

Service Manual



ORDER NO.
ARP 1465

FH/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)

CONTENTS

1. SPECIFICATIONS.....	2	8. PACKING	32
2. PANEL FACILITIES.....	3	9. IC INFORMATION.....	33
3. EXPLODED VIEW AND PARTS LIST.....	5	10. BLOCK DIAGRAM	35
4. SCHEMATIC DIAGRAM	9	11. CIRCUIT DESCRIPTION	37
5. P.C. BOARDS CONNECTION DIAGRAM	13	12. FOR HE, HB, HEZ AND SD/G TYPES.....	39
6. ELECTRICAL PARTS LIST	22		
7. ADJUSTMENTS	26		
RÉGLAGE	28		
AJUSTE.....	30		

1. SPECIFICATIONS

FM Tuner Section

Frequency range	87.5 MHz to 108 MHz
Usable Sensitivity	Mono; 9.8 dBf, IHF (0.85 μ V/75 Ω)
50 dB Quieting Sensitivity	
U.S. and Canadian models	
Mono;	12.8 dBf, IHF (1.2 μ V/75 Ω)
Stereo;	34.8 dBf, IHF (15 μ V/75 Ω)
U.K. and other destination's models	
Mono;	15.3 dBf, IHF (1.6 μ V/75 Ω)
Stereo;	35.9 dBf, IHF (17 μ V/75 Ω)
Sensitivity (DIN)	Mono; 0.75 μ V/75 Ω Stereo; 20 μ V/75 Ω
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 μ V/75 Ω)
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 μ V/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

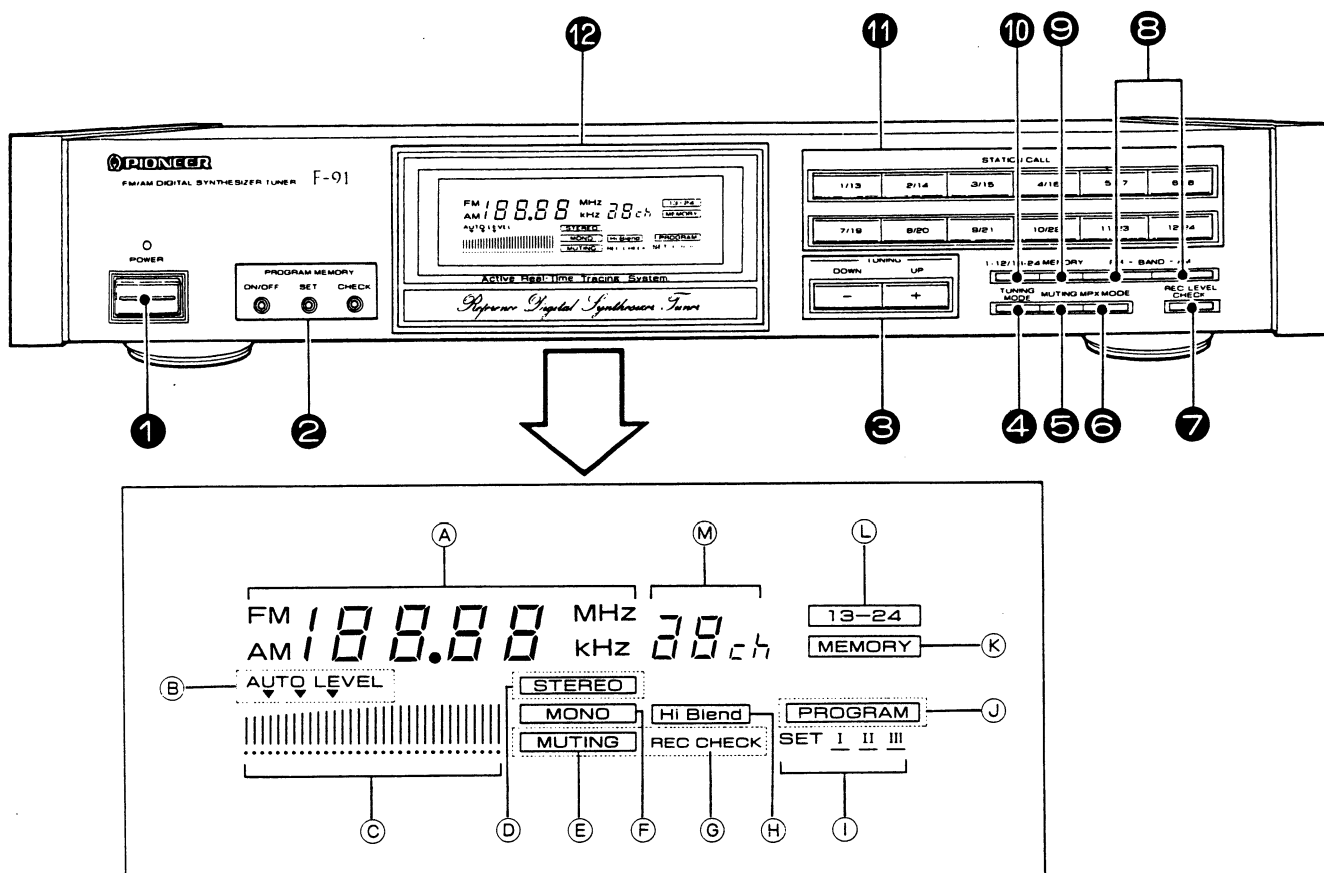
FM T-type Antenna	1
AM Loop Antenna	1
Connecting Cord with Pin Plugs	1
Antenna adaptor *	1
Control cord *	1
Operating Instructions	1

* 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).

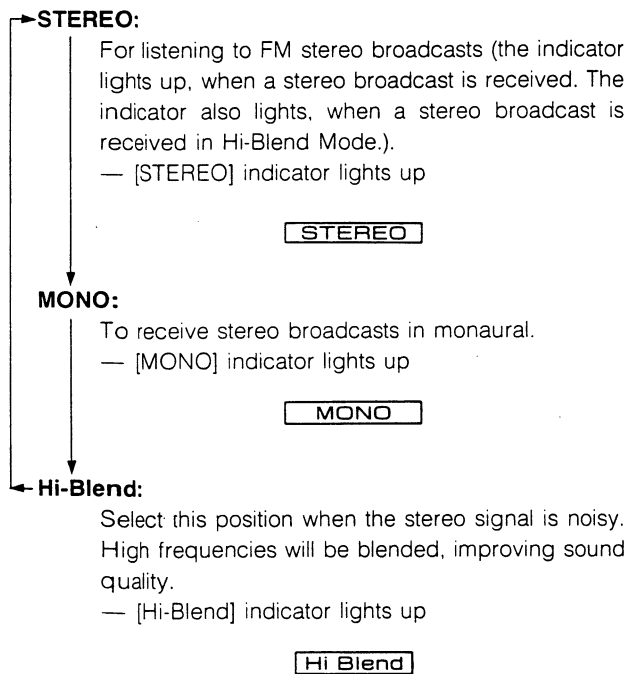
This switch does not affect AM reception.

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]

