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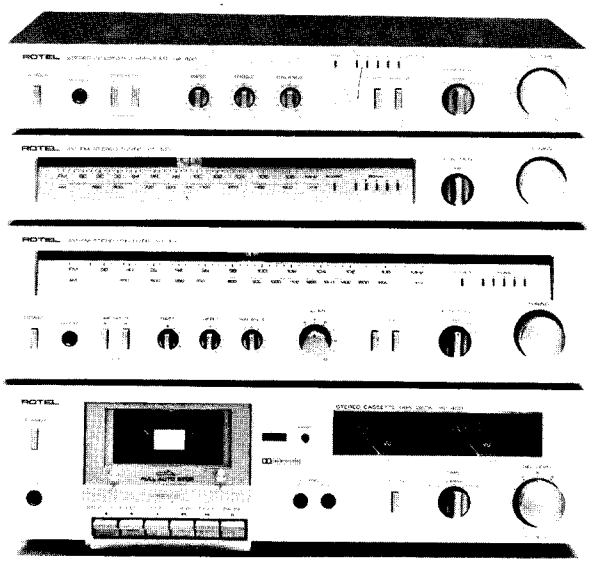
ROTEL®

Technical Manual



RT-400 AM/FM STEREO TUNER
RT-400L MW/LW/FM STEREO TUNER

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INHALTSVERZICHMIS

TABLE DES MATIERES

THE ROTEL CO., LTD.
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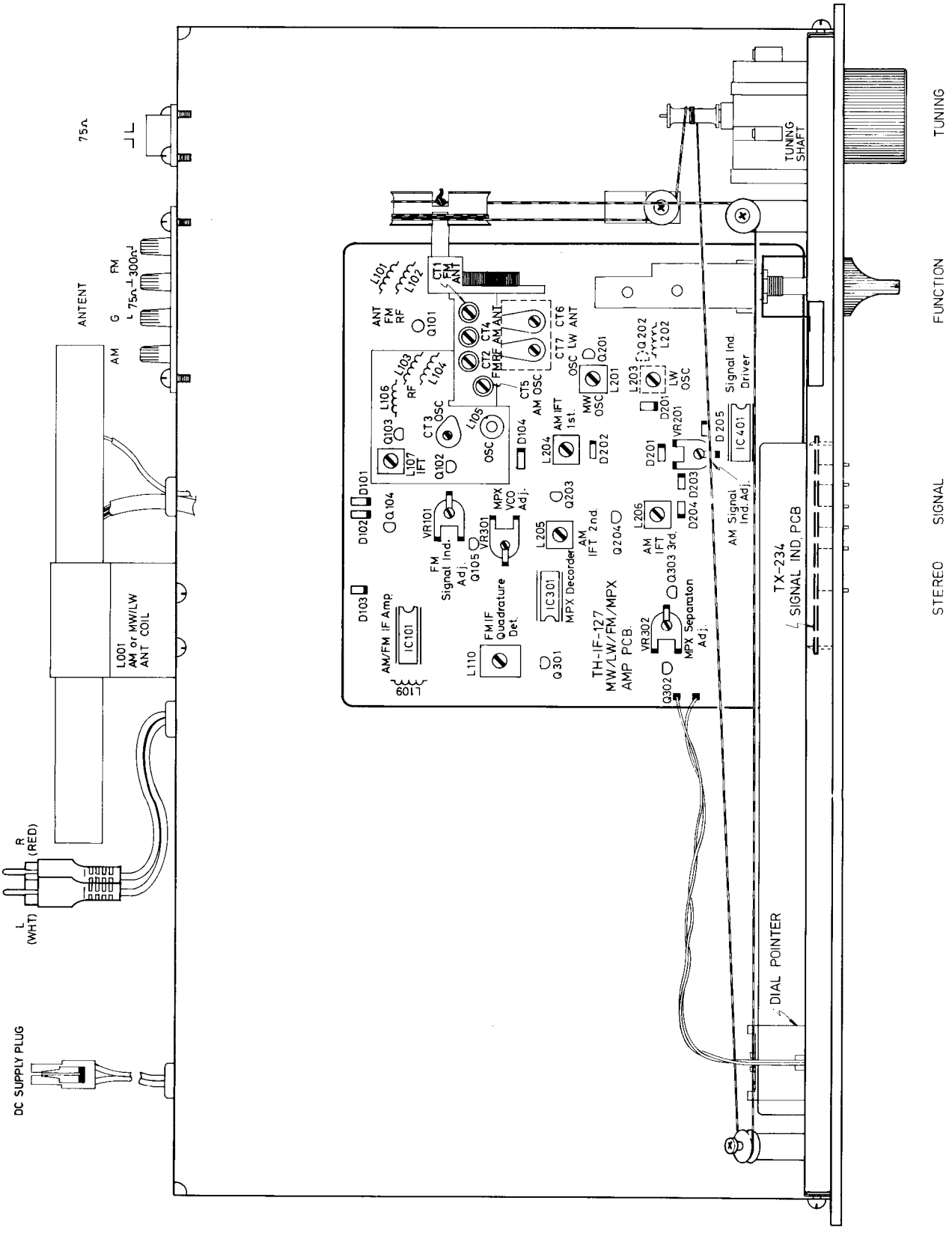
Chassis Layout/Chassis Anordnung/ Installation de Châssis



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. 5 (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	L201 (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 strength 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/ Signal Indicator Calibration

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

Step	Generator		Tuning Dial setting	Adjust	Adjust for
	Coupling	Frequency			
1	Antenna terminal	90MHz	90MHz	L104 (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 VTUM.
5		106MHz	106MHz	CT1 (ANT) and CT2 (RF)	
6		98MHz	98MHz	L107 (OSC)	
7	Repeat steps 4 and 5 unit no further improvement is noticed.				
8	Antenna terminal (1mV Input)	98MHz	98MHz	L110 (upper core)	Minimum reading on H.D. Analyzer.
9			No interfering	L110 (low core)	Tuning Meter to "Center" position.
10			98MHz	VR101	5 LEDs just light up. (Signal strength indicator)

FM MPX Alignment

nstruments: FM Stereo Generator, AC VTVM and Oscilloscope.

