R : GENERAL MODEL

G | H | I | J | K | L | M | N | O

CONTROL 1 — DIGITAL FREQUENCY READ OUT SECTION — TUNING CONTROL SECTION - I

V601 FIP 7D8S

MEMORY

AM 1098 KHZ

FM 1098 MHz

British and North European Models Only.

IC601 LC7258

IC604 LC7207

IC602 M54459L

IC603 TC4011P

2SC2320 (E,F) or 2SC1740 (R,S)

2SC2320(E,F)X2 or 2SC1740(R,S)

Band edge check ADJ

AM Frequency display ADJ

FM Frequency display ADJ

Pilot canseling ADJ

MUTING

TR601 TR602 TR603 TR604 TR110 TR111 TR112

2SA999 (E,F)

2SD655(D,E,F) X2

D601 1S1555 or 1S2473

D602 HZ7B-1L

D603 1S1555 or 1S2473 X2

D604 D605 HZ6A-1L

D606 D607 D608 D609 D610 D611 D612 SLR-340C X7

D613 LS-011

IC605 BA6104

POWER 14,5V80mA

PRESET STATION 1 2 3 4 5 6 7

TUNING AM FM UP DOWN

TUNING LEVEL MEMORY HIGH LOW

CONTROL 3 | CONTROL 2 | CONTROL 4

MAIN 1 — TONE CONTROL — SPATIAL EXPANDER

IC405 M5214L

IC407 NJM4560

IC403 M5214L

IC408 NJM4560

IC404 M5214L

IC409 NJM4559

IC410 NJM4559

IC411 NJM4559

SUBSONIC FILTER

BASS

PRESENCE

TREBLE

SPATIAL EXPANDER

HIGH FILTER

0.8KHz 1.6KHz 3.2KHz

CONTROL 6

PHONES JK601 JK602

PIN-CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICS.

2SA1170 2SC2774

2SA1210 2SC2912

2SA968B 2SC2238B

2SC535

2SC1983

2SA777 2SC1509

2SD400 2SC2320 2SA970 2SA933 2SA999 2SD655 2SB737 2SD786 2SC1740 2SB544

2SK19 2SK170

S6K20

MV12

1S1555 1S2473 W06C 1SS82 1S1885 HZ6A-1L

HZ78-1L RD3.0EB2 HZ118-1L HZ12B3L

HZ6C-1L HZ16-3L HZ18-1L

KV1226

LA1245 (iG04780)

TC4011P (iG00124) TC4069P (iG00172)

LA2300 (iG03211)

μPC577H (iG03450)

M5214L (iG03490)