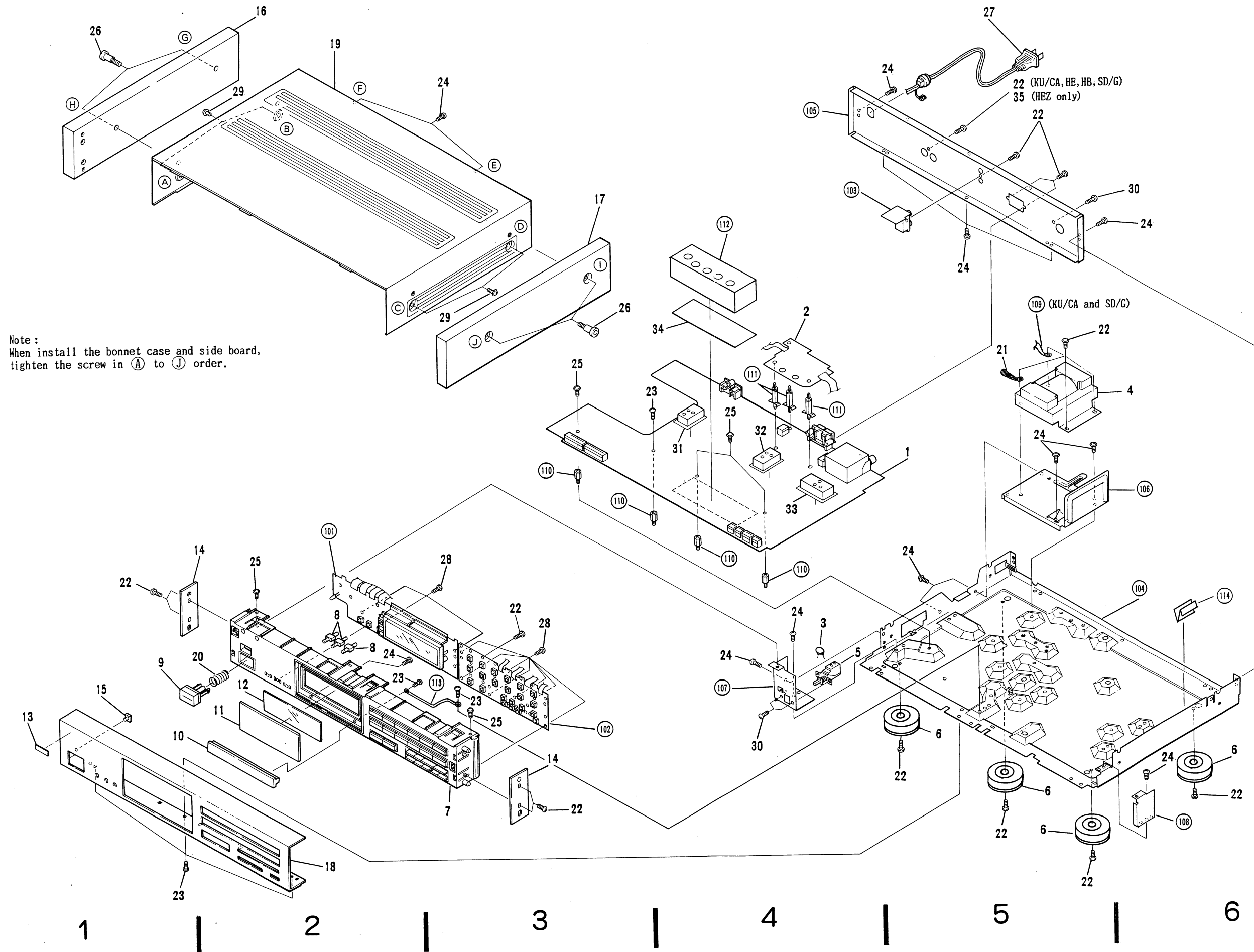
11 STATION CALL switches

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

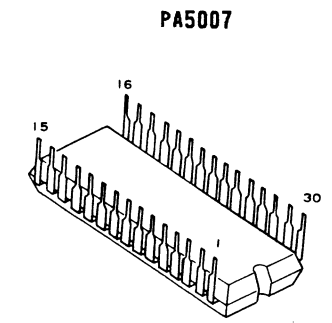
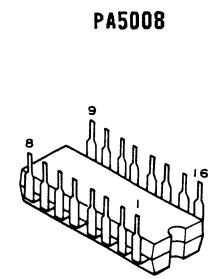
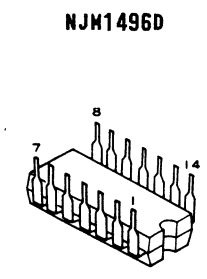
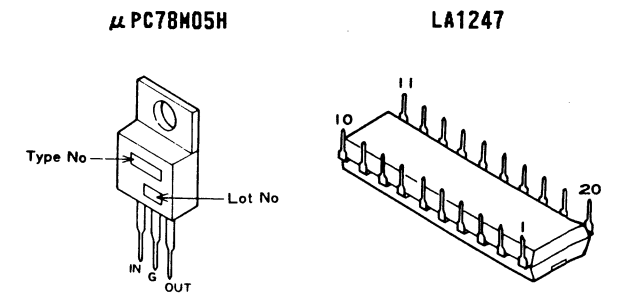
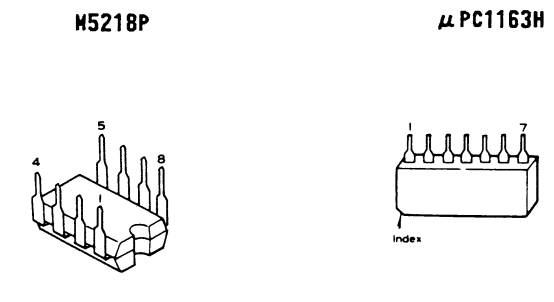
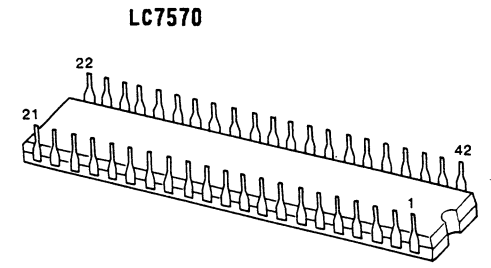
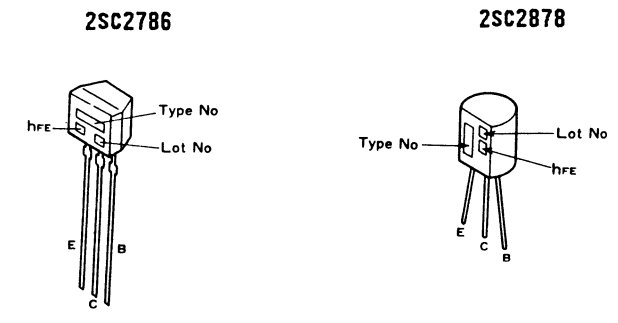
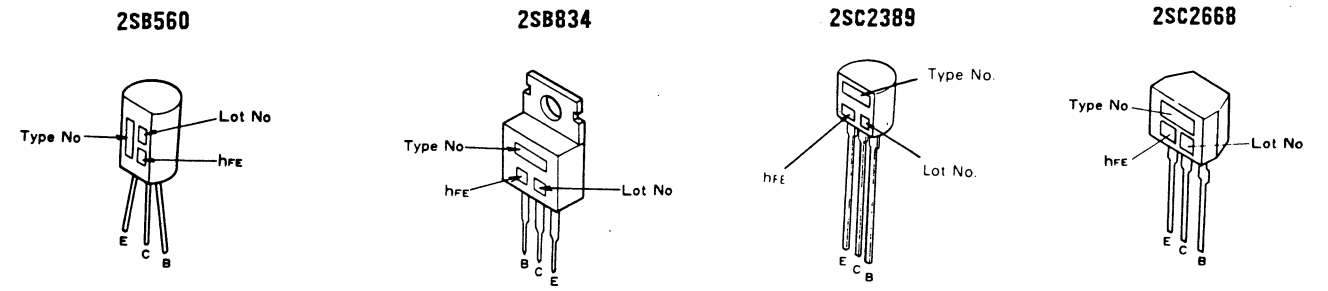
- RN1
- RN2



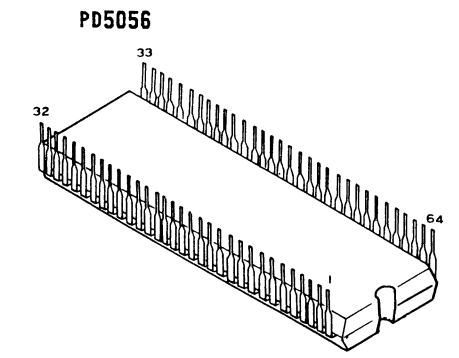
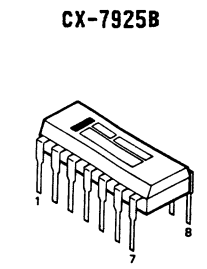
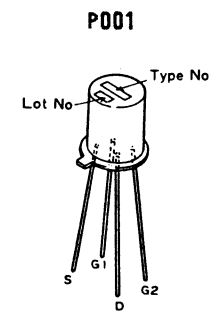
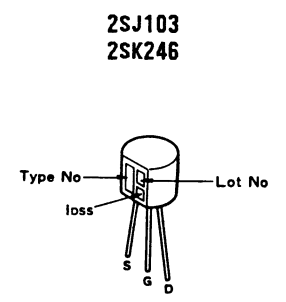
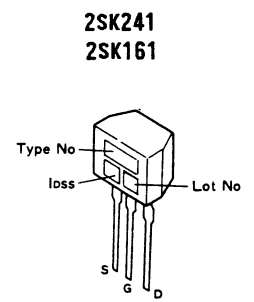
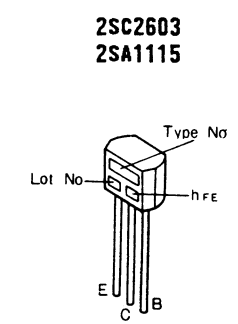
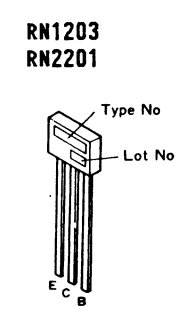
- NOTES:**
- Parts without part number cannot be supplied.
 - The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
 - For your parts Stock Control, the fast moving items are indicated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

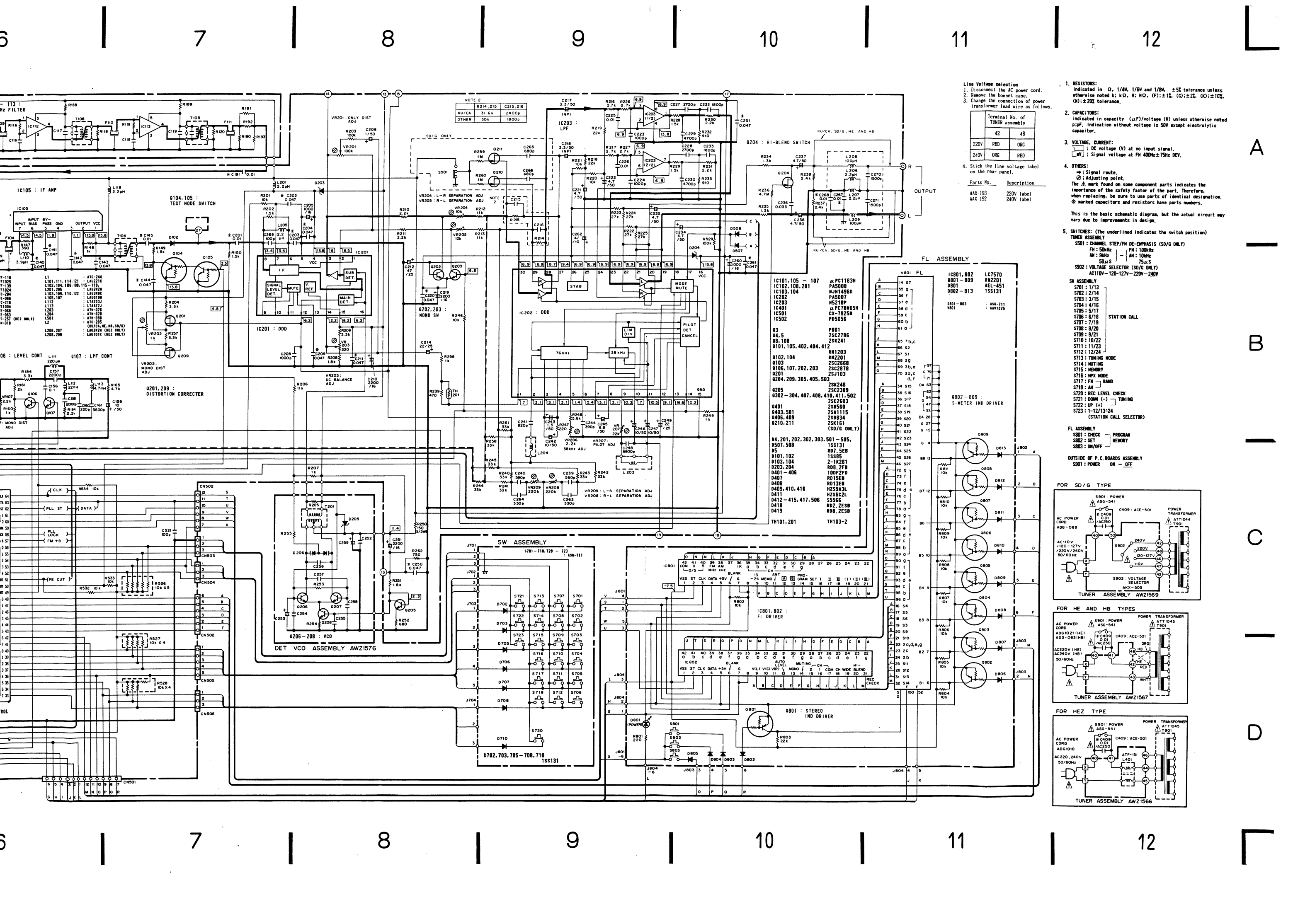
Parts List

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	ACE-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
Δ $\star\star$	5	ASG-541	Push switch (POWER, S901)		29	FBT40P080FZK	Screw
	6	AMR1047	Leg assembly		30	VMZ30P060FCU	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	AAM1001	Name plate		102		SW 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	ANB1087	Bonnet case		108		Front panel holder B
	20	ABH1033	Coil spring A		109		Earth lead
	21	AEC-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





Line Voltage selection
 1. Disconnect the AC power cord.
 2. Remove the bonnet case.
 3. Change the connection of power transformer lead wire as follows.

Terminal No. of Tuner assembly	220V	240V
42	RED	ORG
48	ORG	RED

4. Stick the line voltage label on the rear panel.

Parts No. Description
 AAX-193 220V label
 AAX-192 240V label

1. RESISTORS:
 Indicated in Ω, 1/4W, 1/8W and 1/2W. ±5% tolerance unless otherwise noted; kΩ, MΩ, GΩ, (F); ±1%, (G); ±2%, (K); ±10%, (N); ±20% tolerance.

2. CAPACITORS:
 Indicated in capacity (μF)/voltage (V) unless otherwise noted; pF. Indication without voltage is SDV except electrolytic capacitor.

3. VOLTAGE, CURRENT:
 ⊖: DC voltage (V) at no input signal.
 ⊕: Signal voltage at FM 400Hz±75Hz DEV.

4. OTHERS:
 ⊕: Signal route.
 ⊙: Adjusting point.
 Δ: The 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. * marked capacitors and resistors have part numbers.

