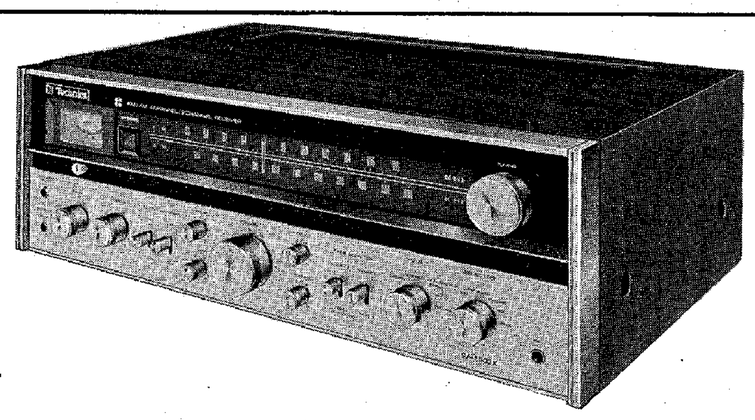
Service Manual

Technics
HI-FI COMPONENTS
Technics

FM/AM
4 CHANNEL/2 CHANNEL RECEIVER

MODEL **SA-5600X**



TECHNICAL SPECIFICATIONS (IHF) Specifications are subject to change without notice for further improvement.

AUDIO SECTION

Music power:		
4 CH operation		108W (4Ω)
2 CH Balanced Transformerless operation		108W (8Ω)
1 kHz RMS (continuous) power:		
4 CH operation (Each ch. driven)		22.5W/22.5W/22.5W/22.5W (4Ω)
		15W/15W/15W/15W (8Ω)
(All ch. driven)		14W+14W+14W+14W (4Ω)
		11W+11W+11W+11W (8Ω)
2 CH Balanced Transformerless (Each ch. driven)		41W/41W (8Ω)
(Both ch. driven)		31W+31W (8Ω)
20 Hz~20 kHz RMS (continuous) power:		
4 CH operation all ch. driven		8.5W+8.5W+8.5W+8.5W (8Ω)
2 CH Balanced Transformerless operation Both ch. driven		25W+25W (8Ω)
Power bandwidth (all ch. driven 8Ω):		7 Hz~30 kHz, −3 dB
Frequency response:	PHONO	RIAA standard curve ±1 dB
	AUX	10 Hz~50 kHz, +0 dB −3 dB
Residual hum & noise:		1.5mV
Input sensitivity & impedance:	PHONO	2mV/50 kΩ
	AUX, PLAYBACK	180mV/40 kΩ
	MIC	3mV/50 kΩ
S/N (IHF, A):	PHONO	70 dB
	AUX	90 dB
Tone control:	BASS	50 Hz, +10 dB −10 dB
	TREBLE	10 kHz, +10 dB −10 dB
Loudness control:		50 Hz, +10 dB
REC OUT:		180mV
Damping factor:		30 (8Ω)
Load impedance:	4 CH (4~16Ω)	Balanced Transformerless (8~16Ω)
Total harmonic distortion:		0.5%
Intermodulation distortion:		0.7%

FM TUNER SECTION

Frequency range:		88~108 MHz
FM sensitivity (IHF):		1.9μV
Alternate channel selectivity:		65 dB
Harmonic distortion:	MONO 0.3%	STEREO 0.4%
S/N:		65 dB
Frequency response:		20 Hz~13 kHz, ±1 dB
Image rejection (at 98 MHz):		55 dB
IF rejection (at 98 MHz):		60 dB
Spurious response rejection (at 98 MHz):		60 dB
Capture ratio:		1.8 dB
AM suppression:		50 dB
Stereo separation (at 1 kHz):		40 dB
Leak carrier (19 kHz, 38 kHz):		50 dB

AM TUNER SECTION

Frequency range:	520~1610 kHz
Sensitivity:	20μV
Selectivity:	25 dB
Image rejection (at 1000 kHz):	40 dB
IF rejection (at 1000 kHz):	40 dB

GENERAL

Power consumption:	270W
Power supply:	50/60 Hz 110/120/220/240V
Dimensions (W×H×D):	430×146×385mm (16 15/16"×5 3/4"×15 5/32")
Weight:	10.9 kg (24 lb.)

