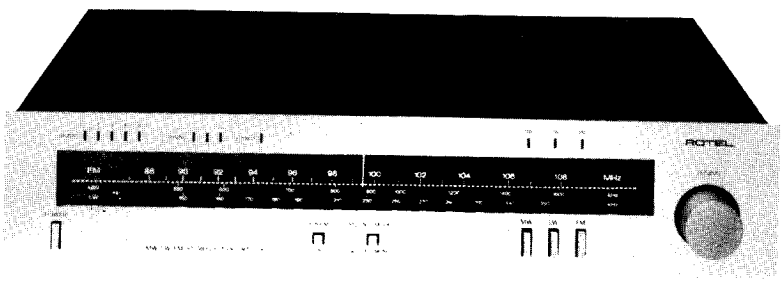
ROTEL®

Technical Manual



AM/FM STEREO TUNER

RT-500

MW/LW/FM STEREO TUNER

RT-500L

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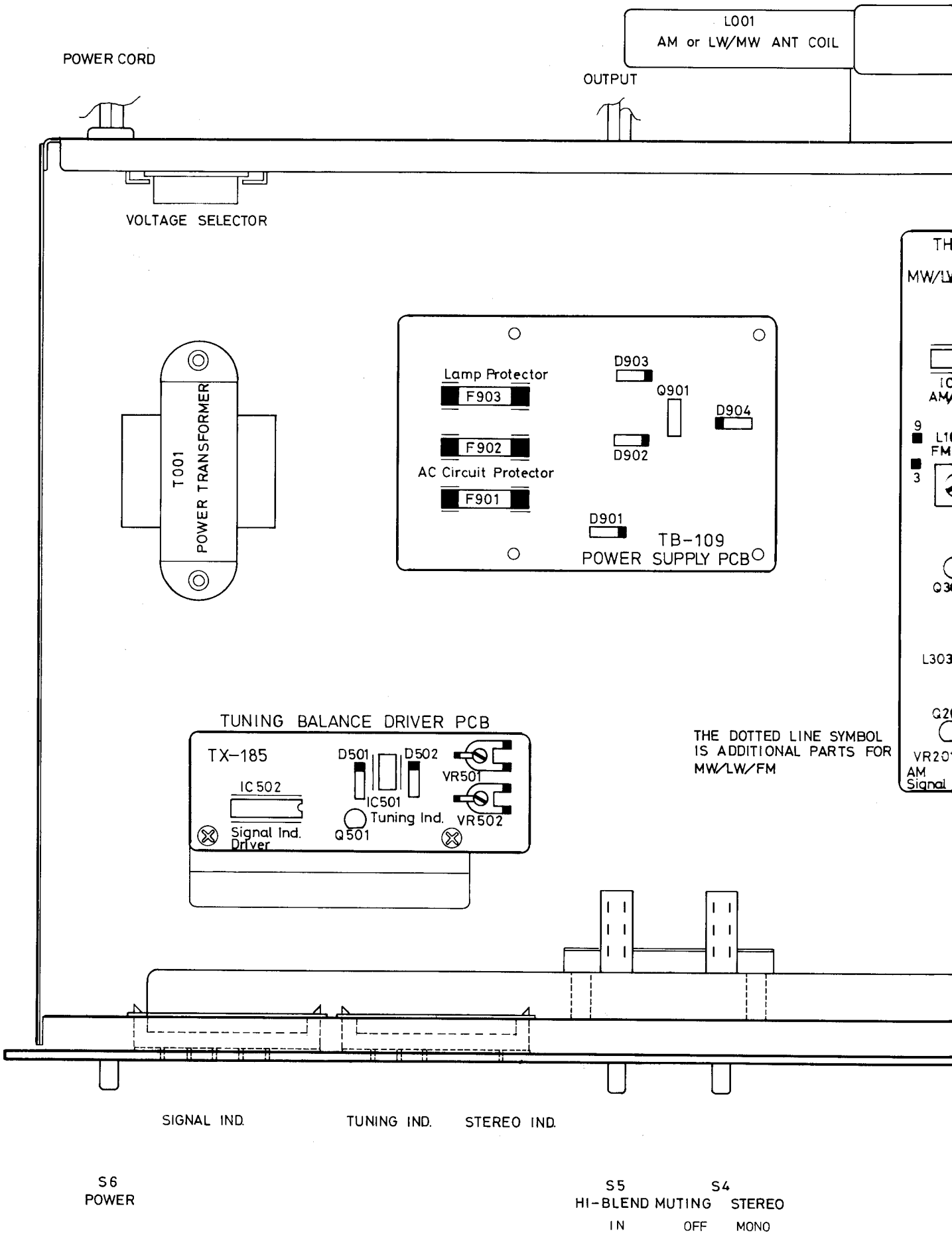
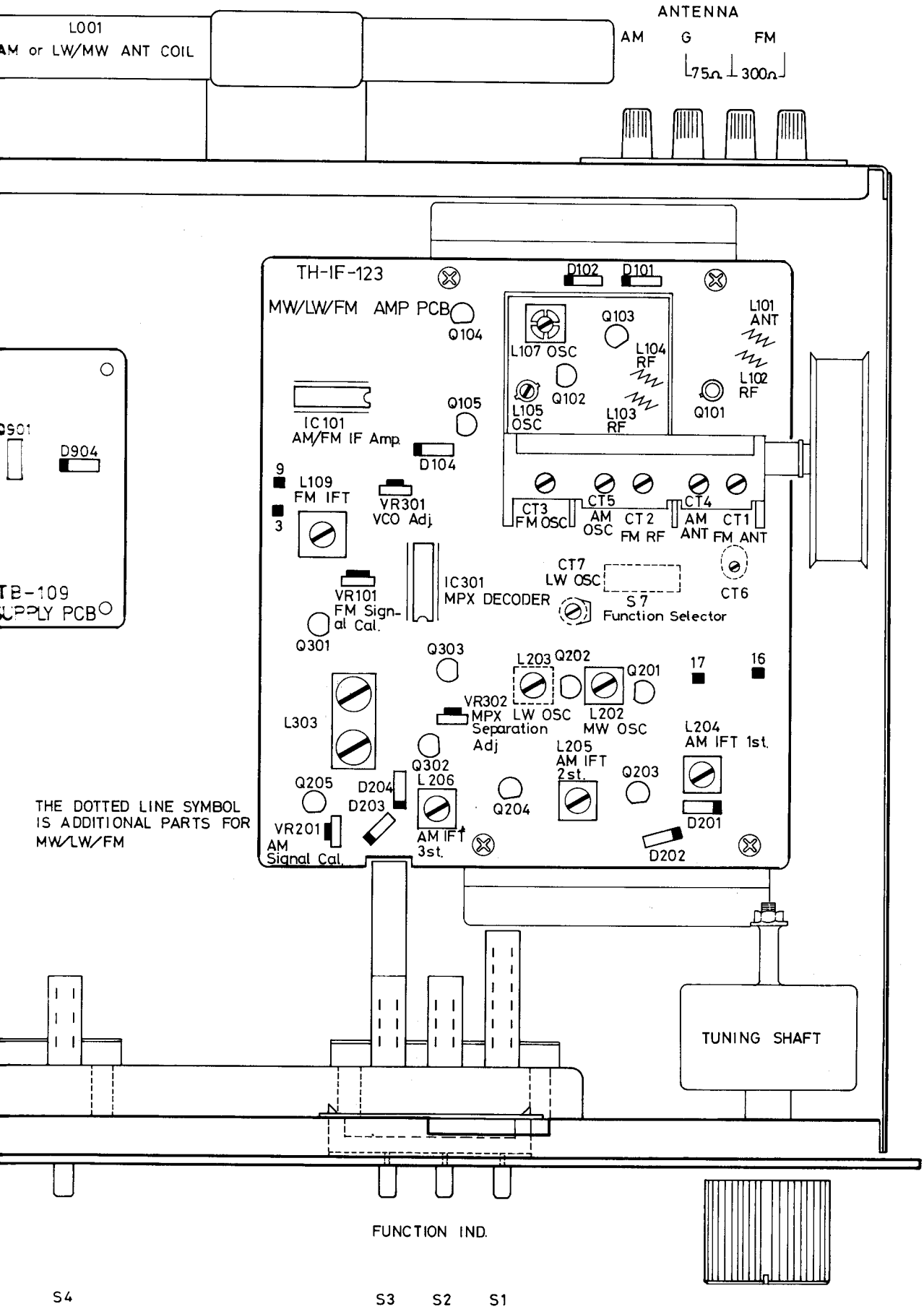


/Installation de Châssis



AM IF and RF Alignment/ Signal Indicator Calibration

Instruments: AM Signal Generator (400Hz 30% Modulated), AC VTVM and Oscilloscope.

