

# ONKYO® SERVICE MANUAL

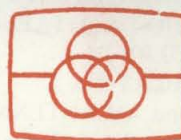
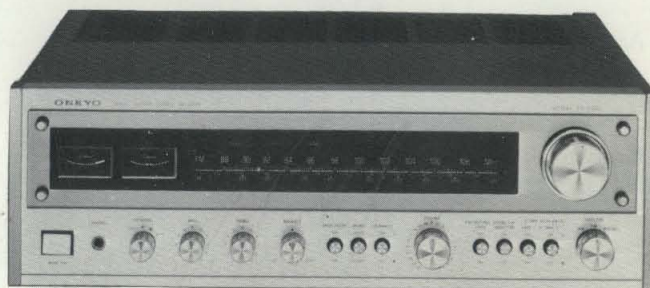
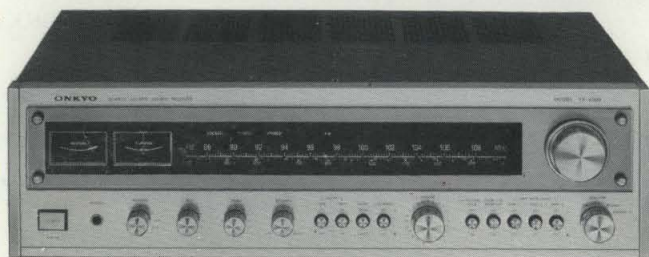
## UNIVERSAL TYPE

### QUARTZ LOCKED

### SERVO LOCKED

**STEREO RECEIVER  
TX-4500**

**STEREO RECEIVER  
TX-2500**



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## INDEX

Item	Page	
	TX-4500	TX-2500
Specifications	2	3
Circuit Description	3	
Block Diagram	7	8
Component Location	9	9
Packing Procedure	10	10
Alignment Procedure	11	11
Chassis Layout	16	15
Parts List	17	25
Circuit Diagram	19	27
Front End Board View	24	32
Dial Cord Arrangement	24	32
Service Procedure	33	33



**SPECIFICATIONS****MODEL TX-4500 QUARTZ LOCKED STEREO RECEIVER****General**

Power Supply Rating	AC 110/120/220/240 volts, 50/60 Hz
Controls	POWER SPEAKERS (OFF, A, B, C. A + B, A + C) SELECTOR (AM, FM, PHONO 1, PHONO 2) TAPE MONITOR 1, 2 & 3 TUNING, VOLUME, BALANCE, TREBLE, BASS DOLBY NR SWITCH, FM MUTING/ LOCK SWITCH LOUDNESS, MODE, FILTER HIGH & LOW
Antennas	FM: 300 $\Omega$ balanced, 75 $\Omega$ unbalanced AM: Built in ferrite core antenna and external terminal
Outputs	SPEAKER A, B & C, HEADPHONES TAPE REC OUT 1, 2 & 3, FM DOLBY OUT PRE OUT, FM 4CH OUT DIN REC OUT 1 & 2
Inputs	PHONO 1 & 2, TAPE PLAY 1, 2 & 3, DOLBY IN DIN PLAY 1 & 2 FM and AM ANTENNA
Dimensions	538 mm W x 163 mm H x 400 mm D
Weight	16.6 kg
Semiconductors	1 FET, 72 Transistors, 8 ICs, 59 Diodes

**Amplifier Section**

Power Output	65 watts per channel, at 4 ohms, both channels driven, from 20 Hz to 20 kHz, with no more than 0.1 % total harmonic distortion. 55 watts per channel, at 8 ohms, both channels driven from 20 Hz to 20 kHz, with no more than 0.1 % total harmonic distortion. 75 watts per channel, at 4 ohms, both channels driven at 1 kHz, 0.1 % THD. 60 watts per channel, at 8 ohms both channels driven at 1 kHz, 0.1 % THD.
Total Harmonic Distortion	0.1 % at rated power 0.08 % at 1 watt output
IM Distortion	0.3 % at rated power 0.1 % at 1 watt output
Damping Factor	50 (8 ohms 1 kHz 10 watts)
Frequency Response	15-30,000 Hz ( $\pm 1$ dB) 2-80,000 Hz ( $\pm 1$ dB in power amplifier alone)
Tilt (sag) of Square Wave	less than 5 % at 50 Hz (power amplifier alone)

**Sensitivity and Impedance**

PHONO-1/2:	2.5 mV, 50 kohms
Tape Play-1/2/3:	150 mV, 50 kohms
Tape Rec-1/2/3:	150 mV, 50 kohms
DIN Play	: 150 mV, 50 kohms
DIN Rec	: 30 mV, 50 kohms
DOLBY OUT	: 150 mV, 50 kohms
DOLBY IN	: 350 mV (30 %) 50 kohms
PRE OUT	: 1 V, 3 kohms
MAIN IN	: 1 V, 100 kohms
Phono Overload Bass Control	200 mV RMS 1 kHz 0.1 % $\pm 12$ dB at 100 Hz
Treble Control	$\pm 10$ dB at 10 kHz
Signal-to-Noise Ratio	PHONO : 65 dB (IHF C NETWORK) TAPE : 80 dB (IHF C NETWORK) High : 6 kHz (12 dB/oct.) Low : 100 Hz (12 dB/oct.)
Filters	

**Tuner Section**

Tuning Range	FM: 87.5-108 MHz AM: 530-1605 kHz
Usable Sensitivity	FM Mono : 1.8 $\mu$ V (10.3 dBf) IHF : 1.5 $\mu$ V DIN (S/N 26 dB, 40 kHz deviation) Stereo: 5.0 $\mu$ V (19.2 dBf) IHF : 4.5 $\mu$ V DIN (S/N 46 dB, 40 kHz deviation) AM : 25 $\mu$ V
50 dB Quieting Sensitivity	FM Mono : 4 $\mu$ V (17.2 dBf) IHF Stereo: 40 $\mu$ V (37.2 dBf) IHF
Intermediate Frequency	FM: 10.7 MHz AM: 455 kHz
Capture Ratio	FM: 1.5 dB
Image Rejection Ratio	FM: 70 dB AM: 40 dB
IF Rejection Ratio	FM: 100 dB AM: 40 dB
Signal to Noise Ratio	FM: 70 dB (Mono) 65 dB (Stereo) AM: 40 dB
Alternate channel att. Selectivity	FM: 70 dB FM: 55 dB DIN ( $\pm 300$ kHz, 40 kHz Deviation)
AM suppression ratio	FM: 50 dB
Harmonic Distortion	FM: 0.2 % (Mono) 0.4 % (Stereo) AM: 0.8 %
Frequency Response	FM: 30-15,000 Hz +0.5, -2 dB
Stereo Separation	FM: 40 dB at 1 kHz 30 dB at 100-10,000 Hz
Muting Level	FM: 4 $\mu$ V
Stereo Lamp Level	FM: 4 $\mu$ V
Quartz Lock Level	FM: 4 $\mu$ V
Tuning Meters	Signal Strength & Center Tuning
Spurious Rejection	FM : $\frac{1}{2}$ IF 85 dB
Pilot Carrier Suppression	FM: 60 dB

Specifications and features are subject to change without notice for improvement.

# SPECIFICATIONS

## MODEL TX-2500 SERVO LOCKED STEREO RECEIVER

### Amplifier section

Dynamic Power	120 watts total
Power Output	40 watts per channel at 4 ohms both channels driven 1 kHz 0.5 % THD. 30 watts per channel at 8 ohms both channels driven 1 kHz 0.5 % THD. 34 watts per channel at 4 ohms both channels driven 40-20,000 Hz 0.5 % THD. 27 watts per channel at 8 ohms both channels driven 40-20,000 Hz 0.5 % THD.
Total Harmonic Distortion	0.5 % at rated power 0.2 % at 1 watt output
IM Distortion	0.5 % at rated power 0.3 % at 1 watt output
Damping Factor	40 (8 ohms 1 kHz 10 watts)
Frequency Response	20 ~ 30,000 Hz ( $\pm 1$ dB) 2 ~ 60,000 Hz ( $\pm 1$ dB at power amplifier) better than 5 % at 50 Hz.
Tilt (sag)	
Sensitivity and Impedance	PHONO : 2.5 mV 50 kohms TAPE PLAY : 150 mV 50 kohms TAPE REC : 150 mV 50 kohms DOLBY OUT : 150 mV 50 kohms DOLBY IN : 350 mV 50 kohms
Phono Overload	150 mV RMS 1 kHz 0.5 % THD
Bass Control	$\pm 12$ dB at 100 Hz
Treble Control	$\pm 10$ dB at 10 kHz
Signal-to-Noise Ratio	PHONO : 65 dB (IHF C NETWORK) TAPE : 80 dB (IHF C NETWORK)
Filter	6 kHz

### Tuner section

Tuning Range	FM: 87.5 ~ 108 MHz AM: 530 ~ 1605 kHz
Usable Sensitivity	FM Mono : 2 $\mu$ V (11.2 dBf) IHF : 1.6 $\mu$ V DIN(S/N 26 dB, 40 kHz deviation) FM stereo : 5.0 $\mu$ V (19.2 dBf) IHF : 50 $\mu$ V DIN(S/N 46 dB, 40 kHz deviation) AM: 25 $\mu$ V
50 dB Quieting Sensitivity Intermediate Frequency	FM: 10.7 MHz AM: 455 kHz
Capture Ratio	FM: 2 dB
Image Rejection	FM: 45 dB AM: 40 dB
IF Rejection	FM: 80 dB AM: 30 dB
Signal-to-Noise Ratio	FM Mono : 65 dB FM stereo : 60 dB AM: 40 dB
Alternate Channel att. Selectivity	FM: 60 dB FM: 42 dB DIN ( $\pm 300$ kHz, 40 kHz deviation)
AM Suppression	FM: 50 dB
Harmonic Distortion	FM Mono : 0.2 % AM: 0.8 % FM stereo : 0.4 %
Frequency Response	FM: 30 ~ 15,000 Hz +0.5, -2 dB
Stereo Separation	FM: 37 dB at 1 kHz 30 dB at 100 ~ 10,000 Hz
Muting Level	FM: 4 $\mu$ V (17.2 dBf)
Stereo Lamp Level	FM: 4 $\mu$ V (17.2 dBf)
Locking Level	FM: 4 $\mu$ V (17.2 dBf)
Tuning Meter	Signal Strength & Center Tuning

### General

Power Supply	AC 110/120/220/240 volts, 50/60 Hz
Dimensions	488 mm W x 163 mm H x 400 mm D
Weight	12 kg.