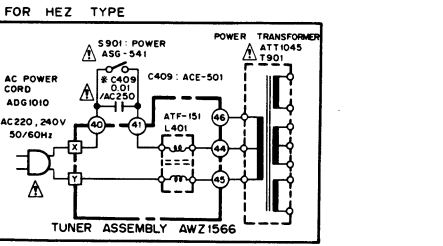
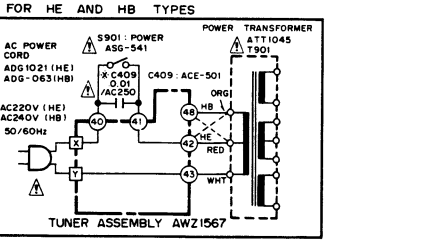
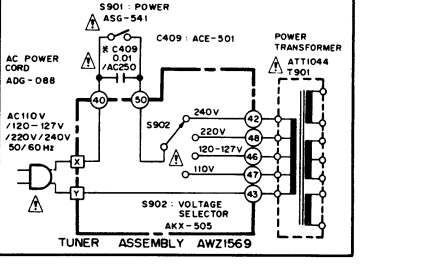
This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

5. SWITCHES: (The underlined indicates the switch position)
 TUNER ASSEMBLY
 S501: CHANNEL STEP/FM DE-EMPHASIS (SD/G ONLY)
 FN: 50kHz
 AM: 50kHz
 50μS
 S902: VOLTAGE SELECTOR (SD/G ONLY)
 AC110V-120-127V-220V-240V

SW ASSEMBLY
 S701: 1/13
 S702: 2/14
 S703: 3/15
 S704: 4/16
 S705: 5/17
 S706: 6/18
 S707: 7/19
 S708: 8/20
 S709: 9/21
 S710: 10/22
 S711: 11/23
 S712: 12/24
 S713: TUNING MODE
 S714: MUTING
 S715: MEMORY
 S716: MPX MODE
 S717: FM BAND
 S718: AM
 S720: REC LEVEL CHECK
 S721: DOWN (-) TUNING
 S722: UP (+) TUNING
 S723: 1-12/13-24 (STATION CALL SELECTOR)

FL ASSEMBLY
 S801: CHECK PROGRAM MEMORY
 S802: SET
 S803: ON/OFF

OUTSIDE OF P.C. BOARDS ASSEMBLY
 S901: POWER ON - OFF



A

B

C

D

5. P. C. BOARDS CONNECTION DIAGRAM

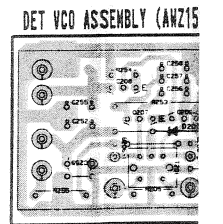
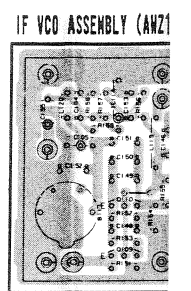
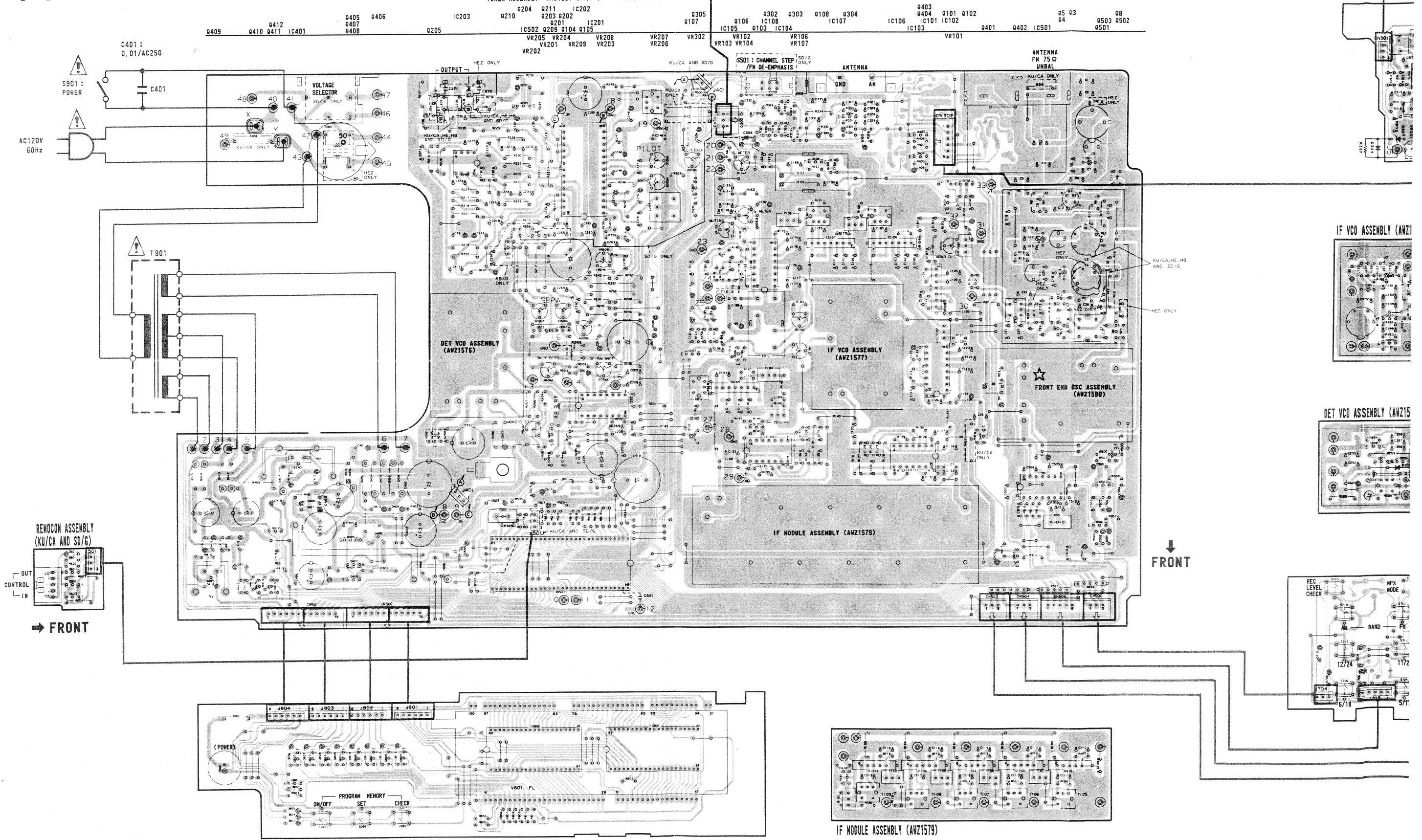
TUNER ASSEMBLY ANZ1568 (KU/CA) ANZ1566 (HEZ)
 ANZ1567 (HE, HB) ANZ1569 (SD/G)

A

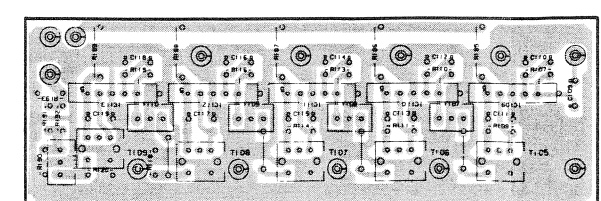
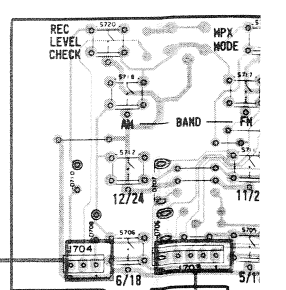
B

C

D



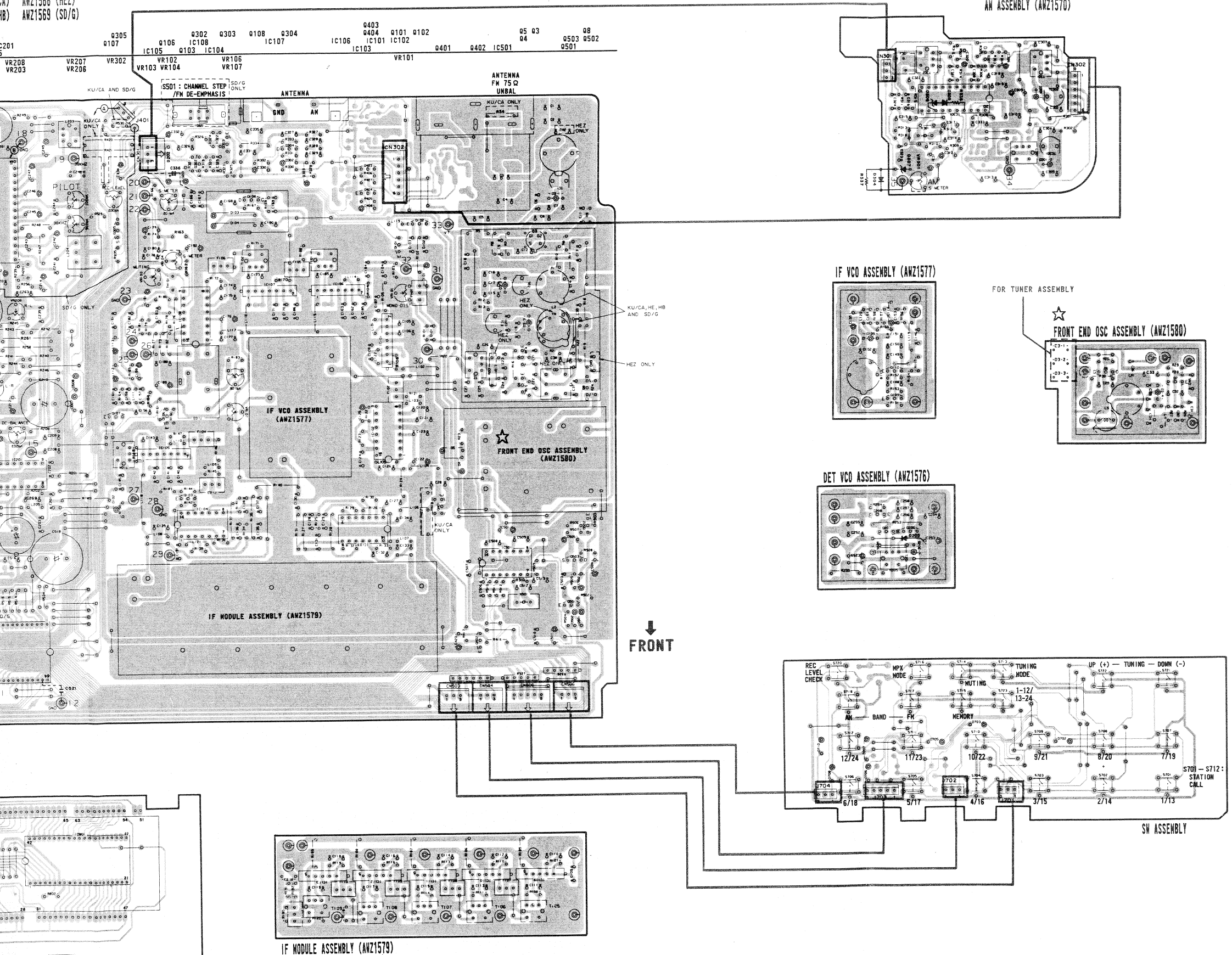
FRONT



FL ASSEMBLY Q801 - Q809 IC802 IC801

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.

