

Service Manual



ORDER NO.
ARP 1465

FM/AM DIGITAL SYNTHESIZER TUNER

F-91

Original

MODEL F-91 COMES IN FIVE VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Power requirement	Export destination
KU/CA	AC120V only	U.S.A and Canada
HE	AC220V, 240V (switchable) *	European continent
HB	AC220V, 240V (switchable) *	United Kingdom
SD/G	AC110V, 120V-127V, 220V, 240V (switchable)	U.S. Military
HEZ	AC220V, 240V (switchable) *	West Germany

* Change the primary wiring of the power transformer.

- This service manual is applicable to the KU/CA, HE, HB, SD/G and HEZ types.
- As to the HE, HB, SD/G and HEZ types, please refer to pages P39-P40.
- Ce manuel pour le service comprend les explications en français de réglage. (P28-P29)
- Este manual de servicio trata del método ajuste escrito en español. (P30-P31)

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1. SPECIFICATIONS

FM Tuner Section

Frequency range	87.5 MHz to 108 MHz
Usable Sensitivity	Mono; 9.8 dBf, IHF (0.85 $\mu\text{V}/75\Omega$)
50 dB Quieting Sensitivity	
U.S. and Canadian models	
Mono; 12.8 dBf, IHF (1.2 $\mu\text{V}/75\Omega$)	
Stereo; 34.8 dBf, IHF (15 $\mu\text{V}/75\Omega$)	
U.K. and other destination's models	
Mono; 15.3 dBf, IHF (1.6 $\mu\text{V}/75\Omega$)	
Stereo; 35.9 dBf, IHF (17 $\mu\text{V}/75\Omega$)	
Sensitivity (DIN)	Mono; 0.75 $\mu\text{V}/75\Omega$
	Stereo; 20 $\mu\text{V}/75\Omega$
Signal-to-Noise Ratio	
U.S. and Canadian models	
Mono; 95 dB (at 80 dBf)	
Stereo; 88 dB (at 80 dBf)	
U.K. and other destination's models	
Mono; 95 dB (at 80 dBf)	
Stereo; 87 dB (at 80 dBf)	
Signal-to-Noise Ratio (DIN)	Mono; 77 dB
	Stereo; 73 dB
Distortion (at 80 dBf)	Mono; 0.015% (100 Hz)
	0.009% (1 kHz)
	0.02% (10 kHz)
	Stereo; 0.02% (100 Hz)
	0.02% (1 kHz)
	0.07% (10 kHz)
Capture Ratio	0.8 dB
Alternate Channel Selectivity	85 dB (400 kHz)
Stereo Separation	65 dB (1 kHz)
	55 dB (20 Hz to 10 kHz)
Frequency Response	+0.2 dB (20 Hz to 15 kHz)
	-0.8
Image Response Ratio	70 dB
IF Response Ratio	100 dB
AM Suppression Ratio	70 dB
Spurious Response Ratio	80 dB
Subcarrier Product Ratio	60 dB
Muting Threshold	25.2 dBf (5 $\mu\text{V}/75\Omega$)
Antenna Input	75 unbalanced

AM Tuner Section

Frequency range	531 kHz to 1602 kHz (Step 9 kHz)
	530 kHz to 1700 kHz (Step 10 kHz)
Sensitivity (IHF, Loop antenna)	150 $\mu\text{V}/\text{m}$
Selectivity	40 dB
Signal-to-Noise Ratio	50 dB
Image Response Ratio	40 dB
IF Response Ratio	60 dB
Antenna	Loop Antenna

Audio Section

Output (Level/Impedance)	
FM (100% MOD) FIXED	650 mV/0.9 k Ω
AM (30% MOD) FIXED	150 mV/0.9 k Ω

Miscellaneous

Power Requirements	
U.S. and Canadian models	AC120V, 60 Hz
U.K. model	a.c.240V, 50/60 Hz
Other destination's models	
AC110V/120-127V/220V/240V (switchable), 50/60 Hz	
Power Consumption	25W
Dimensions	457 (W) x 85 (H) x 316 (D) mm
	18 (W) x 3-3/8 (H) x 12 - 7/16 (D) in
Weight (without package)	5.2 kg (11 lb 8 oz)

Furnished Parts

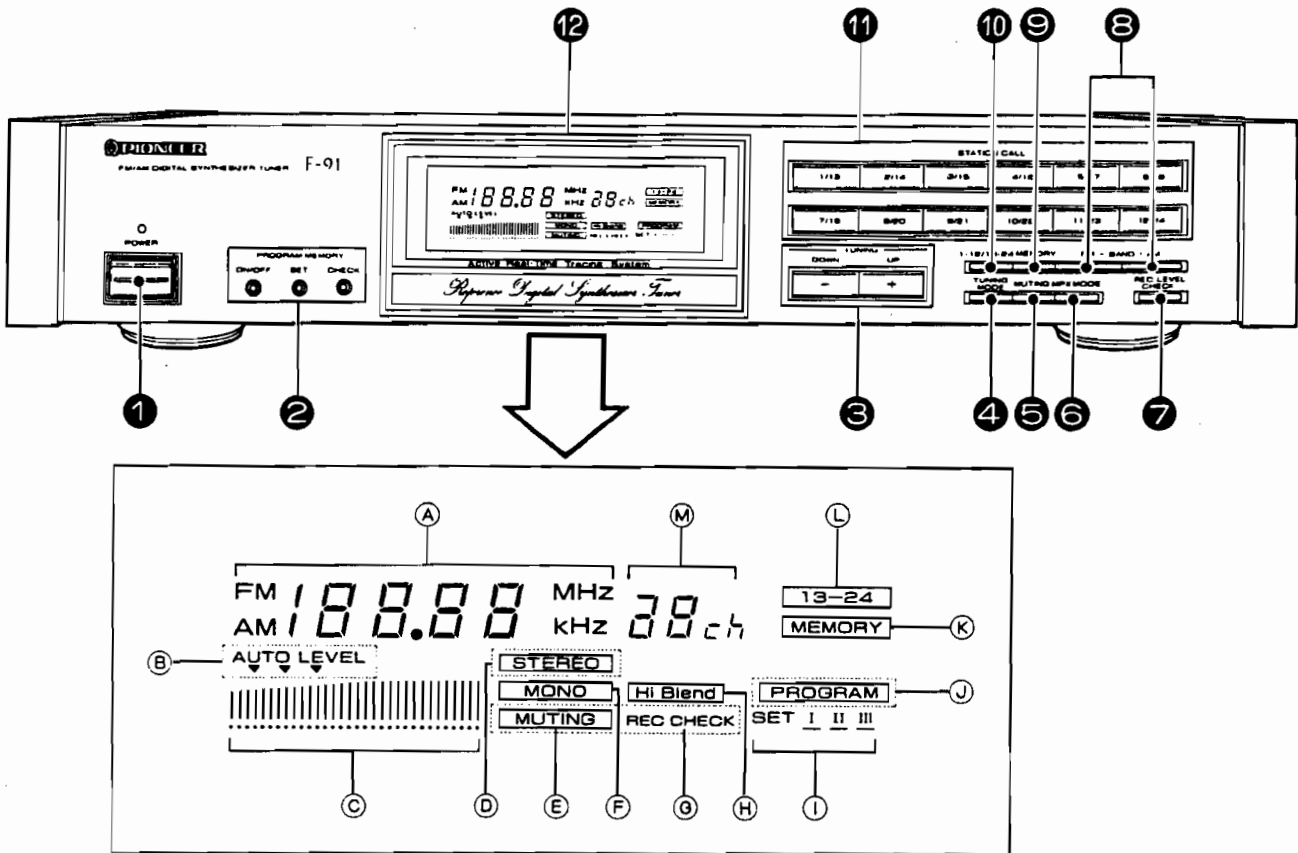
FM T-type Antenna	1
AM Loop Antenna	1
Connecting Cord with Pin Plugs	1
Antenna adaptor *	1
Control cord *	1
Operating Instructions	1

* Not attached on U.K. model.

NOTE:

Specifications and design subject to possible modification without notice due to improvements.

2. PANEL FACILITIES



1 POWER switch/Indicator

- Press to turn power on on
- Press again to turn power off off

2 PROGRAM MEMORY buttons

Convenient for programmed recording.

ON/OFF:

Set to ON, and the three memorized stations will be recalled in sequence as power is turned off and on again.

SET:

Press to set the program memory contents.

CHECK:

Press to confirm the program memory contents.

3 TUNING UP/DOWN switches

Use these switches to tune in broadcasting stations. Press UP (+) to receive a station whose frequency is higher than the displayed frequency, and DOWN (-) to tune in to a lower frequency station.

4 TUNING MODE switch

To select the tuning mode. It changes each time the switch is pressed:

MANUAL:

Frequency changes by one step each time one of the TUNING UP/DOWN switches is pressed. When the switch is held depressed the frequency will change continuously.

- AUTO LEVEL indicator off

AUTO 1:

Press one of the TUNING UP/DOWN switches once. The unit will automatically scan the frequency band and stop when it finds a station (a too weak signal station will be ignored). In this case use MANUAL tuning mode.

- [▼] AUTO LEVEL indicator lights up

AUTO 2:

Tuning will stop at stations with more than medium signal strength.

- [▼] AUTO LEVEL indicator lights up

AUTO 3:

Tuning will only stop at strong signal stations.

- [▼] AUTO LEVEL indicator lights up

Ⓟ

5 MUTING switch

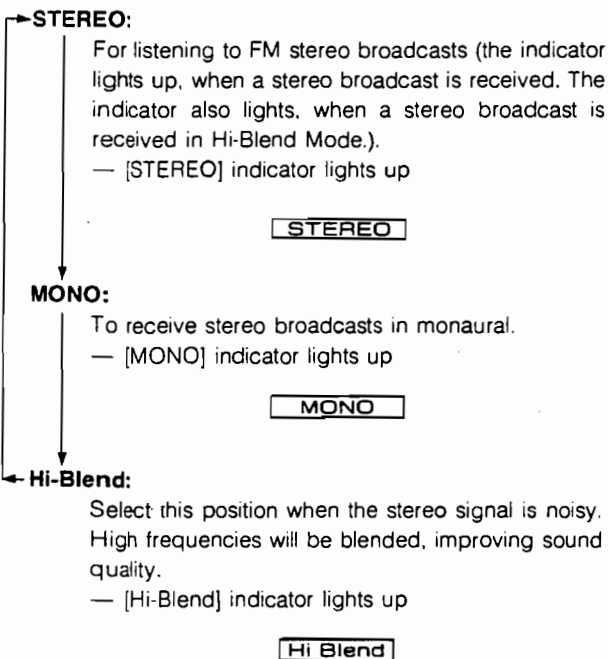
The muting circuit is designed to remove the typical FM interstation noise generated when moving away from in-tune frequencies, but it can also prevent reception of distant or weak signal stations. In this case, press the MUTING switch off and tune into the desired station. Normally, leave this switch on (MUTING indicators lit).
This switch does not affect AM reception.

NOTE:

The setting of this switch is memorized together with the station in the station memory.

6 MPX (multiplex) MODE switch

Mode changes as follows each time this switch is pressed:



NOTE:

The setting of this switch is memorized together with the station in the station memory.

7 REC LEVEL CHECK switch

To set the tape deck recording level when recording FM broadcasts. Press this switch on (the REC CHECK indicator will start flashing), and an FM recording standard level signal (frequency: approx. 330 Hz; level: equivalent to 50% modulation FM) will be continuously delivered from the OUTPUT jacks. Adjust the tape deck level meter reading to approx. -2 dB to obtain an appropriate recording level. Always press this switch off after setting the recording level (the REC CHECK indicator will go off).

8 BAND selector switches

FM:

Press to receive FM broadcasts.

AM:

Press to receive AM broadcasts.