Specifications and features are subject to change without notice.

## CIRCUIT DESCRIPTION

### 1. Tuning Knob

Touch of the tuning knob causes the ham to be initiated, which, in turn, is amplified at Q 126, followed by rectification at D 119, and 120, while the transistor of Q 135 allows passage thereby causing the signal for the local oscillation frequency regulation to drop to the earth, thus leading to a perfect tuning.

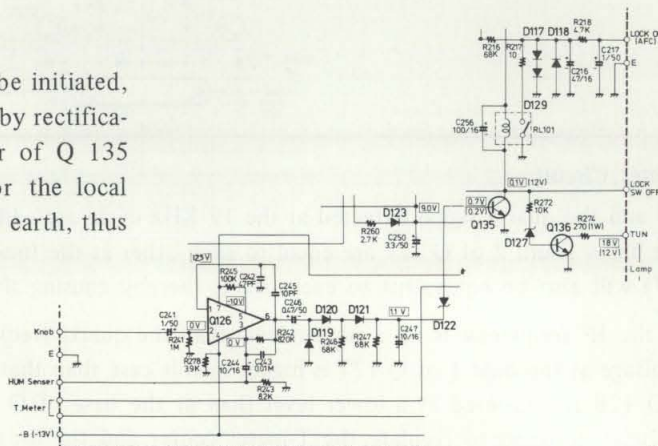


fig-1

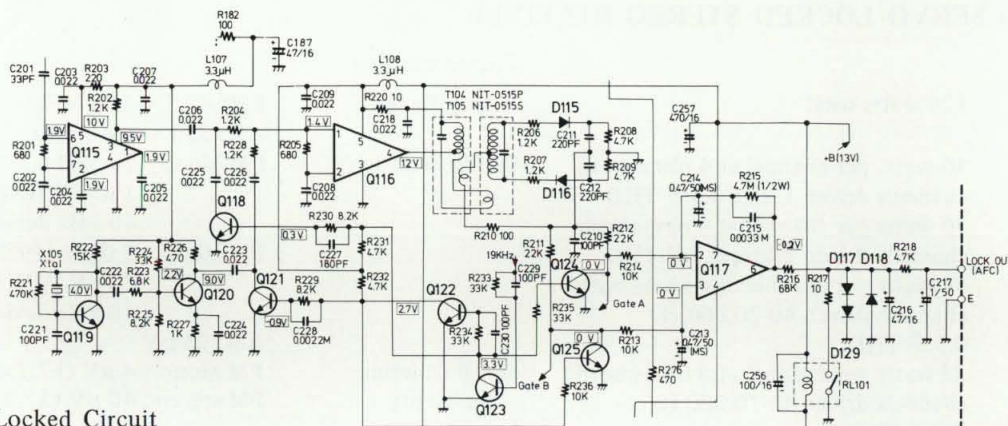


fig-2

### 2. Quartz Locked Circuit

The IF component of the quadrature detector output of Q 102 and the quartz oscillation signal at 10.7 MHz of Q 119 are detected with the cycle of 19 KHz, and the variance of the detected output is amplified with the DC voltage being imparted to the variable capacitance diode at the front end. In this way, the local oscillation frequency is regulated.

(Circuit Performance)

Q 123 is set to ON-OFF motions with the rectangular waves at 19 KHz inducted from No. 10 terminal of Q 103 of MPX IC at the cycle of 19 KHz.

In case Q 123 is set to ON position, Q 118 and 124 are turned OFF, and the IF signal is amplified by Q 116, detected at T 104 and 105 and added to No. 2 terminal of Q 117.

Q 122, on the other hand, is turned OFF as Q 123 is set to ON position, with Q 121 and 125 being also turned ON to cause the quartz oscillation signal (10.7 MHz) to precipitate to the earth. Conversely, when the Q 123 is turned OFF, the switching transistors (Q 118, 121 – 125) perform functions in complete reversal to the above, with the quartz oscillation signal amplified by Q 116, detected in turn at T 104 and 105, added to No. 3 terminal of Q 117, resulting in the fall of the IF component to the earth.

The preceding performance repeats itself at 19 KHz, amplifying the input variance (between the IF signal and the quartz oscillation signal) with the OP amplifier of Q 117, which is then caused to pass the low-pass filter, to be imparted to the variable capacitance diode. In this manner, the local oscillation frequency is regulated.

The deviation from center of the detector transformers T 104 and T 105 will be registered alike with both transformers and will have no relationship whatsoever with the AFC input.

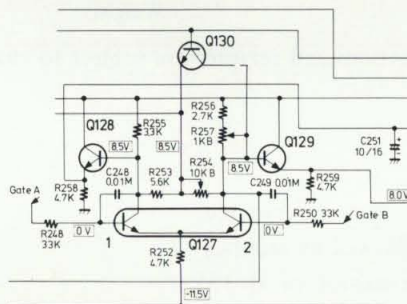


fig-3

### 3. Tuning Meter Circuit

The IF signal and the quartz signal detected at the 19 KHz cycle are added to the bases 1 and 2 of Q 127. Since the voltage at the bases 1 and 2 of Q 127 are equal to each other at the time of tuning, the voltage at the bases of Q 128 and 129 (OV) will also be equivalent to each other, thereby causing the T-meter to point to the center.

In the event the IF frequency is on a higher level than the quartz frequency, the T-meter is caused to swing to the left as the voltage at the base 1 of Q 127 is higher in this case than that at the base 2, and at the same time, same at the base of Q 128 is registered at a lower level than at the base of Q 129. Incidentally, R 257 and R 254 are the semi-fixed volume designed to regulate the T-meter center and the breadth of the same, respectively. In addition, Q 130 is designed to avert any error in performance by shortcircuiting the T-meter at the time of detuning.

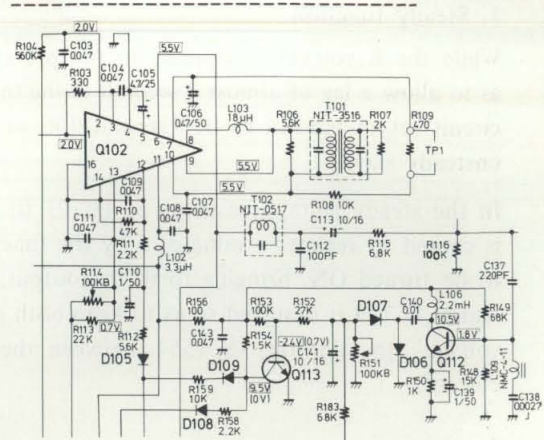
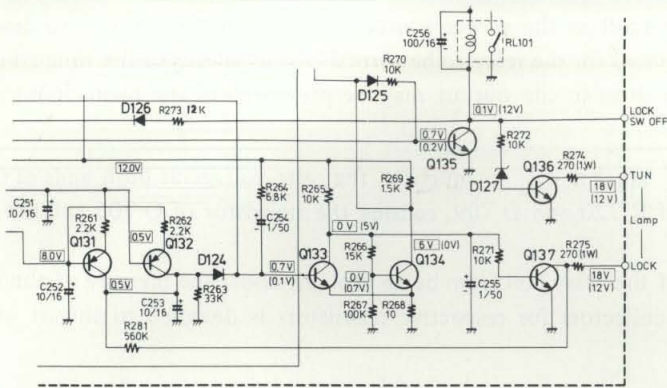


fig-4

#### 4. Muting Circuit

The muting circuit is operated through utilization of functions of the IF carrier, the 0-point detection (variance in detected waves between IF and Quartz) and the noise component.

(At time of tuning)

For reasons that the base potential of Q 128 and 129 is in the state of 0V in terms of direct current as can be noted from the description given of the T-Meter Circuit at the time of tuning, the emitter potential of Q 128 and 129 is rendered equal to each other. As for Q 131 and 132, these are cut off to cause 0V output to be brought forth. At the same time, the IF carrier portion, at the time of tuning, is at a lower level in voltage than the standard level for the Schmitt trigger of Q 133 and 134 as muting regulating output inside the quadrature detector IC. For this reason, Q 133 is turned OFF while Q 137 is turned ON, which, in turn, causes Q 109 and 110 to be turned OFF.

(At time of detuning)

When the voltage of the 0-point (the variance in output between the IF detector and quartz detector) has turned positive or negative, if it come to stay on the plus side, for instance, the base potential of Q 128 is caused to drop, that of Q 129 to pick up, with Q 132 and 133 being turned ON. Again Q 109 and 102 are turned ON at the same time, with the signal being caused to drop to the earth. Again, simultaneously, Q 133 is turned ON, Q 134 OFF, Q 135 ON, causing the AFC circuit to be closed. In addition, the IF carrier portion, too, is caused to act upon Q 133, turning Q 133 ON.

Again, the L 106 resonance point is arranged at a higher level as the noise portion enters into the Q 112 base, so that Q 112 may act on the noise amplifier, causing the Q 113 to be turned OFF. This passes through D 109 and is added to the base of Q 131. It also passes through D 105, causing the transistor of Q 130 to be turned ON, and thus, causing, in turn, the meter circuit to be shortcircuited, thus ensuring against any error in performance.