Step	Generator		Tuning Dial setting	Adjust	Adjust for
	Coupling	Frequency			
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 5 (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	L201 (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	Maximalanzeige am Roehrenvoltmeter
2		330KHz	330KHz	CT7 (OSZ) und CT6 (ANT)	

UKW-ZF und HF-Einstellung/ Signalstärkeanzeige-Eichung

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

Schritt	Messender		Abstimmskalen Einstellung	Abgleich	Abgleich auf
	Anschluss	Frequenz			
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 anschliessen	90MHz	90MHz	L101, L102, L103 and L104 (HF)	Maximalanzeige am Roehrenvoltmeter
5		106MHz	106MHz	CT1 (ANT) and CT2 (HF)	
6		98MHz	98MHz	L107 (OSZ)	
7	Schritt 4 und 5 weiderholen, bis kein weitere Verbesserung eintritt.				
8	Antennenkl-emmen anschliessen (Antennenkl-emmen enspannung 1mV	98MHz	98MHz	L110 (upper core)	Minimalanzeige am Klirrfaktormesser
9			KEINE Interferenz	L110 (low core)	Abstimmanzeiger auf "center" stellen.
10			98MHz	VR101	fünf LEDS leuhtet recht auf. (Signalstärkeanzeige)

UKW MPX-Einstellung

Instrumente: UKW stereo Messender, Roehrenvoltmeter und Oszillograph.

Schritt	Messender		Abstimmskalen Einstellung	Abgleich	Abgleich auf
	Anschluss	Frequenz			
1	Antennekl-emmen anschliessen	97MHz Pilotton.....10% 1KHz.....90% Moduliert.	98MHz	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 niveau 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. 5 (Sur IF plaquette per l'intermédiaire dún condensateur de 0.01 mfd.	455KHz	Non interférence a l'extrémité de l'échelle	L204, L205 et L206 (sur la plaquette IF)	Lecture maximum sur le voltmètre électronique AC VTVM.

Alignement MW RF (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	L201 (OSC) et L001 (ANT) Côté de ligne de connexion	Leucture 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 RF (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 niveau de 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	Borne 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 (Nogan haut)	Lecture maximum sur AC VTVM.
9			non interférence	L109 (Nogan bas)	Lecture de syntonisation à la position "centrole".
10			98MHz	VR101	5 LEDS allument seule. ment (Indicateur de force du signal)

Alignement FM MPX

Instruments: FM stéréo Générateur, AC VTVM et Oscilloscope.

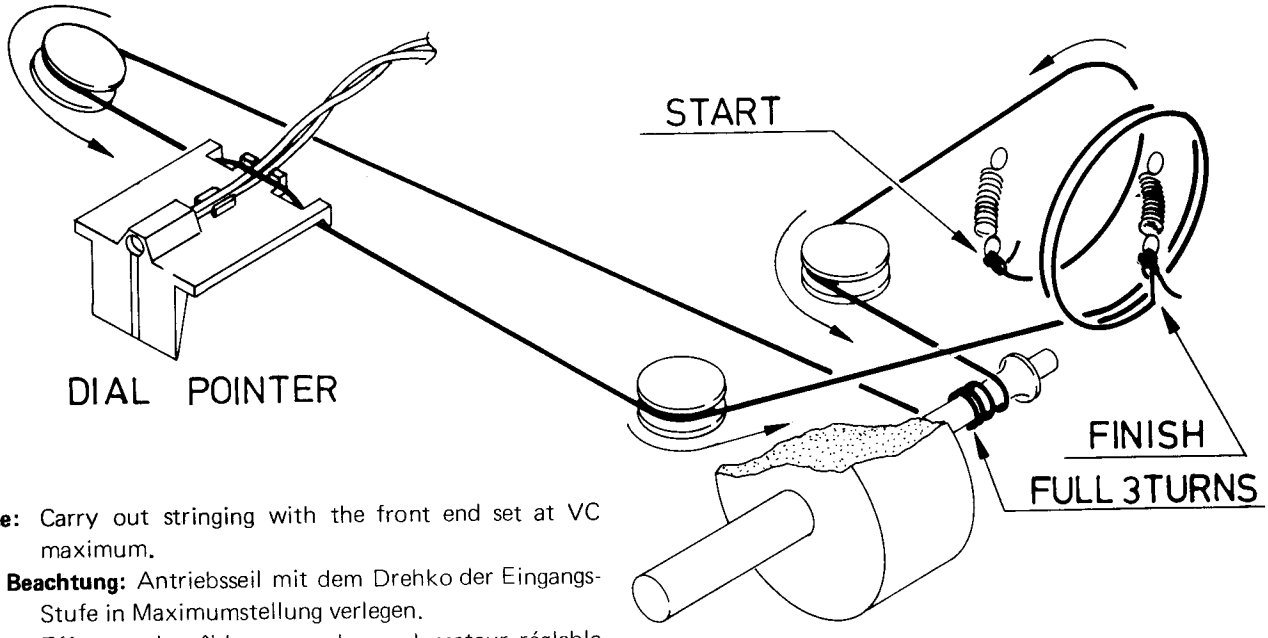
Point	Générateur		Ecran d'accord	Réglage	Réglage pour
	Couplage	Fréquence			
1	Borne d'antenne	98MHz lampe témoin 10% 1 KHz 90% Mod.	98MHz	VR301	Indicateur stéréo allume
2				VR302	Séparation la plus meilleure
3	Eraminer l'indicateur stéréo peut être opéré normalement lorsque le signal de lampe témoin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