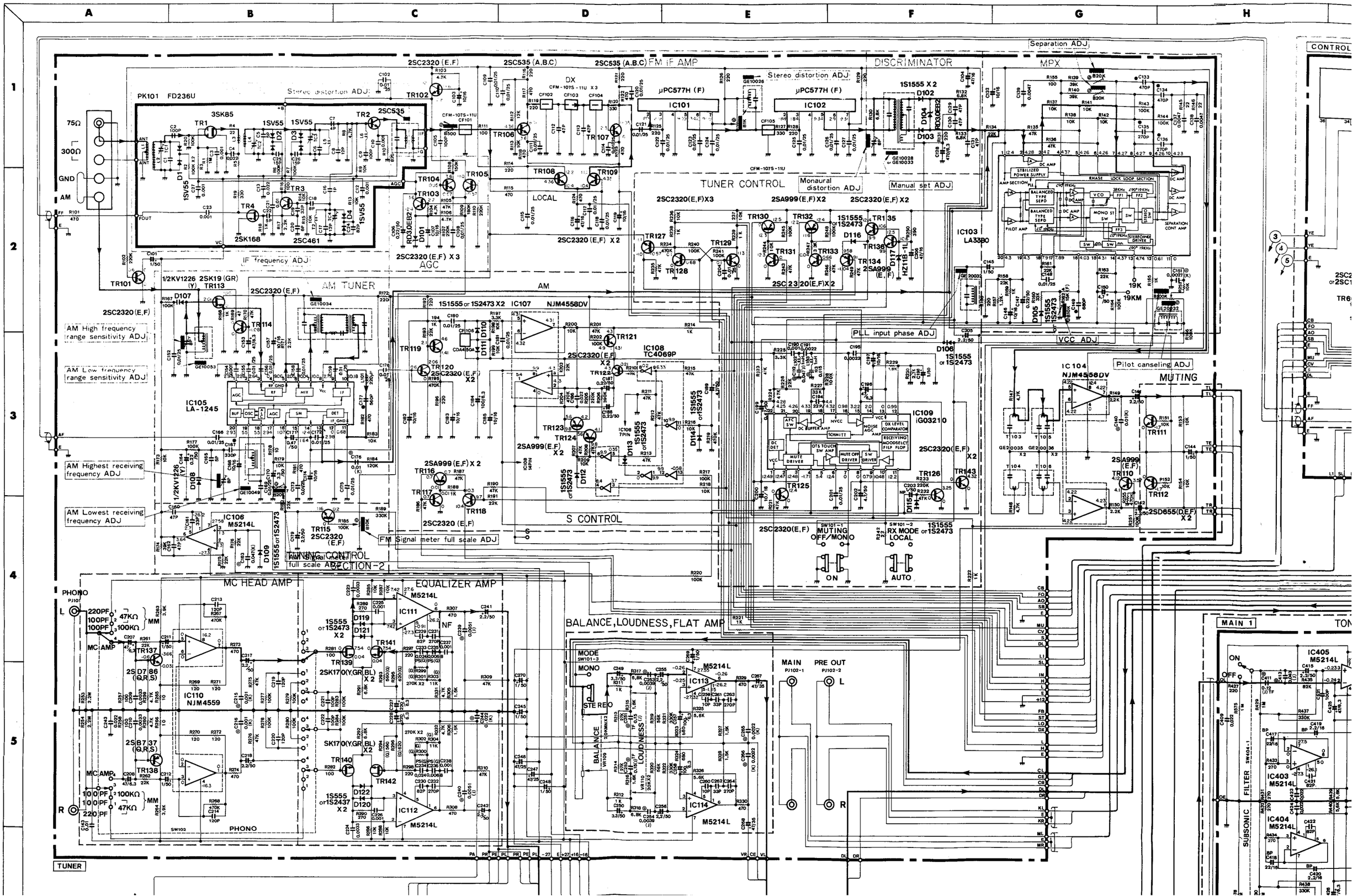
LA3380 (iG02920)