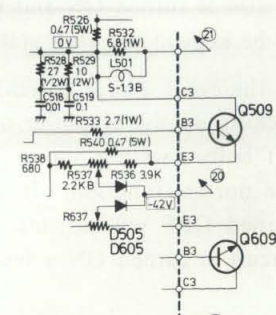
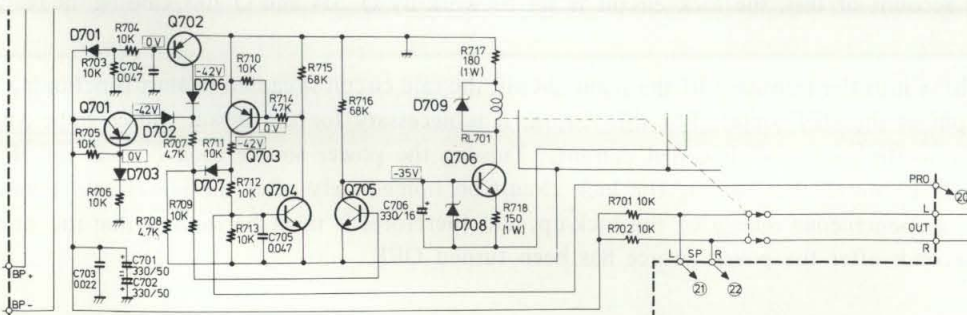


fig-5

## 5. The Explanation of Protection Circuit

### 1. Steady function

While the B voltage is supplied to the protection circuit as the power source switch is turned on, it is so designed as to allow a lag of almost 4 seconds in the time required for the relay to be turned ON, by means of the time-constant circuit set to motion by R 716 and 706 so that a drop in the output may be prevented of the main circuit in the unsteady state.

In the steady state, transistors of Q 701 to Q 705 are cut off, so much so that the voltage at both ends of C 706 is caused to register a value of 6 by the function of R 720 and D 709, causing the transistor of Q 706 and the delay to be turned ON, bringing forth the output.

Again, D 709 is designed so as to keep both ends of the relay coil from being brought under the pressure of abnormal voltage. In addition, 1S 1554 between the base collectors for respective transistors is designed to thwart inverse current.

### 2. Detection of abnormal voltage

As the equivalent of 2 or more is generated at the center line of the main amplifier, there is a mixing between the right side and the left side at R 701 and 702, with the alternate current portion being cut off at C 701 and 702. In the case that the direct current generated here is negative, the current, passing through D 701, is broken up into partial pressure, acting on the base of the transistor at Q 702, which, in turn, causes Q 702 to open up allowing the current to pass through in the sequence of D 706 — R 707 — R 708.

As a result, the portion of voltage generated by R 708 is caused to be reinforced to Q 705, rendering the transistor to be turned ON. This, in turn, causes the voltage of the collector at Q 705 to fall, thus making the base potential of Q 706 go deeper into the negative side and turning the Q 706 OFF. This in turn causes the relay to be turned OFF, and also, the output circuit to be cut off.

In the event the base potential is on the positive side, the similar function takes place within the loop of Q 721 — D 202 — R 707 — R 708.

By eliminating a cause or causes for DC generation at the center line, the relay is caused to turn ON by the function staged in reverse order of the description given, causing the proper function to start automatically.

### 3. Detection of abnormal current

When the abnormal current is generated on the driver stage (power stage) of the main amplifier, the voltage is detected by the collector resistance and added subsequently to semi-solid resistance R 537 and 637 which are designed for current detection in the protection circuit. (The semi-solid resistance is set to function with the adequate flow of current causing the protection circuit to start operating. Refer to the Chapter dealing with Adjustment.) By the voltage reaching Q 704 by way of D 536 and D 636, Q 704 is caused to be turned ON while R 705 witnesses a voltage drop, resulting in Q 703 being turned ON.

As a result, the current flows in the sequence of Q 703 — R 711 — D 707 — R 708, and by the voltage generated at R 708, R 705 is turned ON while Q 706 is turned OFF, causing the relay, in turn, to be turned OFF, thereby cutting off the output circuit. By the voltage added to the base of Q 704 through R 713, on the other hand, Q 704 is turned ON and on account of this, the lock circuit is set to work by Q 704 and Q 703, causing the relay to be kept in the OFF state.

In the event a large current flows into the transistor of the main circuit, the said circuit is caused to start functioning, locking up the amplifier output in the OFF state. For this reason, it is necessary for the power source to be cut off before setting out to remove the cause for abnormal current. Turning the power source back on will set off the normal function. It should be noted that turning the lock circuit on immediately after the power source was turned OFF will not lead to a spontaneous release of the lock-up, and therefore, it must be assured that the lock circuit is turned ON a few seconds after the power source has been turned OFF.