Repair Parts List/Reparaturteilliste/ Liste des pièces de rechange

Schematic Location	Parts No.	Description
TRANSISTORS, DIODES AND IC'S		
Q101	302001112	2SK49 (F,H), FM RF Amp.
Q102,103	301901133	LC1674 (K,L), FM MIX OSC
Q104	301901134	LC1675 (K,C), FM IF Amp.
Q105,301	301901132	LC945, for Switching/stop Control
Q302,303	301201202	2SC1571, Audio Amp.
Q201	301901134	LC1675 (K,C), AM OSC
Q202	301901134	LC1675 (K,C), LW OSC (MW/LW/FM only)
Q203,204	301901134	LC1675 (K,C), Audio Amp.
D101,102	300111008	1K188, FM AGC Detector
D103,104	300111010	1S2472, for Switching/Rectifier
D201,202	300111010	1S2472, POP Provention
D203-205	300111008	1K188, AM Audio AGC
D701-706	300414042	LN224RP, Signal Ind.
IC101	303452199	LA1231N, AM/FM IF Amp.
IC301	303452250	HA12003, MPX Decorder
IC401	303452188	LB1405, Phono Amp.

Schematic Location	Parts No.	Description
COILS, VARIABLE RESISTORS		
L001	222391156	AM ANT Coil
	222391158	MW/LW ANT Coil (MW/LW/FM only)
L101	226501131	FM ANT Coil
L102-104	226501132	FM RF Coil
L105	226501161	FM OSC Coil
L106	226501143	2.2uH, FM IF Trap Coil
L107	225501142	FM IFT
L108	226501127	470uH, Chock Coil
L109	226501125	18uH, Moving Phase
L110	225501139	FM IF Quadrature Detector
L201	223301127	MW OSC
L202	226501142	2mH, LW Filter (MW/LW/FM only)
L203	223301129	LW OSC (MW/LW/FM only)
L204	225301131	AM IFT 1st.
L205	225301132	AM IFT 2nd.
L206	225301133	AM IFT 3rd.
VR101	510502195	10KB, FM Signal Ind. Adj.
VR201	510502196	100KB, AM Signal Ind. Adj.
VR301,302	510502195	10KB, VCO, Separation Adj.
S1	601011350	Switch, Function Selector (AM/FM)
	601011332	Switch, Function Selector (MW/LW/FM)
CT6,CT7	490110114	Trimmer, LW ANT/OSC
	322420020	Front-End