TECHNISCHE DATEN (DIN 45 500) Änderungen vorbehalten

VERSTÄRKERTEIL

Musikleistung:	4-Kanal Betrieb	4×27W (4Ω)
	Transformatorlos Ausgeglichen Betrieb	2×54W (8Ω)
Nennleistung 1 kHz:		
4-Kanal Betrieb Alle Kanäle in Betrieb		4×14W (4Ω) 4×11W (8Ω)
Transformatorlos Ausgeglichen Betrieb Beide Kanäle in Betrieb		2×31W (8Ω)
Nennleistung 20 Hz~20 kHz:		
4-Kanal Betrieb Alle Kanäle in Betrieb		4×8.5W (8Ω)
Transformatorlos Ausgeglichen Betrieb Beide Kanäle in Betrieb		2×25W (8Ω)
Klirrfaktor:		
Nennleistung, bei 1000 Hz 4Ω		0.5%
Nennleistung, bei 40~14000 Hz 4Ω		3.0%
Leistungsbandbreite (Alle Kanäle in Betrieb 4Ω):		10 Hz~25 kHz −3 dB
Frequenzgang:		10 Hz~50 kHz, −3 dB
Eingangs-Empfindlichkeit und-Impedanz:	PHONO	2mV/50 kΩ
	AUX	180mV/40 kΩ
	MIC	3mV/50 kΩ
Tonband-Cinchbuches:	PLAYBACK	180mV/40 kΩ
	REC OUT	180mV
Fremdspannungsabstand:		
bei Nennleistung	PHONO	55 dB
	AUX	80 dB
bei 50 mW Ausgangsleistung	PHONO	50 dB
	AUX	55 dB
Klangregler:	Tiefen-Bereich	+10 dB, −10 dB bei 50 Hz
	Höhen-Bereich	+10 dB, −10 dB bei 10 kHz
Loudness-Regler:		50 Hz +10 dB
Dampfungsfaktor:		30 bei 8Ω
Ausgänge Lautsprecher:	4-Kanal Betrieb	4~16Ω
	Transformatorlos Ausgeglichen Betrieb	8~16Ω

FM TUNERTEIL

Empfangsbereich:		88~108 MHz
Antennenanschluß:	300Ω (symmetrisch)	75Ω (unsymmetrisch)
Empfindlichkeit (bei ±40 kHz Hub):	1.8μV, 30 dB Fremdspannungsabstand	300Ω
	1.5μV, 20 dB Fremdspannungsabstand	300Ω
	1.0μV, 20 dB Fremdspannungsabstand	75 Ω
Klirrfaktor (bei ±40 kHz Hub):	MONO 0.3%	STEREO 0.7%
Fremdspannungsabstand:	MONO 52 dB	STEREO 50 dB
Selektivität bei 400 kHz:		65 dB
Spiegelselektion (bei 98 MHz):		55 dB
ZF-Festigkeit (bei 98 MHz):		60 dB
Verzerrungsfestigkert (bei 98 MHz):		60 dB
Gleich wellen-Selektion:		1.8 dB
AM-Unterdrückung:		50 dB
Stereo-Übersprechdämpfung:		40 dB bei 1 kHz
Pilotton-Unterdrückung:		48 dB bei 19 kHz, 58 dB bei 38 kHz
Begrenzung, Einsatzpunkt:		1.2μV
Bandbreite:	ZF-Verstärker	350 kHz
	UKW-Demodulator	700 kHz

AM TUNERTEIL

Empfangsbereich:	520~1610 kHz
Empfindlichkeit:	20μV
Selektivität:	25 dB
Spiegelselektion:	40 dB
ZF-Festigkeit:	40 dB

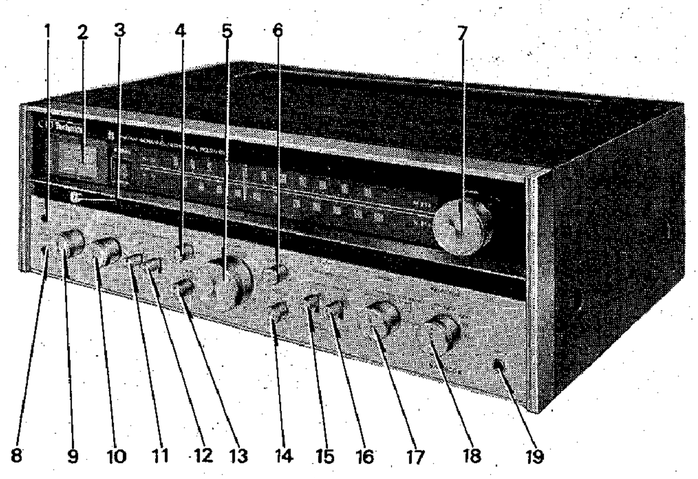
ALLGEMEINS

Leistungsaufnahme:	270W
Netzspannung umschaltbar:	50/60 Hz, 110/120/220/240V
Abmessungen (B×H×T):	430×146×385mm
Gewicht:	10.9 kg