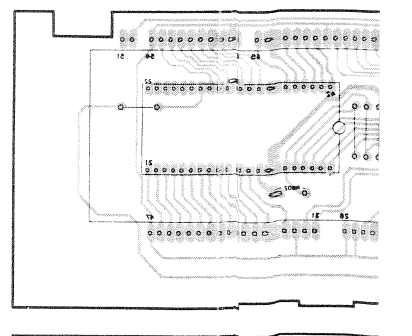
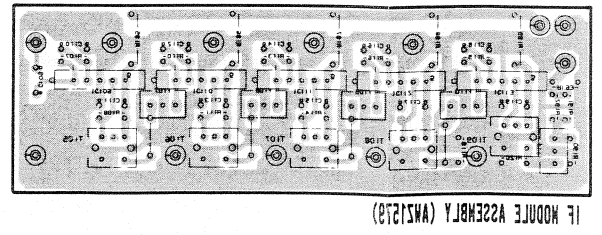
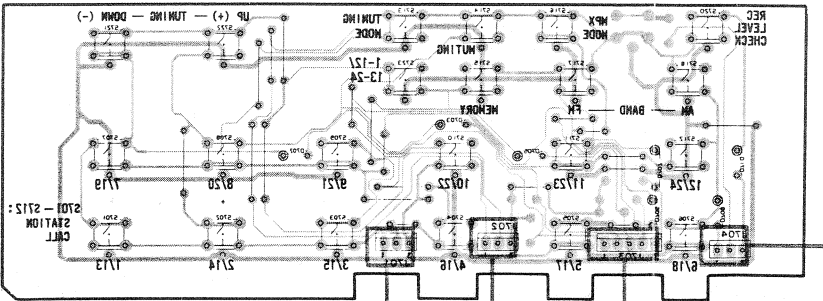
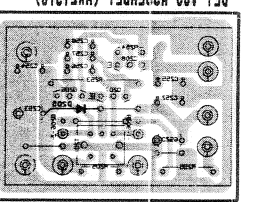
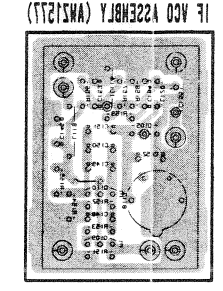
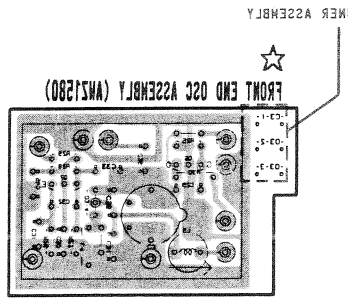
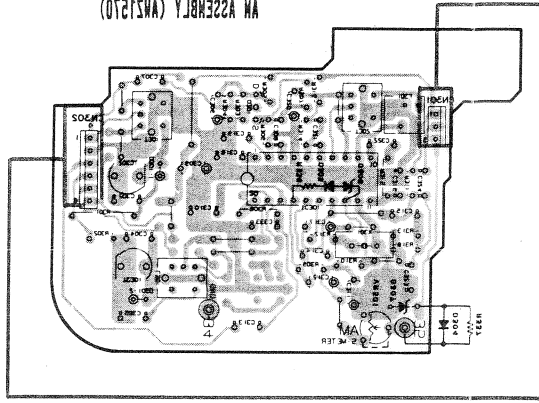
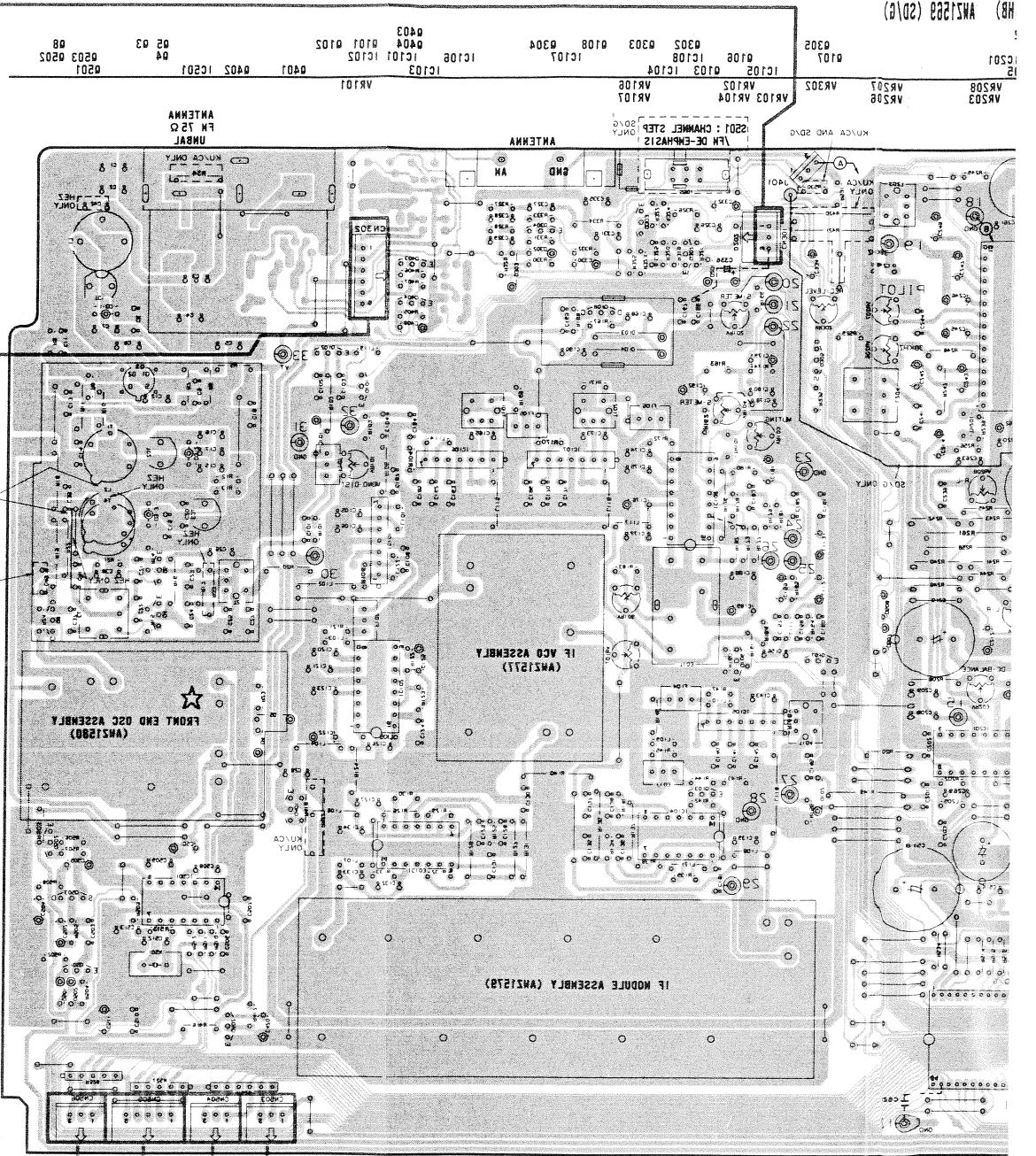
A

B

C

D

IC801



*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.

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

Others

Part Name	P.C.B. pattern diagram indication
IC	
Switch	
Relay	
Coil	
Filter	
Variable resistor	
2-terminal 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