Dial Stringing Diagram
Skalenantriebsschema
Diagramme des câble d'entraînement

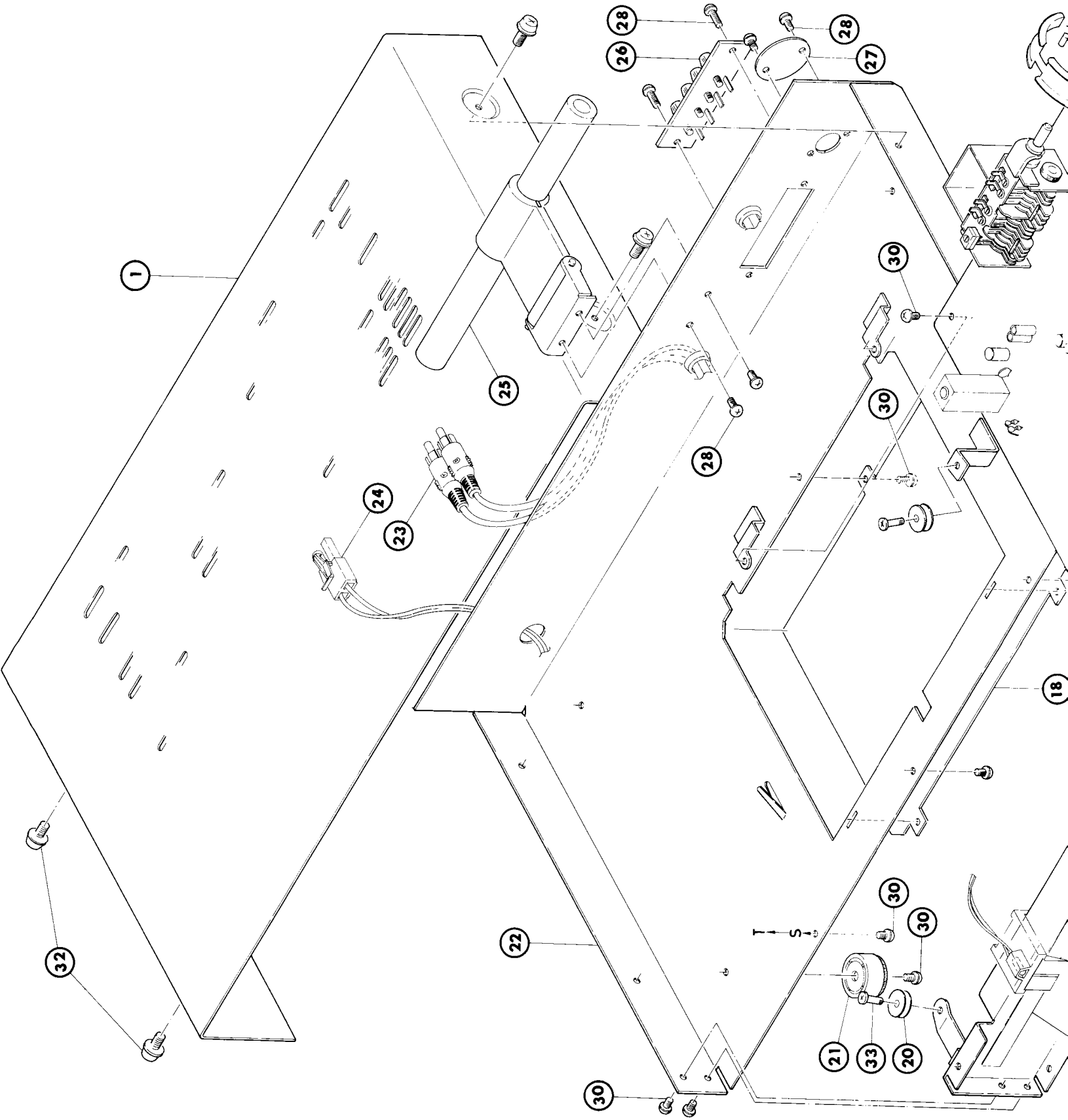


Note: Carry out stringing with the front end set at VC maximum.

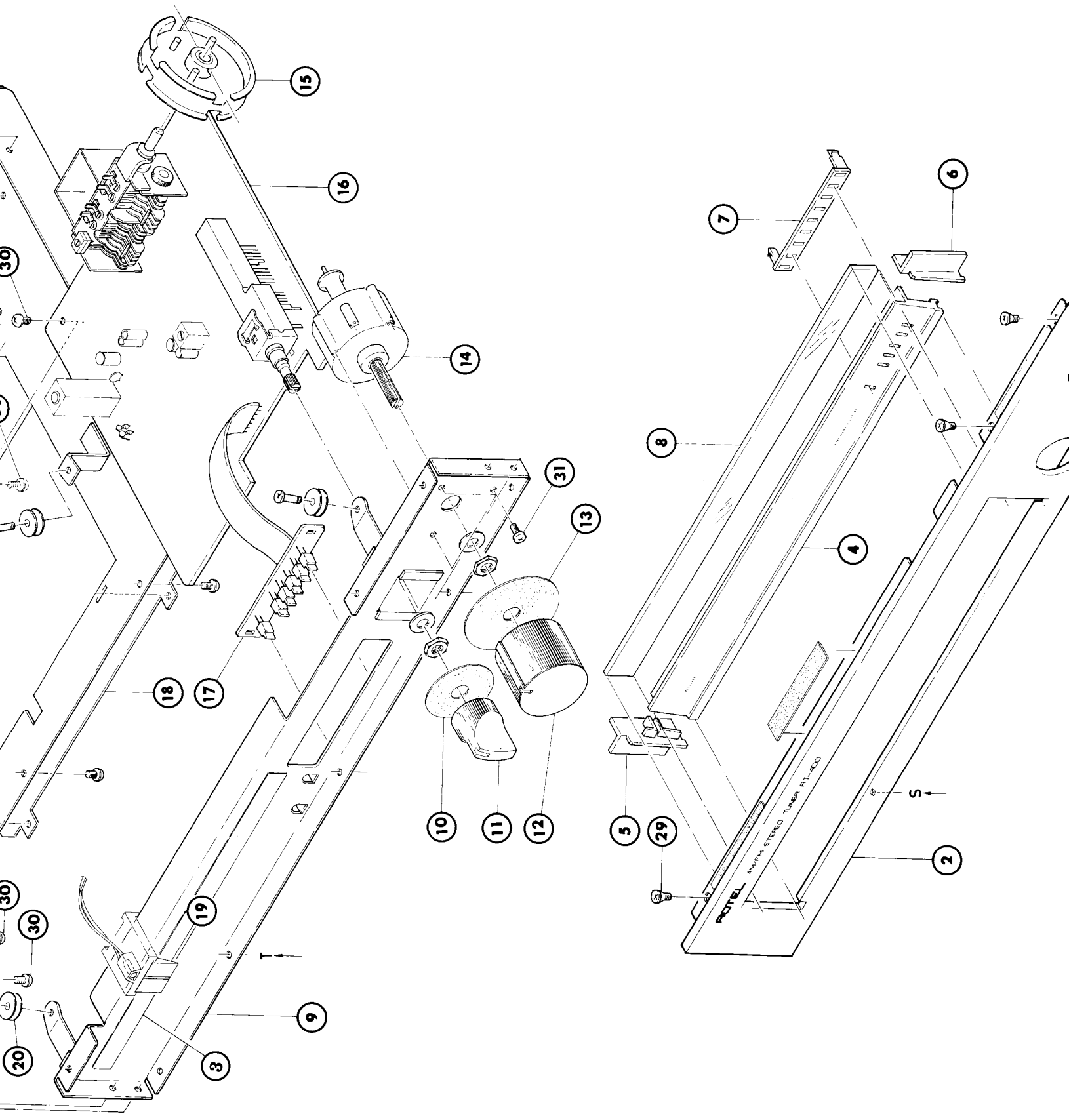
Zur Beachtung: Antriebsseil mit dem Drehko der Eingangs-Stufe in Maximumstellung verlegen.