ORDER NO. AD-044

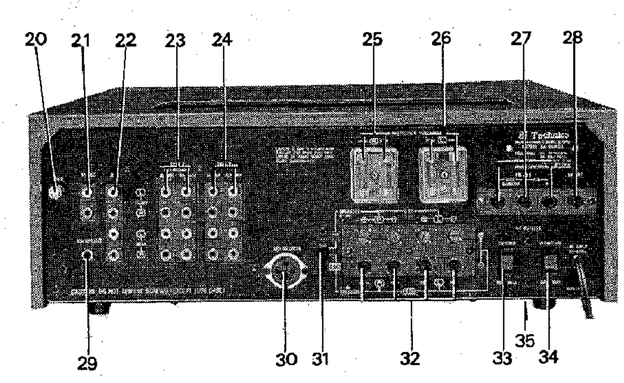
MATSUSHITA ELECTRIC
MATSUSHITA ELECTRIC TRADING CO., LTD.
P. O. Box 288, Central Osaka, Japan

■ LOCATION OF CONTROLS



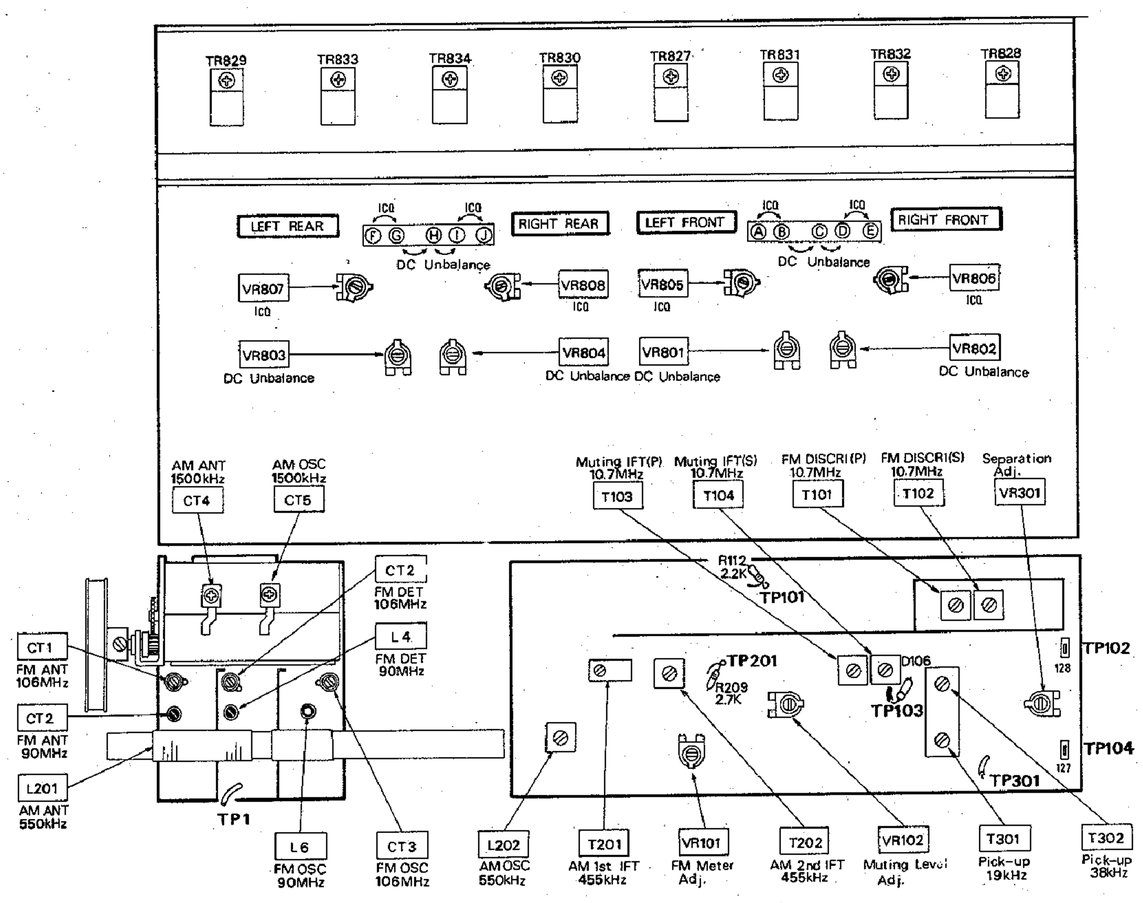
1. HEADPHONES JACK ..... Front Channel
2. SIGNAL STRENGTH METER
3. POWER SOURCE SWITCH (S901)
4. LEFT FRONT LEVEL CONTROL (VR601)
5. MAIN VOLUME CONTROL (VR701)
6. RIGHT FRONT LEVEL CONTROL (VR602)
7. TUNING CONTROL
8. HEADPHONES JACK ..... Rear Channel
9. BASS CONTROL (VR703)
10. TREBLE CONTROL (VR702)
11. MUTING SWITCH (S101)
12. LOUDNESS SWITCH (S701)
13. LEFT REAR LEVEL CONTROL (VR603)
14. RIGHT REAR LEVEL CONTROL (VR604)
15. 4CH TAPE MONITOR SWITCH ..... TAPE 1 (S403)
16. 4CH TAPE MONITOR SWITCH ..... TAPE 2 (S404)
17. MODE SWITCH (S402)
18. SELECTOR SWITCH (S401)
19. MICROPHONE JACK