AM IF Alignment (AM/FM, MW/LW/FM)

Step	Generator		Tuning Dial Setting	Adjust	Adjust for
	Coupling	Frequency			
1	Pin No. 17 (on IF board through a 0.01 mfd Capacitor)	455KHz	No interfering at low end of scale	L204, L205 and L206 (on IF board)	Maximum reading on AC VTVM.

MW RF Alignment (AM/FM, MW/LW/FM)

Step	Generator		Tuning Dial Setting	Adjust	Adjust for
	Coupling	Frequency			
1	Test Loop Radiate signal into ferrite loop-stick antenna.	600KHz	600KHz	L202 (OSC) and L001 (ANT) lead line side	Maximum reading on AC VTVM.
2		1400KHz	1400KHz	CT5 (OSC) and CT4 (ANT)	
3	(Input 100mV)	1000KHz	1000KHz	VR201	5 LEDs just light up. (Signal stregth indicator.)

LW RF Alignment (MW/LW/FM only)

Step	Generator		Tuning Dial Setting	Adjust	Adjust for
	Coupling	Frequency			
1	Test Loop Radiate signal into ferrite loop-stick antenna.	160KHz	160KHz	L203 (OSC) and L001 (ANT) against the lead line side	Maximum reading on AC VTVM.
2		330KHz	330KHz	CT7 (OSC) and CT6 (ANT)	

FM IF and RF Alignment/ Tuning and Signal Indicator Calibration

Instruments: FM Signal Generator (400Hz, 100% Modulated), H.D. Analyzer, Oscilloscope, AC VTUM and Tuning Meter.

Step	Generator		Tuning Dial	Adjust	Adjust for
	Coupling	Frequency	Setting		
1	Antenna terminal	90MHz	90MHz	L105 (OSC)	Maximum reading on AC VTUM.
2		106MHz	106MHz	CT3 (OSC)	
3	Repeat steps 1 and 2 unit no further improvement is noticed.				
4	Antenna terminal	90MHz	90MHz	L101, L102, L103 and L104 (RF)	Maximum reading on AC VTVM.
5		106MHz	106MHz	CT1 (ANT) and CT2 (RF)	
6		98MHz	98MHz	L107 ()SC)	
7	Repeat steps 4 and 5 unit no further improvement is noticed.				
8	Antenna terminal (1mV Input)	98MHz	98MHz	L109 (upper core)	Minimum reading on H.D. Analyzer.
9			No interfering	L109 (low core)	Tuning Meter to "Center" position.
10			98MHz	VR101	5 LEDs just light up. (Signal strength indicator)
11			98MHz-50KHz	VR501	Left LED just light up (FM Tuning indicator)
12			98MHz i50KHz	VR502	Right LED just light up. (FM Tuning indicator)

FM MPX Alignment

FM MPX Alignment

Instruments: FM Stereo Generator, AC VTVM and Oscilloscope.

Step	Generator		Tuning Dial	Adjust	Adjust for
	Coupling	Frequency	Setting		
1	Antenna terminal	98MHz Pilot.....10% 1KHz.....90% Mod.	98MHz	VR301	Stereo indicator light up.
2				VR302	best separation
3	Check the stereo indicator can be operated normally when pilot signal is reduce from 10% to 6%.				

MW-ZF und HF-Einstellung/ MW-Signalstärkeanzeige-Eichung

Instrumente: MW-Messender (400Hz 30% moduliert), Wechselstrom-Roehrenvoltmeter und Oszillograph.

MW-ZF Einstellung (MW/UKW, MW/LW/UKW)

Schritt	Messender		Abstimmskalen Einstellung	Abgleich	Abgleich auf
	Anschluss	Frequenz			
1	Steckerstift 17 (auf ZF-leiterplatte ueber 0.01 MF Kondensator)	455KHz	Kine Interfenz am unteren skalenende	L204, L205 und L206 (auf ZF-Leiterplatte)	Maximalanzige am Roehrenvoltmeter

MW-HF Einstellung (MW/UKW, MW/LW/UKW)

Schritt	Messender		Abstimmskalen Einstellung	Abgleich	Abgleich auf
	Anschluss	Frequenz			
1	Mess-Signal mit Schleife in Ferrit antenna einspeisen.	600KHz	600KHz	L202 (OSZ) und L001 (ANT) Lotleine-Seite	Maximalanzeige am Roehrenvoltmeter
2		1400KHz	1400KHz	CT5 (OSZ) und CT4 (ANT)	
3	(Antennenklennenspannung 1mV)	1000KHz	1000KHz	VR201	fünf LEDS leuhtet recht auf. (Signalstärkeanzeige)

LW-HF Einstellung (MW/LW/UKW nur)

Schritt	Messender		Abstimmskalen Einstellung	Abgleich	Abgleich auf
	Anschluss	Frequenz			
1	Mess-Signal mit Schleife in Ferrit antenna einspeisen	160KHz	160KHz	L203 (OSZ) und L001 (ANT) gegen Lotleine-Seite	Maximalanzeign am Roehrenvoltmeter
2		330KHz	330KHz	CT7 (OSZ) und CT6 (ANT)	

UKW-ZF und HF-Einstellung/Ratiomitteanzeige und Signalstärkeanzeige-Eichung

Instrumente: UKW-Messender (400Hz 100% Moduliert), Klirrfaktomesser, Oszillograph, Wechselstrom-Roehrenvoltmeter

Schritt	Messender		Abstimmskalen	Abgleich	Abgleich auf
	Anschluss	Frequenz	Einstellung		
1	Antennenkl-emmen anschliessen	90MHz	90MHz	L105 (OSZ)	Maximalanzeige am Roehrenvoltmeter
2		106MHz	106MHz	CT3 (OSZ)	
3	Schritt 1 und 2 weiderholen, bis kein weitere Verbesserung eintritt.				
4	Antennekl-emmen ansch-liessen	90MHz	90Mhz	L101, L102, L103 and L104 (HF)	Maximalanzeige am Roehrenvoltemeter
5		106MHz	106MHz	CT1 (ANT) and CT2 (HF)	
6		98MHz	98Mz	L107 (OSZ)	
7	Schritt 4 und 5 weiderholen, bis kein weitere Verbesserung eintritt.				
8	(Antennenkl-emmen ensp-annung 1mV)	98MHz	98MHz	L109 (upper core)	Minimalanzeige am Klirrfaktormesser
9			KEINE Inter-ferenz	L109 (low core)	Abstimmanzeiger auf "center" stellen.
10			98MHz	VR101	fünf LEDS leuhtet recht auf. (Signal-stärkeanzeige)
11			98MHz-50KHz	VR501	Links-LED leuchtet recht auf. (UKW-Ratiomitteanzeige)
12			98MHz+50KHz	VR502	Rechts-LED leuchet recht auf. (UKW-Ratiomitteanzeige)

UKW MPX-Einstellung

Instrumente: UKW-stereo Messender, Roehrenvoltmeter und Oszillograph.

Schritt	Messender		Abstimmskalen	Abgleich	Abgleich auf
	Anschluss	Frequenz	Einstellung		
1	Antennekl-emmen anschliessen	98MHz Pilotton.....10% 1KHz.....90% Moduliert.		VR301	Stereoanzeige leuchtet auf.
2				VR302	beste Trennung
3	Einwandfreier Stereoanzeigebetrieb muss auch noch gewahrleistet sein, wenn der Stereopilotton von 10% auf 6% reduziert wird.				

Alignement AM IF et HF/ Indicateur de nivea de signal

Instruments: Générateur de signal AM (400Hz 30% modulé) AC VTVM et Oscilloscope.