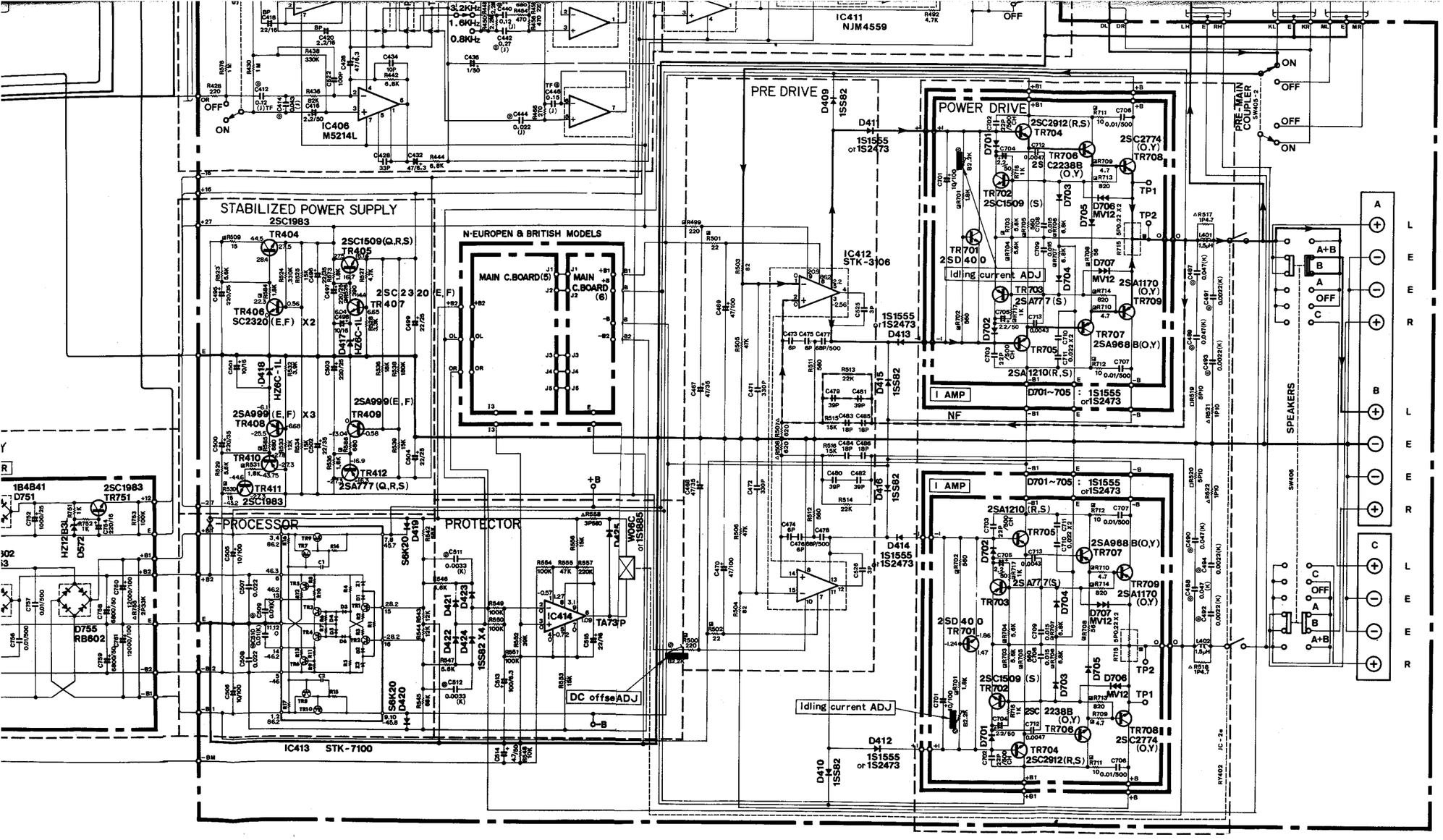
MJM4558DV (iG00139) MJM4559 (iG03960) MJM4560 (iG04000)

STK3156 (iG04880)

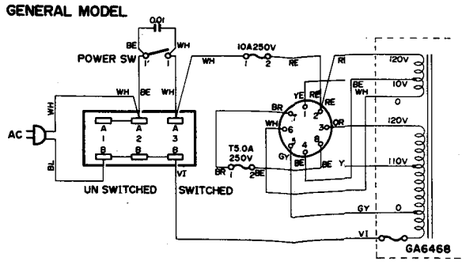
TA7317P (iG03480) BA6104

■SCHEMATIC DIAGRAM





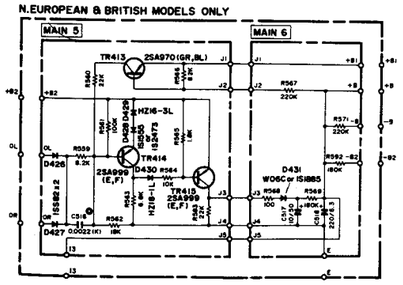
GENERAL MODEL



** All voltages measured with a 10MΩ/V DC electric Volt meter, no-signal condition.*
BAND SELECT BUTTONS → FM
RX MODE → Auto
MUTING → ON
The voltages in the tuner sectin are measured at FM reception mode.
Only the voltages at TR113 ~ TR124, IC105 and 107 are measured at AM reception mode.

** Schematic Diagram is subject change without notice.*

N.EUROPEAN & BRITISH MODELS ONLY



AREA	★RESISTOR				★FUSE
	R134	R135, 136	R166	R630	F751
U.S.A.&CANADIAN	22K	270P	100K	22K	1.0A250V
GENERAL	22K	270P	100K	—	T1.0A250V
BRITISH	22K	—	100K	—	T800mA250V
AUSTRALIAN	22K	—	100K	—	T1.0A250V
N.EUROPEAN	12K	—	47K	—	T800mA250V

CAUTION; ★Connected in the North European and British models only.