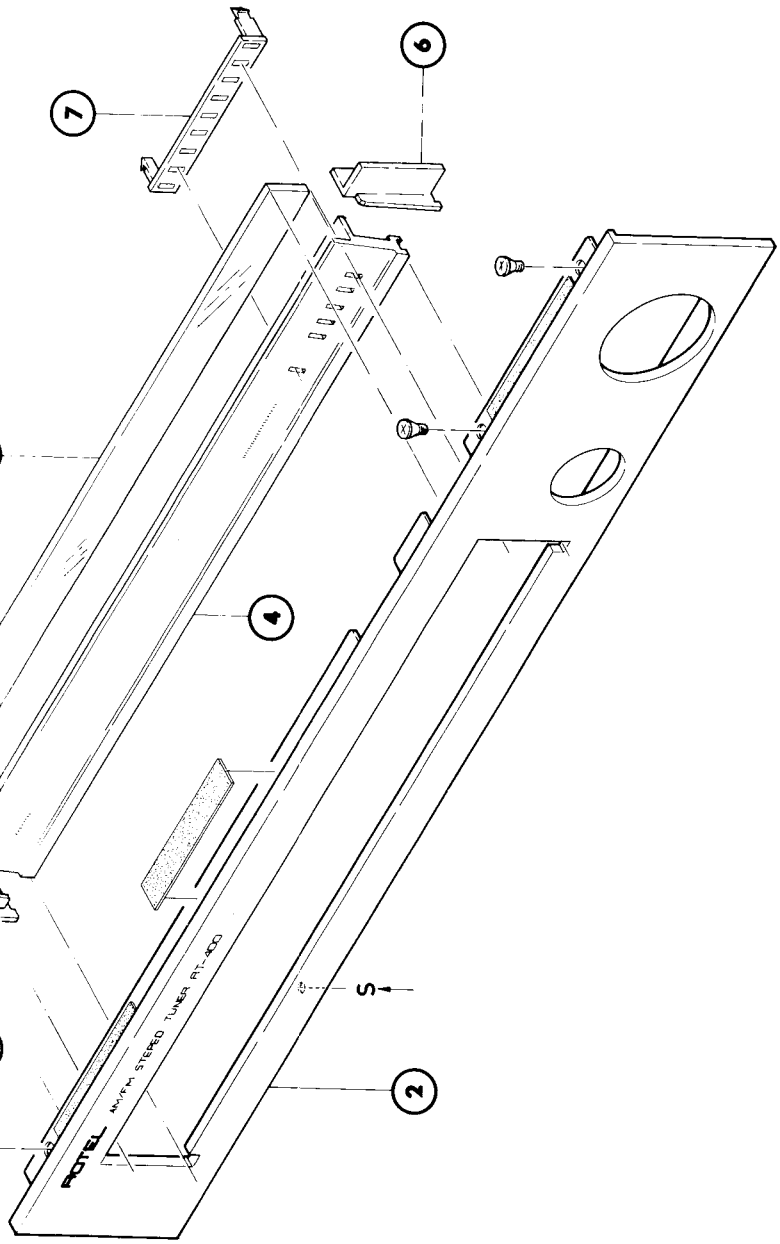
Note: Effectuer le câblage avec le condensateur réglable de l'éntrge réglé au maximum.