Alignement AM IF (AM/FM, MW/LW/FM)

Point	Générateur		Ecran d'accord	Réglage	Réglage pour
	Couplage	Fréquence			
1	Brouche No. 17 (Sur IF plaquette par l'intermédiaire dún condensateur de 0.01 mfd.	455KHz	Non interférence a l'extrémité de l'èchelle	L204, L205 et L206 (sur la plaquette IF)	Lecture maximum sur le voltmètre électronique AC VTVM.

Alignement MW HF (AM/FM, MW/LW/FM)

Point	Générateur		Ecran d'accord	Réglage	Réglage pour
	Couplage	Fréquence			
1	Boucle de mesure Envoyée le signal sur ferrite à boucle	600KHz	600KHz	L202 (OSC) et L001 (ANT) Côté de ligne de connecion	Lecture. maximum sur AC VTVM.
2		1400KHz	1400KHz	CT5 (OSC) et CT4 (ANT)	
3	(absorbé 100mV	1000KHz	1000KHz	VR201	5 LEDS allument seulement. (Indicateur de force du signal)

Alignement LW HF (MW/LW/FM seulement)

Point	Générateur		Ecran d'accord	Réglage	Réglage pour
	Couplage	Fréquence			
1	Boucle de mesure Envoyée le signal sur ferribe à boucle	160KHz	160KHz	L203 (OSC) et L001 (ANT) contre le côté de ligne de connexion	Lecture maximum sur AC VTVM.
2		330KHz	330KHz	CT7 (OSC) et CT6 (ANT)	

Alignement FM IF et HF/Indicateur de synonisation et de force du signal

Instruments: (400Hz, 100% modulé) Analyseur H.D., Oscilloscope, AC VTVM et Compteur de syntonisation.

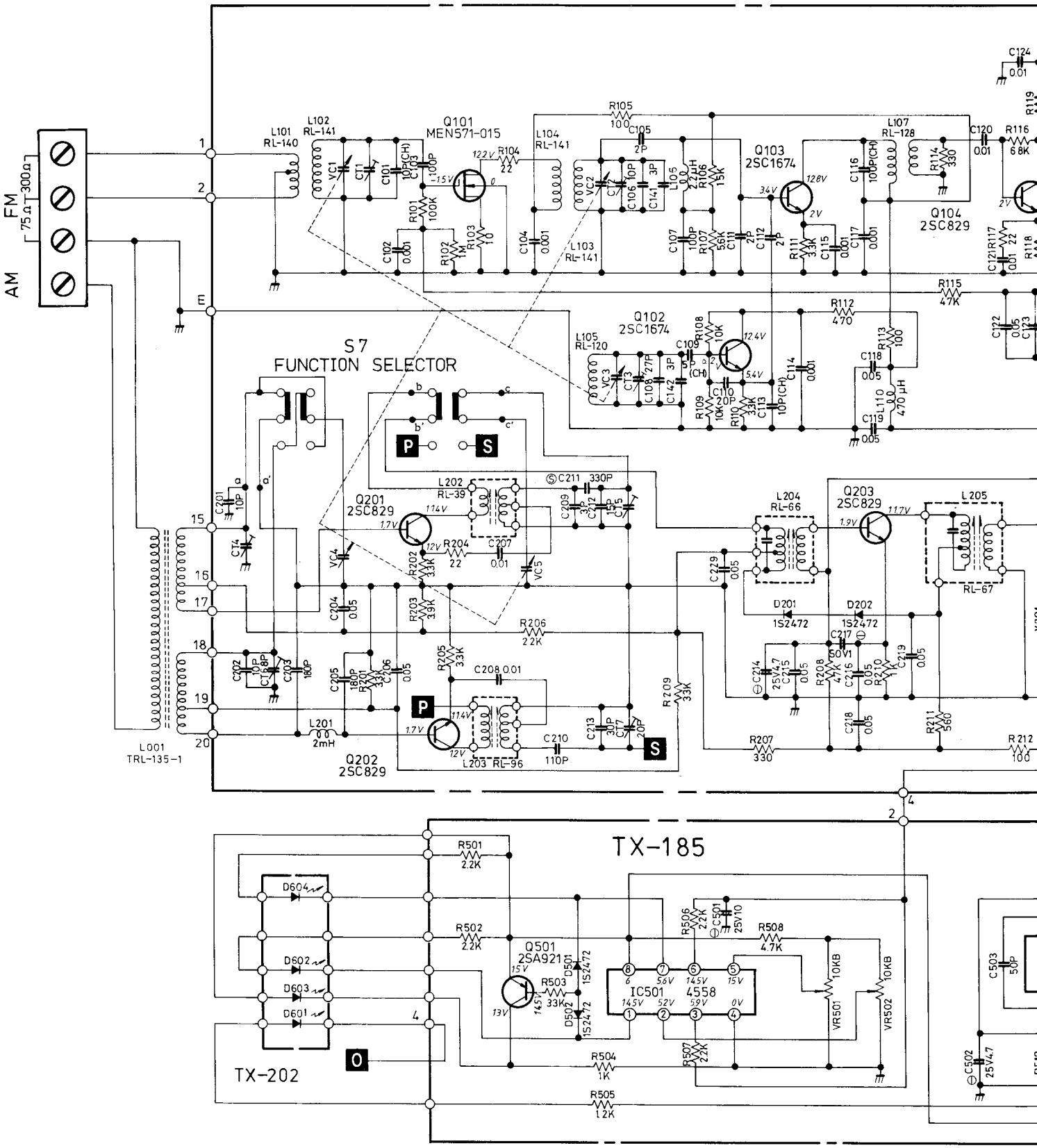
Point	Générateur		Ecran d'accord	Réglage	Réglage pour
	Couplage	Fréquence			
1	Borne d'antenne	90MHz	90MHz	L105 (OSC)	Lecture maximum sur AC VTVA
2		106MHz	106MHz	CT3 (OSC)	
3	Répéter les points 1 et 2 jusqu'ancun perfectionnement est marqué.				
4	Brone d'antenne	90MHz	90MHz	L101, L102, L103 et L104 (RF)	Lecture maximum sur AC VTVM.
5		106MHz	106MHz	CT1 (ANT) et CT2 (RF)	
6		98MHz	98MHz	L107 (OSC)	
7	Répéter les points 4 et 5 jusqu'avcun perfectionnement est marqui				
8	Borne d'antenne (1mV absorbée)	98MHz	98MHz	L109 (nogau haut)	Lecture maximum sur AC VTVM.
9			non interférence	L109 (nogau bas)	Lecture de syntonisation à la position "centrole".
10			98MHz	VR101	5 LEDS allument seulement (Indicateur de force du signal)
11			98MHz-50KHz	VR501	LED gauche allume seulement (Indicateur de syntonisation FM)
12			98MHz+50KHz	VR502	LED droit allume seulement (Indicateur de syntonisation FM)