TUNER

MAIN 3

TAPE 2 REC PJ401-1 PB PJ401-2 TAPE 1 REC PJ402-1 AUX PJ402-2 PB PJ402-3

AUX / PHONO / OFF / TUNER / TAPE 1→2 / TAPE 2→1

REC OUT SELECTOR SW401

INPUT SELECTOR

SW402 TUNER AUX TAPE 1 TAPE 2

CONTROL 5

VR605 VOLUME

Auto phono gain control ADJ

MAIN 2 AUTO PHONO PROCESSER

IC401 NJM4558DV

IC402 TC4011P

IC402 14PIN

2SB544 X2

2SD400

TR401 TR402 TR403

RY401 HB-2

PHONO TUNER
14.5V 80mA X2

D405 SLR-54UW5D D406 D407 D408 SLR-55GC5 X3

MAIN 4

POWER SUPPLY

GA6465

POWER SW

E. LYTIC CAPACITOR

1B4B41 D751 2SC1983 TR751

RB602 D753 D755 RB602

HZ12B3 D572

F751 1.0A 250V

120V

UNSWITCHED SWITCHED

STABILIZED POWER SUPP

2SC1983

TR404 2SC1509 TR405

TR406 SC2320 (E,F) X2

HZ6C-1L D418

2SA999 (E,F) X3 TR408

TR410 TR411 2SA777 (

2SC1983

PROCESSOR

IC413 STK-7100

RESISTOR

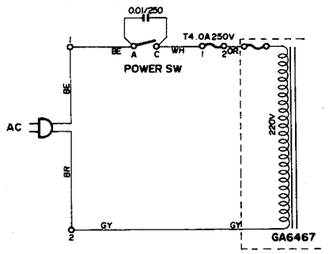
REMARKS	PARTS NAME
NO MARK	CARBON FILM RESISTOR
▲	METAL FILM RESISTOR
△	METAL OXIDE FILM RESISTOR
■	METAL PLATE RESISTOR
□	CEMENT MOLDED RESISTOR
◪	FLAME PROOF CARBON FILM RESISTOR
⊘	SEMI VARIABLE RESISTOR

CAPACITOR

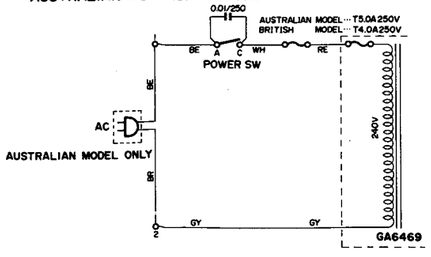
REMARKS	PARTS NAME
NO MARK	CERAMIC CAPACITOR
◎	POLYESTEL FILM CAPACITOR
●	SA CAPACITOR or SBL CAPACITOR
PS	PS CAPACITOR

NOTE : Auto Phono Gain Control ADJ.
Auto phono circuit switches at 0.3mV (100Hz) input to phono MM input by adjusting VR407 at the center position.
The circuit switches at 0.15mV (100Hz) input to phono MM input by rotating VR407 full clockwise.