20. GROUND TERMINAL
21. PHONO INPUT TERMINALS ..... 2 Channel
22. AUX INPUT TERMINALS ..... 4 Channel
23. 4CH TAPE MONITOR TERMINALS ..... TAPE 1
24. 4CH TAPE MONITOR TERMINALS ..... TAPE 2
25. RIGHT CH. CIRCUIT PROTECTION FUSES
26. LEFT CH. CIRCUIT PROTECTION FUSES
27. EXT. FM ANTENNA TERMINALS
28. EXT. AM ANTENNA TERMINAL
29. 4CH. MPX OUTPUT TERMINAL
30. 4CH. REMOTE BALANCER CONNECTION SOCKET
31. BALANCED TRANSFORMER LESS SWITCH (S801)
32. SPEAKER TERMINALS
33. AC POWER OUTLET ..... Switched
34. AC POWER OUTLET ..... Unswitched
35. VOLTAGE SELECTOR SWITCH (S902)



■ ALIGNMENT INSTRUCTIONS

Alignment Points



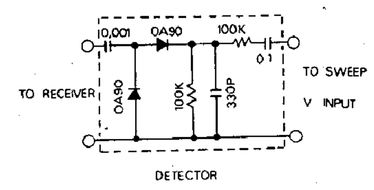


Fig. 1

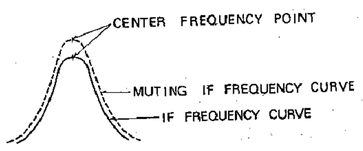
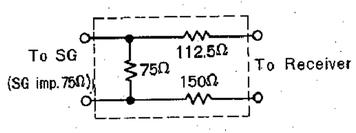


Fig.2



300Ω FM Dummy Antenna

Fig. 3 (Abb. 3)

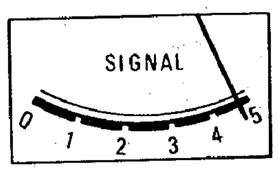


Fig.4

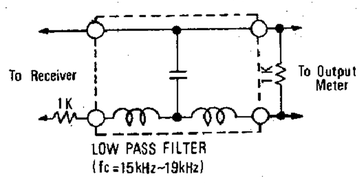


Fig. 5

ALIGNMENT INSTRUCTIONS.....READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Notes :
1. Volume control ..... Minimum
2. Balanced transformer less switch..... 4CH
3. Other controls ..... Optional position
4. Maintain line voltage at rated voltage.
5. The adjustment should be started two minutes after setting the power switch to the ON position.
6. Before adjusting, I_{CQ} adjusting volumes (VR805, VR806, VR807 and VR808) as shown in Alignment Point Location.

	CIRCUIT	VTVM CONNECTION	ADJUSTMENT POINTS	REMARKS
	MAIN AMP ALIGNMENT			
1	DC Unbalance	Connect DC VTVM to Ⓒ and Ⓓ (R-Front) or Ⓒ and Ⓑ (L-Front) terminal.	VR802 (R-Front) VR801 (L-Front)	Make sure that DC VTVM becomes 0mV.
		Connect DC VTVM to Ⓗ and Ⓘ (R-Rear) or Ⓗ and Ⓖ (L-Rear) terminal.	VR804 (R-Rear) VR803 (L-Rear)	
2	I_{CQ}	Connect DC VTVM to Ⓓ and Ⓔ (R-Front) or Ⓐ and Ⓑ (L-Front) terminal.	VR806 (R-Front) VR805 (L-Front)	Make adjustments so that the indication on DC VTVM becomes 4mV.
		Connect DC VTVM to Ⓘ and Ⓙ (R-Rear) or Ⓕ and Ⓖ (L-Rear) terminal.	VR808 (R-Rear) VR807 (L-Rear)	