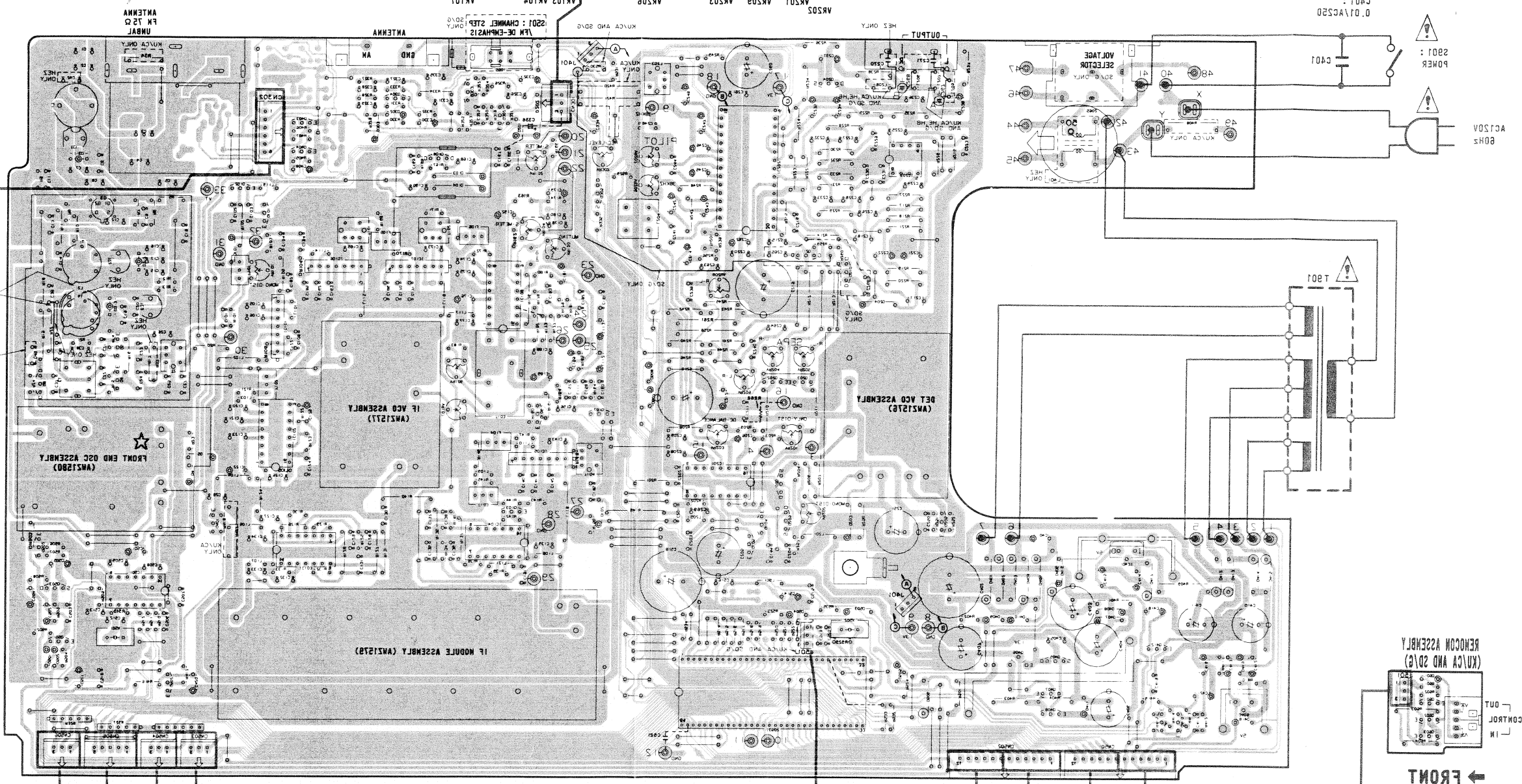
C

D

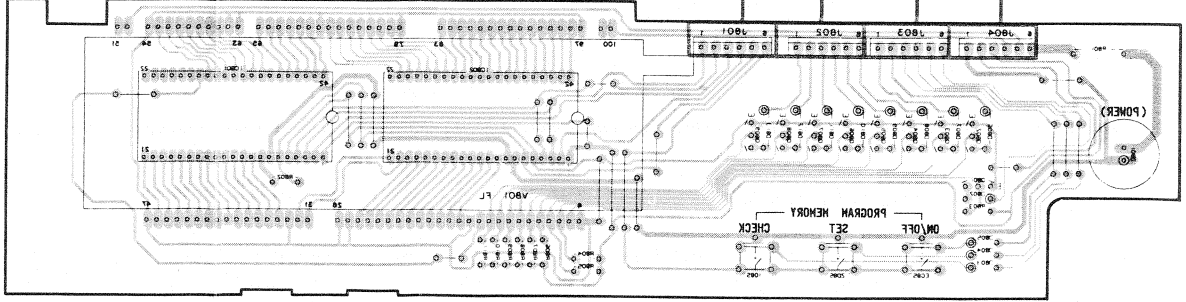
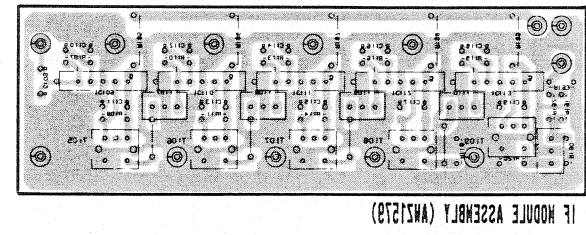
2.P.C. BOARDS CONNECTION DIAGRAM

INNER ASSEMBLY (HE/HB) (WAS1288 (201g))
WAS1288 (K/U/CA) (WAS1288 (HEZ))

9408 9407 9406 9405 9404 9403 9402 9401
1C401 1C402 1C403 1C404 1C405 1C406 1C407 1C408 1C409 1C410 1C411 1C412 1C413 1C414 1C415 1C416 1C417 1C418 1C419 1C420 1C421 1C422 1C423 1C424 1C425 1C426 1C427 1C428 1C429 1C430 1C431 1C432 1C433 1C434 1C435 1C436 1C437 1C438 1C439 1C440 1C441 1C442 1C443 1C444 1C445 1C446 1C447 1C448 1C449 1C450 1C451 1C452 1C453 1C454 1C455 1C456 1C457 1C458 1C459 1C460 1C461 1C462 1C463 1C464 1C465 1C466 1C467 1C468 1C469 1C470 1C471 1C472 1C473 1C474 1C475 1C476 1C477 1C478 1C479 1C480 1C481 1C482 1C483 1C484 1C485 1C486 1C487 1C488 1C489 1C490 1C491 1C492 1C493 1C494 1C495 1C496 1C497 1C498 1C499 1C500 1C501 1C502 1C503 1C504 1C505 1C506 1C507 1C508 1C509 1C510 1C511 1C512 1C513 1C514 1C515 1C516 1C517 1C518 1C519 1C520 1C521 1C522 1C523 1C524 1C525 1C526 1C527 1C528 1C529 1C530 1C531 1C532 1C533 1C534 1C535 1C536 1C537 1C538 1C539 1C540 1C541 1C542 1C543 1C544 1C545 1C546 1C547 1C548 1C549 1C550 1C551 1C552 1C553 1C554 1C555 1C556 1C557 1C558 1C559 1C560 1C561 1C562 1C563 1C564 1C565 1C566 1C567 1C568 1C569 1C570 1C571 1C572 1C573 1C574 1C575 1C576 1C577 1C578 1C579 1C580 1C581 1C582 1C583 1C584 1C585 1C586 1C587 1C588 1C589 1C590 1C591 1C592 1C593 1C594 1C595 1C596 1C597 1C598 1C599 1C600 1C601 1C602 1C603 1C604 1C605 1C606 1C607 1C608 1C609 1C610 1C611 1C612 1C613 1C614 1C615 1C616 1C617 1C618 1C619 1C620 1C621 1C622 1C623 1C624 1C625 1C626 1C627 1C628 1C629 1C630 1C631 1C632 1C633 1C634 1C635 1C636 1C637 1C638 1C639 1C640 1C641 1C642 1C643 1C644 1C645 1C646 1C647 1C648 1C649 1C650 1C651 1C652 1C653 1C654 1C655 1C656 1C657 1C658 1C659 1C660 1C661 1C662 1C663 1C664 1C665 1C666 1C667 1C668 1C669 1C670 1C671 1C672 1C673 1C674 1C675 1C676 1C677 1C678 1C679 1C680 1C681 1C682 1C683 1C684 1C685 1C686 1C687 1C688 1C689 1C690 1C691 1C692 1C693 1C694 1C695 1C696 1C697 1C698 1C699 1C700 1C701 1C702 1C703 1C704 1C705 1C706 1C707 1C708 1C709 1C710 1C711 1C712 1C713 1C714 1C715 1C716 1C717 1C718 1C719 1C720 1C721 1C722 1C723 1C724 1C725 1C726 1C727 1C728 1C729 1C730 1C731 1C732 1C733 1C734 1C735 1C736 1C737 1C738 1C739 1C740 1C741 1C742 1C743 1C744 1C745 1C746 1C747 1C748 1C749 1C750 1C751 1C752 1C753 1C754 1C755 1C756 1C757 1C758 1C759 1C760 1C761 1C762 1C763 1C764 1C765 1C766 1C767 1C768 1C769 1C770 1C771 1C772 1C773 1C774 1C775 1C776 1C777 1C778 1C779 1C780 1C781 1C782 1C783 1C784 1C785 1C786 1C787 1C788 1C789 1C790 1C791 1C792 1C793 1C794 1C795 1C796 1C797 1C798 1C799 1C800 1C801 1C802 1C803 1C804 1C805 1C806 1C807 1C808 1C809 1C810 1C811 1C812 1C813 1C814 1C815 1C816 1C817 1C818 1C819 1C820 1C821 1C822 1C823 1C824 1C825 1C826 1C827 1C828 1C829 1C830 1C831 1C832 1C833 1C834 1C835 1C836 1C837 1C838 1C839 1C840 1C841 1C842 1C843 1C844 1C845 1C846 1C847 1C848 1C849 1C850 1C851 1C852 1C853 1C854 1C855 1C856 1C857 1C858 1C859 1C860 1C861 1C862 1C863 1C864 1C865 1C866 1C867 1C868 1C869 1C870 1C871 1C872 1C873 1C874 1C875 1C876 1C877 1C878 1C879 1C880 1C881 1C882 1C883 1C884 1C885 1C886 1C887 1C888 1C889 1C890 1C891 1C892 1C893 1C894 1C895 1C896 1C897 1C898 1C899 1C900 1C901 1C902 1C903 1C904 1C905 1C906 1C907 1C908 1C909 1C910 1C911 1C912 1C913 1C914 1C915 1C916 1C917 1C918 1C919 1C920 1C921 1C922 1C923 1C924 1C925 1C926 1C927 1C928 1C929 1C930 1C931 1C932 1C933 1C934 1C935 1C936 1C937 1C938 1C939 1C940 1C941 1C942 1C943 1C944 1C945 1C946 1C947 1C948 1C949 1C950 1C951 1C952 1C953 1C954 1C955 1C956 1C957 1C958 1C959 1C960 1C961 1C962 1C963 1C964 1C965 1C966 1C967 1C968 1C969 1C970 1C971 1C972 1C973 1C974 1C975 1C976 1C977 1C978 1C979 1C980 1C981 1C982 1C983 1C984 1C985 1C986 1C987 1C988 1C989 1C990 1C991 1C992 1C993 1C994 1C995 1C996 1C997 1C998 1C999 1C1000



A
B
C
D



FRONT

FRONT

1

2

3

4

5

6

1

2

3

4

5

6

IF ASSEMBLY

1C801

1C803

9801 - 9808

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	56×10 ¹	561	RD1/4PS561J
47kΩ	47×10 ³	473	RD1/4PS473J
0.5Ω	0R5		RN2H0R5K
1Ω	010		RS1P010K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	562×10 ¹	5621	RN1/4SR5621F
--------	---------------------	------	--------------

Miscellaneous Parts

Mark	Symbol & Description	Part No.
	REMOCON assembly	
	FL assembly	
	TUNER assembly	AWZ1568
	SW assembly	
	AM assembly	AWZ1570
	DET VCO assembly	AWZ1576
	IF VCO assembly	AWZ1577
	FRONT END OSC assembly	AWZ1580
	IF MODULE assembly	AWZ1579
Δ	C409 Ceramic capacitor (0.01/AC250V)	ACE-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

SEMICONDUCTORS

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

SEMICONDUCTORS

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)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	TH101, TH201 Thermistor	TH103-2
★★	IC501	CX-7925B
★★	IC203	M5218P
★★	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	10DF2FD
★	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)	ATM-026
	L204 Coil (19kHz)	ATM-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.	Mark	Sy
	L103, L109, L110, L122 Axial inductor	LAU3R9K		C5
	L112 Inductor	LTA223J		C1'
	L113 Inductor	LTA472J		C2
	F101 FM Ceramic filter	ATF-118		C1:
	F103, F104 FM IF filter	ATF-139		C4
	F105, F106 Ceramic filter	ATF1024		C1:
	F102 FM IF filter	ATF1025		C4:
	T1 FM RF transformer	ATC-204		C5:
	T3 FM Balun transformer	ATC-218		C2:
	T104 FM Matching transformer	ATE-063		C1:
	T2 FM IF transformer	ATE-066		C4:
	T103 FM Detector transformer	ATE-068		C4:
	T101, T102 FM Matching transformer	ATE1004		C1:
				C2:
				C2:

CAPACITORS

Mark	Symbol & Description	Part No.	Mark	Sy
	TC1 - TC3 Trimmer	ACM-018		C24
	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		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		C40
				C20
				C17
				C40
				C21
				C22
				C22
				C15
				C32
				C32
				C23
				C32
				C20
				C44
				C41'
				C33
				C50:
				C22:
				C23:
				C15:
				C15'
				C21:
				C22:
				C16:
				C22:
				C24:
				C24:
				C26:
				C23:

TUNER Assembly (AWZ1568)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	TH101, TH201 Thermistor	TH103-2
★★	IC501	CX-7925B
★★	IC203	M5218P
★★	IC103, IC104	NJM1496D
★★	IC202	PA5007
★★	IC102, IC108, IC201	PA5008
★★	IC502	PD5056
★★	IC101, IC105-IC107	μPC1163H
★★	IC401	μPC78M05H
★★	Q3	P001
★★	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	10DF2FD
★	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)	ATM-026
	L204 Coil (19kHz)	ATM-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	ACM-018
	C244 (390p/DC50V)	ACG-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)	ACG-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)	ACG-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	CCDSH050C50
	C15, C16, C19, C20	CCDSH150J50
	C333	CCDSL101J50
	C17	CCDSL820J50