9 MEMORY switch

Press to memorize preset stations.

The [MEMORY] indicator will remain lit for about 5 seconds. Press the desired STATION CALL switch to memorize it during this period.

MEMORY

10 [1-12/13-24] Station call selector switch

Use this selector to choose between channels 1-12 and 13-24 when memorizing station frequencies or recalling already stored stations. The [13-24] indicator lights up when channels 13-24 are selected.

13-24

11 STATION CALL switches

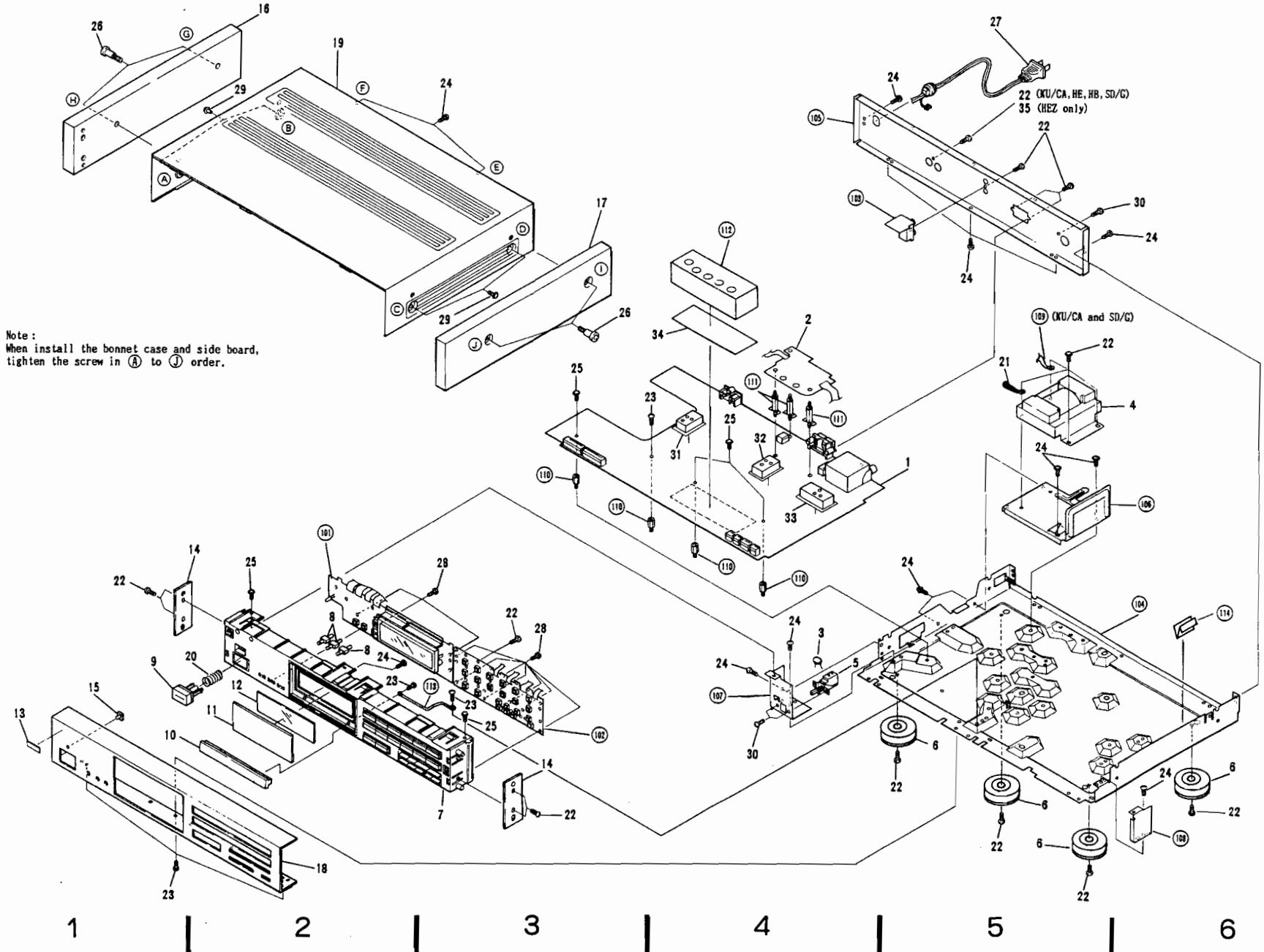
Use these switches to preset stations and to receive already preset stations.

12 Operation Display

- (A) Shows reception band and frequency.
- (B) When the TUNING MODE switch is set to AUTO 1-3, the mark ▼ above the signal indicator indicates the level set for automatic tuning.
- (C) Signal indicator
- (D) Lights up when a stereo broadcast is received.
- (E) Stays lit while muting is occurring.
- (F) Stays lit while the MPX MODE switch is set to MONO.
- (G) Flashes when the REC LEVEL CHECK switch is set to on.
- (H) Stays lit while the MPX MODE switch is set to Hi-Blend.
- (I) Shows the condition of the program memory mode.
- (J) Stays lit while the PROGRAM MEMORY ON/OFF switch is on.
- (K) Lights for about 5 seconds when the MEMORY switch is pressed.
- (L) Lights up when the station call selector switch is set to 13-24.
- (M) When a STATION CALL switch is pressed, it will show the corresponding channel number.



3. EXPLODED VIEW AND PARTS LIST



Note:
When install the bonnet case and side board,
tighten the screw in (A) to (J) order.

Parts Li
Mark No

- ▲
- ▲★
- ▲★★

Extern

RN1
RN2



NOTES:

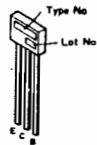
- Parts without part number cannot be supplied.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your parts Stock Control, the fast moving items are indicated with the marks $\Delta\Delta$ and $\Delta\Delta\Delta$.
- **$\Delta\Delta$ GENERALLY MOVES FASTER THAN Δ**
- This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- Parts marked by $\Delta\Delta$ are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Parts List

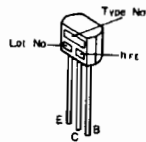
Mark	No.	Part no.	Description	Mark	No.	Part no.	Description
	1	AWZ1568	TUNER assembly		25	ABA1011	Screw
	2	AWZ1570	AM assembly		26	ABA1032	Screw
Δ	3	ACB-501	Ceramic capacitor (0.01 μ F/AC250V, C409)	Δ	27	ADG-088	AC power cord
Δ \star	4	ATT1043	Power transformer (T901)		28	BBZ26P080FMC	Screw
$\Delta\Delta\Delta$	5	ASG-541	Push switch (POWER, S901)		29	FBT40P080FZK	Screw
	6	AMR1047	Leg assembly		30	VWZ30P060FCU	Screw
	7	AMB1222	Panel base assembly		31	AWZ1576	DET VCO assembly
	8	AAD1190	Tact knob B (PROGRAM MEMORY)		32	AWZ1577	IF VCO assembly
	9	AAD1197	Power knob (POWER)		33	AWZ1580	FRONT END OSC assembly
	10	AAH1029	Aluminum sash		34	AWZ1579	IF MODULE assembly
	11	AAK1298	Acrylic panel		35	ABA1035	Screw (HEZ only)
	12	AAK1300	FL filter		101		FL assembly
	13	AAH1001	Name plate		102		SH assembly
	14	AAP1064	Side sash		103		REMOCON assembly
	15	AMR1160	LED lens		104		Chassis
	16	AMS1015	Side board L		105		Rear panel
	17	AMS1016	Side board R		106		Transformer frame
	18	ANB1128	Front panel		107		Front panel holder A
	19	ANE1087	Bonnet case		108		Front panel holder B
	20	ABH1033	Coil spring A		109		Earth lead
	21	ABC-093	Binder		110		PCB holder
	22	ABA-298	Screw		111		PCB support
	23	ABA1006	Screw		112		Shield cover
	24	ABA1009	Screw		113		Earth lead
					114		Earth leader

External Appearance of Transistor and ICs

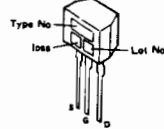
RW1203
RW2201



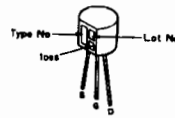
ZSC2603
ZSA1115



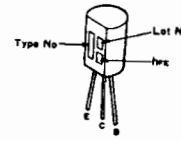
ZSK241
ZSK161



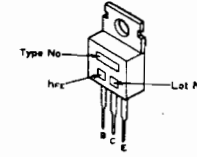
ZSJ103
ZSK246



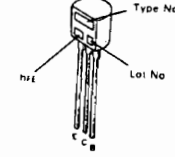
ZSB560



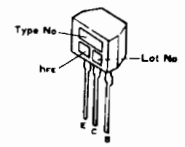
ZSB834



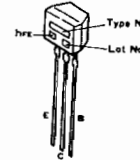
ZSC2389



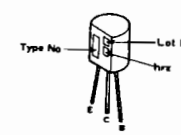
ZSC2668



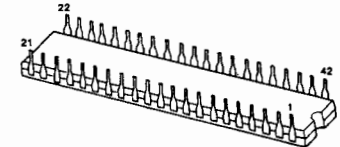
ZSC2786



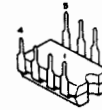
ZSC2878



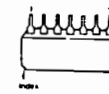
LC7570



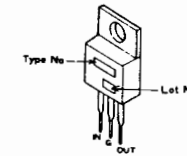
M5218P



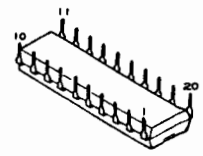
PC1163H



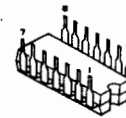
PC78N05H



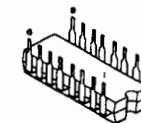
LA1247



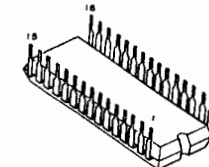
NJM1496D



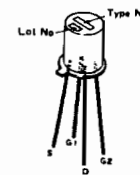
PA5008



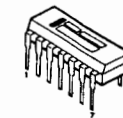
PA5007



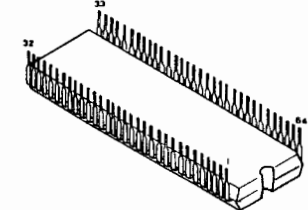
P001



CX-7925B



PD5056



5.P.C. BOARDS CONNECTION DIAGRAM

TUNER ASSEMBLY ANZ1568 (KU/CA) ANZ1566 (HEZ)
 ANZ1567 (HE, HB) ANZ1569 (SD/G)