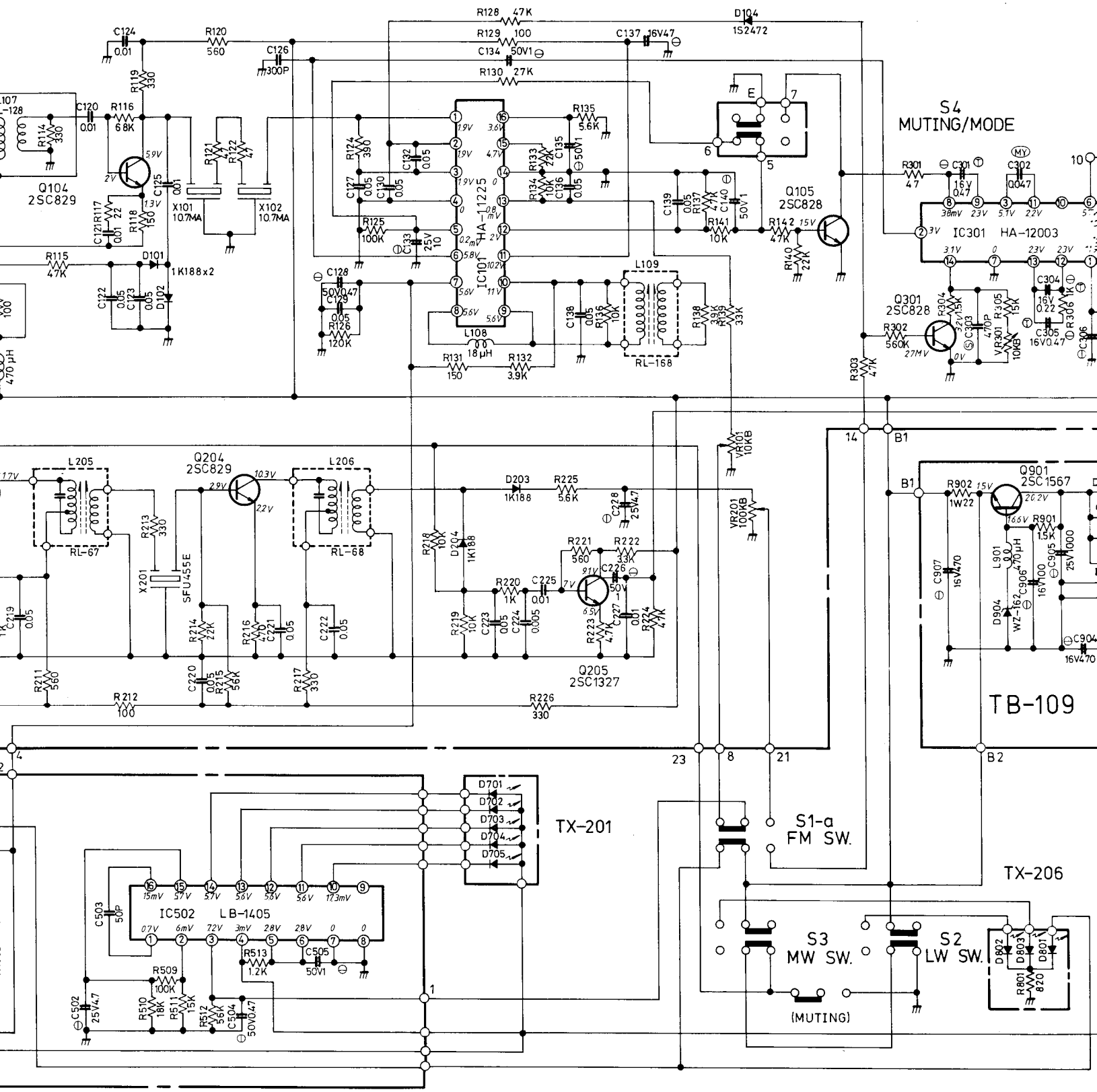
Alignement FM MPX

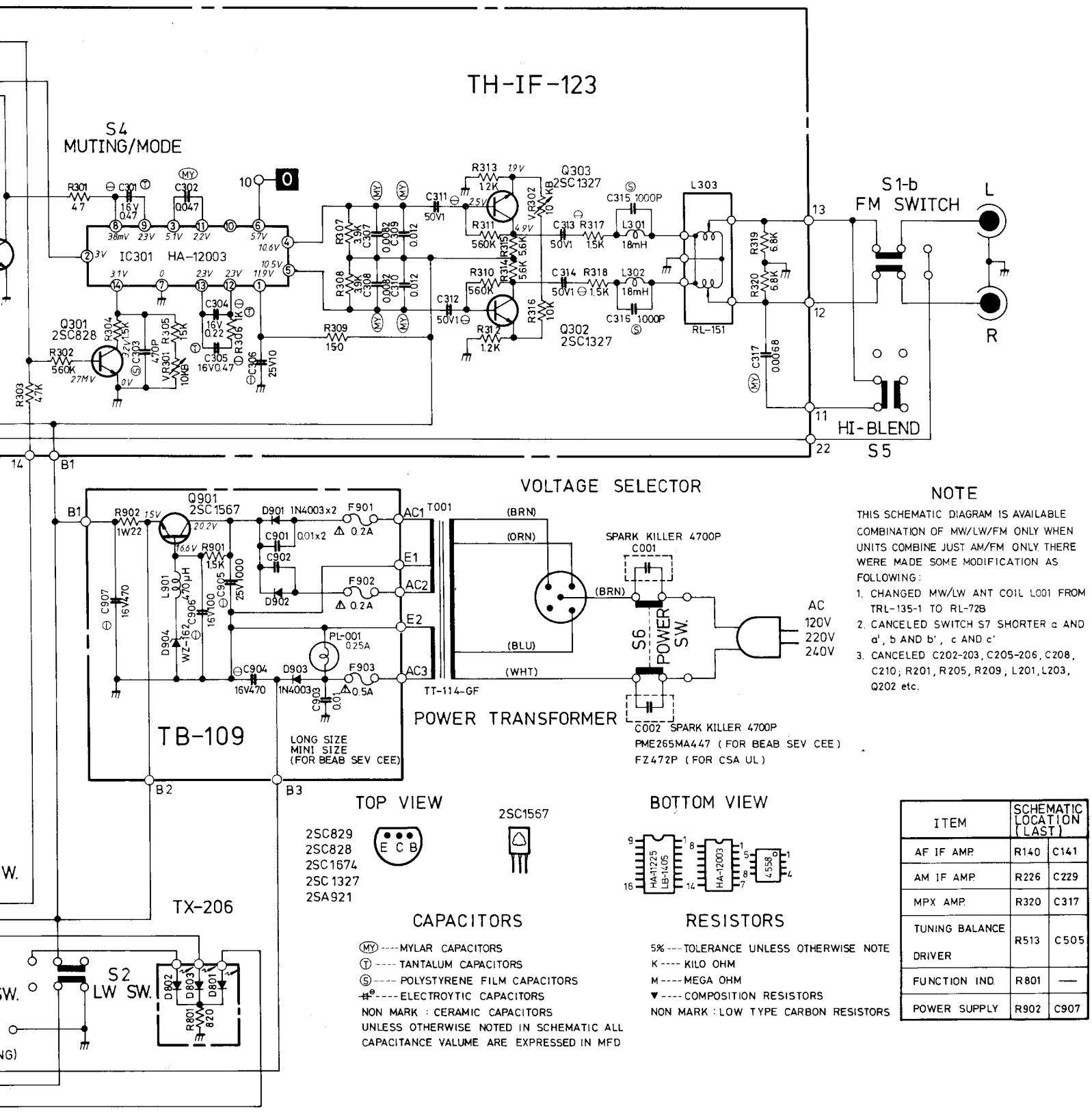
Instruments: FM stéréo Générateur, AC VTVM et Oscilloscope.

Point	Générateur		Ecran d'accord	Réglage	Réglage pour
	Couplage	Fréquence			
1	Borne d'antenne	98MHz lampe témoin 10% 1KHz 90% Mod.	98MHz	VR301	Indicateur stéréo allume
2				VR302	Séparation la plus meilleure
3	Eraminer l'indicateur stéréo peut être opéré normalement lorsque le signal de lampe témoin est véduite de 10% à 6%				

Schematic Diagram/Skalenantriebsschema/Diagramme




S4
MUTING/MODE
Q104
2SC829
Q105
2SC828
IC101
HA-11225
IC301
HA-12003
Q301
2SC828
Q204
2SC829
Q205
2SC1327
Q901
2SC1567
L205
L206
RL-67
RL-68
RL-168
X101
10.7MA
X102
10.7MA
X201
SFU455E
D101
1K188x2
D104
1S2472
D203
1K188
D204
1K188
L108
18μH
L109
VR101
10KB
VR201
100KB
TB-109
TX-201
TX-206
IC502
LB-1405
S1-a
FM SW.
S3
MW SW.
S2
LW SW.
(MUTING)
D701
D702
D703
D704
D705



NOTE

THIS SCHEMATIC DIAGRAM IS AVAILABLE COMBINATION OF MW/LW/FM ONLY WHEN UNITS COMBINE JUST AM/FM ONLY THERE WERE MADE SOME MODIFICATION AS FOLLOWING :

1. CHANGED MW/LW ANT COIL L001 FROM TRL-135-1 TO RL-728
2. CANCELED SWITCH S7 SHORTER a AND a', b AND b', c AND c'
3. CANCELED C202-203, C205-206, C208, C210; R201, R205, R209; L201, L203, Q202 etc.