Mark	Symbol & Description	Part No.
	C501	CEANL2R2M50
	C502	CEASR47M50
	C179, C192, C206, C332	CEAS010M50
	C243	CEAS1R5M50
	C159, C242, C246, C247, C416, C418, C514	CEAS100M50
	C125, C511	CEAS101M10
	C414, C415	CEAS101M16
	C504	CEAS101M35
	C214, C249, C330, C421, C505	CEAS220M25
	C122	CEAS221M16
	C410, C411	CEAS222M16
	C402	CEAS332M35
	C181, C334, C336, C408, C420	CEAS4R7M50
	C262	CEAS470M10
	C212, C401, C412, C413	CEAS470M25
	C245	CEAS6R8M50
	C251	CEXA222M16
	C404	CEXA471M50
	C217, C218	CEYANP3R3M50
	C189	CEYA101M16
	C406, C407	CEYA101M50
	C205, C260	CEYA102M16
	C176	CEYA221M16
	C403	CEYA221M50
	C210, C219	CEYA222M16
	C221, C222, C234, C235, C237, C238	CEYA4R7M50
	C225, C226	CFTXA103J50
	C156	CFTXA104J50
	C327-C329	CFTXA123J50
	C325	CFTXA223J50
	C236	CFTXA333J50
	C326	CFTXA473J50
	C208, C509	CKDYF102Z50
	C44, C178, C180, C335, C506	CKDYF103Z50
	C417	CKDYF223Z50
	C331, C405, C507, C510, C515, C516	CKDYF473Z50
	C503	CQMA103J50
	C223, C224	CQMXA102J100
	C232, C233	CQMXA182J100
	C158	CQMXA202J100
	C157	CQMXA222J100
	C215, C216	CQMXA242J100
	C227, C228	CQMXA272J100
	C161	CQMXA362J100
	C229, C230	CQMXA472J100
	C248	CQSA682J50
	C241	CQSA821J50
	C263, C264	CQSA331J160
	C239, C240	CQSA561J160

RESISTORS

Mark	Symbol & Description	Part No.
★	VR106, VR202 Semi-fixed (1kΩ)	VRTSGVS102
★	VR103, VR204, VR205	VRTSGVS103
★	VR102, VR104, VR201	VRTSGVS104
★	VR101, VR203 Semi-fixed (220Ω)	VRTSGVS221
★	VR107, VR206 Semi-fixed (2.2kΩ)	VRTSGVS222
★	VR207 Semi-fixed (22kΩ)	VRTSGVS223
★	VR208, VR209 Semi-fixed (220kΩ)	VRTSGVS224
★	VR302 Semi-fixed (47kΩ)	VRTSGVS473
	R408 Carbon composition resistor (2.2M/1/2W)	ACN-209
	R527, R528	RA4S103J
	R526 Resistor array (10k×4)	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	RN1/4P□□□□□F
	R420, R421	RS1LMF181J
	R409, R422	RS2LMF□□□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)	AKB1031
	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

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.

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

☆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.

CAPACITORS

Mark	Symbol & Description	Part No.
	TC301	ACM-019
	TC302	ACM-020
	C304	CCDUJ100D50
	C309	CEAS010M50
	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 (22k Ω)	VRTS6VS223
	Other resistors	RD1/8PM□□□J

OTHERS

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

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.

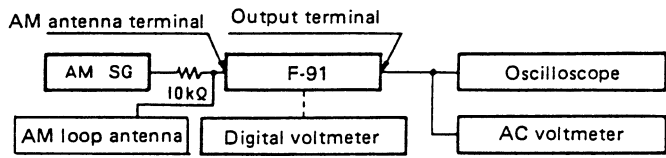


Fig. 7-1 AM adjustment wiring diagram

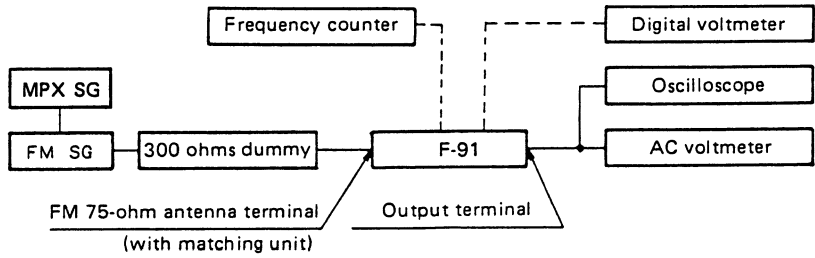


Fig. 7-2 FM adjustment wiring diagram

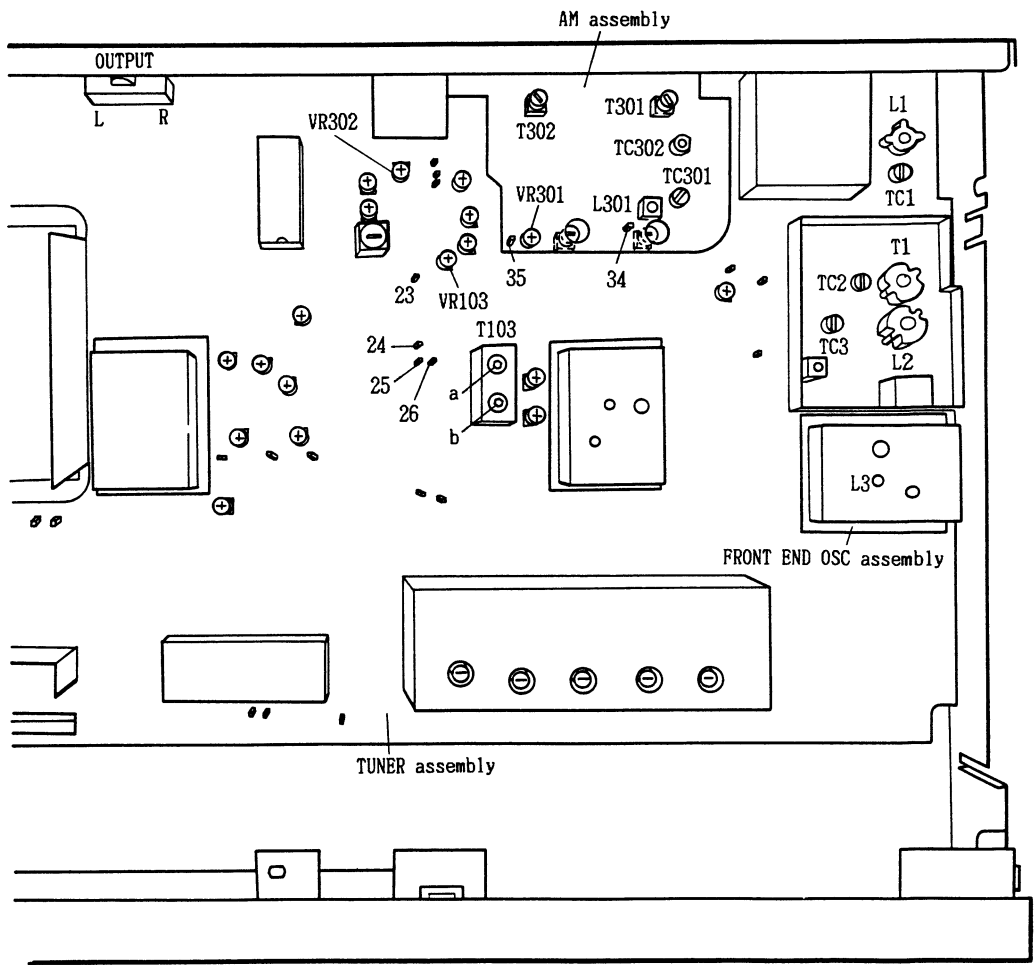


Fig. 7-3 Adjustment point

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.



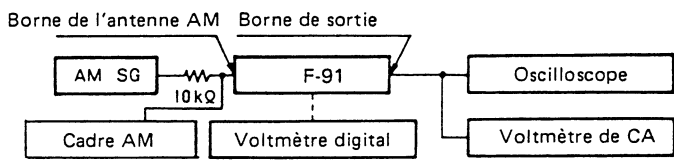


Fig.7-1 Diagramme de câblage de réglage AM

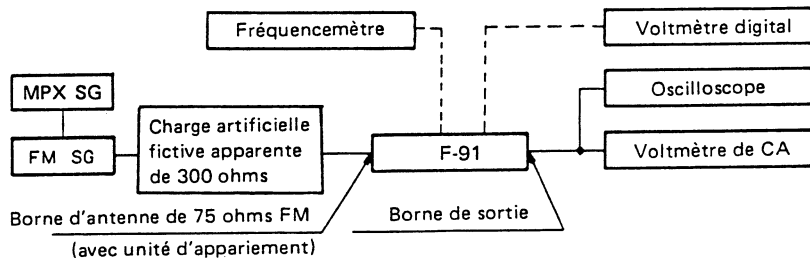


Fig.7-2 Diagramme de câblage de réglage FM

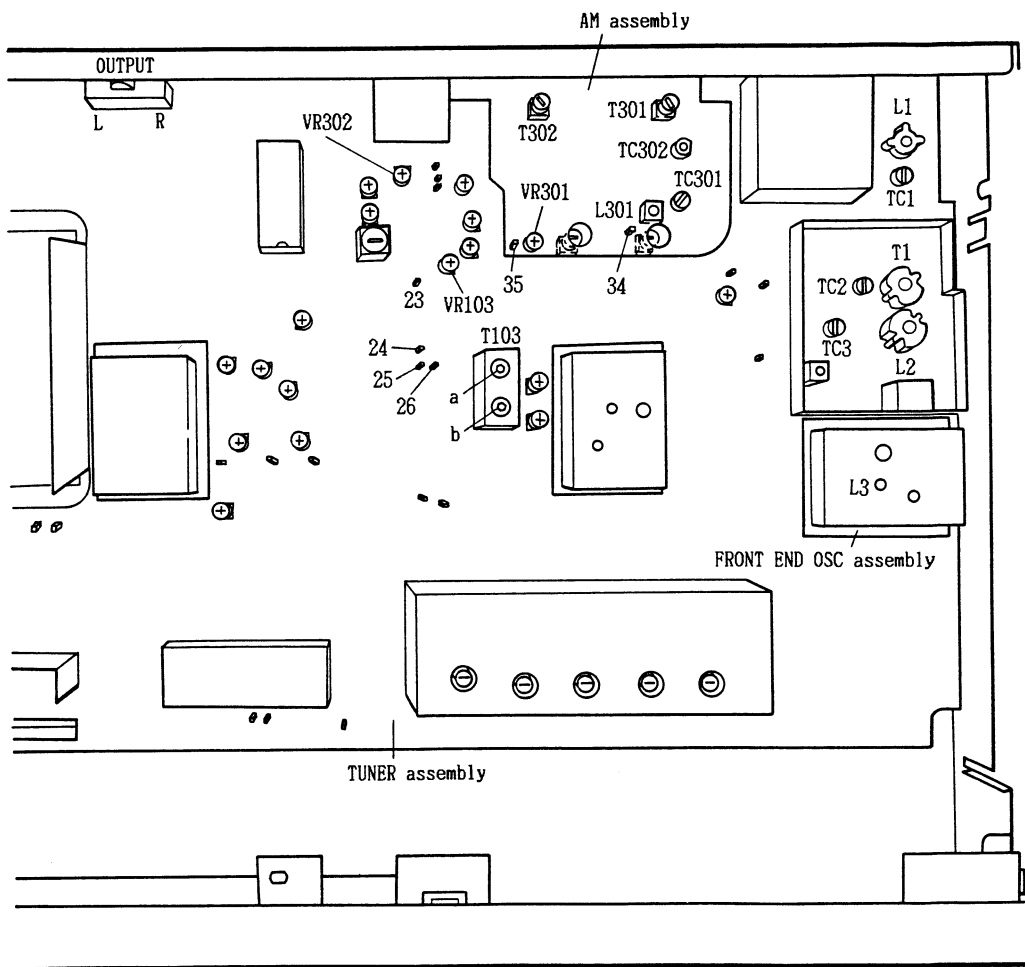


Fig.7-3 Point de réglage

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 HB).