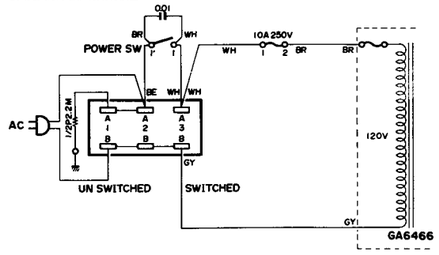
NORTH EUROPEAN MODEL



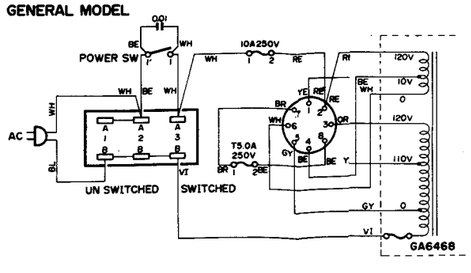
AUSTRALIAN & BRITISH MODELS



CANADIAN MODEL



GENERAL MODEL



Tuner C. Board

TRANSISTOR, IC, VOLTAGE TABLE

TR No		FM Tuning mode(ST)	FM At Local	FM At DX	FM Detuned mode	AM Tuning mode	AM Detuned mode
101	B	0.6	0.6	0.6	0.6	0.24	0.24
	C	0	0	0	0		
	E	0	0	0	0	0	0
102	B	11.6	11.6	12.0	12.0	0.2	0.2
	C	12.0	12.0	12.0	12.0	0.2	0.2
	E	10.9	10.9	10.9	10.9	0	0
103	B	− 2.2	− 2.2	− 2.2	− 1.7	− 2.2	− 1.72
	C	3.6	3.6	3.6	3.8	− 0.6	− 2.3
	E	− 2.4	− 2.4	− 2.4	− 2.4	− 2.4	− 2.4
104	B	0.05	0.05	0.05	0.05	− 0.15	− 0.15
	C	3.6	3.5	3.6	3.8	− 0.6	− 2.3
	E	− 0.57	− 0.57	− 0.57	− 0.57	− 0.64	− 0.64
105	B	0	0	0	0	0	0
	C	11.0	11.0	11.0	11.0	0	0
	E	− 0.57	− 0.57	− 0.57	0.57	− 0.64	− 0.64
106	B	4.36	5.25	4.36	4.4	0.1	0.1
	C	8.01	12.05	8.02	8.02	0.24	0.24
	E	3.6	10.56	3.6	3.6	3.6	3.6
107	B	2.3	8.9	2.3	2.3	0.24	0.24
	C	10.05	9.2	11.1	11.1	0.0	0
	E	1.6	10.5	1.6	1.6	3.6	3.6
108	B	4.36	5.25	4.38	4.38		
	C	12.2	11.2	12.2	12.2		
	E	10.4	4.58	10.5	10.5		
109	B	4.35	5.23	4.38	4.38		
	C	11.1	9.2	11.1	11.1		
	E	10.4	4.58	10.5	10.5		
110	B	3.57	10.5	3.54	3.54	3.7	3.7
	C	4.12	0	4.1	4.1	4.05	4.05
	E	4.1	4.2	4.08	4.08	4.1	4.1
111	C	− 1.7	− 1.7	− 1.7	0.07	− 1.7	0.67
	C	0	0	0	0	0	0
	E	0	0	0	0	0	0
112	B	− 1.7	− 1.7	− 1.7	0.67	− 1.7	0.67
	C	0	0	0	0	0	0
	E	0	0	0	0	0	0
113	D					10.0	10.0
	G					2.01	1.6
	S					0	0
114	B					− 1.08	− 0.48
	C					0	0
	E					0	0
115	B	1.31	1.31	0.56	0.3	0	0
	C	4.3	4.2	10.9	12.0	0.2	0.2
	E	0.8	0.8	0	0	1.16	0.4
116	B	0.09	0.09	0	0	0.01	0.01
	C	0.7	0		0	0.7	0.7
	E	0.7	0		0	0.7	0.6
117	B	0.7	0.7		0	0.7	0.6
	C	0.09	0	0	0	0.01	0.01
	E	0	0	0	0	0	0
118	B	9.7	9.7	9.7	11.0	9.7	11.0
	C	10.24	10.24	10.24	0	10.3	0
	E	10.4	10.4	10.4	11.0	10.4	11.1
119	B					2.1	2.0
	C					4.6	4.6
	E					1.41	1.41
120	B					0.6	0.6
	C					2.06	2.06
	E					0	0
121	B					4.9	4.9
	C					4.3	4.3
	E					4.31	4.31
122	B	0.21	0.21	0.21	4.92	0.21	4.92
	C						
	E	4.3	4.3	4.3	4.3	4.3	4.3
123	B	9.8	9.8	9.8	8.9	9.8	7.3
	C	4.2	4.2	4.2	4.2	4.2	4.2
	E	4.5	4.4	5.0	5.0	5.6	4.0
124	B	9.84	9.84	9.84	8.9	9.8	
	C	4.1	4.1	4.5	4.5	4.1	
	E	4.5	4.4	5.0	5.0	5.6	4.0
125	B	0	0	0	0.65	0	0.65
	C	12.4	12.4	12.4	0	12.5	0
	E	0	0	0	0	0	0
126	B	0	0	0	0.5	0	0.4
	C	3.25	3.7	3.25	0.7	0.1	0
	E	0	0	0	0	0	0