# TX-4500 BLOCK DIAGRAM

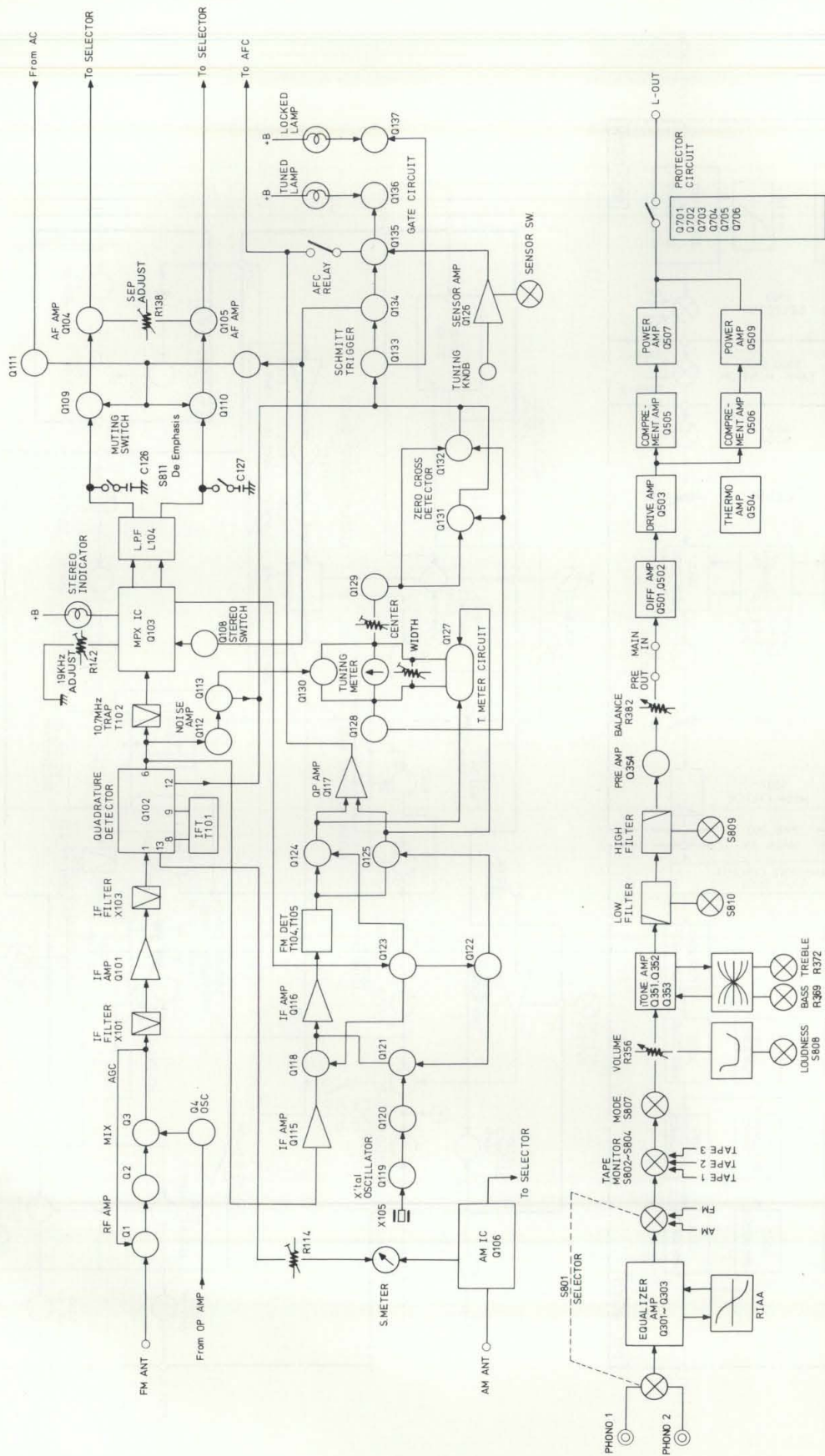


fig-6

# TX-2500 BLOCK DIAGRAM

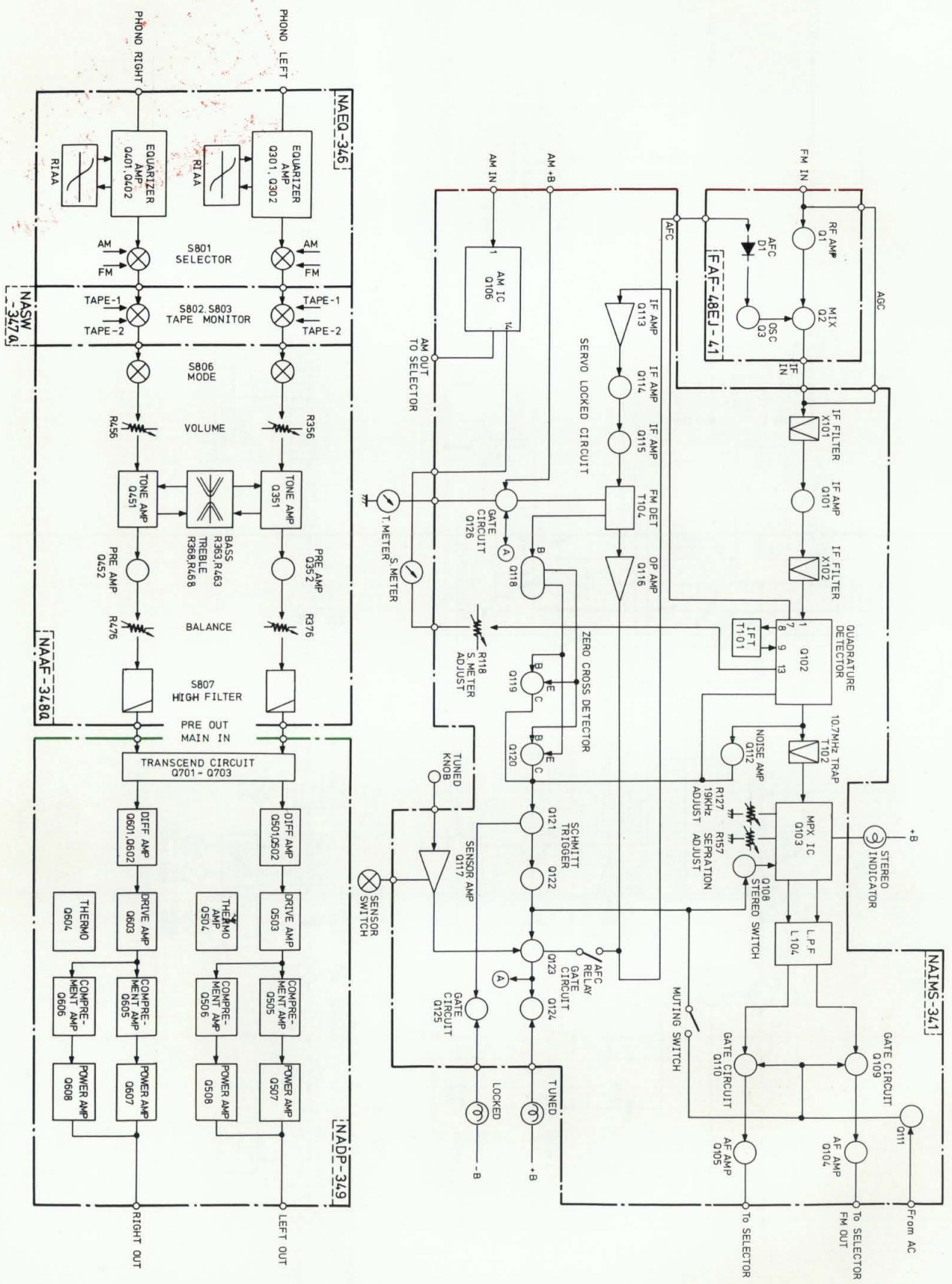


fig-7



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# COMPONENT LOCATION

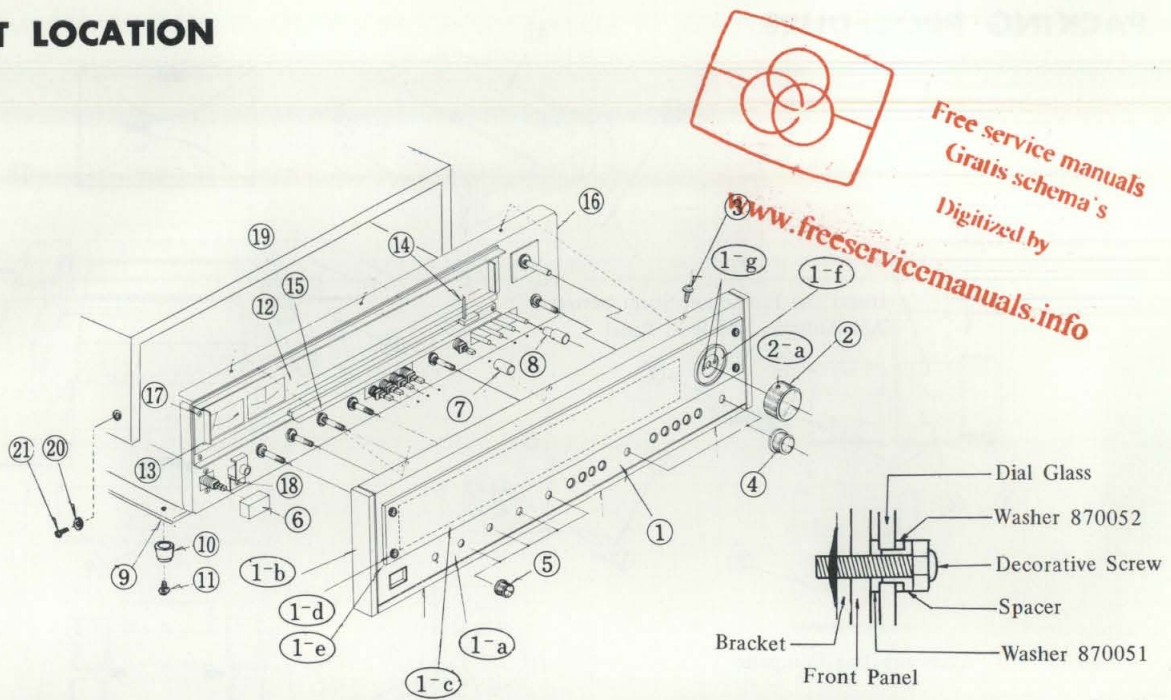
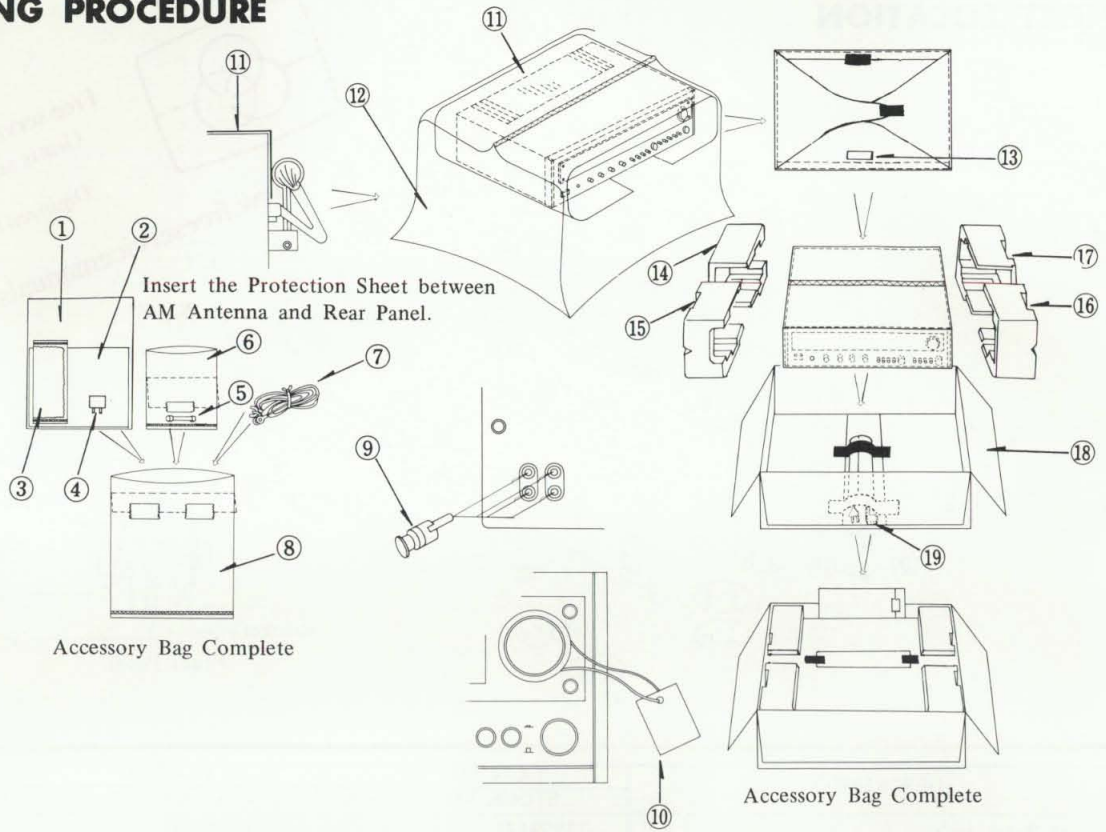


fig-8

ITEM	DESCRIPTION	TX-4500		TX-2500	
		STOCK NO.	Q'TY	STOCK NO.	Q'TY
1	Front Panel Ass'y	13829121	1	13809121	1
1-a	Front Panel	27210045	1	27210046	1
1-b	End Cap	28125032	2	28125032	2
1-c	Dial Glass	28191007	1	28191008	1
1-d	Spacer	27270014	4	27270014	4
1-e	Decorative Screw	27300038	4	27300038	4
1-f	Tuning Ring	27265003A	1	27265003A	1
1-g	Tapping Screw 3STS+6BQ	834130062	2	834130062	2
2	Tuning Knob	28320136	1	28320136	1
2-a	Enamel Screw		(1)		(1)
3	Tapping Screw 3STW+8BQ	831130082	6	831130062	6
4	Volume Knob	28320132	2	28320132	2
5	Tone Knob	28320131	4	28320131	4
6	Power Knob	28320130	1	28320130	1
7	Push Button A	28320133	5	28320133	4
8	Push Button B	28320134	4	28320134	3
9	Bottom Board	27170017	1	27170018	1
10	Rubber Cushion	280889	4	280889	4
11	Tapping Screw 3STW+16BQ	831130162	4	831130162	4
12	Dial Plate	28130032A	1	28130034	1
13	Bracket-Dial Plate	27240006	1	27240007	1
14	Pointer Ass'y	13829133	1	13829133	1
15	Pointer Rail	27300035	1	27300036	1
16	Bracket-Front	27110023B	1	27110024B	1
17	Tapping Screw 3STS+10BQ	834130102	4	834130102	4
18	Bracket-Headphone	27140090A	1	27140090	1
19	Amp. Box	28110095A	1	28110096A	1
20	Washer 4-12BS-Ni	870040	4	870040	4
21	Screw 4MS+15BS-Ni	82374015	4	82374015	4