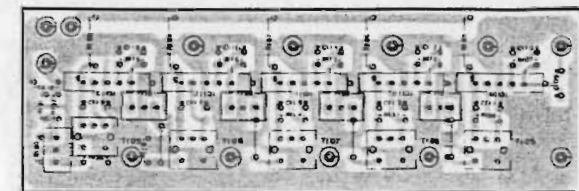
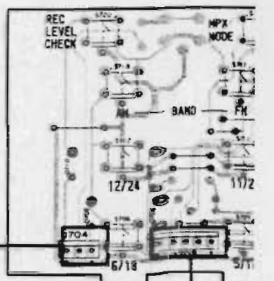
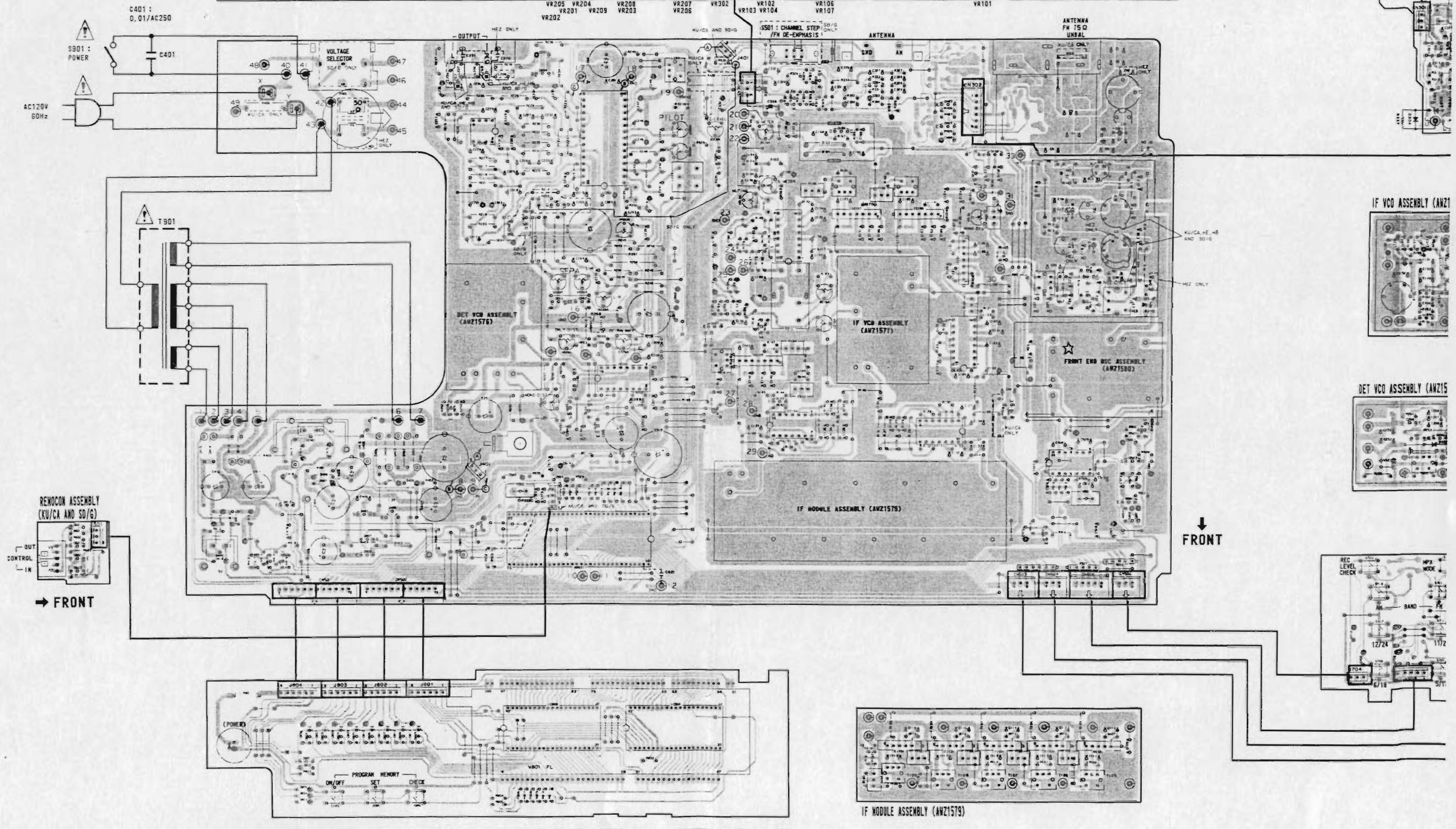
Q409 Q410 Q411 IC401 Q405 Q406
 Q407 Q408 Q205 IC203 Q204 Q211 IC202
 IC502 Q208 Q104 Q105 VR205 VR204 VR208 VR207 VR206 VR302
 Q305 Q107 Q106 Q302 Q303 Q108 Q304 IC105 Q103 IC104 IC106 Q403 Q101 Q102
 Q5 03 Q8 Q503 Q502 Q501

A

B

C

D



Q801 - Q805 IC802 IC801

FL ASSEMBLY

FRONT

1

2

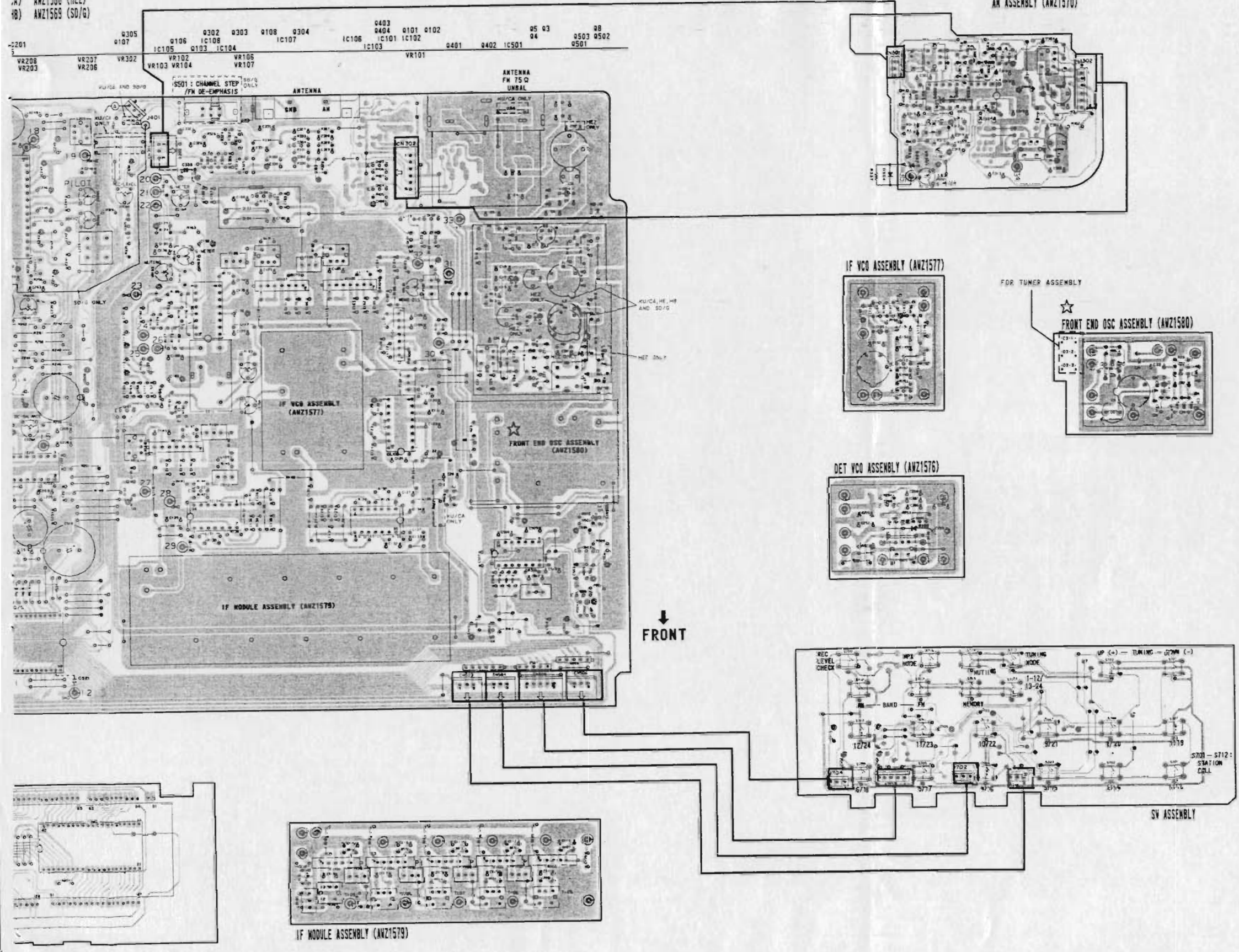
3

4

5

6

(A) ANZ1566 (HEZ)
(B) ANZ1569 (SD/G)



☆Note: D3-4 in the FRONT END OSC ASSEMBLY and D3-1 to D3-3 in the TUNER ASSEMBLY are used the even characteristic varactor. Therefore, when the FRONT END OSC ASSEMBLY is replaced, replace D3-1 to D3-3 in the TUNER ASSEMBLY together. Use D3-1 to D3-3 so that D3-1 to D3-3 as even characteristic as D3-4 are installed in the FRONT END OSC ASSEMBLY.

NOTE

1. This P.C.B connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the following Table.

P.C.B. pattern diagram indication	Corresponding part symbol	Part Name
		Transistor
		Radiator type transistor
		Diode
		Resistor
		Capacitor (Polarity)
		Capacitor (Non-polarity)

Others

P.C.B. pattern diagram indication	Part Name
IC	IC
S	Switch
RY	Relay
L	Coil
F	Filter
VR	Variable resistor or Semi-fixed resistor

3. The capacitor terminal marked with ⊖ (double circles) shows negative terminal.
4. The diode terminal marked with ⊖ (double circles) shows cathode side.
5. The transistor terminal to which E is affixed shows the emitter.

A

B

C

D

IC801

6. ELECTRICAL PARTS LIST

NOTES:

- Parts without part number cannot be supplied.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.
- ★ ★ **GENERALLY MOVES FASTER THAN ★**
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.
Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).
560Ω 56×10¹ 561 RD1/4PS(5)(J)CJ
47kΩ 47×10³ 473 RD1/4PS(3)(K)CJ
0.5Ω 0K5 RN2M(0)(R)5K
1Ω 010 RS1P(0)(0)0K
Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).
5.62kΩ 562×10¹ 5621 RN1/4SR(5)(6)(Z)CJ

Miscellaneous Parts

Mark	Symbol & Description	Part No.
	REMOCON assembly	
	FL assembly	
	TUNER assembly	AMZ1568
	SW assembly	
	AM assembly	AMZ1570
	DET VCO assembly	AMZ1576
	IF VCO assembly	AMZ1577
	FRONT END OSC assembly	AMZ1580
	IF MODULE assembly	AMZ1579
Δ	C409 Ceramic capacitor (0.01/AC250V)	ACB-501
	L901 Loop antenna assembly	ATB-086
Δ ★	T901 Power transformer	ATT1043
Δ ★ ★	S901 Push switch (POWER)	ASG-541
Δ	AC power cord	ADG-088

REMOCON Assembly

Mark	Symbol & Description	Part No.
★ ★	Q603	RN1203
★ ★	Q601, Q602	2SC2603
★	D601	1SS131

RESISTORS

Mark	Symbol & Description	Part No.
	R601-R604	RD1/8PM103J

OTHERS

Mark	Symbol & Description	Part No.
	2P Mini jack (CONTROL)	AKN-209

FL Assembly

Mark	Symbol & Description	Part No.
★ ★	IC801, IC802	LC7570
★ ★	Q801-Q809	RN2201
★	D801 LED (POWER)	ABL-451
★	D802-D813	1SS131

SWITCHES

Mark	Symbol & Description	Part No.
★ ★	S801-S803 Tact switch (PROGRAM MEMORY (CHECK, SET, ON/OFF))	ASG-711

RESISTORS

Mark	Symbol & Description	Part No.
	R801	RD1/4PM221J
	R802-R811	RD1/8PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
★	V801 Fluorescent indicator tube	AAV1025

TUNER Assembly (AWZ1568)