Notes :
1. Volume control .....Maximum (AM-RF)
   Minimum (AM-IF, FM-IF)
   Variable (FM-RF)
2. Bass and treble control .....Center
3. Band selector switch .....AM
   FM-Auto (FM-RF, FM-IF)
4. Loudness switch .....OFF
5. Muting switch ..... OFF
6. Balanced transformer less switch..... 4CH
7. Tape-monitor switch ..... Source
8. Mode switch ..... Stereo
9. Maintain line voltage at rated voltage.
10. Output of signal generator should be no higher than necessary to obtain an output reading.

	SIGNAL GENERATOR or SWEEP GENERATOR: CONNECTION	SIGNAL GENERATOR or SWEEP GENERATOR: FREQUENCY	RECEIVER DIAL SETTING [DISTANCE]	INDICATOR (VTVM or SCOPE)	ADJUSTMENT POINTS	REMARKS
	AM ALIGNMENT					
3	High side through 0.001μF to antenna terminal, Common to chassis.	455kHz (20kHz Sweep)	Point of non-interference	Connect vert. amp. of scope to **TP**201.	T201 (1st IFT) T202 (2nd IFT)	Adjust for maximum output.
4	Fashion loop of several turns of wire and radiate signal into loop of receiver.	550kHz (30% Mod. with 400Hz)	550kHz [5.5mm (3/16")]	Connect meter to speakers terminal of set.	L202 (OSC Coil) L201 (ANT Coil)	Adjust for maximum output. Adjust L201 by moving coil bobbin along ferrite core.
5	Fashion loop of several turns of wire and radiate signal into loop of receiver.	1500kHz (30% Mod. with 400Hz)	1500kHz [157.2mm (6 3/16")]	Connect meter to speakers terminal of set.	CT5 (OSC Trimmer) CT4 (ANT Trimmer)	Adjust for maximum output. Repeat steps (4) and (5).
	FM-IF ALIGNMENT					
6			Point of non-interference.	Connect DC VTVM between **TP**102 and **TP**104.	T102 (FM DISCRI IFT) (S)	Make sure that VTVM becomes 0V.
7	High side through 0.001μF to **TP**1. Common to chassis.	10.7MHz (400kHz Sweep)	Point of non-interference.	Connect vert. amp. of scope through detector to **TP**101. Refer to figure 1.		Confirm center frequency.
8	High side through 0.001μF to **TP**1. Common to chassis.	10.7MHz (400kHz Sweep)	Point of non-interference.	Connect vert. amp. of scope to **TP**103.	T103 (Muting IFT) (P) T104 (Muting IFT) (S)	Adjust for maximum sharp and proper linearity. Adjust to center frequency as step 7. Refer to figure 2.
	FM-RF ALIGNMENT					
9	Connect to FM antenna terminal through FM dumm antenna. (Refer to fig 3)	90MHz (100% Mod. with 400Hz)	90MHz [20.7mm (13/32")]	Output meter across speaker terminals.	L6 (FM OSC Coil) * L4 (FM DET Coil) L2 (FM ANT Coil)	Adjust for maximum output.
10	Connect to FM antenna terminal through FM dummy antenna. (Refer to fig. 3)	106MHz (100% Mod. with 400Hz)	106MHz [147.2mm (5 25/32")]	Output meter across speaker terminals.	CT3 (FM OSC Trimmer) CT2 (FM DET Trimmer) CT1 (FM ANT Trimmer)	Adjust for maximum output. Repeat steps (9) and (10).

* Use six cornered alignment tool for aligning FM OSC coil (L6).

	SIGNAL GENERATOR: CONNECTION	SIGNAL GENERATOR: FREQUENCY	RECEIVER DIAL SETTING	INDICATOR (DISTORTION METER and SIGNAL METER)	ADJUSTMENT POINTS	REMARKS
	MUTING LEVEL ALIGNMENT					
	Note : Muting switch.....ON					
11	Connect to FM antenna terminal through FM dummy antenna.	98MHz (100% Mod. with 400Hz) Output 28dB	98MHz	Output meter or speaker across speaker terminals.	VR102 (Muting Level)	Adjust so that output can be obtained.
	FM-MONO DISTORTION ALIGNMENT					
	Note : Muting switch ..... OFF					
12	Connect to FM antenna terminal through FM dummy antenna.	98MHz (100% Mod. with 400Hz) Output 72dB	98MHz	Connect distortion meter to speaker terminals.	T101 (FM DISCRI IFT) (P)	Adjust for minimum distortion.
	SIGNAL METER ALIGNMENT					
13	Connect to FM antenna terminal through FM dummy antenna.	98MHz (30% Mod. with 400Hz) Output 72dB	98MHz	Signal meter of set.	VR101 (Indicated Position)	Refer to fig. 4.