## PACKING PROCEDURE



ITEM	DESCRIPTION	TX-4500		TX-2500		
		STOCK NO.	Q'TY	STOCK NO.	Q'TY	
1	Instruction Manual (English)	29340183	1	29340182	1	U
	Instruction Manual (German)	29340126	1	29340128	1	G
2	Warranty Card (German)	29365001-1	1	29365001-1	1	G
3	Silicon Cloth	292017-2	1	292017-2	1	
4	Conversion Plug CV-K	292063	1	292063	1	U
5	Fuse 5A-T	252020	1			U
	3A(ST-2)			252005	1	U
	3A(SS-2)			252006	1	
6	Poly Bag 80X150m/m (Fuse)	29100002	1	29100002	1	U
7	FM Antenna Ass'y	292064	1	292064	1	
8	Poly Bag 350X250m/m	29100006A	1	29100006A	1	
9	Shorted Pin PO-107	250153	4	250153	4	
10	Sensor Tag	29355045	1	29355045	1	
11	Protection Sheet 500X1200m/m	290093	1	290093	1	
12	Poly Bag 720X1020m/m	29100020	1	29100020	1	
13	Caution Label	293041	1	293041	1	
14	Pad-Left (Back)	29090150	1	29090150	1	
15	Pad-Left (Front)	29090149	1	29090149	1	
16	Pad-Right (Front)	29090147	1	29090147	1	
17	Pad-Right (Back)	29090148	1	29090148	1	
18	Master Carton Box	29050082	1	29050083	1	
19	Power Supply Cord Ass'y		1		1	
	Power Supply Cord AS-CEE	253083	(1)	253083	(1)	U
	Power Supply Cord AS-VDE-1	253088	(1)	253088	(1)	G
	Voltage Tag	293268	(1)	293268	(1)	
	Poly Bag 220X330m/m	29100005	(1)	29100005	(1)	

U: Universal

G: Germany

# ALIGNMENT PROCEDURE

## INSTRUMENTS REQUIRED

1. DC Ammeter
2. DC Voltmeter
3. AM/FM Sweep Generator
4. AM/FM Signal Generator
5. Vacuum Tube Voltage Meter (VTVM) AC, DC
6. Oscilloscope
7. Monitorscope
8. Distortion Analyzer
9. Stereo Modulator
10. Frequency Counter
11. CR Oscillator

## GENERAL ALIGNMENT CONDITIONS

1. Signal input should be kept as low as possible.
2. Standard modulation is 400Hz 30% (AM), 400Hz 100% (FM MONO), pilot 10% sub and main 90% (FM STEREO).
3. Standard knob position  
 SPEAKERS..... A    VOLUME..... Maximum  
 BASS, TREBLE & BALANCE..... Center  
 LOW & HIGH FILTER..... OFF  
 MODE..... STEREO  
 LOUDNESS..... OFF  
 MUTING LOCK & DOLBY ADAPTOR..... OFF  
 TAPE 1, 2, 3..... OFF (SOURCE)

### CENTER VOLTAGE ADJUSTMENT

Connect a 8-ohm load resistor across the SPEAKER terminals.  
 Connect the DC Voltmeter between CT and E terminal.

TX-4500

- Adjust the voltage to  $0 \pm 20\text{mV}$  with R504. (Left channel)
- Adjust the voltage to  $0 \pm 20\text{mV}$  with R604. (Right channel)

TX-2500

- Adjust the voltage to  $0 \pm 40\text{mV}$  with R504. (Left channel)
  - Adjust the voltage to  $0 \pm 40\text{mV}$  with R604. (Right channel)
- NOTE: Adjust after switching on for 10 minutes.

### IDLING CURRENT ADJUSTMENT

Connect the DC Voltmeter between ID and CT terminal.

TX-4500

- Adjust the voltage to  $20 \pm 5\text{mV}$  with R518. (Left channel)
- Adjust the voltage to  $20 \pm 5\text{mV}$  with R618. (Right channel)

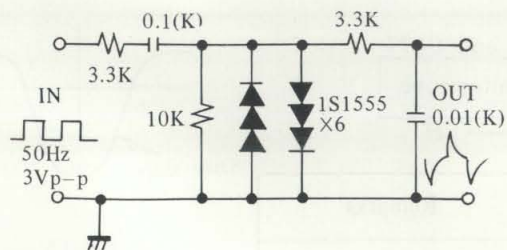
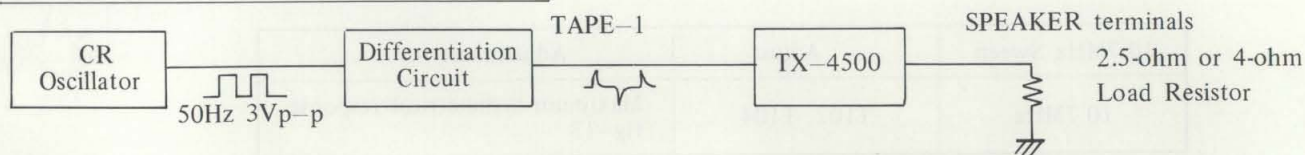
TX-2500

- Adjust the voltage to  $20 \pm 5\text{mV}$  with R514. (Left channel)
- Adjust the voltage to  $20 \pm 5\text{mV}$  with R614. (Right channel)

NOTE: Adjust after switching on for 10 minutes.

Open load    VOLUME..... Minimum    TAPE MONITOR-1..... ON

### PROTECTIVE CIRCUIT ADJUSTMENT



Load Resistor	CR Oscillator	Relay	Adjust
4-ohm, 100W	50Hz 3Vp-p	ON	R537 (Left channel)
2.5-ohm, 100W		OFF	R637 (Right channel)

NOTE: VOLUME.....Maximum  
 TAPE MONITOR-1.....ON

fig-10 Differentiation Circuit

### ATTACHMENT OF DIAL POINTER

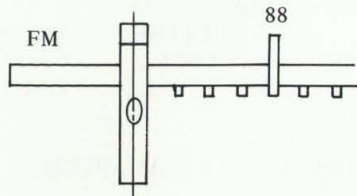
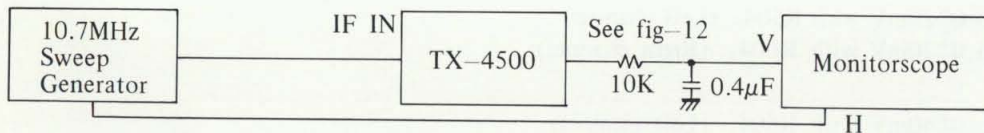


fig-11

1. Close the variable capacitor completely.
2. Set the radio dial pointer to zero (0) on dial scale and install the dial pointer ass'y.

### QUARTZ LOCKED CIRCUIT ALIGNMENT

Set SELECTOR switch to FM.



10.7MHz Sweep	Adjustment	Adjustment for
10.7MHz	T104, 105	Maximum symmetrical response fig-13

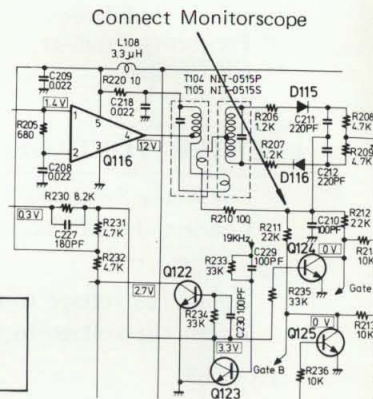


fig-12

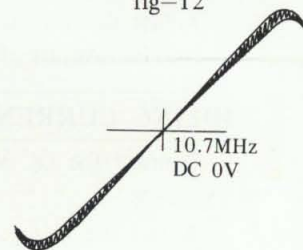
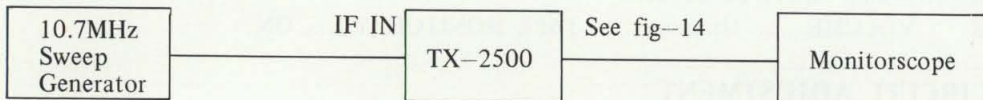


fig-13

### SERVO LOCKED CIRCUIT ALIGNMENT



10.7MHz Sweep	Adjust	Adjustment for
10.7MHz	T102, T104	Maximum symmetrical response fig-13

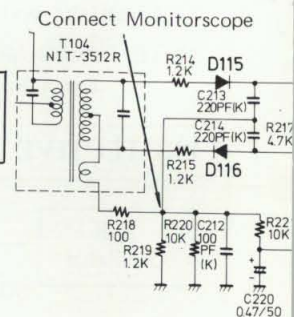
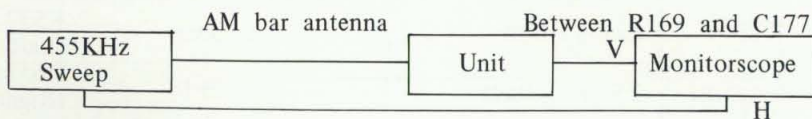


fig-14

### AM IF ALIGNMENT



Set Radio Dial	Adjust	Adjust for	Remarks
Upper end	X104 (TX-4500) X103 (TX-2500)	Maximum symmetrical response	Usually not necessary to adjust

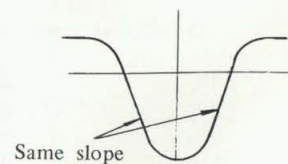
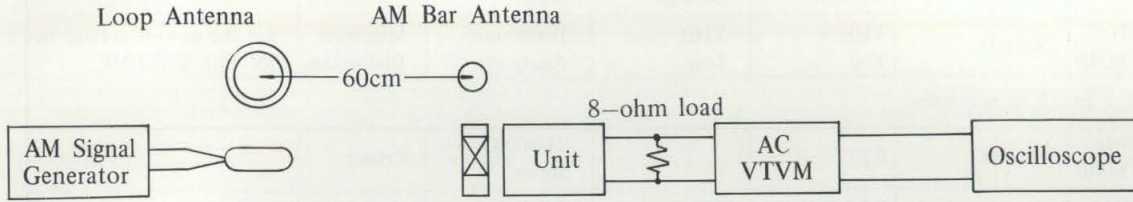


fig-15

### AM RF ALIGNMENT

Confirm start point of dial pointer before alignment.