Mark	Symbol & Description	Part No.
★ ★	TR101, TR201 Thermistor	TR103-2
★ ★	IC501	CX-79258
★ ★	IC203	MS218P
★ ★	IC103, IC104	NJM1496D
★ ★	IC202	PA5007
★ ★	IC102, IC108, IC201	PA5008
★ ★	IC502	PD5056
★ ★	IC101, IC105-IC107	μPC1163H
★ ★	IC401	μPC78M05H
★ ★	Q3	PO01
★ ★	Q101, Q105, Q402, Q404, Q412	RN1203
★ ★	Q102, Q104	RN2201
★ ★	Q403, Q501	2SA1115
★ ★	Q401	2SB560
★ ★	Q406, Q409	2SB834
★ ★	Q205	2SC2389
★ ★	Q302-Q304, Q407, Q408, Q410, Q411, Q502	2SC2603
★ ★	Q103	2SC2668
★ ★	Q4, Q5	2SC2786
★ ★	Q106, Q107, Q202, Q203	2SC2878
★ ★	Q201	2SJ103
★ ★	Q8, Q108	2SK241
★ ★	Q204, Q209, Q305, Q405, Q503	2SK246
★	D411	HZS6C2L
★	D409, D410, D416	HZS9A3L
★	D408	RD13EB
★	D407	RD15EB
★	D418	RD2, 2ESB
★	D5	RD7, 5EB
★	D419	RD8, 2ESB
★	D203, D204	RD8, 2FB
★	D412-D415, D417, D506	S5566
★	D4, D201, D202, D302, D303, D501-D505, D507, D508	1SS131
★	D101, D102	1SS85
★	D401-D406	10PF2FD
★	D103, D104	2-1K261

COILS, FILTERS AND TRANSFORMERS

Mark	Symbol & Description	Part No.
	L2 FM RF Coil	ATC-205
	L1 FM ANT Coil	ATC-244
	L501 Inductor (1mH)	ATH-098
	L203 Coil (38kHz)	ATH-026
	L204 Coil (19kHz)	ATH-028
	L105, L107 Axial inductor	LAU010H
	L102, L104, L106, L108, L115-L117, L123, L124, L201, L205 Axial inductor	LAU2R2H
	L101, L111, L114, L121 Axial inductor	LAU221K

Mark	Symbol & Description	Part No.	Mark	Symbol
	L103, L109, L110, L122 Axial inductor	LAU3R9K		C5
	L112 Inductor	LTA223J		C5
	L113 Inductor	LTA472J		C1
	F101 FM Ceramic filter	ATF-118		C2
				C1
				C4
	F103, F104 FM IF filter	ATF-139		
	F105, F106 Ceramic filter	ATF1024		C1
	F102 FM IF filter	ATF1025		C4
	T1 FM RF transformer	ATC-204		C5A
	T3 FM Balun transformer	ATC-218		C2
				C1
	T104 FM Matching transformer	ATE-063		C4
	T2 FM IF transformer	ATE-066		C4
	T103 FM Detector transformer	ATE-068		C1
	T101, T102 FM Matching transformer	ATE1004		C2
				C21

CAPACITORS

Mark	Symbol & Description	Part No.	Mark	Symbol
	TC1-TC3 Trimmer	ACH-018		C2A
	C244 (390p/DC50V)	ACG-023		C2
	C1-C5, C9, C11, C13, C14, C21, C22, C28, C37-C39, C101, C104, C127, C130, C137, C145, C168, C169, C184, C190, C191, C201, C267, C268 (0.01/DC25V)	ACG-036		C1E
				C40
				C2C
				C17
				C40
				C21
	C18, C27, C102, C103, C105, C106, C108, C120, C121, C123, C124, C128, C129, C131, C134-C136, C138-C144, C162, C163, C165-C167, C170, C171, C173-C175, C177, C188, C202-C204, C209, C211, C220, C231, C250, C261 (0.047/DC25V)	ACG-037		C22
				C22
				C15
				C32
				C32
				C23
				C32
				C20
				C44
				C41'
	C518 (47000 μ/5.5V)	ACH1011		C33
	C185	CCCSL010C50		C50
	C186	CCCSL030C50		C22
	C187	CCCSL050C50		C23
	C132, C269, C419, C521	CCCSL101J50		C15A
				C15
				C21
				C22
				C16
				C22
				C24E
				C24J
				C26
				C26

TUNER Assembly (AWZ1568)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	TH101, TH201 Thermistor	TH103-2
★★	IC501	CX-79258
★★	IC203	M5218P
★★	IC103, IC104	NJM1496D
★★	IC202	PA5007
★★	IC102, IC108, IC201	PA5008
★★	IC502	PD5056
★★	IC101, IC105-IC107	μ PC1163H
★★	IC401	μ PC78M05H
★★	Q3	P001
★★	Q101, Q105, Q402, Q404, Q412	RN1203
★★	Q102, Q104	RW2201
★★	Q403, Q501	2SA1115
★★	Q401	2SB560
★★	Q406, Q409	2SB834
★★	Q205	2SC2389
★★	Q302-Q304, Q407, Q408, Q410, Q411, Q502	2SC2603
★★	Q103	2SC2668
★★	Q4, Q5	2SC2786
★★	Q106, Q107, Q202, Q203	2SC2878
★★	Q201	2SJ103
★★	Q8, Q108	2SK241
★★	Q204, Q209, Q305, Q405, Q503	2SK246
★	D411	HZS6C2L
★	D409, D410, D416	HZS9A3L
★	D408	RD13EB
★	D407	RD15EB
★	D418	RD2, 2ESB
★	D5	RD7, 5EB
★	D419	RD8, 2ESB
★	D203, D204	RD8, 2FB
★	D412-D415, D417, D506	S5566
★	D4, D201, D202, D302, D303, D501-D505, D507, D508	1SS131
★	D101, D102	1SS85
★	D401-D406	100P2FD
★	D103, D104	2-1K261

COILS, FILTERS AND TRANSFORMERS

Mark	Symbol & Description	Part No.
L2	FM RF Coil	ATC-205
L1	FM ANT Coil	ATC-244
L501	Inductor (1mH)	ATH-098
L203	Coil (38kHz)	ATH-026
L204	Coil (19kHz)	ATH-028
L105, L107	Axial inductor	LAU010M
L102, L104, L106, L108, L115-L117, L123, L124, L201, L205	Axial inductor	LAU2R2M
L101, L111, L114, L121	Axial inductor	LAU221K

Mark	Symbol & Description	Part No.
L103, L109, L110, L122	Axial inductor	LAU3R9K
L112	Inductor	LTA223J
L113	Inductor	LTA472J
F101	FM Ceramic filter	ATF-118
F103, F104	FM IF filter	ATF-139
F105, F106	Ceramic filter	ATF1024
F102	FM IF filter	ATF1025
T1	FM RF transformer	ATC-204
T3	FM Balun transformer	ATC-218
T104	FM Matching transformer	ATE-063
T2	FM IF transformer	ATE-066
T103	FM Detector transformer	ATE-068
T101, T102	FM Matching transformer	ATE1004

CAPACITORS

Mark	Symbol & Description	Part No.
TC1-TC3	Trimmer	ACH-D18
C244	(390p/DC50V)	ACC-023
C1-C5, C9, C11, C13, C14, C21, C22, C28, C37-C39, C101, C104, C127, C130, C137, C145, C168, C169, C184, C190, C191, C201, C267, C268 (0.01/DC25V)		ACC-036
C18, C27, C102, C103, C105, C106, C108, C120, C121, C123, C124, C128, C129, C131, C134-C136, C138-C144, C162, C163, C165-C167, C170, C171, C173-C175, C177, C188, C202-C204, C209, C211, C220, C231, C250, C261 (0.047/DC25V)		ACC-037
C518 (47000 μ /5.5V)		ACH1011
C185		CCCSL010C50
C186		CCCSL030C50
C187		CCCSL050C50
C132, C269, C419, C521		CCCSL101J50
C182, C183		CCCSL181J50
C160		CCCSL221J50
C126		CCCSL271J50
C133		CCCSL390J50
C12		CCDCH010C50
C23, C24		CCDCH030C50
C508, C513		CCDCH150J50
C512		CCDCH220J50
C519, C520		CCDCH270J50
C8		CCDCH470J50
C25, C26		CCDRH101J50
C6, C7		CCDRH050C50
C15, C16, C19, C20		CCDRH150J50
C333		CCDSL101J50
C17		CCDSL820J50

Mark	Symbol & Description	Part No.
C501		CEANL2R2M50
C502		CEASR47M50
C179, C192, C206, C332		CEASO10M50
C243		CEAS1R5M50
C159, C242, C246, C247, C416, C418, C514		CEAS100M50
C125, C511		CEAS101M10
C414, C415		CEAS101M16
C504		CEAS101M35
C214, C249, C330, C421, C505, C122		CEAS220M25
		CEAS221M16
C410, C411		CEAS222M16
C402		CEAS332M35
C181, C334, C336, C408, C420		CEAS47M50
C262		CEAS470M10
C212, C401, C412, C413		CEAS470M25
C245		CEAS6R8M50
C251		CEXA222M16
C404		CEXA471M50
C217, C218		CEYAMP3R3M50
C189		CEYA101M16
C406, C407		CEYA101M50
C205, C260		CEYA102M16
C176		CEYA221M16
C403		CEYA221M50
C210, C219		CEYA222M16
C221, C222, C234, C235, C237, C238		CEYAR7M50
C225, C226		CFTXA103J50
C156		CFTXA104J50
C327-C329		CFTXA123J50
C325		CFTXA223J50
C236		CFTXA333J50
C326		CFTXA473J50
C208, C509		CKDYF102250
C44, C178, C180, C335, C506		CKDYF103250
C417		CKDYF223250
C331, C405, C507, C510, C515, C516		CKDYF473250
C503		CMMA103J50
C223, C224		CMXA102J100
C232, C233		CMXA182J100
C158		CMXA202J100
C157		CMXA222J100
C215, C216		CMXA242J100
C227, C228		CMXA272J100
C161		CMXA362J100
C229, C230		CMXA472J100
C248		CSA682J50
C241		CSA821J50
C263, C264		CSXA331J160
C239, C240		CSXA561J160

RESISTORS

Mark	Symbol & Description	Part No.
★	VR106, VR202 Semi-fixed (1kΩ)	VRTS6VS102
★	VR103, VR204, VR205	VRTS6VS103
	Semi-fixed (10kΩ)	
★	VR102, VR104, VR201	VRTS6VS104
	Semi-fixed (100kΩ)	
★	VR101, VR203 Semi-fixed (220Ω)	VRTS6VS221
★	VR107, VR206 Semi-fixed (2.2kΩ)	VRTS6VS222
★	VR207 Semi-fixed (22kΩ)	VRTS6VS223
★	VR208, VR209 Semi-fixed (220kΩ)	VRTS6VS224
★	VR302 Semi-fixed (47kΩ)	VRTS6VS473
	R408 Carbon composition resistor (2.2M/1/2W)	ACN-209
	R527, R528 Resistor array (10k×4)	RA4S103J
	R526 Resistor array (10k×5)	RA5S103J
	R206, R207, R210-R213, R216-R235, R237, R238, R240-R243, R258, R261	RDR1/4PM□□□J
	R34, R250, R401	RD1/2PM□□□J
	R11, R20, R236	RD1/4PM□□□J
	R208, R209, R214, R215, R248, R403, R404	RN1/4PM□□□□F
	R420, R421	RS1LM181J
	R409, R422	RS2LM□□□□J
	Other resistors	RD1/8PM□□□□J

OTHERS

Mark	Symbol & Description	Part No.
★	X502 Ceramic resonator	ASS-030
★	X501 Crystal resonator	ASS1009
	2P Pin jack (OUTPUT)	AKB103J
	2P Push terminal	AKE-060

SW Assembly

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★	D702, D703, D705-D708, D710	1SS131

SWITCHES

Mark	Symbol & Description	Part No.
★★	S701-S718, S720-S723 Tact switch	ASG-711
	(STATION CALL, TUNING (UP, DOWN), 1-12/13-24 MEMORY, BAND (FM, AM), TUNING MODE, MUTING, MPX MODE, REC LEVEL CHECK)	

AM Assembly (AWZ1570)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC301	LA1247
★★	Q301	2SK246
★	D301	KV1226
★	D304, D305	1SS131
★	D306	RD5.1ESB
★	D307	HZS5CLL

COIL, FILTER AND TRANSFORMERS

Mark	Symbol & Description	Part No.
	L301 AM OSC Coil	ATB-073
	F301 AM Ceramic filter	ATF1004
	T301 AM Antenna transformer	ATB-087
	T302 AM IF transformer	ATB1002

CAPACITORS

Mark	Symbol & Description	Part No.
	TC301	ACM-019
	TC302	ACM-020
	C304	CCDUJ100D50
	C309	CEASO10M50
	C306	CEAS100M50
	C317, C320	CEAS330M16
	C311, C312	CEAS4R7M50
	C323	CFTXA103J50
	C324	CFTXA473J50
	C316, C318	CKDYF102Z50
	C307, C308, C313, C315, C321	CKDYF103Z50
	C310, C322	CKDYF223Z50
	C302, C314, C319	CKDYF473Z50
	C305	CQSA431K50
	C333	CCDSL101J50

RESISTORS

Mark	Symbol & Description	Part No.
★	VR301 Semi-fixed (22kΩ) Other resistors	VRTSGVS223 RD1/8PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
★	X301 Ceramic resonator	ATF-125

DET VCO ASSEMBLY (AWZ1576)

IF VCO ASSEMBLY (AWZ1577)

★FRONT END OSC ASSEMBLY (AWZ1580)

IF MODULE ASSEMBLY (AWZ1579)

There are not supplied parts above four assemblies.