TOP VIEW

2SC829
2SC828
2SC1674
2SC1327
2SA921

E C B

2SC1567

BOTTOM VIEW

HA-11225
LB-1405
HA-12003
4.558

CAPACITORS

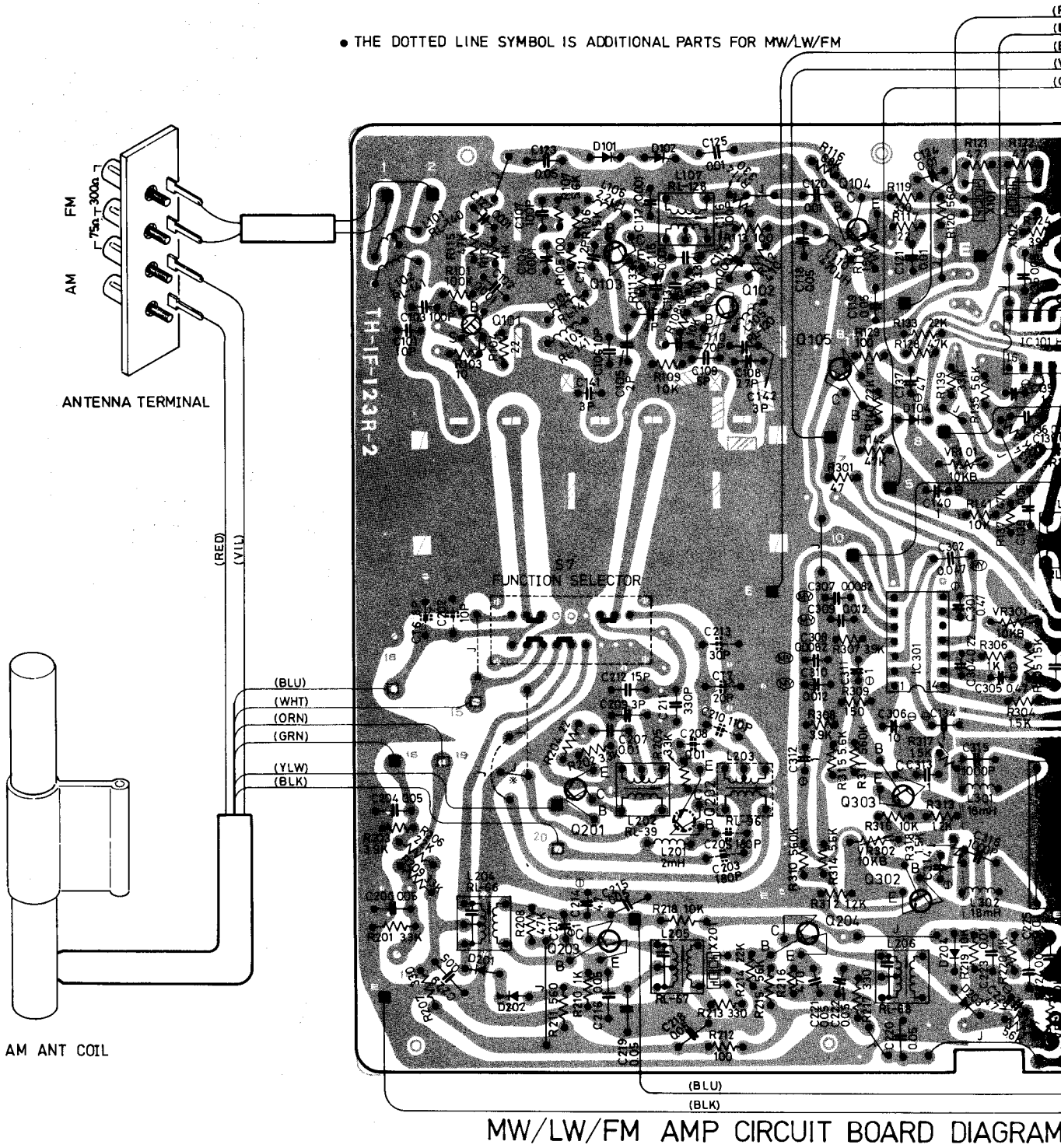
(MY) ---- MYLAR CAPACITORS
(T) ---- TANTALUM CAPACITORS
(S) ---- POLYSTYRENE FILM CAPACITORS
⊕ ---- ELECTROYTIC CAPACITORS
NON MARK : CERAMIC CAPACITORS
UNLESS OTHERWISE NOTED IN SCHEMATIC ALL CAPACITANCE VALUME ARE EXPRESSED IN MFD

RESISTORS

5% --- TOLERANCE UNLESS OTHERWISE NOTE
K ---- KILO OHM
M ---- MEGA OHM
▼ ---- COMPOSITION RESISTORS
NON MARK : LOW TYPE CARBON RESISTORS

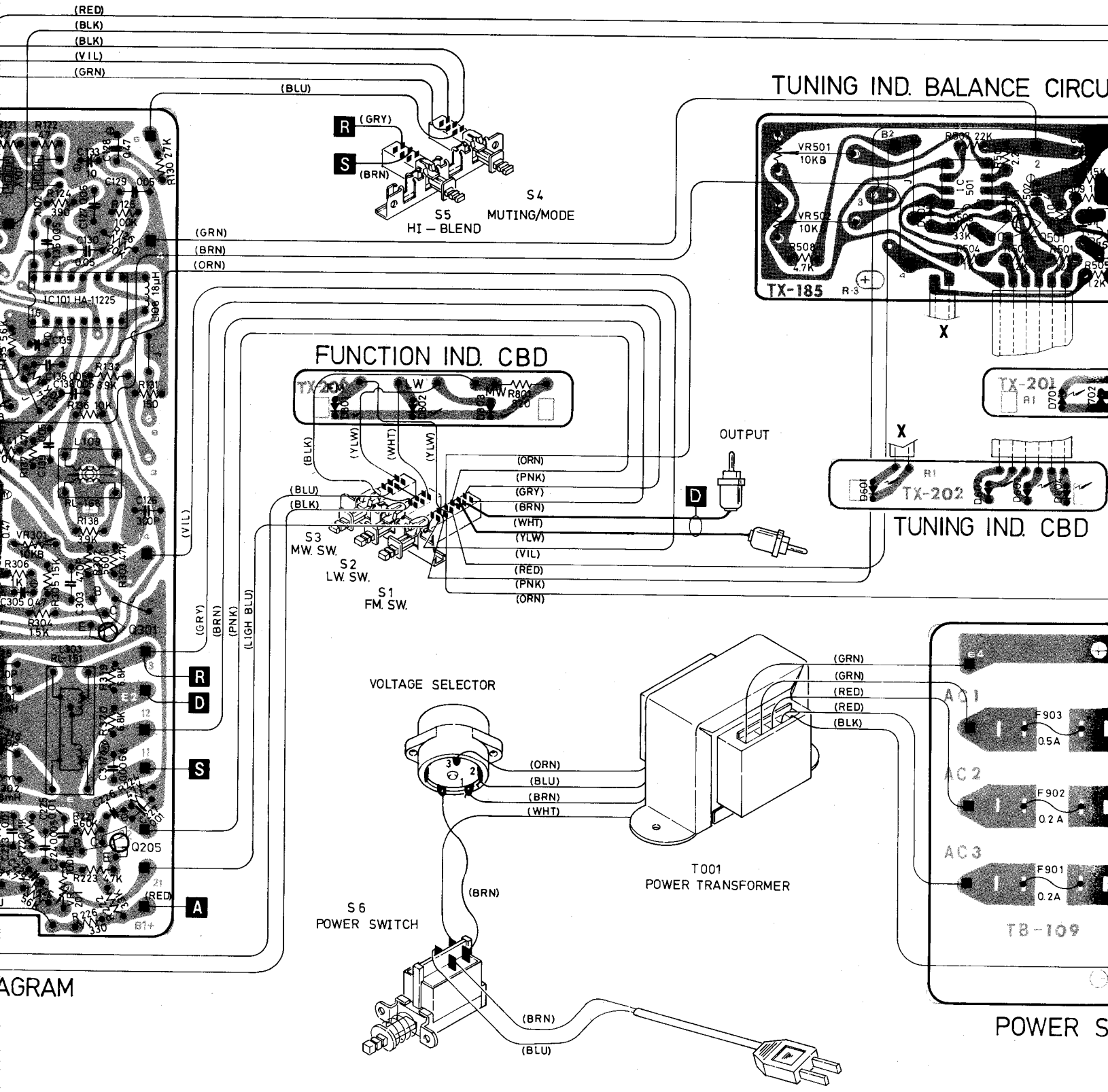
ITEM	SCHEMATIC LOCATION (LAST)	
AF IF AMP.	R140	C141
AM IF AMP.	R226	C229
MPX AMP.	R320	C317
TUNING BALANCE DRIVER	R513	C505
FUNCTION IND.	R801	—
POWER SUPPLY	R902	C907