Notes :
Stereo-modulator ..... Connect stereo-modulator output to EXT. MOD. terminal of signal generator. Internal OSC 1kHz. Pilot signal modulation 10%.
Signal generator ..... Frequency approximately 98MHz. Output level 72dB. Modulation mode to FM.
1. Band selector ..... FM-Auto
2. Bass and treble control..... Center
3. Balanced transformer less switch..... 4CH
4. Mode switch ..... Stereo
5. Maintain line voltage at rated voltage.
6. Muting switch.....OFF
7. Loudness-switch.....OFF
8. Tape monitor switch.....Source
9. Dummy load 8Ω

	SIGNAL GENERATOR CONNECTION	STEREO MODULATOR MODE and MOD. RATE	INDICATOR (VTVM or SCOPE)	ADJUSTMENT POINTS	REMARKS
	19kHz COIL and PHASE ALIGNMENT				
14	FM antenna terminal through dummy antenna.	Pilot signal to ON.	Connect scope to **TP**301, Common to chassis.	T301 (19kHz Coil)	Adjust for maximum output.
15	〃	〃 L (or R) 30% Mod.	Connect scope to speaker terminals.	T302 (38kHz Coil) (Phase Alignment)	Adjust for minimum right (or left) output.
	SEPARATION ALIGNMENT				
16	FM antenna terminal through dummy antenna.	L (and R) 30% Mod.	Output meter across speaker terminals through low pass filter. (Refer to fig. 5)	VR301 (Separation)	Adjust for minimum right (and left) output.

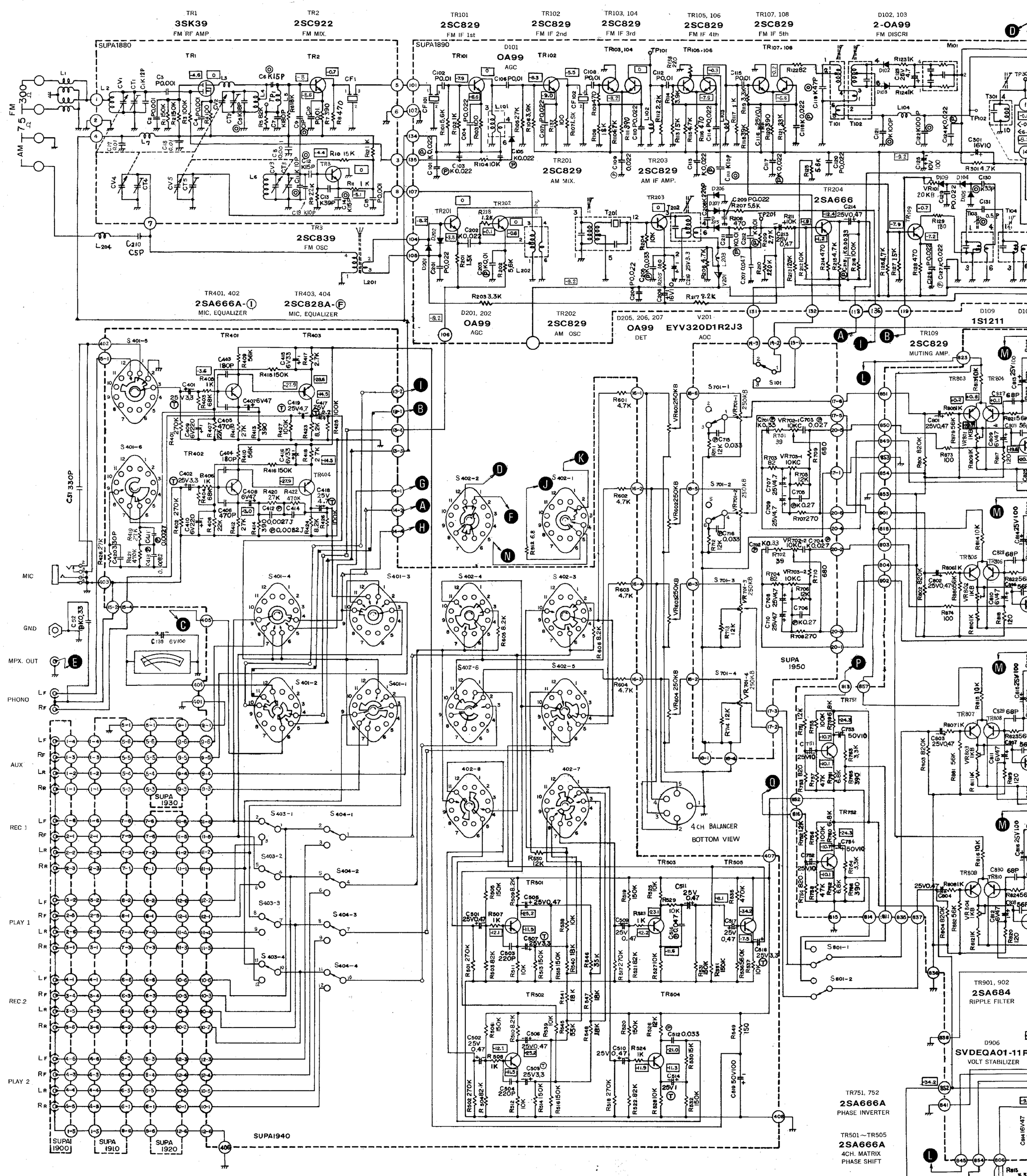
■ FM-RF ALIGNMENT INSTRUCTIONS ..... Only set for Germany