☆Note :

D3-4 in the FRONT END OSC ASSEMBLY and D3-1 to D3-3 in the TUNER ASSEMBLY are used the even characteristic varactor.

Therefore, when the FRONT END OSC ASSEMBLY is replaced, replace D3 -1 to D3-3 in the TUNER ASSEMBLY together.

Use D3-1 to D3-3 so that D3-1 to D3-3 as even characteristic as D3 -4 are installed in the FRONT END OSC ASSEMBLY.

7. ADJUSTMENTS

AM Section Adjustments

- Wire as shown in Fig. 7-1
- Set the AM key to ON and the REC LEVEL CHECK key to OFF.

Step	AM SG (400Hz, 30% de modulation)		F-91 frequency indication	Adjustment point	Adjustments
	Frequency	Level			Standard
1	No signal		530kHz (531kHz) ^{*1}	L301	Adjust so that the voltage between terminal 33 and ground is 2V ($\pm 0.3V$).
2			1,700kHz (1,602kHz) ^{*1}	TC301	Adjust so that the voltage between terminal 33 and ground is 24.5V ($\pm 0.5V$).
3	Repeat steps 1 and 2 until both ground voltage standards are satisfied.				
4	Mechanically set VR301 to the midpoint.				
5	600kHz (603kHz) ^{*1}	50 – 80dB	600kHz (603kHz) ^{*1}	T301	Maximize the voltage between terminal 35 and ground.
6	1,400kHz (1,395kHz) ^{*1}	50 – 80dB	1,400kHz (1,395kHz) ^{*1}	TC302	
7	Repeat steps 5 and 6 until the maximum voltage standard is satisfied in both steps.				
8	600kHz (603kHz) ^{*1}	100dB	600kHz (603kHz) ^{*1}	VR301	Adjust so that the voltage between terminal 35 and ground is 4.9V ($\pm 0.1V$). ^{*2}

*1: The frequency in the parenthesis is the frequency at 9kHz STEP (HE and HB types).

*2: Do not let the voltage of terminal 35 exceed 5.2V.

FM Section Adjustment

Note: The adjustment method of this FM section is simple throughout.

- Wire as shown in Fig. 7-2
- Set the FM key to ON, and the REC LEVEL CHECK and MUTING keys to OFF.

Step	FM SG (1kHz, $\pm 75kHz$ deviation)		F-91 frequency indication	Adjustment point	Adjustments
	Frequency	Level			Standard
1	No signal		108MHz	L3	Adjust so that the voltage between terminal 33 and ground is 23.5V ($\pm 0.2V$).
2			87.5MHz	...	Confirm that the voltage between terminal 33 and ground is 7.5V ($\pm 1.0V$).
3	90MHz	40dB	90MHz	L1, T1, L2	Maximize the voltage between terminal 22 and ground.
4	106MHz	40dB	106MHz	TC1-3	
5	Repeat steps 3 and 4 until both ground voltage standards are satisfied. Terminate the adjustment with step 4.				
6	106MHz	60dB	106MHz	T103-a	Set the voltage to 0V for terminal 24 to 26.
7	98MHz	18dB (Stereo modulation)*	98MHz	VR103	Adjust to the point just before muting is applied.
8	98MHz	40dB	98MHz	—	Check the output level of the output terminal.
9	Set the REC LEVEL CHECK key to ON.			VR302	At step 8, set the output level of the output terminal to -6dB ($\pm 1dB$).

* Stereo modulation: Main 1kHz, L-R, $\pm 68.25kHz$ dev. pilot 19kHz, $\pm 6.75kHz$ dev.

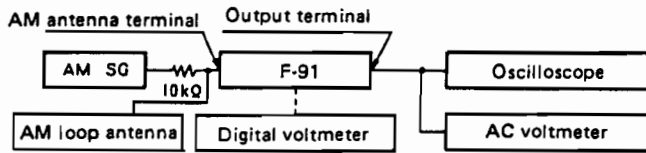


Fig. 7-1 AM adjustment wiring diagram

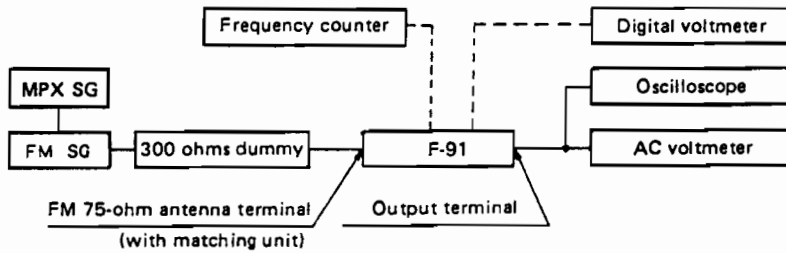


Fig. 7-2 FM adjustment wiring diagram

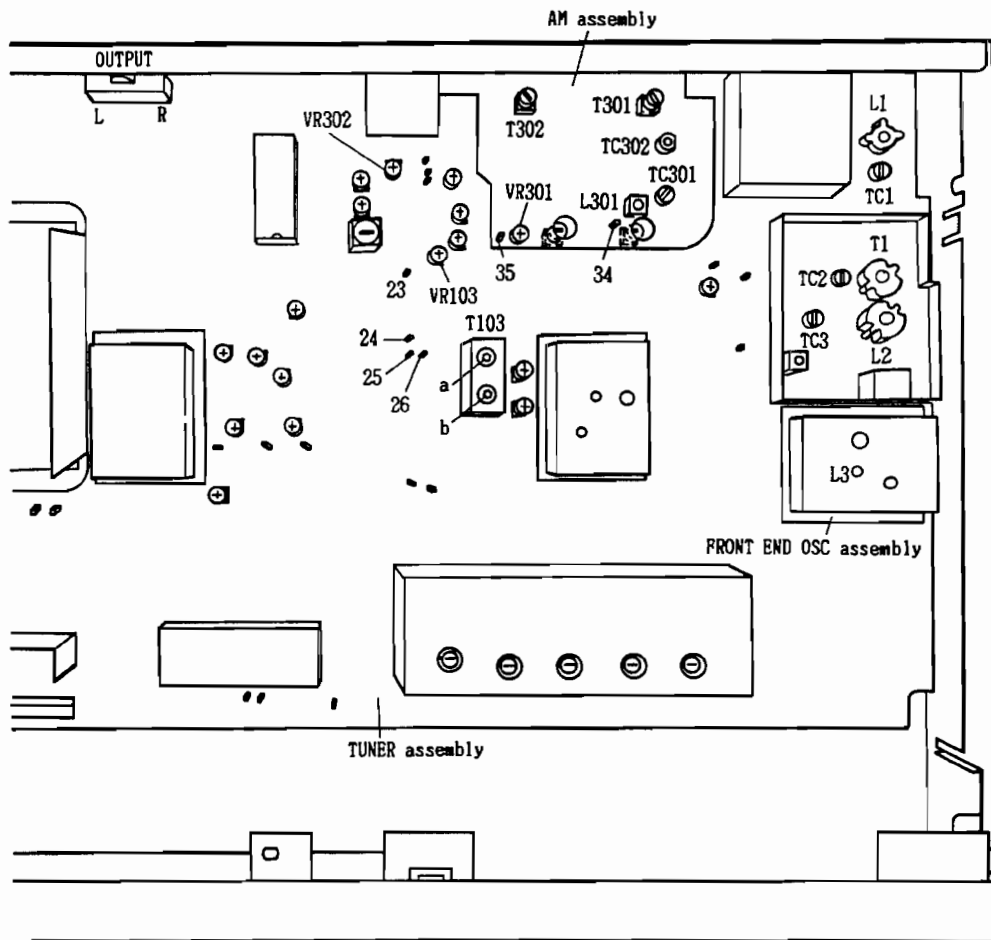


Fig. 7-3 Adjustment point

7. RÉGLAGE

Réglages de la Section AM

- Effectuer le câblage comme indiqué sur la figure 7-1.
- Enclencher la touche AM et désenclencher la touche REC LEVEL CHECK.

Etape	AM SG (400Hz, 30% de modulation)		F-91 indication de fréquence	Point de réglage	Réglages
	Fréquence	Niveau			Norme
1	Aucun signal		530kHz (531kHz) ^{*1}	L301	Régler de telle manière que la tension entre la borne 33 et la terre soit égale à 2V ($\pm 0,3V$).
2			1.700kHz (1.602kHz) ^{*1}	TC301	Régler de telle manière que la tension entre la borne 33 et la terre soit égale à 24,5V ($\pm 0,5V$).
3	Répéter les étapes 1 et 2 jusqu'à ce que les deux normes de tension de terre soient satisfaites.				
4	Régler mécaniquement VR301 à mi-chemin.				
5	600kHz (603kHz) ^{*1}	50 – 80dB	600kHz (603kHz) ^{*1}	T301	Régler de telle manière que la tension entre la borne 35 et la terre soit au maximum.
6	1.400kHz (1.395kHz) ^{*1}	50 – 80dB	1.400kHz (1.395kHz) ^{*1}	TC302	
7	Répéter les étapes 4 et 6 jusqu'à ce que la norme de tension maximum soit satisfaisante dans les deux étapes.				
8	600kHz (603kHz) ^{*1}	100dB	600kHz (603kHz) ^{*1}	VR301	Régler de sorte que la tension entre la borne 35 et la masse soit de 4,9V ($\pm 0,1V$). ^{*2}

*1: La fréquence entre les parenthèses est la fréquence à l'intervalle de 9kHz (modèles HE et HB).

*2: Ne pas laisser la tension de la borne 35 dépasser 5,2V.

Réglage de la Section FM

Remarque: La méthode de réglage de cette section FM est simple du début jusqu'à la fin.

- Effectuer le câblage comme indiqué dans la figure 7-2.
- Enclencher la touche FM et désenclencher les touches REC LEVEL CHECK et MUTING.