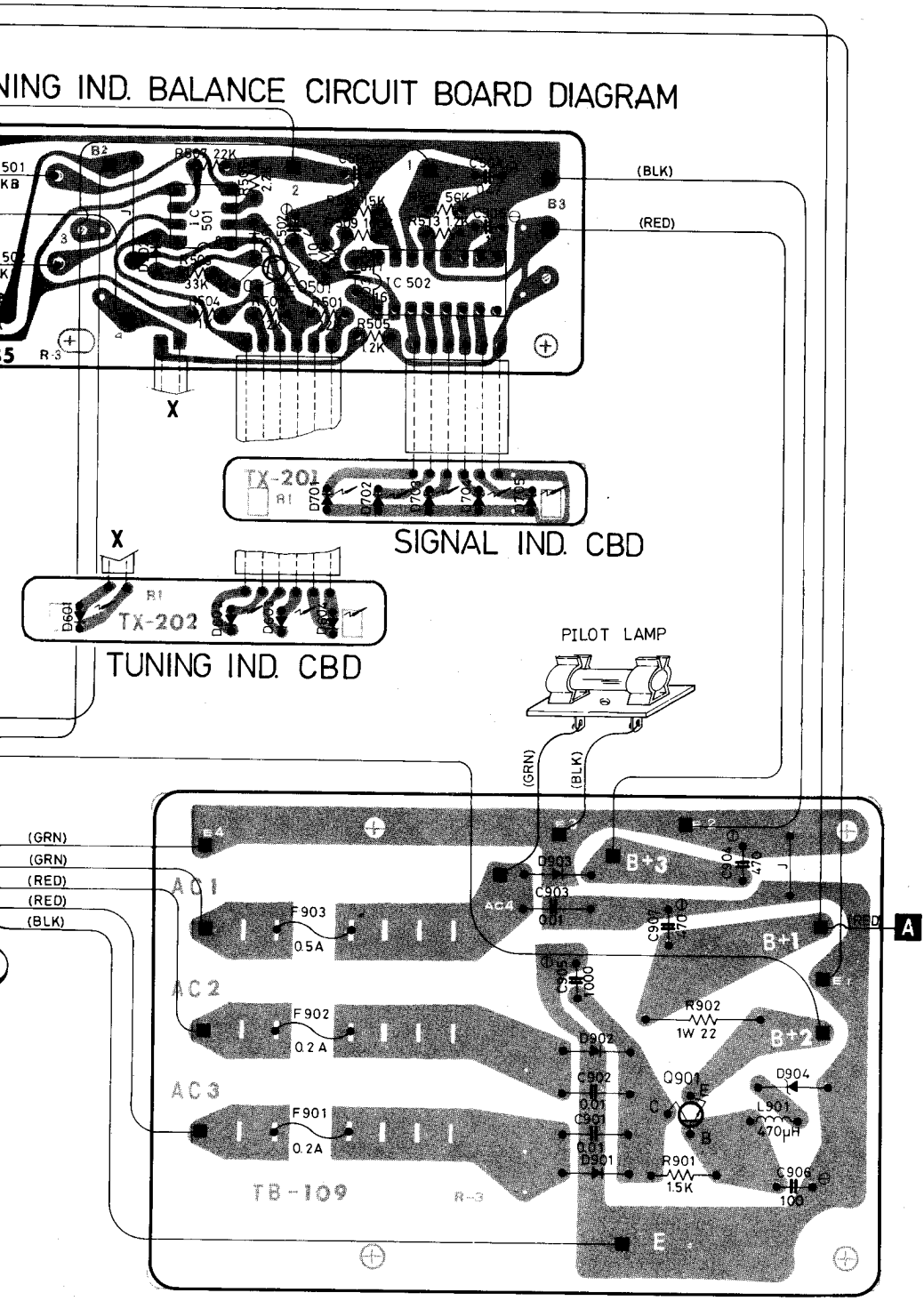
Wiring Diagram/Drahtleitung Diagramm/Diagram