Connect AC VTVM across LEFT SPEAKER terminals.

Step	AM Signal Generator	Dial to set	Adjust		AC VTVM reading	Remarks
			TX-4500	TX-2500		
1	515KHz 400Hz 30% mod.	515KHz Lower end	L105 NMO-2504	L105 NMO-2503	Maximum	(Repeat step 1 and 2 as necessary)
2	1680KHz 400Hz 30% mod.	1680KHz Upper end	TC-5	TC-4	Maximum	
3	600KHz 400Hz 30% mod.	600KHz	L001 NMA-2521	L001 NMA-2520	Maximum	(Repeat step 3 and 4 as necessary)
4	1400KHz 400Hz 30% mod.	1400KHz	TC-2	TC-2	Maximum	

### FM FRONT END ALIGNMENT

Set SELECTOR switch to FM.

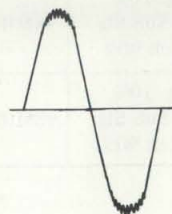
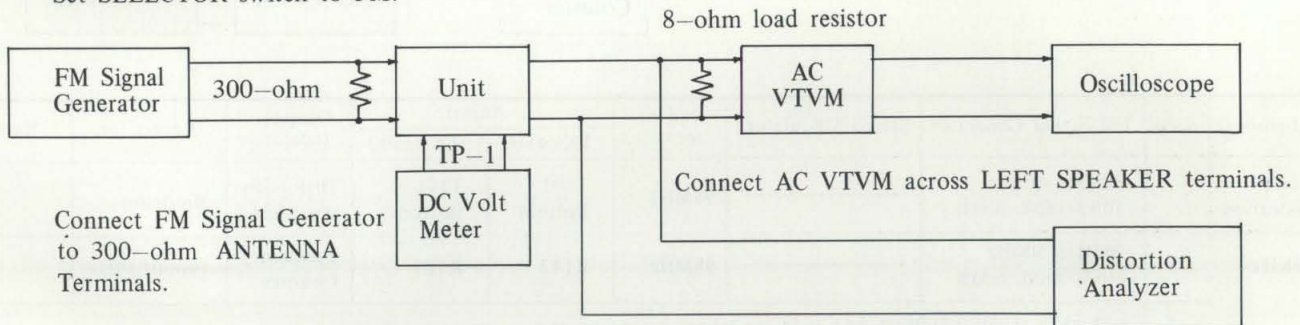
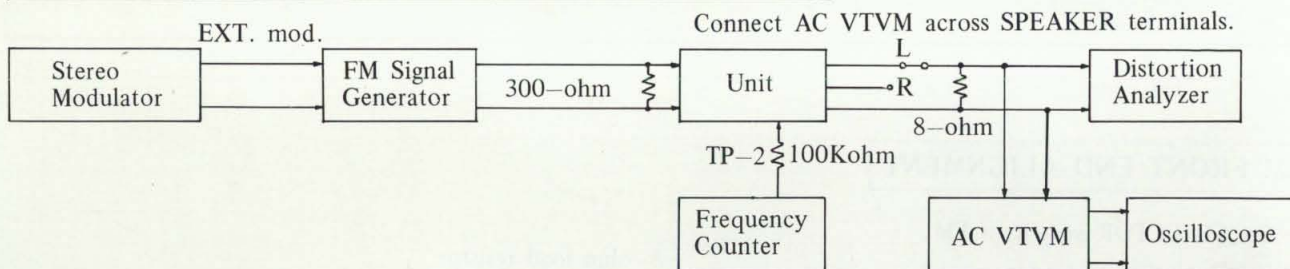


fig-16

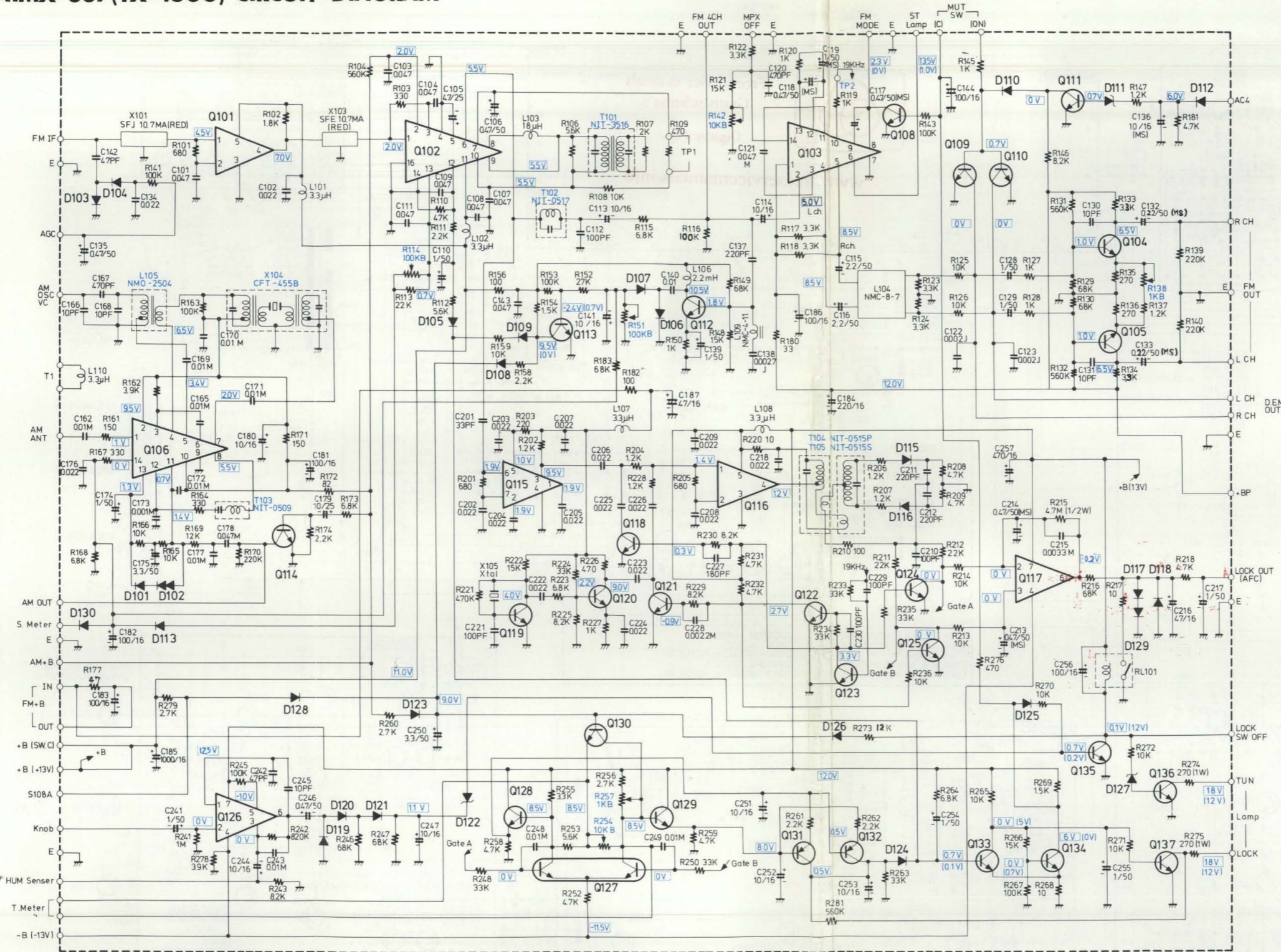
Step	FM Signal Generator	Dial to set	Adjust		Output Indicator	Adjust for	Remarks
			TX-4500	TX-2500			
1	No Signal	Quiet Point	T101 Bottom	T101 Bottom	DC Volt Meter	0mV	
2	98MHz 400Hz 100% mod. 60dB	98MHz	T101 Top	T101 Top	Distortion Analyzer	Minimum Distortion	Set the output voltage to 3V with VOLUME.
3	Repeat step 1 and 2 as necessary.						
4	98MHz 400Hz 100% mod. 60dB	98MHz	R257		TUNING Meter	Center	
5	90MHz 400Hz 100% mod. 60dB	90MHz	OSC Coil L0	OSC Coil L5	DC Volt Meter	0mV	
6	106MHz 400Hz 100% mod. 60dB	106MHz	OSC Trimmer TC5(TC 0)	OSC Trimmer TC5	Same as above	0mV	
7	Repeat step 5 and 6 as necessary.						
8	90MHz 400Hz 100% mod.	90MHz	L1(LA) L2(LR1) L3(LR2)	L1 L2	AC VTVM or Oscilloscope	Maximum	Set FM Signal Generator level as low as possible. fig-16
9	106MHz 400Hz 100% mod.	106MHz	TC1(TCA) TC3(TCR1) TC4(TCR2)	TC1 TC3	Same as above	Maximum	
10	Repeat step 8 and 9 as necessary						
11	98 MHz 400Hz 100% mod.	98MHz	IF Core Top and Bottom L5	IF Core L4	AC VTVM or Oscilloscope	Maximum	