Disassembly Diagram/Illustration des Auseinaderbaus/Sch



baus/Schéma de démontage

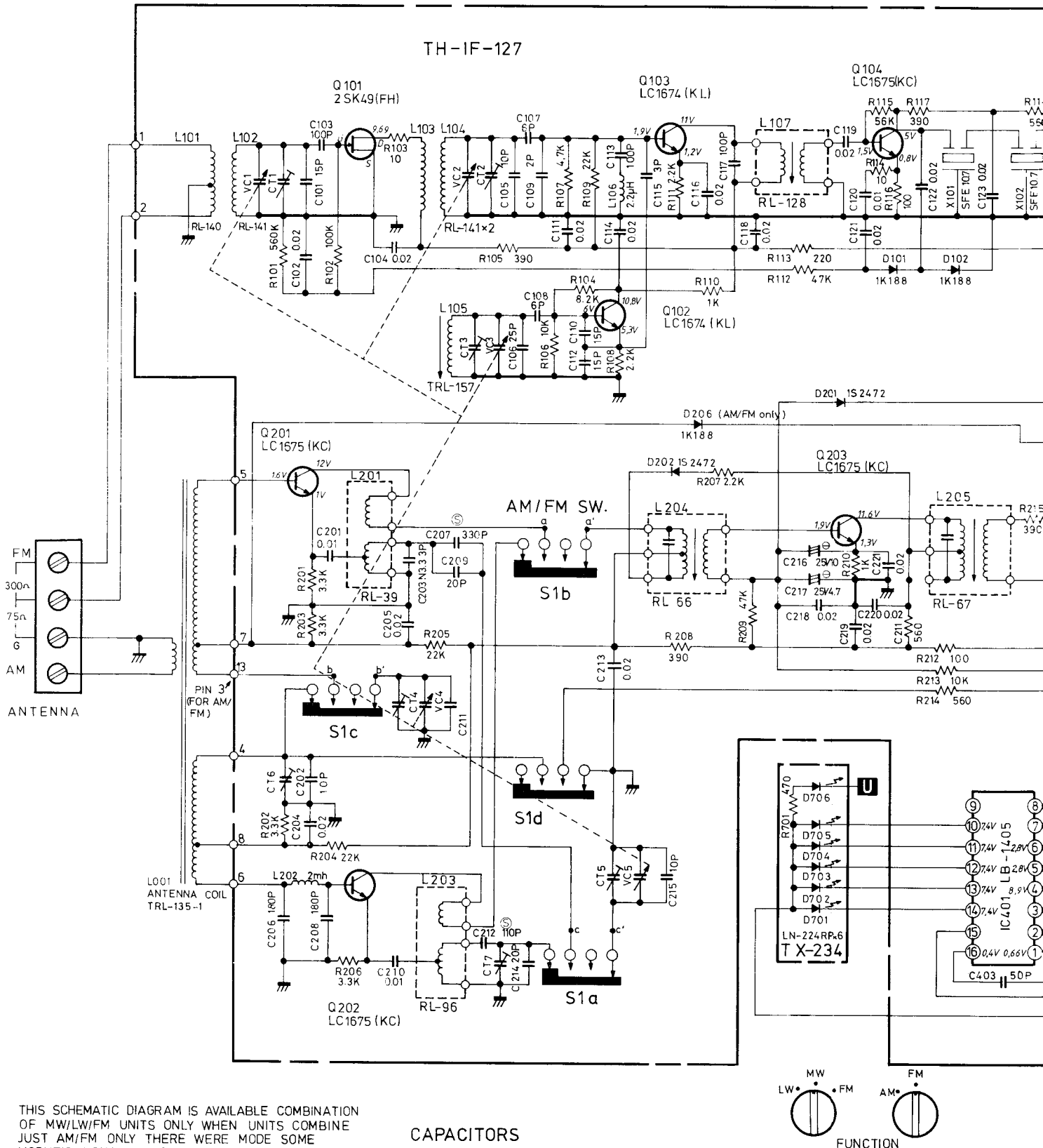




Key No.	Parts No.	Description
1	138011320	Upper Cover
2	111911553	Front Panel Ass'y (AM/FM)
	111911554	Front Panel Ass'y (MW/LW/FM)
3	880001276	Sticker, Front Chassis
4	112011392	Dial Board (AM/FM)
	112011393	Dial Board (MW/LW/FM)
5	114902358	Holder, Dial Board (L)
6	114902359	Holder, Dial Board (R)
7	114902321	Holder, Signal Ind.
8	114902360	Dial Window
9	122011428	Front Chassis Ass'y
10	990201329	Felt, Knob (20ϕ)
11	116310339	Knob, 20ϕ, Function
12	116310307	Knob, 33ϕ, Tuning
13	990201330	Felt, Knob (33ϕ)
14	654911300	Tuning Shaft
15	651300013	Pulley, Dial
16	141311406	AM/FM/MPX Amp. PCB Ass'y (for 75uS)
	141311407	AM/FM/MPX Amp. PCB Ass'y (for 50uS)
	141311408	MW/LW/FM/MPX Amp. PCB Ass'y (for 50uS)
17	141811157	Signal Ind. PCB Ass'y
18	120013019	Bottom, Mask
19	151691151	Dial Pointer Ass'y
20	651110019	Pulley
21	673402055	Plastic Foot
22	121011361	Chassis Body
23	791001152	Signal Connector
24	628111192	Plug, DC Supply
25	222391156	AM ANT Coil (AM/FM)
	222391158	MW/LW ANT Coil (MW/LW/FM)
26	649201115	Terminal, Screw, 4P
27	120012598	Mask, Coaxle Connector
28	766223006	Screw, +M3x6 STV BK
29	701203006	Screw, +M3x6 SMF
30	726203006	Screw, +M3x6 BTV MC
31	726203010	Screw, +M3x10 BTV MC
32	756224008	Screw, +M4x8 W/SP BK
33	770911264	Screw, Pulley

Schematic Diagram/Schaltungsschema/Diagramme sc

NOTE: PARTS AND CIRCUIT SUBJECT TO CHANGES FOR IMPROVEMENT WITHOUT PRIOR NOTICE.