MW/LW/FM AMP CIRCUIT BOARD DIAGRAM

ramme de connexion





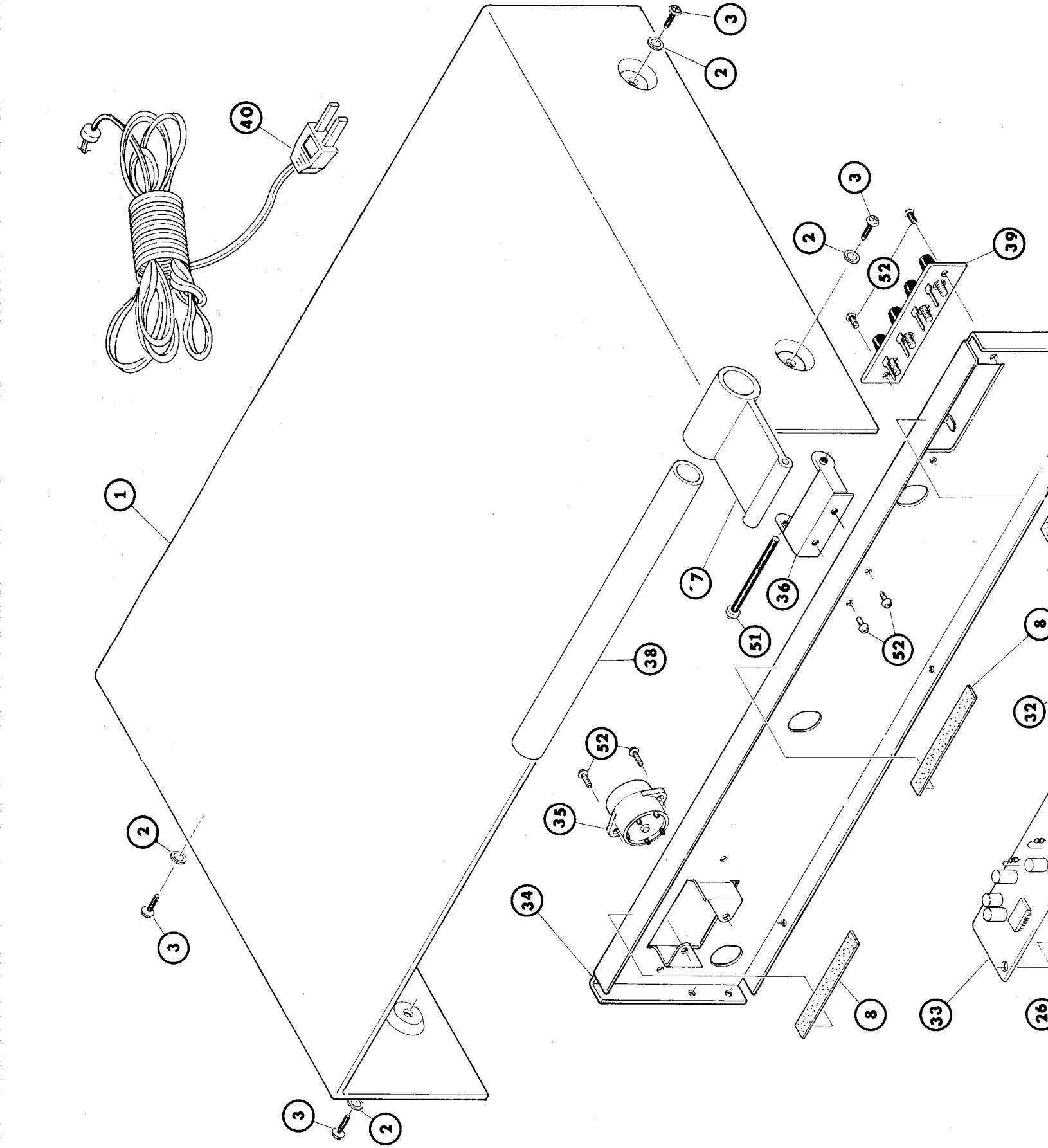
POWER SUPPLY CIRCUIT BOARD DIAGRAM

Repair Parts List/Reparaturteilliste/ Liste des piéces de rechange

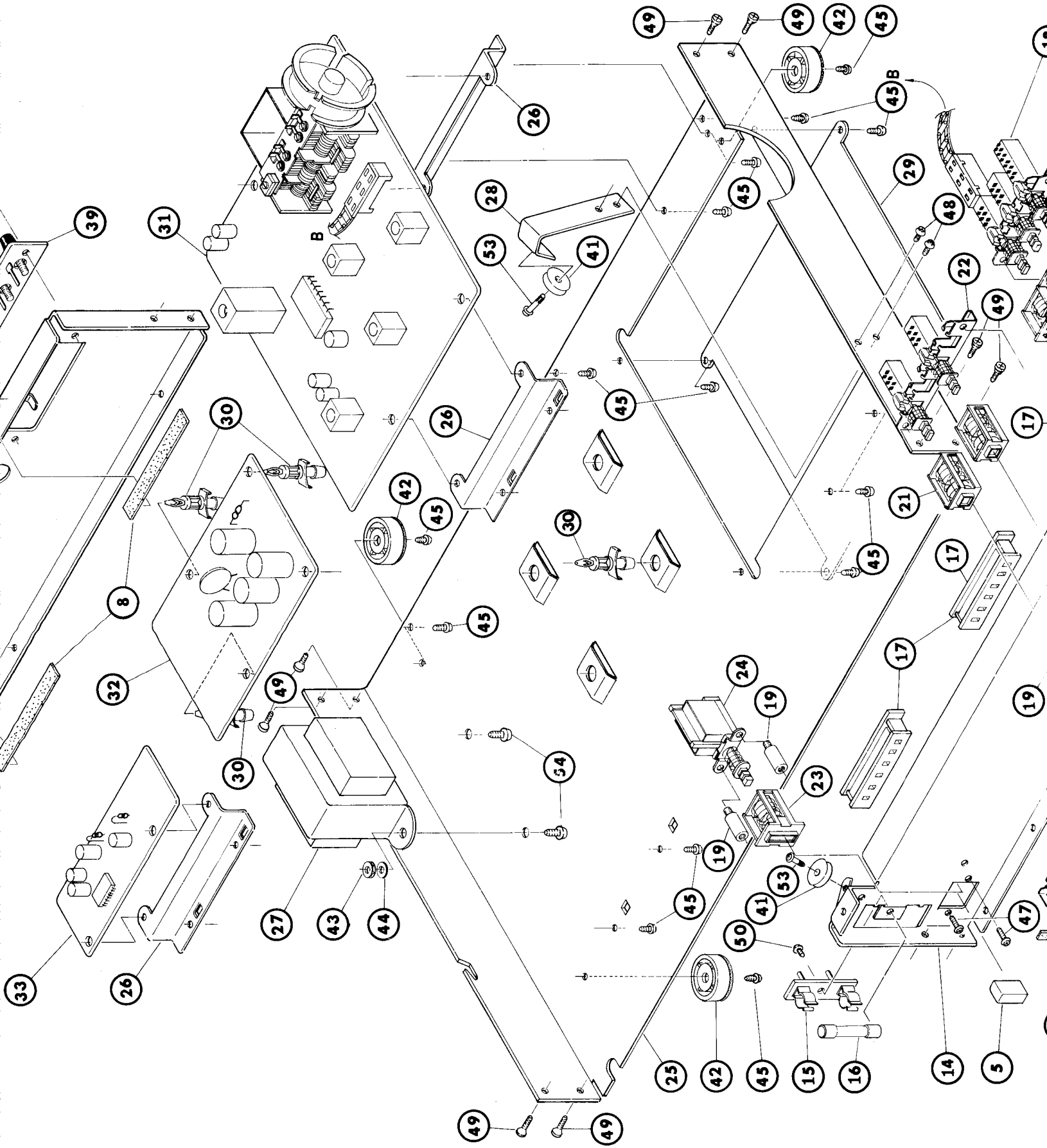
Schematic Location	Parts No.	Description
TRANSISTORS, DIODES AND IC'S		
Q101	302001125	MEN571-015, FM RF Amp.
Q102,104	301201163	2SC1674 (K,L), FM MIX, OSC.
Q103	301201117	2SC829 (C), IF Amp.
Q105	301201115	2SC828 (R,S), for Auto-Switching
Q201-204	301201117	2SC829 (C), AM MIX, OSC. IF ... etc.
Q301	301201115	2SC828 (R,S), VCO Cut off.
Q302,303	301201134	2SC1327 (S,T), Andio Amp.
Q501	301001145	2SA921, Tuning Indicator Control
Q901	301201150	2SC1567, Stabilizer
D101,102 D203,204	300111008	1K188, FM AGC Detector, Ind. Detector, Rectifier
D103 D201-202	300111010	1S2472, for Switching, AM AGC
D501,502	300111010	1S2472, Tuning Ind. Switching
D904	300313017	WZ-162, Zener Regrator, 16V ½W
D801-803	300414040	LN224GP, Function Ind.
D901-903	300919026	1N4003, Rectifier
D601,603 D604	300414042	LN224RP, Tuning, Stereo Ind.
D602	200414040	LN224GP, Tuning Ind. (Green)
D101-105	300414042	LN224RP, Signal Ind.
IC101	303452251	HA-11225, FM IF Amp.
IC301	303452250	HA12003, MPX Decorder
IC501	303452152	RC-4558, Tuning Ind. Decorder
IC502	303452188	LB-1405, Signal Ind. Decorder
COILS AND VARIABLE RESISTORS		
L101	226501131	FM ANT Coil
L102,103	226501132	FM RF Coil
L104	226501159	FM RF Coil
L105	226501158	FM OSC Coil
L001	222391121	AM ANT Coil (AM/FM)
L106	226501143	2.2μH, FM IF Trap. Coil
L107	225501131	FM IFT
L108	226501125	18μH, Moving Phase
L109	225501139	FM IFT Quadrature Detector
L110	226501127	470μH, RF Chocke Coil
L201	226501142	2mH.
L202	223301127	MW OSC
L203	223301129	LW OSC (MW/LW/FM only)
L204	225301131	AM IFT 1st.
L205	225301132	AM IFT 2nd.
L206	225301133	AM IFT 3rd.
L301,302	228641180	18mH, 38KHz Filter
L303	228641137	19KHz Filter
L901	226501127	470μH, Chocke Coil
VR101,201	510502149	100KB, AM FM Signal Ind. Adj.
VR301,302	510502141	10KB, FM MPX VCO Seperation Adj.
VR501,502	510502153	10KB, Tuning Ind. Balance Adj.