Etape	FM SG (1kHz, $\pm 75kHz$ de déviation)		Indication de fréquence de F-91	Point de réglage	Réglages
	Fréquence	Niveau			Norme
1	Aucun signal		108MHz	L3	Régler de telle manière que la tension entre la borne 33 et la terre soit égale à 23,5V ($\pm 0,2V$).
2			87,5MHz	...	Vérifier si la tension entre la borne 33 et la terre est égale à 7,5V ($\pm 1,0V$).
3	90MHz	40dB	90MHz	L1, T1, L2	Régler de telle manière que la tension entre la borne 22 et la terre soit au maximum.
4	106MHz	40dB	106MHz	TC1-3	
5	Répéter les étapes 3 et 4 jusqu'à ce que les deux normes de tension de masse soit atteintes. Parachever le réglage avec l'étape 4.				
6	106MHz	60dB	106MHz	T103-a	Régler la tension sur 0V pour les bornes 24 à 26.
7	98MHz	18dB (Modulation stéréo)*	98MHz	VR103	Régler au point situé juste avant que l'assourdissement n'entre en service.
8	98MHz	40dB	98MHz	—	Vérifier le niveau de sortie de la borne de sortie.
9	Enclencher la touche REC LEVEL CHECK.			VR302	A l'étape 8, régler le niveau de sortie de la borne de sortie sur -6dB ($\pm 1dB$).

* Modulation stéréo: Principale 1kHz, G-D, $\pm 68,25kHz$ dév. pilote 19kHz, $\pm 6,75kHz$ dév.

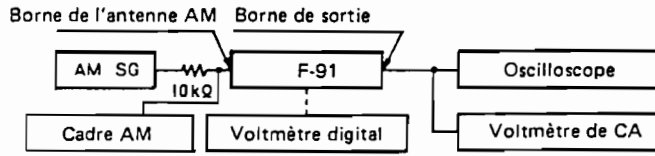


Fig. 7-1 Diagramme de câblage de réglage AM

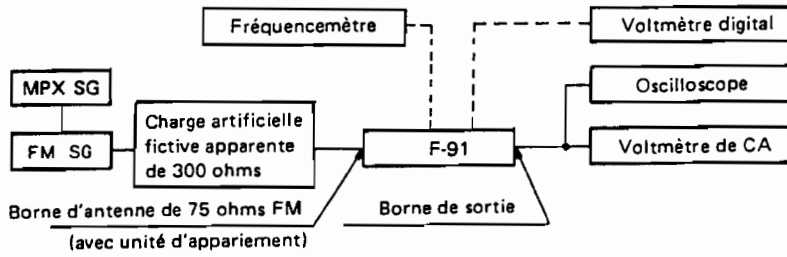


Fig. 7-2 Diagramme de câblage de réglage FM

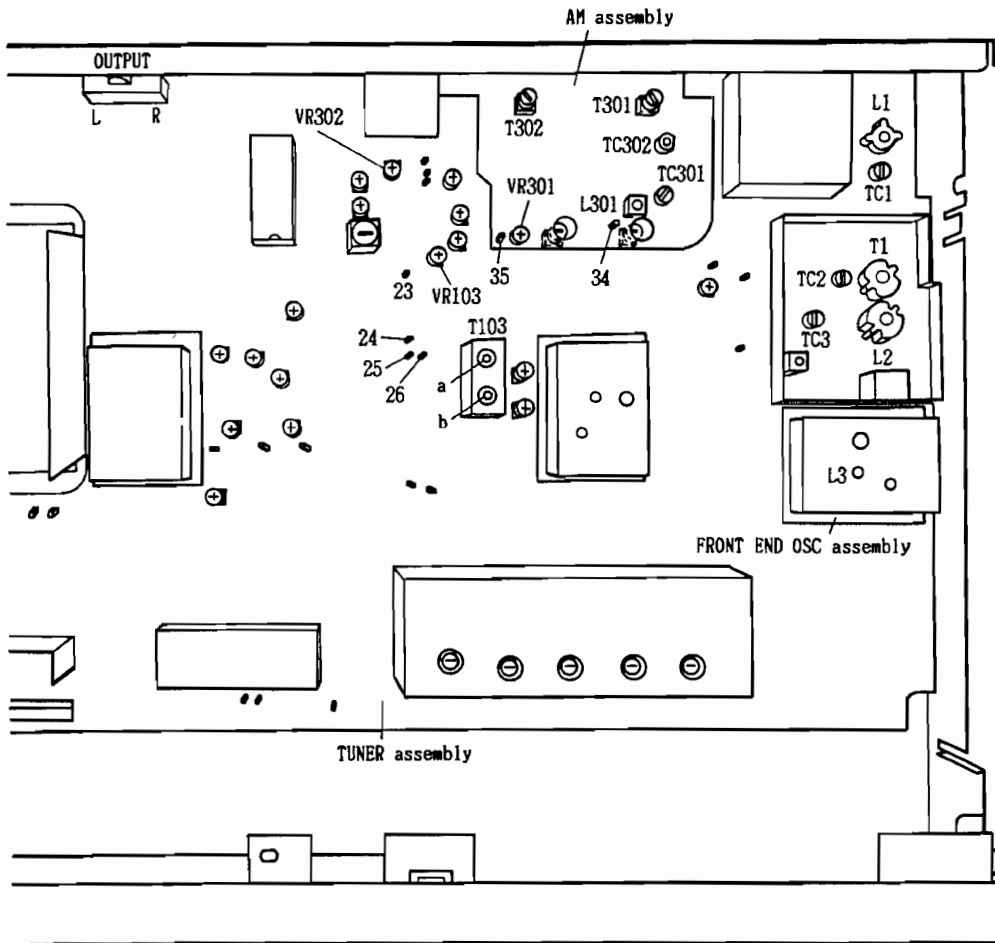


Fig. 7-3 Point de réglage



7. AJUSTE

Ajustes de la Sección AM

- Ejecutar el alambrado como se muestra en la figura 7-1.
- Ponga la tecla AM en ON, y la tecla REC LEVEL CHECK en OFF.

Paso	AM SG (400Hz, 30% de modulación)		F-91 indicación de frecuencia	Punto de ajuste	Ajustes
	Frecuencia	Nivel			Estándar
1	Ninguna señal		530kHz (531kHz)* ¹	L301	Ajustar de modo que el voltaje entre el terminal 33 y la tierra sea de 2V ($\pm 0,3V$).
2			1.700kHz (1.602kHz)* ¹	TC301	Ajustar de modo que el voltaje entre el terminal 33 y la tierra sea de 24,5V ($\pm 0,5V$).
3	Repetir los pasos 1 y 2 hasta que ambos estándares de voltaje de tierra sean satisfechos.				
4	Ponga VR301 mecánicamente en el punto central.				
5	600kHz (603kHz)* ¹	50 – 80dB	600kHz (603kHz)* ¹	T301	Ajustar de modo que el voltaje entre el terminal 35 y la tierra sea máximo.
6	1.400kHz (1.395kHz)* ¹	50 – 80dB	1.400kHz (1.395kHz)* ¹	TC302	
7	Repetir los pasos 5 y 6 hasta que el estándar de voltaje máximo sea satisfecho en ambos pasos.				
8	600kHz (603kHz)* ¹	100dB	600kHz (603kHz)* ¹	VR301	Ajuste de forma que la tensión entre el terminal 35 y masa sea de 4,9V ($\pm 0,1V$).* ²

*1: La frecuencia entre paréntesis corresponde a 9kHz STEP (modelos HE y H8).

*2: No deje que la tensión del terminal 35 sobrepase los 5,2V.

Ajuste de la Sección FM

Nota: El método de ajuste de esta sección de FM es muy sencillo.

- Ejecutar el alambrado como se muestra en la figura 7-2.
- Ponga la tecla FM en ON, y las teclas REC LEVEL CHECK y MUTING en OFF.

Paso	FM SG (1kHz, $\pm 75kHz$ de desviación)		Indicación de frecuencia de F-91	Punto de ajuste	Ajustes
	Frecuencia	Nivel			Estándar
1	Ninguna señal		108MHz	L3	Ajustar de modo que el voltaje entre el terminal 33 y la tierra sea de 23,5V ($\pm 0,2V$).
2			87,5MHz	...	Verificar si el voltaje entre el terminal 33 y la tierra es de 7,5V ($\pm 1,0V$).
3	90MHz	40dB	90MHz	L1, T1, L2	Ajustar de modo que el voltaje entre el terminal 22 y la tierra sea máximo.
4	106MHz	40dB	106MHz	TC1-3	
5	Repita los pasos 3 y 4 hasta obtener ambos valores de tensión. Termine el ajuste con el paso 4.				
6	106MHz	60dB	106MHz	T103-a	Ajuste la tensión a 0V para los terminales 24 a 26.
7	98MHz	18dB (Modulación estéreo)*	98MHz	VR103	Ajuste el punto justamente antes de que se aplique el silenciamiento.
8	98MHz	40dB	98MHz	—	Compruebe el nivel de salida del terminal de salida.
9	Ponga la llave REC LEVEL CHECK en ON.			VR302	En el paso 8, ajuste el nivel de salida del terminal de salida a -6dB ($\pm 1dB$).

* Modulación estéreo: Principal 1kHz, L-R, piloto de $\pm 68,25kHz$ de desviación 19kHz, desviación de $\pm 6,75kHz$