*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 $\pm 6,75kHz$



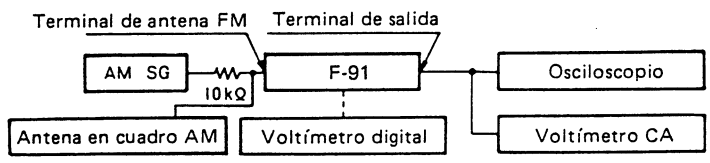


Fig. 7-1 Esquema de alambado de ajuste AM

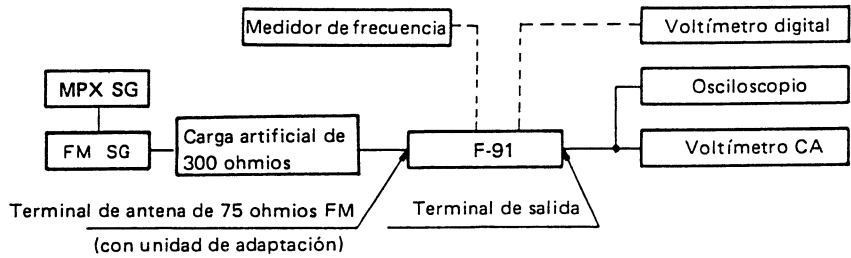


Fig. 7-2 Esquema de alambado de ajuste FM

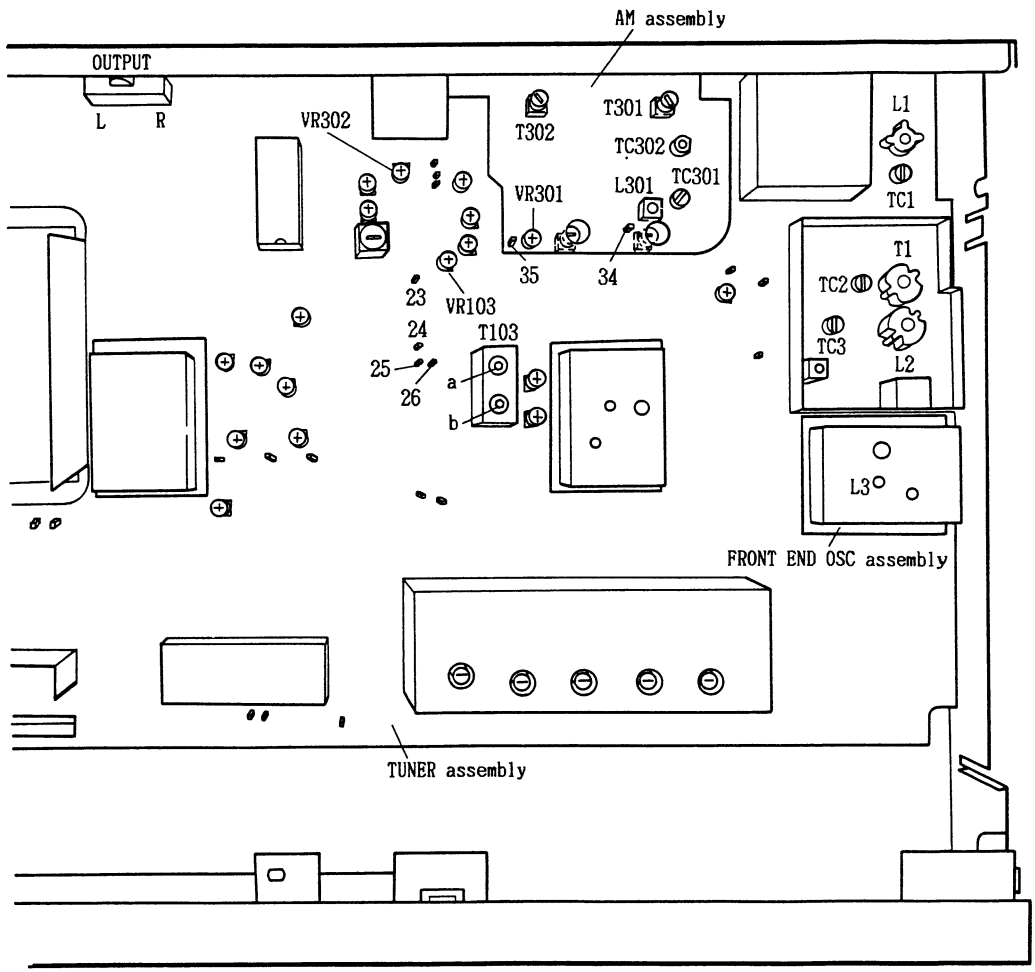


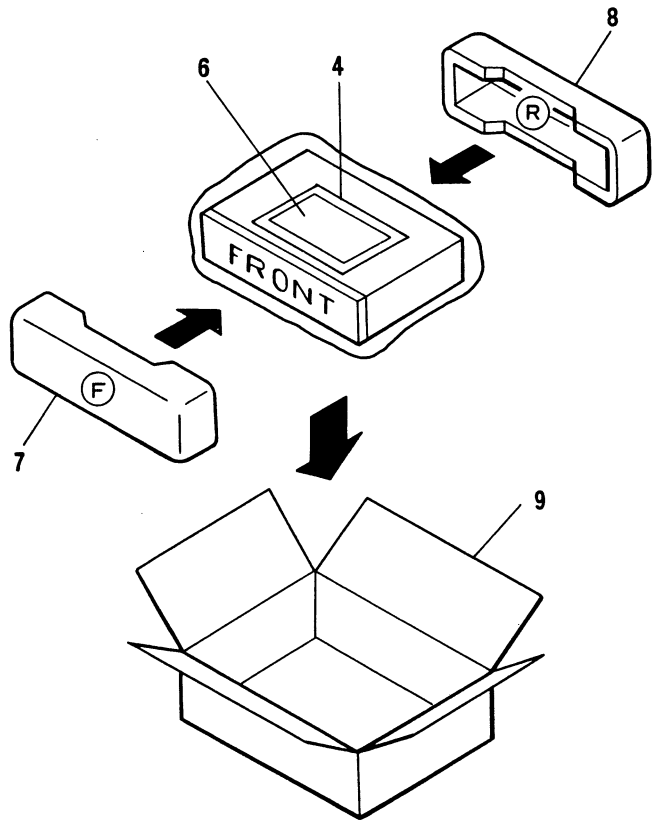
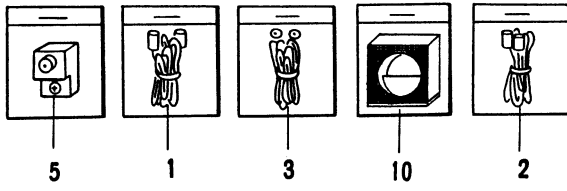
Fig. 7-3 Punto de ajuste

31

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

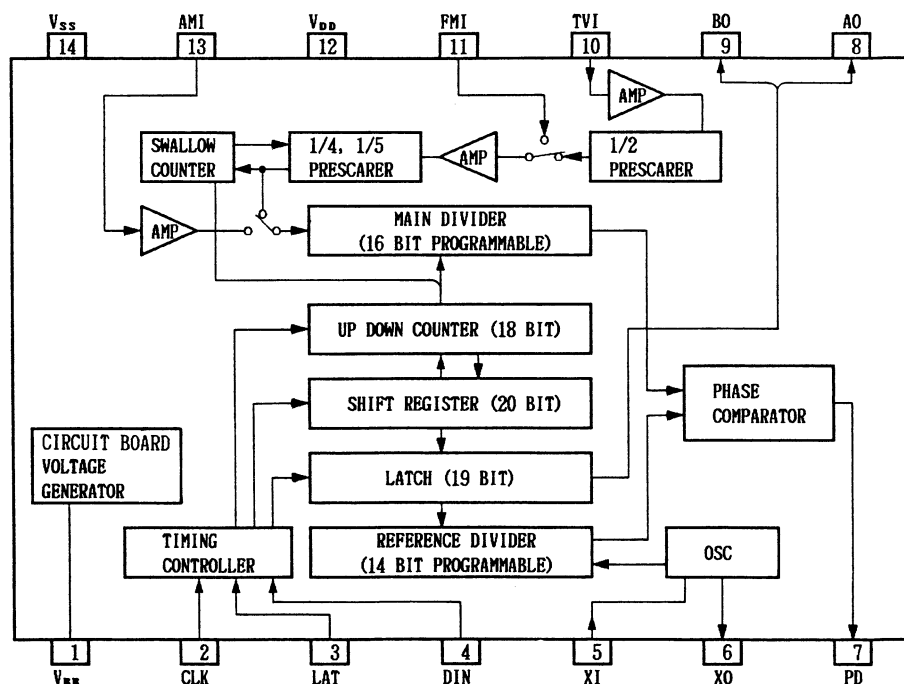
■ CX-7925B

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	A0	Exite control signal output/Unlock output (E/E MOS push-pull)
9	B0	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



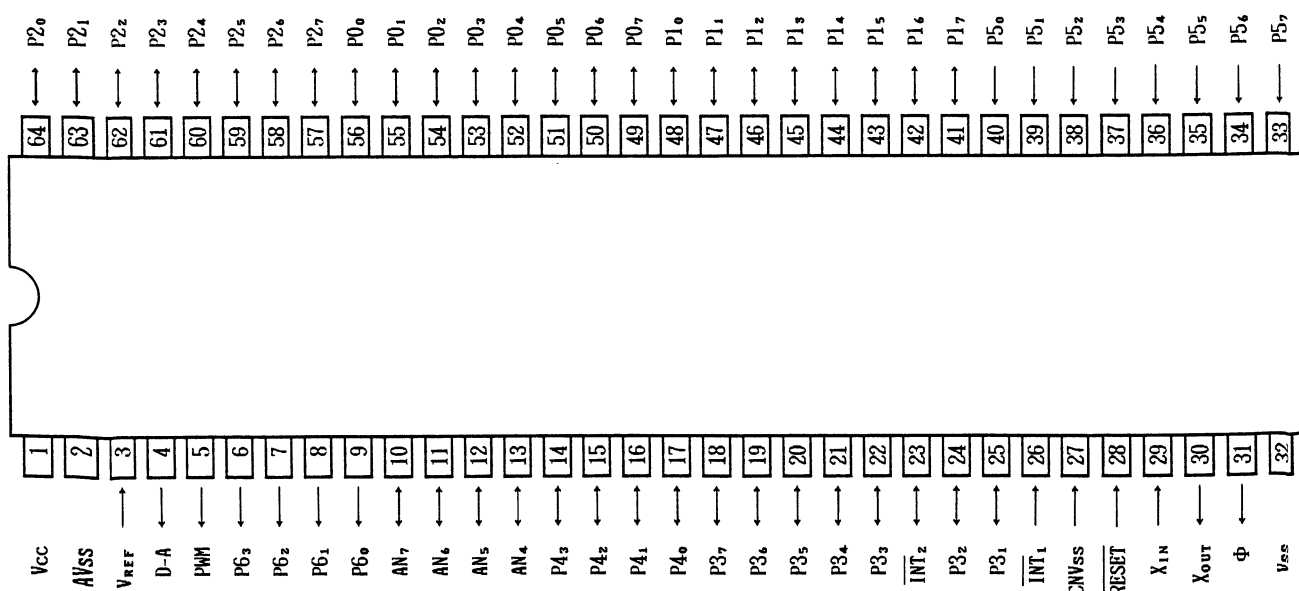
■ PD5056 (IC502)