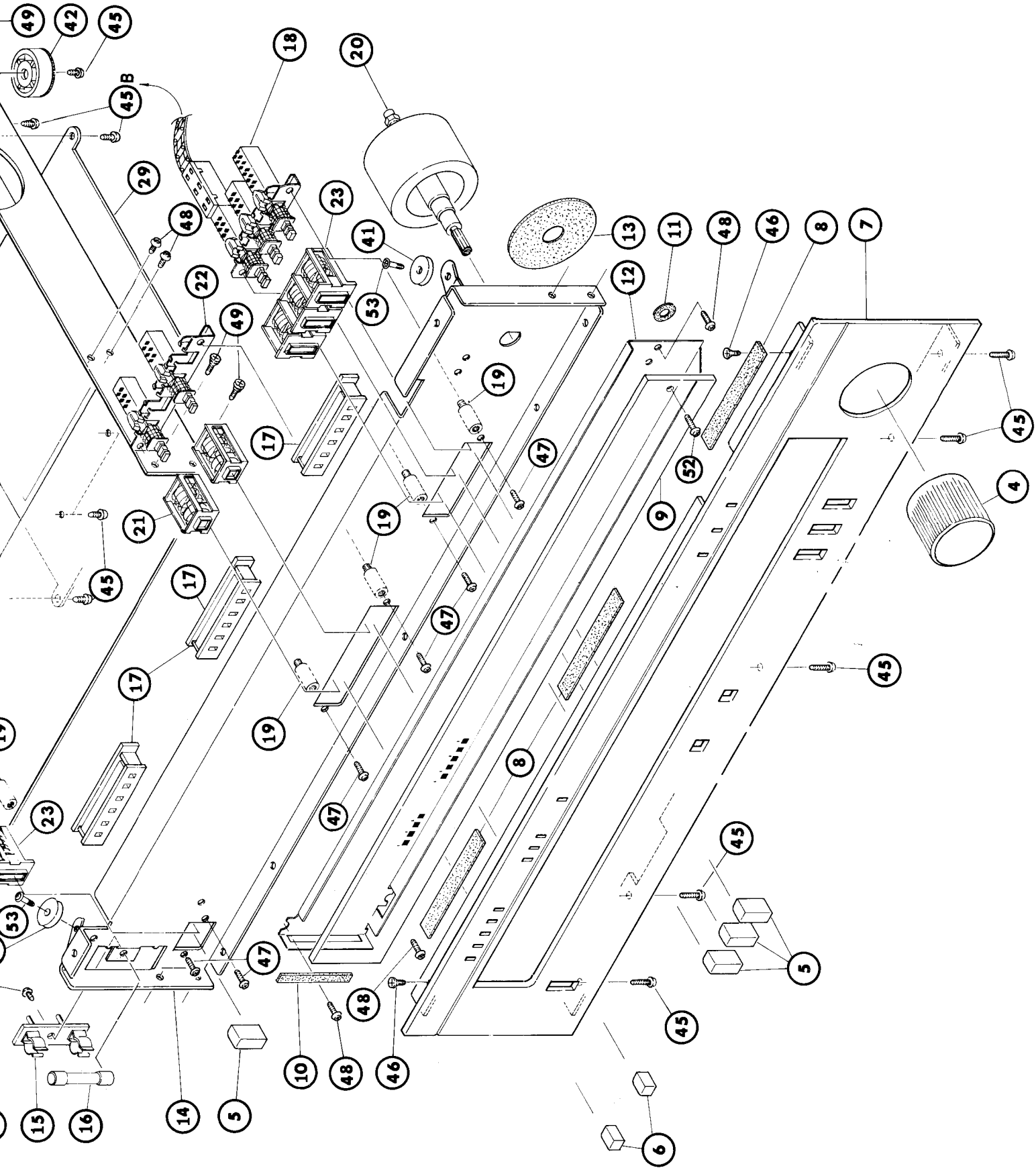
Schematic Location	Parts No.	Description
OTHERS		
CT4,CT5	490110120	MW ANT, OSC Trimer
CT6	490110121	LW OSC Trimer
CT7	490110116	LW ANT, Trimer
X101,102	229101171	10.7MA, Ceramic Filter
X201	229101207	SFU-455E, Ceramic Filter
S1-3	614030834	Switch, Push 3-Key, FM, LW and FM
	614030838	Switch, Push 2-Key, FM and AM
S4,5	614030837	Switch, Push 2-Key, Muting/Mode and Hi-Blend ⚠
S6	614010138	Switch, Power Supply (For BEAB..)
	614010139	Switch, Power Supply (For CSA)
S7	615212282	Switch, Slide, MW/LW
F901,902	341221020	Fuse, 0.2A, AC Circuit Protector (Long Size)
	345222020	Fuse, 0.2A, AC Circuit Protector (Mini Size)
	345252020	Fuse, 200mA, AC Circuit Protector (Mini Size with S D Mark) ⚠
F903	341221050	Fuse, 0.5A, Lamp Protector (Long Size)
	345222050	Fuse, 0.5A, Lamp Protector (Mini Size)
	345252050	Fuse, 500mA, Lamp Protector (Mini Size with S D Mark) ⚠

Disassembly Diagram/Illustration des Auseinaderbaus/



erbaus/Schéma de démontage

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Key No.	Parts No.	Description
1.	138011311	Upper Cover
2.	770500002	Washer, 4.2x10x1 BK
3.	705220408	Screw, + M4x8 SMB
4.	116310307	Knob, 33$^{\Phi}$ Tuning
5.	116210073	Push Button, Function
6.	116210074	Push Button, Hi-Blend
7.	111911507	Front Panel Ass'y (AM/FM)
	111911508	Front Panel Ass'y (MW/LW/FM)
8.	990201332	Spong, Front Panel
9.	112011377	Dial Board (AM/FM)
	112011378	Dial Board (MW/LW/FM)
10.	990201334	Felt, Front Panel
11.	990201335	Felt, Dial Board
12.	120012948	Dial Alumimum Back Board
13.	990201330	Felt, Knob
14.	122011411	Front Chassis Ass'y
15.	648211135	Holder, Pilot Lamp
16.	359101116	Lamp, Pilot 6.3V 250mV Blue
17.	114902322	Holder, LED Indicator PCB
18.	614030838	Switch, Push 2-Key, Function (AM/FM)
	614030834	Switch, Push 3-Key, Function (MW/LW/FM) (M)
19.	770911263	Cylinder Bush, Inner Screw
20.	654911289	Tuning Shaft
21.	114902318	Frame, Push Button
	658601130	Spring, Frame
	114902320	Shaft, Frame
22.	614040837	Switch, Push 2-Key, Hi-Blend and Muting
23.	114902319	Frame, Push Button
24.	614010138	Switch, Power Supply (for BEAB)
	614010139	Switch, Power Supply (for UL, CSA)
25.	121011350	Chassis Bady
26.	120012936	Support, PCB
27.	207001506	Transformer, Power Supply (Multi-Type)
28.	120012946	Support, Pulley
29.	120012947	Bottom Mask A
30.	672200831	Holder, PCB
31.	141311388	AM/FM/MPX Amp. PCB Ass'y (for 75us)
	141311389	AM/FM/MPX Amp. PCB Ass'y (for 50us)
	141311390	MW/LW/FM/MPX Amp. PCB Ass'y
32.	141811037	Power Supply PCB Ass'y (with Long Size Fuse)
	141811038	Power Supply PCB Ass'y (with Mini Size Fuse)
	141811309	Power Supply PCB Ass'y (with "S" "D" Mark Fuse)

Key No.	Parts No.	Description
33.	141811032	Tuning Indicator Decorder PCB Ass'y
34.	123011534	Rear Panel Ass'y
	123011535	Rear Panel Ass'y (for CSA)
35.	648211247	Voltage Selector
36.	120012201	Support, Bar ANT Coil
37.	648211111	Holder, Bar ANT Coil
38.	222391142	Bar ANT Coil (AM/FM)
	222391143	Bar ANT Coil (MW/LW/FM)
39.	649201115	Terminal, Screw, 4P
40.	796301115	Line Cord
	796301149	Line Cord (for Europe)
	796301125	Line Cord (for Austria)
	796301138	Line Cord (for BEAB)
41.	651110019	Pulley
42.	673402025	Plastic Foot
43.	770402201	Nut, M4
44.	770500004	Washer, 5
45.	726103006	Screw, +M3x6 BTV
46.	701203006	Screw, +M3x6 SMF
47.	701203006	Screw, +M3x6 PAN
48.	766203006	Screw, +M3x6 STV
49.	722203008	Screw, +M3x8 JT20
50.	703213004	Screw, +M3x4 Pan
51.	705224045	Screw, +M3x45 BK
52.	766223006	Screw, +M3x6 STV BK
53.	770911264	Screw, +M3x10
54.	766204008	Screw, +M4x10 CTB

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