### FM MONO DISTORTION AND MULTIPLEX ALIGNMENT



Alignment	Step	FM Signal Generator	Stereo Modulator	Dial to set	Adjust		Output Indicator	Adjust for	Remarks
					TX-4500	TX-2500			
Mono Distortion		98MHz 400Hz 100% mod. 60dB	_____	98MHz	T101 Bottom	T101 Bottom	Distortion Analyzer	Minimum	
19KHz	1	98MHz 400Hz 100% mod. 60dB	_____	98MHz	R142	R127	Frequency Counter	19000±19Hz	
	2	STEREO INDICATOR should light up when stereo program is being received.							
Multiplex	1	98MHz EXT. Mod.	Pilot Sig. 10% Main & Sub Sig. 1KHz Lch 90%	98MHz	R138	R157	AC VTVM Right ch.	Minimum	Repeat step 1 & 2 as necessary
	2	Same as above	Pilot Sig. 10% Main & Sub Sig. 1KHz Rch 90%	98MHz	R138	R157	AC VTVM Left ch.	Minimum	

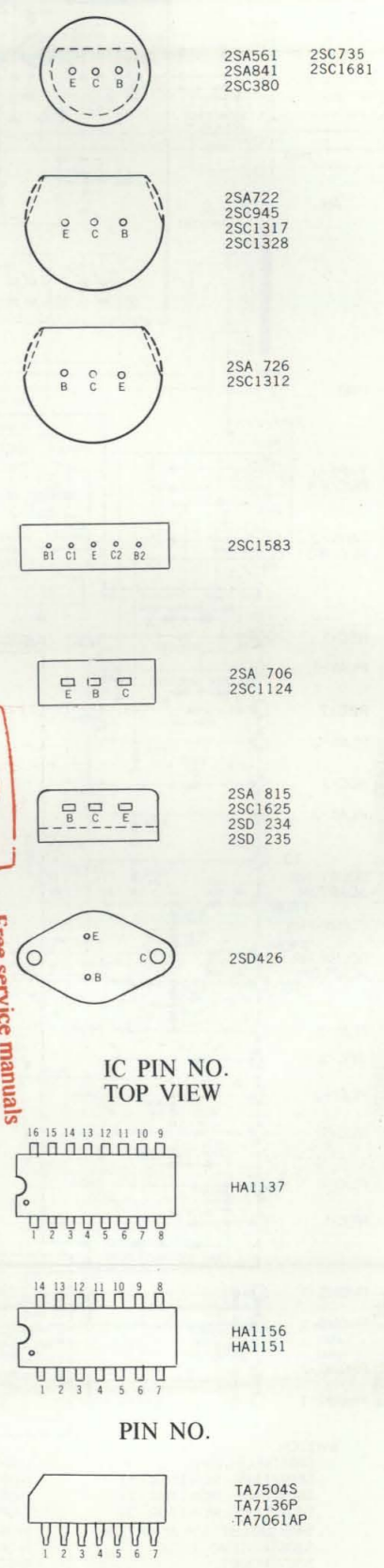
# NAIMX-337(TX-4500) CIRCUIT DIAGRAM



- |                        |                           |                        |                  |
|------------------------|---------------------------|------------------------|------------------|
| Q101, Q116             | TA7060P                   | D101, D105, D110, D118 | 1S1555           |
| Q102                   | HA1137                    | D121, D124, D125, D128 | VD1212           |
| Q103                   | HA1156W                   | D102                   | VD1212           |
| Q104, Q105             | 2SC1312 (F)               | D103, D104, D106-D109  | 1N60             |
| Q106                   | HA1151                    | D112-D117, D119, D120  | 1N60             |
| Q108, Q111, Q114       | 2SC945 (Q)                | D123, D126, D129       | D130             |
| Q109, Q110, Q118, Q130 | 2SC1317 (R) or 2SC735 (Y) | D111                   | WZ051 or RD5.1EB |
| Q121-Q125, Q133-Q137   | 2SC1317 (R) or 2SC735 (Y) | D122                   | YZ047 or RD4.7EB |
| Q112, Q113, Q128, Q129 | 2SC733 (BL)               | D127                   | WZ061 or RD5.6EC |
| Q115                   | TA7061AP                  |                        |                  |
| Q117                   | TA7504S                   |                        |                  |
| Q119, Q120             | 2SC380 (O)                |                        |                  |
| Q126                   | TA7136P                   |                        |                  |
| Q127                   | 2SC1583G                  |                        |                  |
| Q131, Q132             | 2SA726 (F)                |                        |                  |

**NOTES**  
 ALL RESISTORS ARE IN OHMS, 1/4 WATT UNLESS OTHERWISE NOTED.  
 ALL CAPACITORS ARE IN  $\mu$ F, 500V UNLESS OTHERWISE NOTED.  
 ELECTROLYTIC CAPACITORS (—H—) ARE IN  $\mu$ F/WV.  
 VOLTAGE (MEASURED WITH V.T.V.M.)  
 (—v) DC VOLTAGE (NO INPUT SIGNAL).  
 (—v) DC VOLTAGE (FM STEREO)

## Semiconductors Bottom View



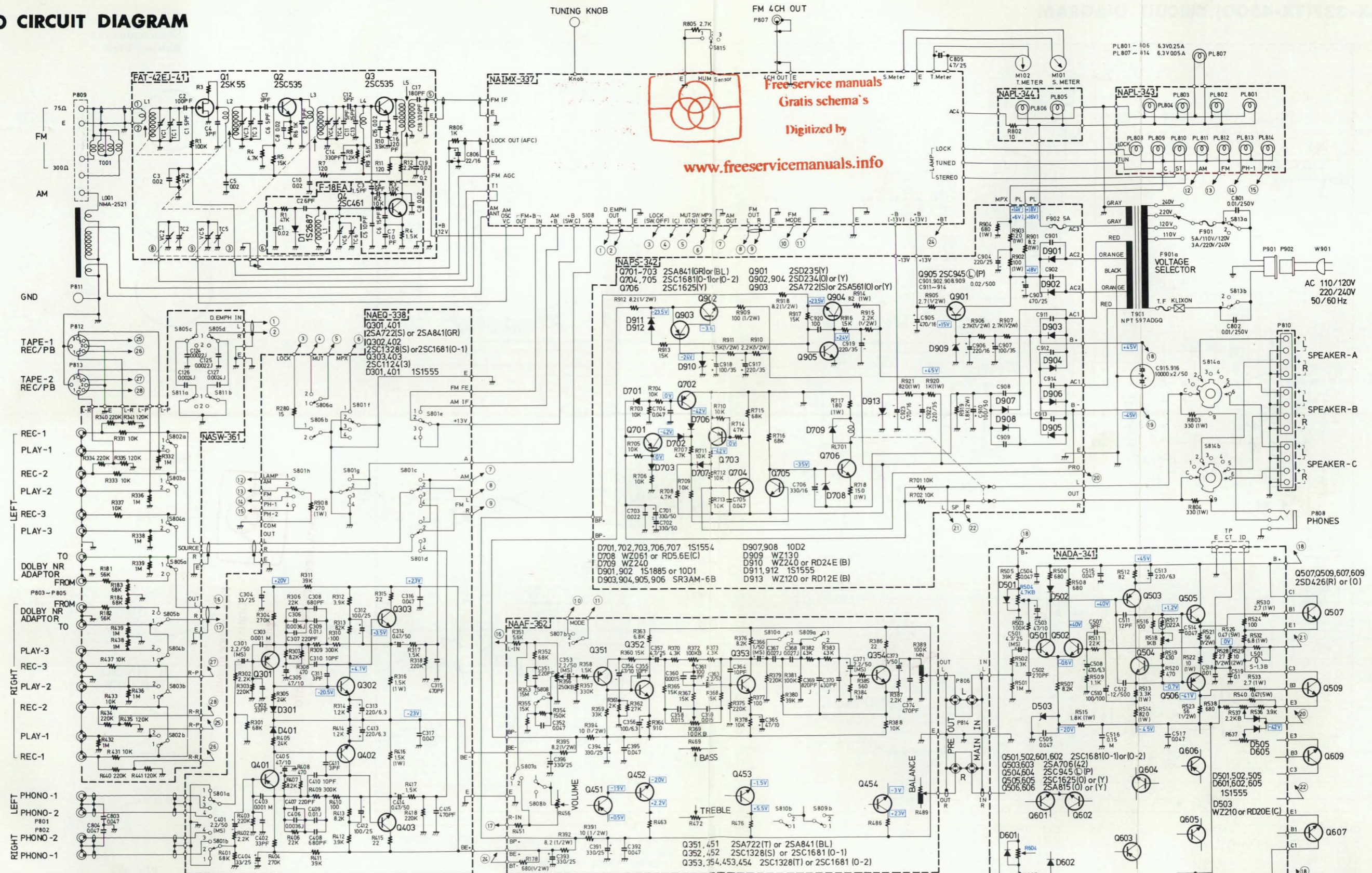
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# TX-4500 CIRCUIT DIAGRAM



- SWITCH**
- |                         |                                    |                    |                                      |
|-------------------------|------------------------------------|--------------------|--------------------------------------|
| S801 (SELECTOR)         | : 1-AM, 2-FM, 3-PHONO 1, 4-PHONO 2 | S808 (LOUDNESS)    | : 1-ON, 2-OFF                        |
| S802 (TAPE MONITOR-1)   | : 1-OFF, 2-ON                      | S809 (HIGH FILTER) | : 1-ON, 2-OFF                        |
| S803 (TAPE MONITOR-2)   | : 1-OFF, 2-ON                      | S810 (LOW FILTER)  | : 1-ON, 2-OFF                        |
| S804 (TAPE MONITOR-3)   | : 1-OFF, 2-ON                      | S811 (DE EMPHASIS) | : 1-75μSEC, 2-50μSEC                 |
| S805 (DOLBY FM ADAPTOR) | : 1-OFF, 2-ON                      | S813 (POWER)       | : 1-ON, 2-OFF                        |
| S806 (MUTING LOCK)      | : 1-OFF, 2-ON                      | S814 (SPEAKERS)    | : 1-OFF, 2-A, 3-B, 4-C, 5-A+B, 6-A+C |
| S807 (MODE)             | : 1-STEREO, 2-MONO                 | S815 (HUM SENSOR)  | : 1-HIGH, 2-NORMAL, 3-LOW            |

**NOTES:**

- ALL RESISTORS ARE IN OHMS, 1/4WATT UNLESS OTHERWISE NOTED.
- ALL CAPACITORS ARE IN μF, 50V UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS (E) ARE IN μF/WV.
- VOLTAGE (MEASURED WITH V.T.V.M) (NO INPUT SIGNAL).