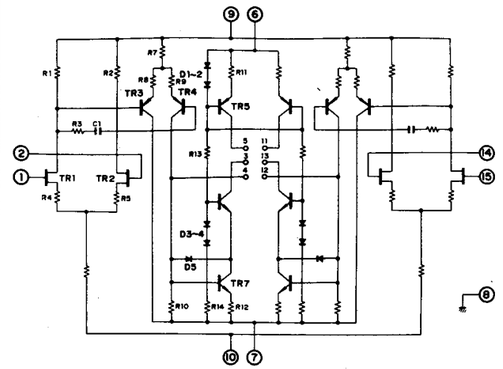
Tuning Level		Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
127	B	-0.57	0	0.57	0	0.57	0	0	9.7	-0.57	0.57	0	0
	C	-1.0	-0.5	-1.0	-0.5	-1.0	-0.5	9.3	9.3	-1.04	-1.04	9.3	9.3
	E	-1.1	-0.53	-1.1	-0.53	-1.1	-0.53	-0.4	9.2	-1.1	-1.1	-0.4	-0.4
128	B	0.68	0.1										
	C	0.1	11.0										
	E	0	0										
129	B	0.1	0.69										
	C	11.3	0.1										
	E	0	0										
130	B	12.3		12.3		12.3		12.3		11.8		11.8	
	C	0		0		0		0		12.5		12.5	
	E	12.5		12.5		12.5		12.5		12.6		12.6	
131	B	0		0		0		0		0.64		0.64	
	C	12.3		12.3		12.3		12.3		0		0	
	E	0		0		0		0		0		0	
132	B	11.6		11.6		11.6		11.6		12.4			
	C	12.2		12.2		12.2		12.2		0.24			
	E	12.4		12.4		12.4		12.4		12.5			
133	B	0.66		0.66		0.66		0.66		0		0	
	C	0.04		0.04		0.04		0.04		12.3		12.3	
	E	0		0		0		0		0		0	
134	B	9.1		9.1		9.1		8.7		9.1		8.7	
	C	− 1.04		− 1.04		−10.4		9.3		− 1.04		− 9.3	
	E	9.58		9.58		9.58		9.33		9.58		9.33	
135	B	10.6		10.6		10.6		10.6		10.6		10.6	
	C	12.4		12.4		12.4		12.4		12.4		12.4	
	E	9.5		9.9		9.9		9.9		9.9		9.9	
136	B	10.6		10.6		10.6		10.6		10.6		10.6	
	C	12.5		12.5		12.5		12.5		12.5		12.5	
	E	9.9		9.9		9.9		9.9		9.9		9.9	
		PHOTO											
137	B	0.6											
	C	− 3.66											
	E	− 0.03											
139	D	7.54											
	G	0											
	S	0.04											
141	D	7.54											
	G	0											
	S	0.04											
143	B	0		0		4.0		0.6		0		0	
	C	4.32		4.32		4.32		0		0.7		0.7	
	E	0		0		0		0		0		0	

IC No.	PIN No.	FM	AM	FM(Mono)
IC01 (μPC577H)	1	5.26		
	2	1.8		
	3	2.19		
	4	0		
	5	9.09		
	6	3.42		
	7	9.09		
IC02 (μPC577H)	1	5.3		
	2	1.88		
	3	1.84		
	4	0		
	5	9.34		
	6	2.9		
	7	9.31		
IC03 (iG02920)	1	12.4		12.4
	2	4.28		4.28
	3	4.2		4.2
	4	4.37		4.37
	5	4.26		4.26
	6	4.26		4.26
	7	4.27		4.27
	8	4.27		4.27
	9	4.26		4.26
	10	4.23		4.23
	11	0		0
	12	0.61		10.89
	13	4.74		4.64
	14	4.37		4.37
	15	4.31		4.31
	16	4.03		4.03
	17	7.89		7.89
	18	7.9		7.9
	19	4.3		4.3
	20	4.3		4.3
IC-104 (4558DV)	1	4.23		
	2	4.22		
	3	4.22		
	4	0		
	5	4.22		
	6	4.22		
	7	4.22		
	8	12.4		
IC-105 (LA-1245)	1		2.98	
	2		2.28	
	3		2.64	
	4		0	
	5		9.06	
	6		2.05	
	7		10.04	
	8		10.0	
	9		2.79	
	10		10.18	
	11		0.68	
	12		0	
	13		2.98	
	14		12.4	
	15		1.64	
	16		1.07	
	17		2.94	
	18		5.5	
	19		5.5	
	20		2.93	
IC-106 (M5214L)		FM(90MHz)	AM(1000Hz)	
	1	−26.2	−26.2	
	2	1.3	4.75	
	3	1.3	4.7	
	4	−27.3	−27.3	
	5	2.7	12.38	
	6	3.64	13.24	
	7	27.58	27.58	