ABGLEICHANWEISUNGEN.....VOR DEM ABGLEICH SORGFÄLTIG DURCHLESEN

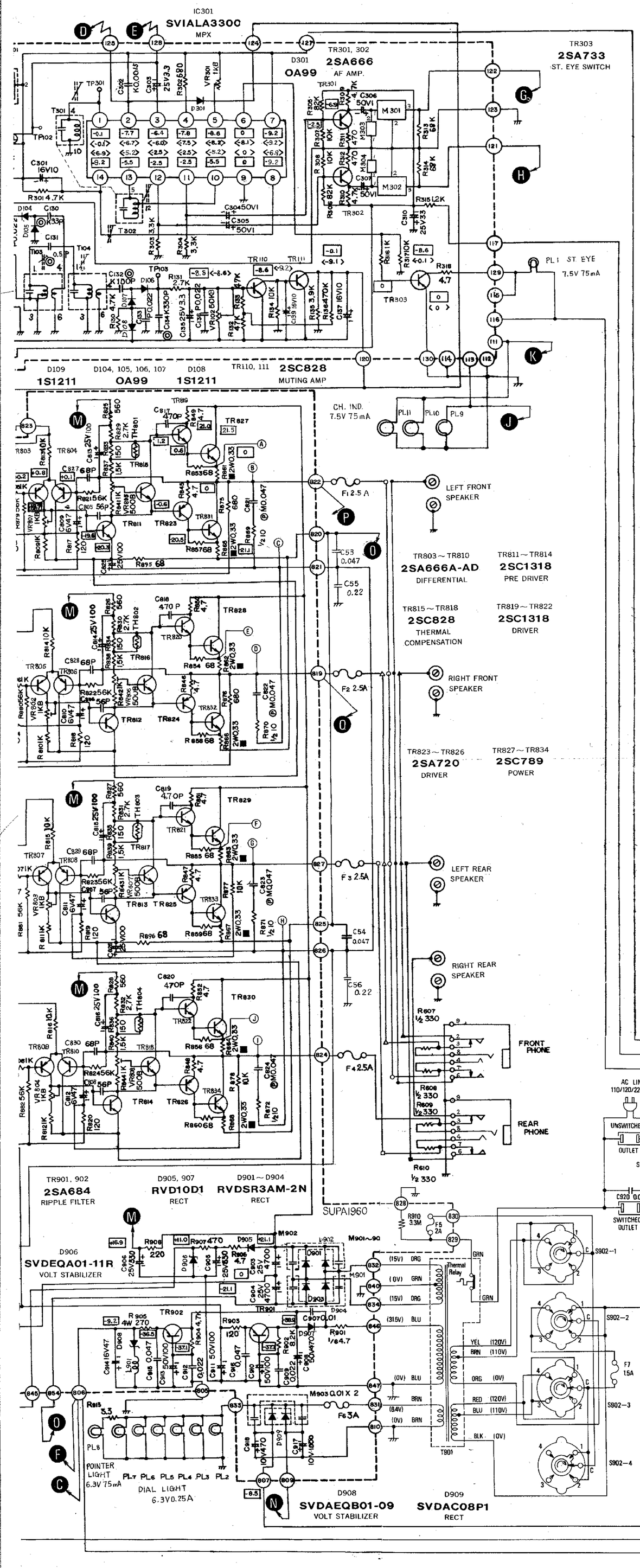
MESSENDER: SCHALTUNG	MESSENDER: FREQUENZ	SKALENZEIGER-EINSTELLUNG DES EMPFÄNGERS [ABSTAND]	ANGEIGE (RÖHRENVOLTMETER ODER OSZILLOGRAPH)	ABGLEICH	BEMERKUNGEN
FM HF-ABGLEICH					
Anschluß an den FM Antennenanschluß über die künstliche. FM Antenne. (Vgl. Abb. 3)	87.5MHz (100% Mod. bei 400Hz)	87.5MHz [0mm]	Output meter über Lautsprecher-schwingspule anschließen.	L6 (Oszillatorspule)	Auf max. Ausgang abgleichen.
〃	90MHz (〃)	90MHz	〃	L4 (Zwischenkreis) L2 (Antennenspule)	〃
〃	106MHz (〃)	106MHz [147.2mm]	〃	CT3 (OSZ. Trimmer) CT2 (DET. Trimmer) CT1 (ANT. Trimmer)	〃