THIS SCHEMATIC DIAGRAM IS AVAILABLE COMBINATION OF MW/LW/FM UNITS ONLY WHEN UNITS COMBINE JUST AM/FM ONLY THERE WERE MODE SOME MODUFICATIONS AS FOLLWING

1 CHANGED ANTENNA COIL L001 FROM TRL-135-1 TO RL-72B-1
2 SHORTED a AND a' b AND b' c AND c'
3 CANCELLED RESISTORS R202 204 AND 206
CAPACITORS C202 204 206 208 210 212 AND 214
COILS L202 AND 203 TRANSISTOR Q202
TRIMMER CT6 AND CT7

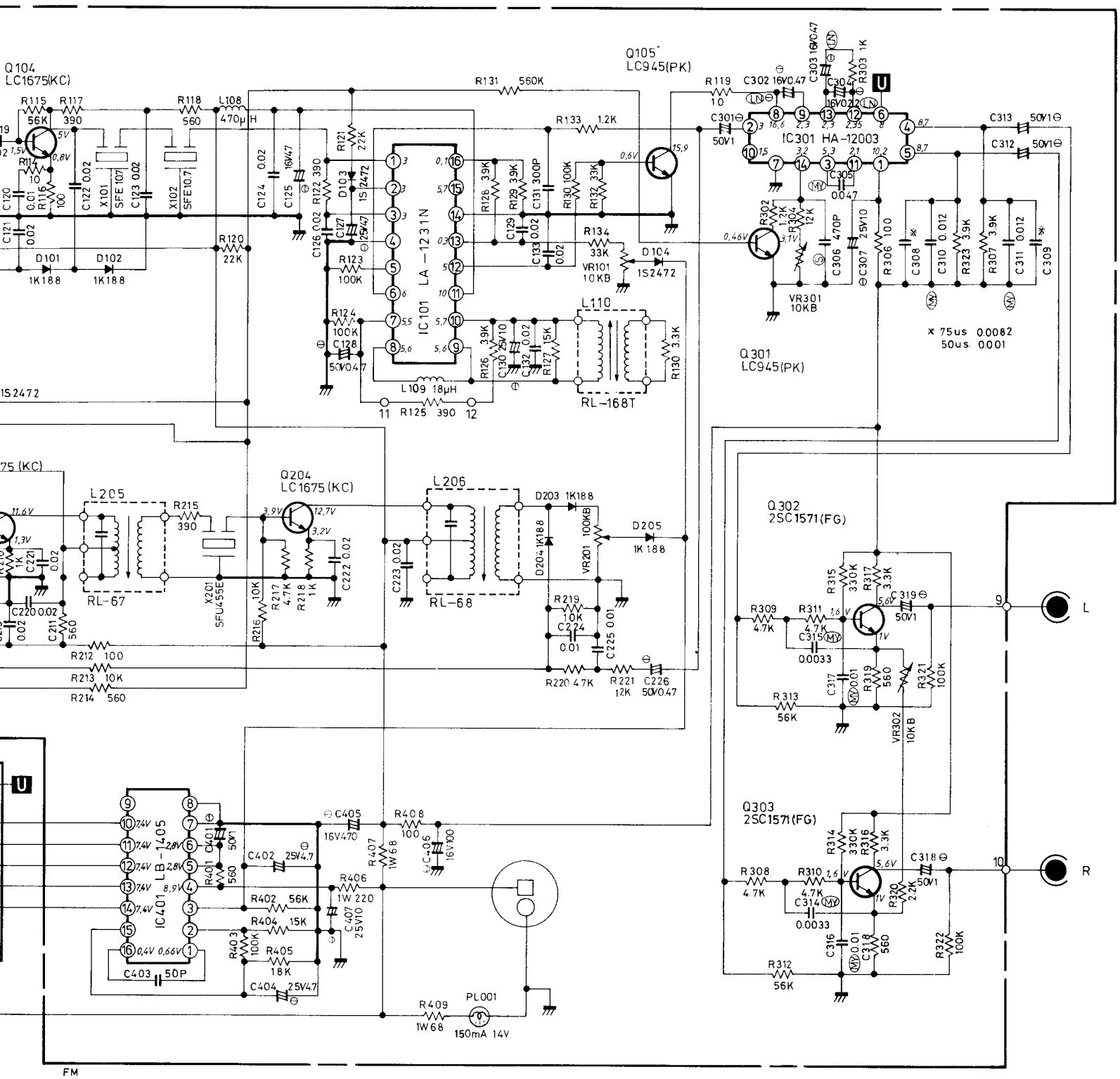
CAPACITORS

(MY)--MYLAR FILM CAPACITORS
(S)---POLYSTYRENE FILM CAPACITORS
(H)--ELECTROLYTIC CAPACITORS
(LN)--NON POLARITY ELECTROYTIC CAPACIORS
NON MARK CERAMIC CAPACITORS
UNLESS OTHERWISE NOTED IN SCHEMATIC ALL CAPACITANCE VALUES ARE EXPRESSED IN MFD

RESISTORS

5%--TALERANCE UNLESS OTHERWISE NOTED
K---KILO OHM
M---MEGA OHM
RSU MEGAL OXIDE FILM RESISTOR
NON MARK LOW TYPE CARBON RESISTOR