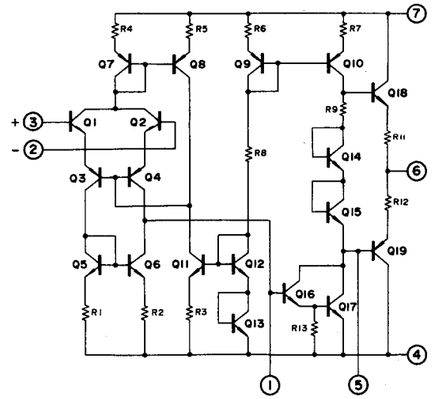
IC No.	PIN No.	FM	AM	FM Detuned mode
IC-107 (4558DV)	1	4.17	5.4	
	2	4.32	4.3	
	3	4.31	4.3	
	4	0	0	
	5	4.31	4.31	
	6	4.32	4.32	
	7	4.32	4.31	
	8	9.9	9.9	
IC-108 (4069P)	1	9.9	9.9	
	2	0	0	
	3	0.8	3.7	
	4	0	8.4	
	5	0.55	0.55	
	6	9.9	9.9	
	7	0	0	
	8	0.2	0.2	
	9	6.3	6.33	
	10	9.9	9.9	
	11	0	0	
	12	9.9	9.9	
	13	− 0.6	− 0.58	
	14	9.9	9.9	
IC-109 (iG03210)	1	12.49		12.49
	2	12.47		0
	3	12.48		12.48
	4	− 1.71		8.07
	5	5.4		5.4
	6	12.4		12.4
	7	0		0
	8	0		10.8
	9	0.79		0.79
	10	10.48		10.6
	11	12.2		12.2
	12	0.99		0.55
	13	0		0
	14	2.0		1.1
	15	3.22		0.68
	16	0.98		0.98
	17	4.32		4.32
	18	4.4		4.4
	19	4.33		4.33
	20	4.26		4.26
	21	4.25		4.25
	22	4.28		4.28
IC-110 (NJM4559)		PHONO		
	1	0		
	2	0		
	3	0		
	4	−16.3		
	5	0		
	6	0		
	7	0		
	8	16.2		
IC-111 (M5214L)	1	−26.2		
	2	7.42		
	3	7.42		
	4	−27.3		
	5	− 0.91		
	6	0		
	7	27.6		
IC-113 (M5214L)	1	−26.2		
	2	− 0.26		
	3	− 0.25		
	4	−27.32		
	5	− 1.15		
	6	− 0.26		
	7	27.55		

IC BLOCK & SCHEMATIC DIAGRAM

STK3156



M5214L



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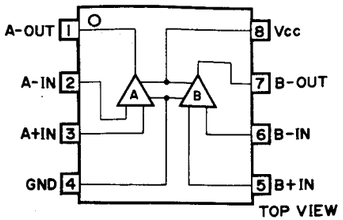
NJM4559



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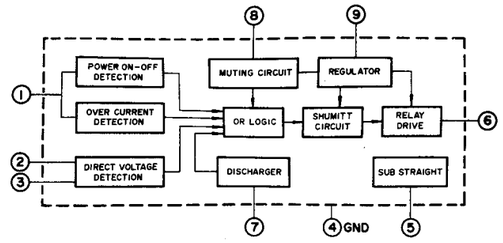

μPC577H