Schematic Diagram .....Model SA-5600X

(This schematic diagram may be modified at any time with the



ime with the development of new technology.)

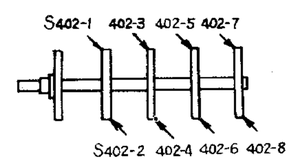


Notes:

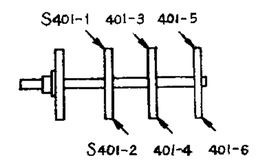
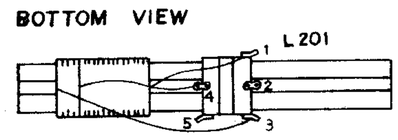
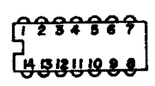
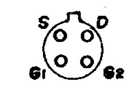
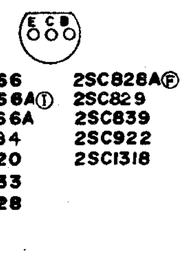
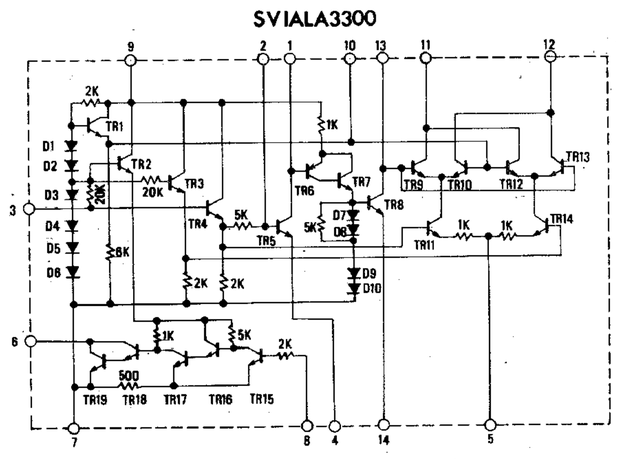
1. S101: FM muting switch in **"OFF"** position.
2. S401-1~S401-6: Selector switch in **"AM"** position.
   AM↔FM AUTO↔PHONO↔MIC↔AUX
3. S402-1~S402-8: Mode switch in **"MONO"** position.
   MONO↔STEREO↔MATRIX 1 (RM)↔MATRIX 2 ↔4CH DISCRETE
4. S403-1~S403-4: Tape monitor (TAPE 1) switch in **"SOURCE"** position.
5. S404-1~S404-4: Tape monitor (TAPE 2) switch in **"SOURCE"** position.
6. S707-1, S701-2: Loudness switch (Only Front Channel) in **"OFF"** position.
7. S801-1, S801-2: Balanced transformer less switch in **"4CH"** position.
8. S901: Power source switch in **"OFF"** position.
9. S902-1~S902-4: Voltage selector switch in "110V" position
   110V↔120V↔220V↔240V
10. DC voltage measurements are taken with DC VTVM from chassis ground.
    ▭ ..... FM/AM No signal condition
    < > ..... FM stereo signal reception or FM muting to **"ON"** position.

VR101: FM Meter Adjustment
VR102: FM Muting Level Adjustment
VR301: Separation Adjustment
VR601~VR604: Channel Level Control
VR701-1~VR701-4 : Main Volume Control
VR702-1, VR702-2: Treble Control (Only Front Channel)
VR703-1, VR703-2: Bass Control (Only Front Channel)
VR801~VR804: DC Unbalance Adjustment
VR805~VR808: ICQ Adjustment

MODE



SELECTOR



BOTTOM VIEW