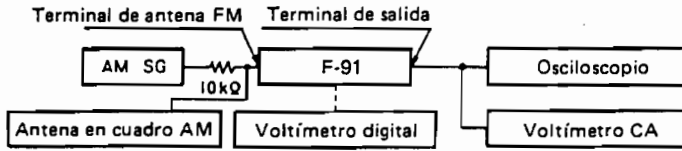


Fig. 7-1 Esquema de alambado de ajuste AM

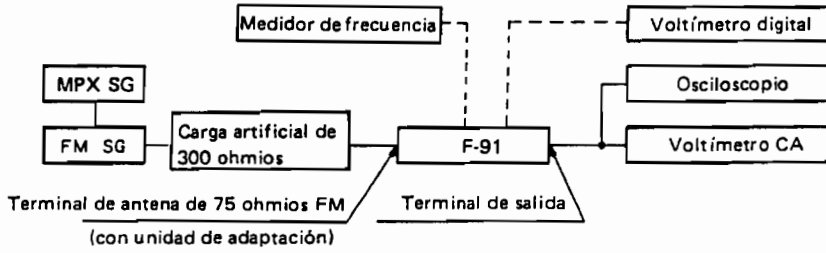


Fig. 7-2 Esquema de alambado de ajuste FM

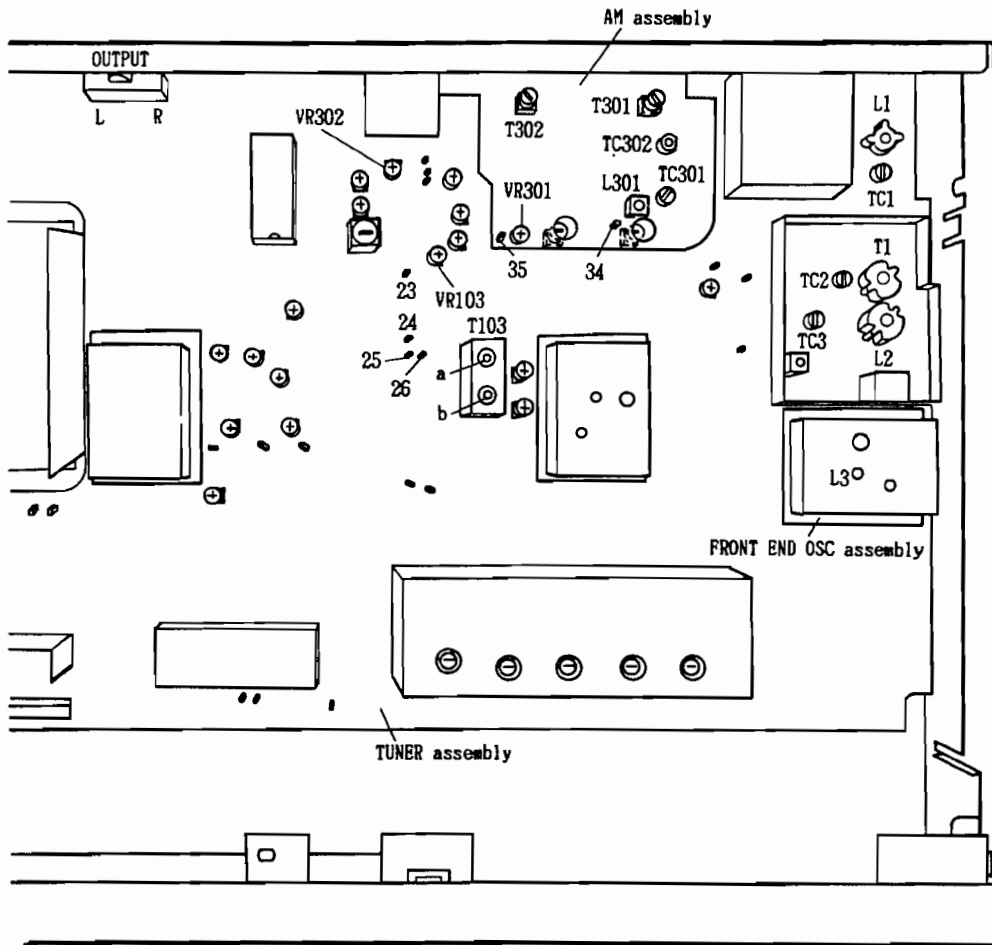


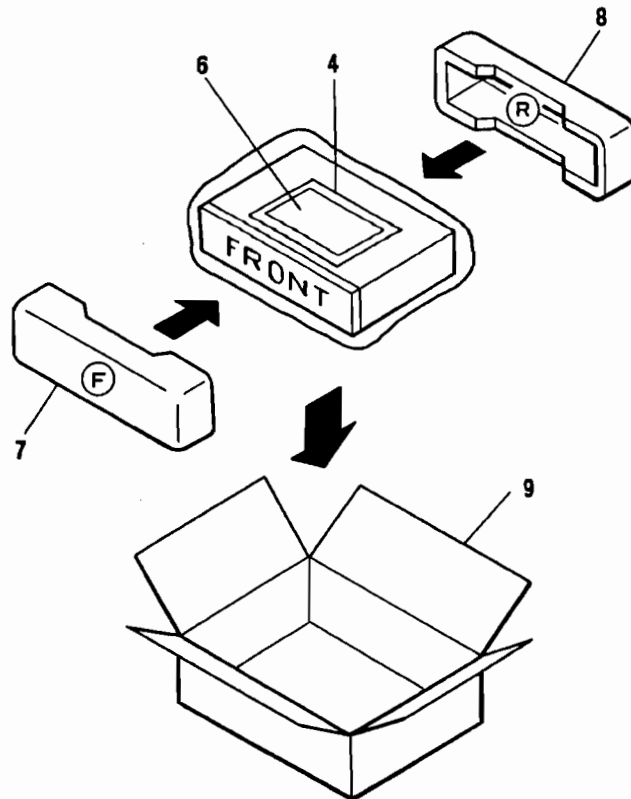
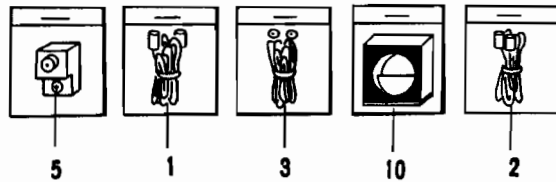
Fig. 7-3 Punto de ajuste

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8. PACKING

Parts List

Mark	No.	Part no.	Description
	1	ADE-081	Connector cord with pin plug
	2	ADE-085	Connector cord with mini plug
	3	ADH-005	FM antenna
	4	AHG-153	Catalog bag
	5	AKX-080	Antenna adaptor
	6	ARB1075	Operating instructions (English)
	7	AHA1083	Front pad
	8	AHA1084	Rear pad
	9	AHD1259	Packing case
	10	ATB-086	Loop antenna assembly (L901)



9. IC INFORMATION

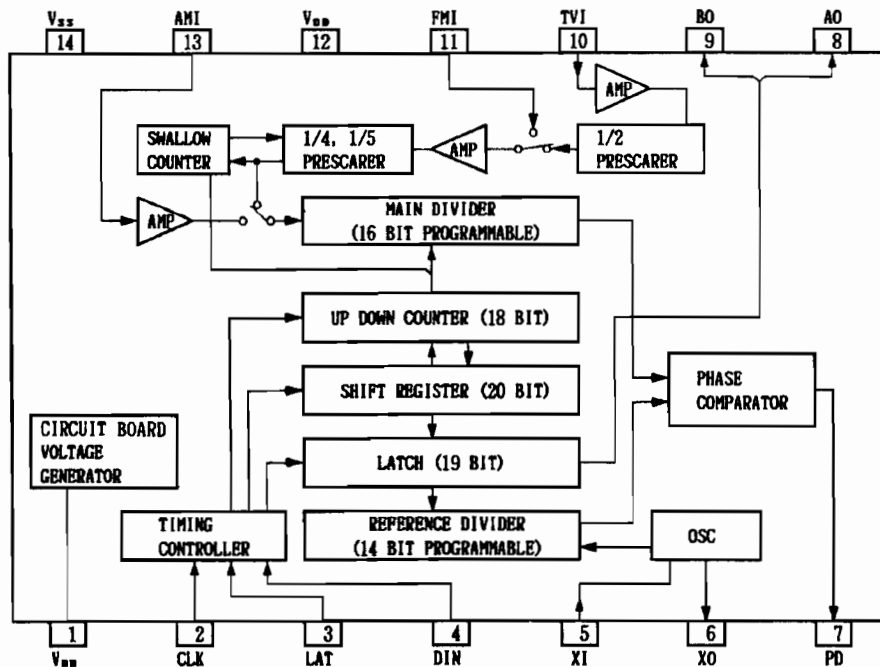
■ CX-7925B

TV/FM/AM frequency synthesizer PLL IC

● Pin Functions

Pin	Pin name	Function & Operation
1	V _{BB}	Circuit board terminal
2	CLK	Clock input for 20 bit series data input
3	LAT	Latch signal input of shift register input and Up/Down clock input
4	DIN	Data input and Up/Down mode change ("H" level:Up, "L" level:Down)
5	XI	Crystal oscillator connect terminal for reference signal generator (Max.:13MHz, Standard:4.0MHz)
6	XO	
7	PD	Phase comparator output (3 states)
8	AO	Exite control signal output/Unlock output (E/E MOS push-pull)
9	BO	Exite control signal output/data check (E/E MOS push-pull)
10	TVI	High frequency signal input (300MHz max.) including 1/2 prescaler
11	FMI	High frequency signal input (150MHz max.)
12	V _{DD}	Power supply (+5V)
13	AMI	High frequency signal input (40MHz max.)
14	V _{SS}	Ground

● Block Diagram



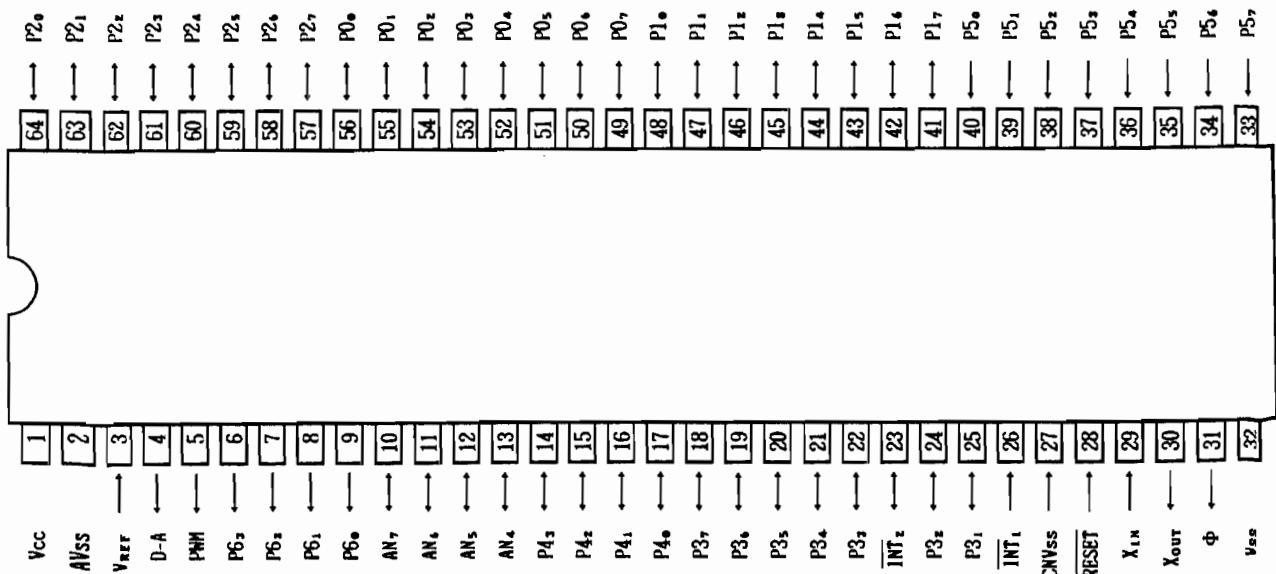
■ PD5056 (IC502)