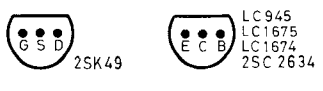
gramme schématique



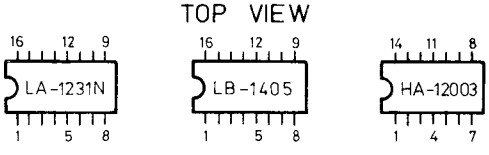
UNLESS OTHERWISE NOTED

E FILM RESISTOR
TYPE CARBON RESISTOR

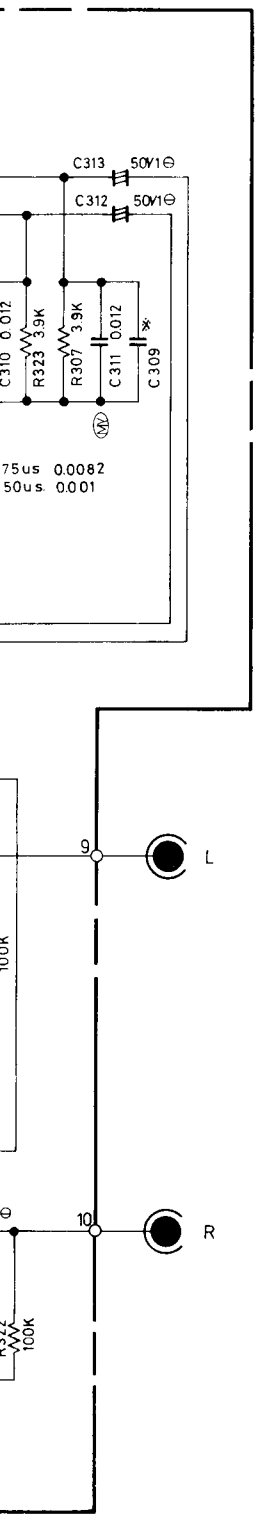
BOTTOM VIEW



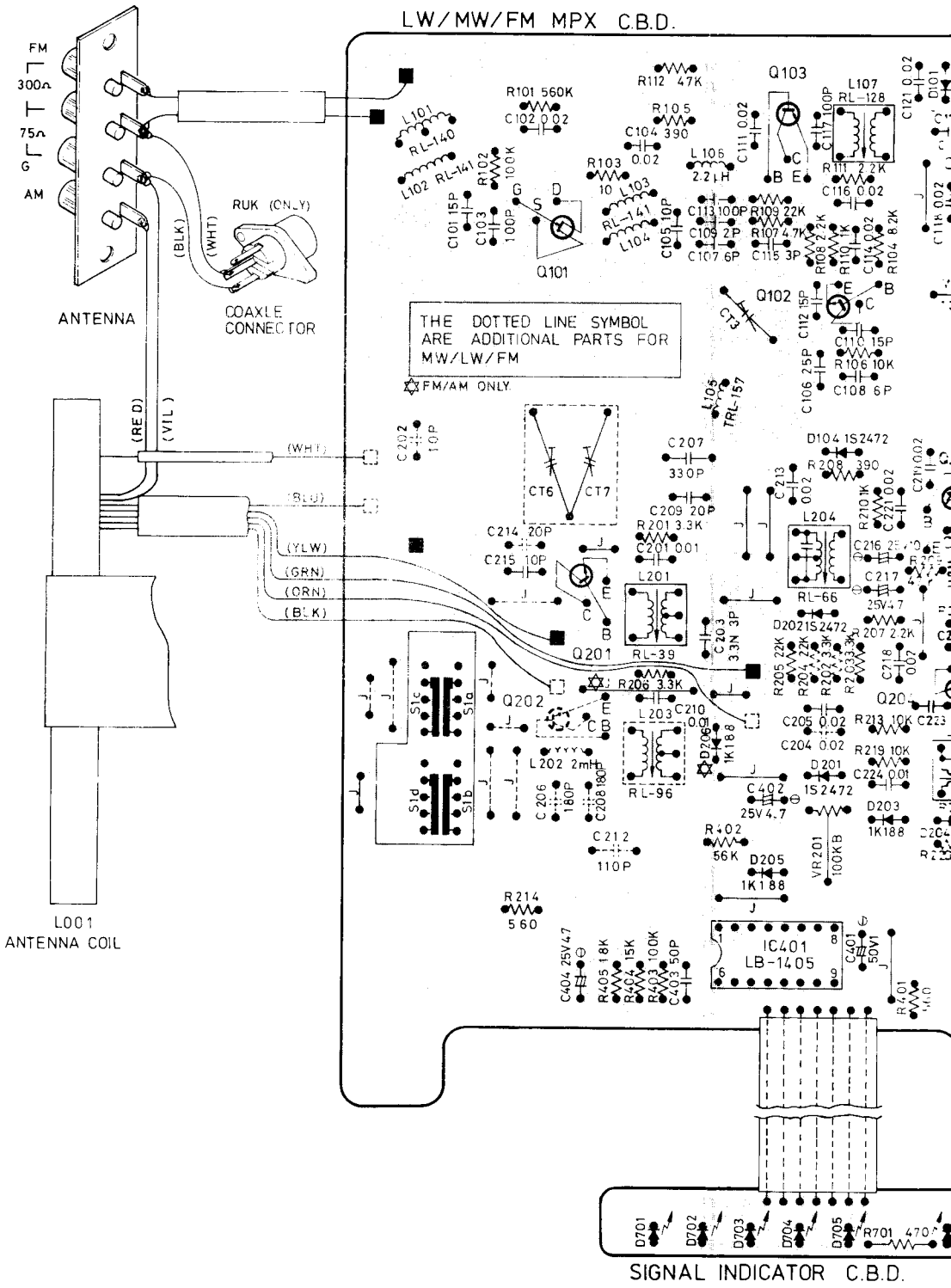
TOP VIEW



ITEM	SCHEMATIC LOCATION (LAST)	
FM IF AMP	R134	C133
AM IF AMP	R221	C216
MPX AMP	R323	C319
SIGNAL IND DRIVER	R409	C406



	SCHEMATIC LOCATION (LAST)	
	R134	C133
	R221	C216
	R323	C319
DRIVER	R409	C406



ahtleitung Diagramm/Diagramme de connexion

MW/FM MPX C.B.D.