● Pin Functions

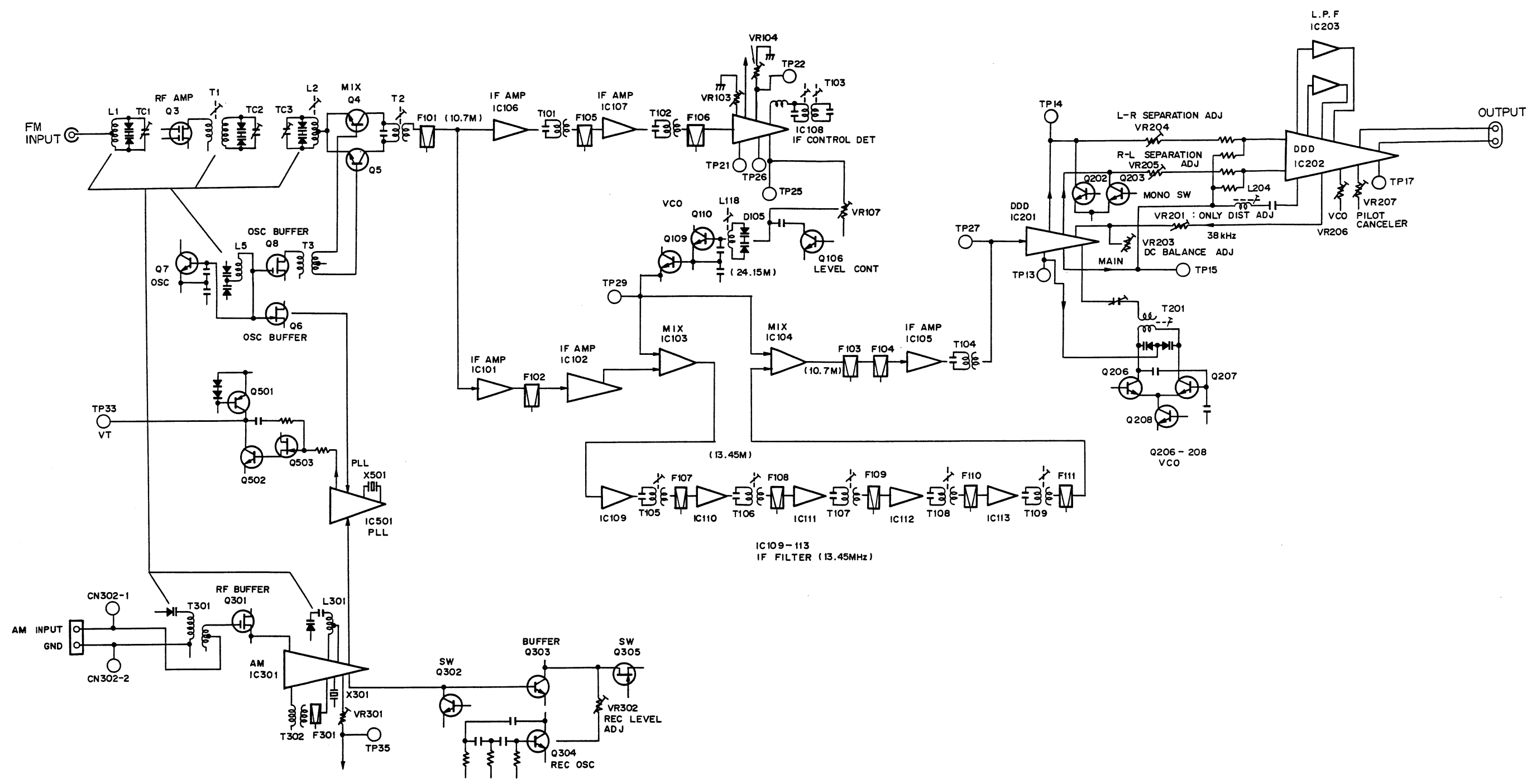
Pin	Pin name	Function & Operation	I/O	Active	Pin	Pin name	Function & Operation	I/O	Active	
1	V _{CC}	Power supply (5V)	-	-	33	P5 ₇	KEY MATRIX INPUT	I	-	
2	AV _{SS}	Analog ground (0V)	-	-	34	P5 ₆		I	-	
3	V _{REF}	Reference voltage input (5V)	-	-	35	P5 ₅		I	-	
4	D-A	N.C.	-	-	36	P5 ₄		I	-	
5	PWM	N.C.	-	-	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	0-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 ₃	9k/10k input (H=10k)	I	-	46	P1 ₂		(6)	N	L
15	P4 ₂	AM & REC CHECK CUT (AM or REC CHECK → H)	N	H	47	P1 ₁		(7)	N	L
16	P4 ₁	REC LEVEL CHECK	N	H	48	P1 ₀	(MSB)	N	L	
17	P4 ₀	N.C.	N	H	49	P0 ₇	LEVEL ADJ. CONT (0-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 (0V 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	CNV _{SS}	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 _{1IN}	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	V _{SS}	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 band is 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 (LPF).

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 (LPF).

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.

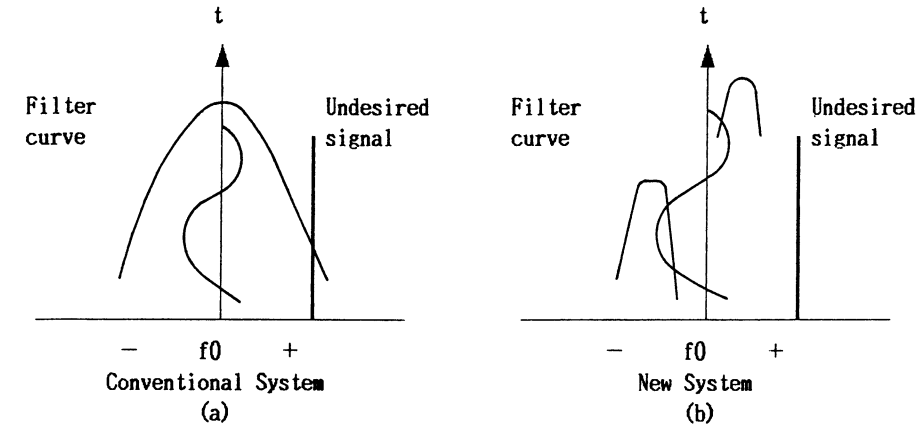


Fig.11-1 Signal tracing characteristics

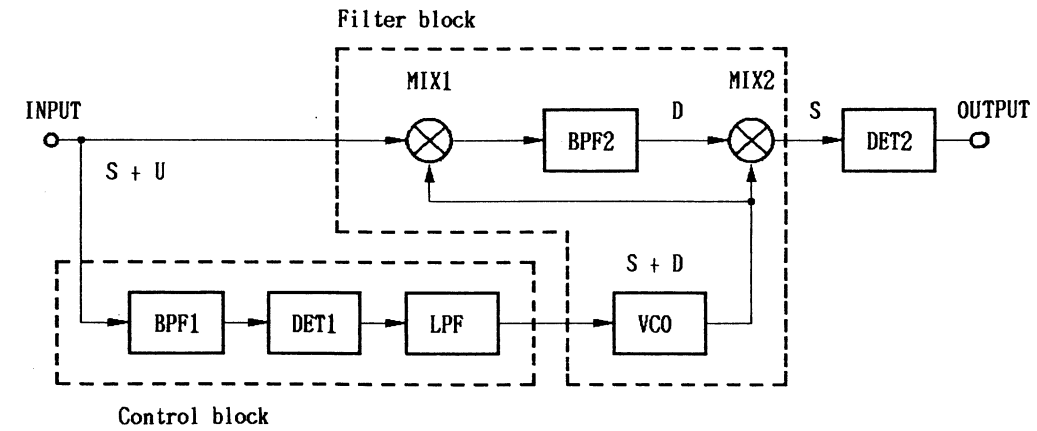


Fig.11-1 Blockdiagram of Active Real-time Tracing System

12. FOR HE, HB, HEZ AND SD/G TYPES

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 △ 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.

Contrast of Miscellaneous Parts.

The F-91/HE, HB, HEZ and SD/G types are the same as the F-91/KU/CA type with the exception of the following sections.

Mark	Symbol & Description	Part No.					Remarks
		F-91/KU/CA type	F-91/HE type	F-91/HB type	F-91/HEZ type	F-91/SD/G type	
	TUNER assembly	AWZ1568	AWZ1567	AWZ1567	AWZ1566	AWZ1569	
	REMOCON assembly	Non supply	• • • •	• • • •	• • • •	Non supply	
	Acrylic panel	AAK1298	AAK1303	AAK1303	AAK1303	AAK1298	
	FL filter	AAK1300	AAK1299	AAK1299	AAK1299	AAK1300	
	Connection cord with Mini plug	ADE-085	• • • •	• • • •	• • • •	ADE-085	
△	AC power cord	ADG-088	ADG1021	ADG-063	ADG1010	ADG-088	
	FM antenna	ADH-005	• • • •	• • • •	• • • •	ADH-005	
	FM antenna assembly	• • • •	ADH1002	ADH1002	ADH1002	• • • •	
	Antenna adaptor	AKX-080	• • • •	• • • •	• • • •	AKX-080	
	Side board L	AMS1015	AMS1019	AMS1015	AMS1019	AMS1015	
	Side board R	AMS1016	AMS1020	AMS1016	AMS1020	AMS1016	
	Operating instructions (English)	ARB1075	• • • •	ARB1075	• • • •	ARB1075	For packing
	(English / German / French / Italian)	• • • •	ARE1054	• • • •	• • • •	• • • •	
	(German)	• • • •	• • • •	• • • •	ARC1051	• • • •	
	(Spanish)	• • • •	• • • •	• • • •	• • • •	ARC1068	
△ ★	Power transformer (T901) (AC120V)	ATT1043	• • • •	• • • •	• • • •	• • • •	For 2P pin-jack
	(AC220/240V)	• • • •	ATT1045	ATT1045	ATT1045	• • • •	
	(AC110/120-127/220/240V)	• • • •	• • • •	• • • •	• • • •	ATT1044	
	Screw	• • • •	• • • •	• • • •	ABA1035	• • • •	
	Spacer	• • • •	• • • •	• • • •	• • • •	AHB1021	For packing
	Packing case	AHD1259	AHD1259	AHD1259	AHD1259	AHD1260	For packing

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	.....	.....	.....