● Pin Functions

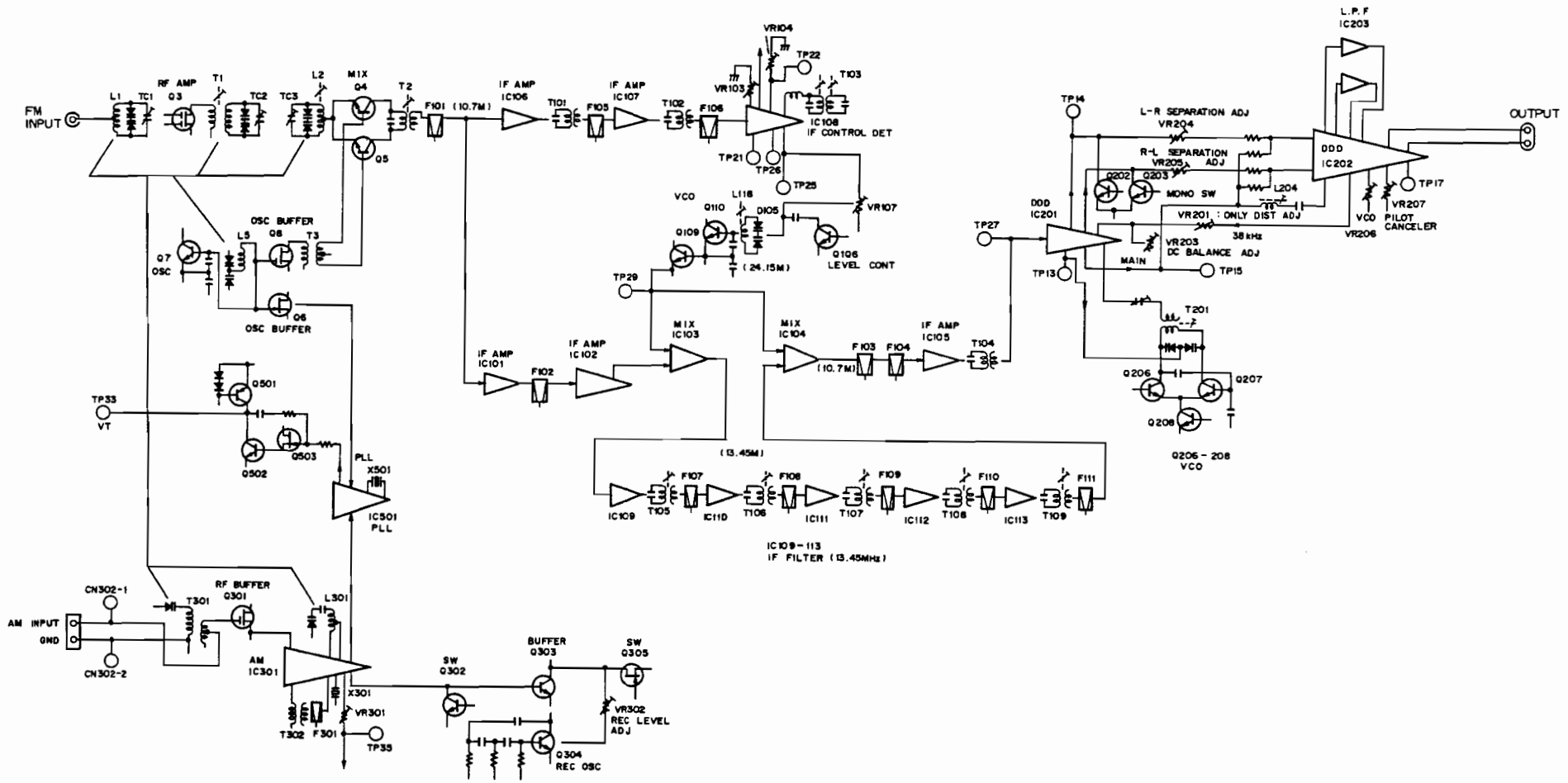
Pin	Pin name	Function & Operation	I/O	Active	Pin	Pin name	Function & Operation	I/O	Active	
1	Vcc	Power supply (5V)	-	-	33	P5 ₇	KEY MATRIX INPUT	I	-	
2	AVss	Analog ground (0V)	-	-	34	P5 ₆		I	-	
3	VREF	Reference voltage input (5V)	-	-	35	P5 ₅		I	-	
4	D-A	N.C.	-	-	36	P5 ₄		I	-	
5	PWM	N.C.	-	-	37	P5 ₃		I	-	
6	P6 ₃	Compulsion MONO	N	H	38	P5 ₂		I	-	
7	P6 ₂	VCO KILLER (AM ON)	N	H	39	P5 ₁		I	-	
8	P6 ₁	Hi-Blend	N	H	40	P5 ₀		I	-	
9	P6 ₀	MUTE CONTROL	N	H	41	P1 ₇	S METER display (LSB)	N	L	
10	AN ₇	FM S METER ② (A/D)	I	-	42	P1 ₆		(2)	N	L
11	AN ₆	FM S METER ① (A/D)	I	-	43	P1 ₅		(3)	N	L
12	AN ₅	O-VOLT MUTE (A/D)	I	-	44	P1 ₄		(4)	N	L
13	AN ₄	AM S METER (A/D)	I	-	45	P1 ₃		(5)	N	L
14	P4 ₂	9k/10k input (H=10k)	I	-	46	P1 ₂		(6)	N	L
15	P4 ₁	AM & REC CHECK CUT (AM or REC CHECK → H)	N	H	47	P1 ₁		(7)	N	L
16	P4 ₀	REC LEVEL CHECK	N	H	48	P1 ₀	(MSB)	N	L	
17	P4 ₀	N.C.	N	H	49	P0 ₇	LEVEL ADJ. CONT (O-VOLT MUTE ON=L)	N	L	
18	P3 ₇	MW +B CONTROL	N	H	50	P0 ₆	Test ② (DET) (L → test data load and FM +B OFF)	I	L	
19	P3 ₆	ANTENNA A/B (A → H)	N	H	51	P0 ₅		Test (L → test data load) (FE)	I	L
20	P3 ₅	STEREO information (L=STEREO)	I	-	52	P0 ₄	KEY MATRIX OUTPUT	N	-	
21	P3 ₄	LPF CONT (OV MUTE ON=H)	N	H	53	P0 ₃		N	-	
22	P3 ₃	STEREO IND.	N	L	54	P0 ₂		N	-	
23	INT ₂	Interrupt for back up (AC input)	I	-	55	P0 ₁		N	-	
24	P3 ₁	N.C.	N	L	56	P0 ₀		N	-	
25	P3 ₀	Remote control data input	I	-	57	P2 ₇		FM +B CONTROL	O	H
26	INT ₁	(5V Pull Up)	-	-	58	P2 ₆	PLL lock	-	-	
27	CNVss	GND	-	-	59	P2 ₅	FL blank ("L" at Power ON)	O	H	
28	RESET	Power ON reset	I	L	60	P2 ₄	LC7570 (No.2) enable line	O	-	
29	X _{1N}	Oscillator input (fo = 4MHz)	I	-	61	P2 ₃	LC7570 (No.1) enable line	O	-	
30	X _{OUT}	Oscillator output	O	-	62	P2 ₂	PLL enable line	O	-	
31	φ	N.C.	-	-	63	P2 ₁	Data line for serial data translator	O	-	
32	Vss	GND	-	-	64	P2 ₀	Clock line for serial data translator	O	-	

I : CMOS INPUT O : CMOS OUTPUT N : Nch OPEN

● Pin connections (Top view)



10. BLOCK DIAGRAM



11. CIRCUIT DESCRIPTION

11.1 New IF system principle

Fig.11-1 (a) shows the conventional IF system which has wide position, and Fig.11-1 (b) shows the new IF system.

Vertical line indicates the time variable of desired signal.

The line at right side of desired signal indicates undesired signal.

Mountainous curve shows the amplitude characteristic of IF filter.

In the case of conventional system, signal pass through the filter without generate the distortion so that filter is wide. At this time, the system is affected by undesired signal.

In the case of new system, signal pass through directly so that narrow filter follow the signal. Besides, the system is not affected by undesired signal.

This system's filter is controlled by feedforward control, therefore, stability is very high and not oscillation.

This system organize the equivalent follow type filter so that input FM signal frequency controlled for center of the filter at any time. (At conventional system, filter is followed the input signal.)

Fig.11-2 shows the block diagram. System consists of the control block and filter block. Control block consists of band-pass filter (BPF1), FM detector (DET1) and low-pass filter (LPP).

The band-pass filter (BPF1) has the same characteristic as conventional tuner's narrow filter, and this filter has selective characteristic sufficiently.

When FM signal is inputted, FM signal is detected by FM detector (DET1) after pass through the band-pass filter (BPF1). And then, output signal of FM detector (DET1) is cut the useless high-frequency elements by low-pass filter (LPP).

Filter block consists of two mixer (MIX1 and 2), band-pass filter (BPF2) and VCO.

Mixer 1 (MIX1) perform frequency change so that multiply input FM signal by VCO output.

F-91 introduce the secondary IF frequency as 13.45 MHz.

Band-pass filter (BPF2) has the same narrow bandwidth characteristic as the band-pass filter (BPF1).

This filter (BPF2) cut the obstruction wave including input signal.

Input signal of passed through the band-pass filter (BPF2) is multiplied by VCO output at mixer (MIX2) again, then change to the original frequency.

Original signal is detected by FM detector (DET2), then audio output is obtained.

In this way, in spite of use the filter of fixed the center frequency, F-91 operate to the variable filter so that center frequency follow the input signal as equivalent.

If desired signal (S) and undesired signal (U) apply to input as shown in Fig.11-2, first, these signals are applied to control block, and cut the undesired signal (U) by BPF1. At this time, desired signal is distorted by BPF1.

This desired signal without undesired signal is detected by FM detector (DET1), then changed the FM waveform by VCO again.

Output signal of VCO is sum of the desired signal (S) and the distortion element (D).

This distortion element (D) not only include generated distortion at filter (BPF1) but also include generated distortion at detector and VCO.

On the other hand, desired signal (S) and undesired signal (U) apply to the filter block, then mix with the VCO output. Direction of desired signal's modulation is same way as input signal.

The differential element is took out from mixer 1 (MIX1)'s output by BPF2. At this time, desired signal (S) is vanished and undesired signal (U) is eliminated by BPF2.

Therefore, only distortion element (D) pass through the BPF2.

When distortion element (D) pass through the BPF2, element (D) hardly distort so that frequency deviation of the distortion element (D) is just a little.

And signal is mixed with VCO output by mixer 2 (MIX2) and pick up the differential element again. Then, desired signal (S) is obtained to not distortion. At this time, undesired signal (U) has eliminated.

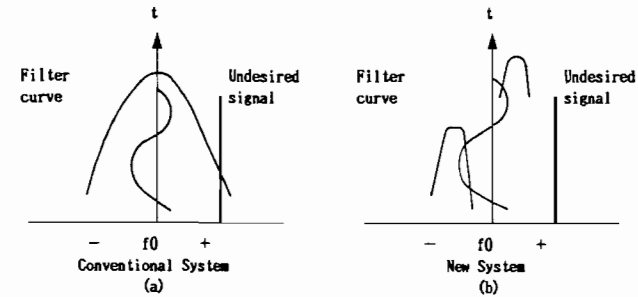


Fig.11-1 Signal tracing characteristics

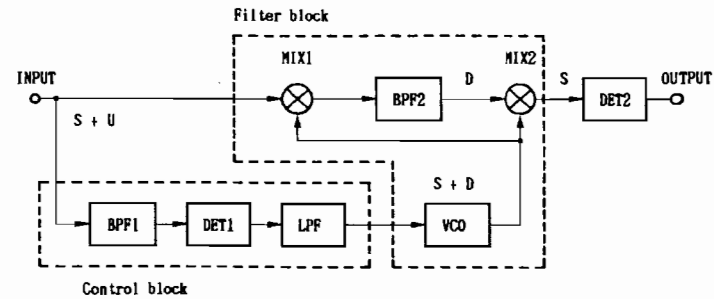


Fig.11-1 Blockdiagram of Active Real-time Tracing System

TUNER Assembly

The TUNER assembly AWZ1567 (HE and HB types), AWZ1566 (HEZ type) and AWZ1569 (SD/G type) are the same as the AWZ1568 (KU/CA type) with the exception of the following sections.

Mark	Symbol & Description	Part No.				Remarks
		AWZ1568	AWZ1567	AWZ1566	AWZ1569	
	C215, C216	CQMXA242J100	CQMXA182J100	CQMXA182J100	CQMXA182J100	
	R178	RD1/8PM822J	RD1/8PM473J	RD1/8PM473J	RD1/8PM473J	
	R214, R215	RN1/4PQ3162F	RDR1/4PM303J	RDR1/4PM303J	RDR1/4PM303J	
	R408 (2.2M Ω , 1/2W)	ACN-209	.....	.....	.....
	R420, R421	RS1LMF181J	.....	.....	.....
	R422	RS2LMF181J	.....	.....	.....
	R530	RD1/8PM102J	.....	.....	RD1/8PM102J	
	Pal socket	.....	AKX1013	AKX1013	.....
	C3 (0.01/25V)	ACG-036	ACG-036	.....	ACG-036	
	C3, C42	.....	.....	CCDCH150J50	.....
	C41	.....	.....	CCCSL101J50	.....
	C43	.....	.....	CKDYX104M25	.....
	C267, C268 (0.01/25V)	.....	.....	ACG-036	.....
	C270, C271	.....	.....	CQSXA152J160	.....
	L2 FM RF coil	ATC-205	ATC-205	.....	ATC-205	
	L206, L207	.....	.....	LAU2R2M	.....
	L208, L209	.....	.....	LAU101K	.....
	L401 Line filter	.....	.....	ATF-151	.....
	R33	.....	.....	RD1/8PM472J	.....
	T4 FM RF transformer	.....	.....	ATC-257	.....
★★	Q210, Q211	.....	.....	.....	2SK161	
	R259, R260	.....	.....	.....	RD1/8PM105J	
★★	S501 Slide switch (CHANNEL STEP/FM DE-EMPHASIS)	.....	.....	.....	ASH1009	
△★★	S902 Voltage selector (AC110/120-127/220/240V)	.....	.....	.....	AKX-505	
	C265, C266	.....	.....	.....	CQMA821J50	
	R34	RD1/2PM103J	.....	.....	.....