### TX-4500 PARTS LIST

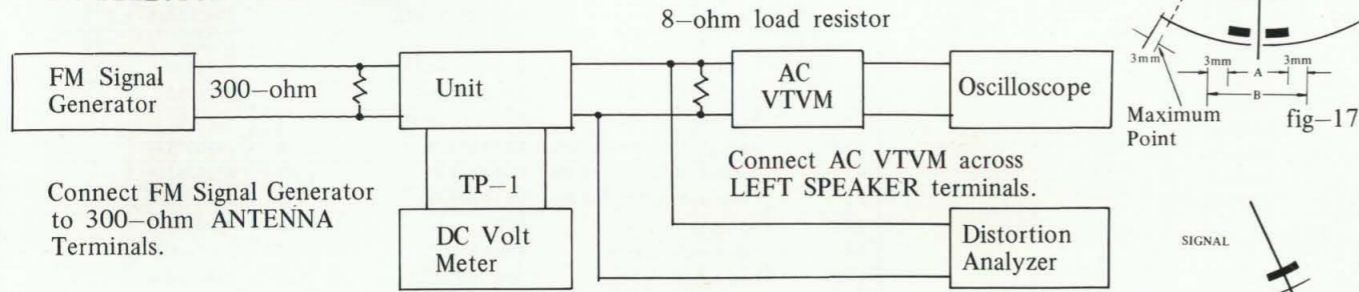
PARTS NO.	DESCRIPTION	SPECIFICATIONS	Q'TY	STOCK NO.	REMARKS
U1	Front End	FAT-42EJ-41	1	240035	
U2	Printed Circuit Board Ass'y	NAIMX-337	1	13829537	Tuner Section
U3	Printed Circuit Board Ass'y	NAEQ-338	1	13829538	Equalizer Section
U4	Printed Circuit Board Ass'y	NASW-361	1	13830561	Switch Section
U5	Printed Circuit Board Ass'y	NAAF-362	1	13830562	Tone Section
U6	Printed Circuit Board Ass'y	NADA-341	1	13829541	Driver Section
U7	Printed Circuit Board Ass'y	NAPS-342	1	13829542	Power Supply Section
U8	Printed Circuit Board Ass'y	NAPL-343	1	13829543	Pilot Lamp Section
U9	Printed Circuit Board Ass'y	NAPL-344	1	13829544	Pilot Lamp Section
Q507, Q509 Q607, Q609	Transistor	2SD426(R) or (O)	4	2200592 or 2200593 or	Using same hfe rank
PL807	Lamp-Pilot	6.3V0.05AW-3	1	210015	Pointer
T901	Transformer-Power	NPT-597ADGQ	1	230155	
T001	Transformer-BLN	NBLN-1	1	233026	
L001	Coil-Antenna	NMA-2521	1	232055	
C801, C802	Capacitor-IS	PME271Y510CEE	2	3500052	
C805	Capacitor-Elect.	CE04W25V47μF	1	352754701	
C806	Capacitor-Elect.	CE04W16V22μF	1	352742201	
C915	Capacitor-Elect.	CE62B50V10000X2S-L	1	3504078 or 3504083 or	
R803, R804	Resistor-Metal Oxide Film	RS1WBJ330ohm	2	441623314	
S813	Switch-Push	NPS121LN4	1	25035028	Power Source
S814	Switch-Rotary	NRS-226-30Y	1	25030058	Speakers
S815	Switch-Slide	NSS-2327	1	25065016	Sensor
P801, P802	Pin Jack	NTM-2WPBL-E1	2	250170	PHONO
P806	Pin Jack	NTM-4WPBL-E1	1	250169	PRE, MAIN
P807	Pin Jack	NTM-1WPBL-E1	1	250256	4 Channel Out
P808	Jack-Stereo Head Phone	LJ-100-H	1	25045018	
P809	Terminal	NTM-3PUM1	1	25060021A	Antenna
P810	Terminal	NTM-12PUR1	1	25060005	Speakers
P811	Terminal		1	270665	
P814	Shorted Plug		2	25055015	
P812, P813	Socket-DIN		2	250008	
P901	Inlet-3P	CM-3	1	25050013	
F901	Fuse	3A-T	1	252003	
F901a	Socket-VS	SI-7205-7	1	250186	
M101	Tuning Indicator	NIND-0500S53	1	243054	Strength
M102	Tuning Indicator	NIND-0250S54	1	243055	Tuning
Q507a, Q509a Q607a, Q609a	Socket-Transistor	M-1614	4	250249	Power Transistor
	Binder	SKB-1	20	260208	
A903	Shorted Pin	PO-107	4	250153	
A001	Chassis		1	27100015	
A006	Drum		1	27200020	
A007	Spring	SP-14A	2	273803	Drum
A008	Dial String			273903	
A009	Heat Sink		1	27160015	
A013	Shaft		4	27260006	Push Switch
A015	Joint		4	28320135	Push Switch
A017	Shield Plate		1	27150045	
A034	Dial Pulley	DP-16N	4	271850002	
A041	Drive Shaft Ass'y		1	27205005	
A042	Shield Plate		1	281750004	
A045	Pointer		1	28165031	
A047	Pointer Slider		1	27220008	
A049	Dial Plate		1	28130032A	
A069	Back Panel		1	27120039	
A071	Holder-Antenna		1	27190015A	
P902	Plug-PS	SFO30A1	1	25055016	
A073	Strain Relief	SR-4K-4	1	270280	
A301	Amp Box		1	28110095A	
A305	Front Panel Ass'y		1	13829121	
A501	Front Panel		(1)	27210045	
A502	End Cap		(2)	28125032	
A503	Clear Plate		(1)	28191007	
A504	Spacer		(4)	27270014	
A505	Decorative Screw		(4)	27300038	
A509	Tuning Ring		(1)	27265003	
A802	Knob-Tuning		1	28320136	
A803	Knob-Volume		2	28320132	
A804	Knob-Tone		4	28320131	
A805	Button-Power		1	28320130	

PARTS NO.	DESCRIPTION	SPECIFICATIONS	Q'TY	STOCK NO.	REMARKS
A806	Button-Push		5	28320133	
A808	Button-Push		4	28320134	
A632	Bottom Board		1	27170017	
A633	Bottom-Cushion		4	280889	
A851	Master Carton Box		1	29050082	
A855	Pad-Right (Front)		1	29090147	
A856	Pad-Right (Back)		1	29090148	
A857	Pad-Left (Front)		1	29090149	
A858	Pad Left (Back)		1	29090150	
A854	Poly Bag	720X1020	1	29100020	
A864	Poly Bag		1	29100006A	
A856	Poly Bag	220X330	1	29100005	
A857	Sheet	500X1200	1	29009	
A880	Instruction Manual		1	29340183	
A882	Caution Card		1	293041	
A883	Caution Label A		1	282969	
	Tag-Voltage		1	293268	
A887	Tag-Sensor		1	29355039	
A901	Silicon Cloth		1	292017-2	
A902	FM Antenna	5059-01	1	292064	
A904	Fuse	5A-T	1	252020	
((NAEQ-338))					
Q301, Q401	Transistor	2SA722(S) or 2SA841(GR)	2	2210913 or 2210665 or	
Q302, Q402	Transistor	2SC1288(S) or 2SC1681(O-1)	2	2210923 or 2210671 or	
Q303, Q403	Transistor	2SC1124(3)	2	2200101	
D301, D401	Diode-Silicon	1S1555	2	223105	
C304, C404	Capacitor-Elect.	CE04W25V33μF	2	352753301	
C305, C405	Capacitor-Elect.	CE04W10V47μF	2	352734701	
C312, C412	Capacitor-Elect.	CE04W25V100μF	2	352751011	
C313, C413	Capacitor-Elect.	CE04W6.3V220μF	2	352722211	
C314, C414	Capacitor-Elect.	CE04W50V0.47μF	2	352784791	
C301, C401	Capacitor-MS or Capacitor-LR	MS04C50V2.2μF or LR04E50V1μF	2	392680221 or 392680222 or	
R316, R416	Resistor-Metal Oxide Film	RS1WBJ1.5K	2	4411621525	
R908	Resistor-Metal Oxide Film	RS1WBJ270	1	441622714	
S801a-h	Switch-Rotary	NRS-184-30K	1	25030661	Selector
S806a, b	Switch-Push	NPS-122LA7	1	25035029	Muting
((NASW-361))					
S802-S805	Switch-Push	NPS-122X3-142LA	1	25035030	
P803	Pin Jack	NTM-4PBL1-E1	1	25045014	
P804, P805	Pin Jack	NTM-6PBL1-E1	2	25045019	
S811	Switch-Slide	NSS-2225	1	250142	
((NAAF-362))					
Q351, Q451	Transistor	2SA722(T) or 2SA841(BL)	2	2210916 or 2210666 or	
Q352, Q452	Transistor	2SC1288(S) or 2SC1681(O-1)	2	2210923 or 2210671 or	
Q353, Q453	Transistor	2SC1288(T) or 2SC1681(O-2)	4	2210926 or 2210671 or	
C352, C452	Capacitor-DE	DE93M50V0.047μF	2	374124735	
C353, C453	Capacitor-MS or LR	MS04C50V2.2μF or LR04E50V1μF	4	392680221 or 392680222 or	
C354, C454	Capacitor-Elect.	CE04W10V47μF	4	352734701	
C356, C456	Capacitor-Elect.	CE04W6.3V100μF	2	352721011	
C357, C457	Capacitor-Elect.	CE04W25V4.7μF	2	352750471	
C363, C463	Capacitor-Elect.	CE04W50V2.2μF	2	352780221	
C366, C466	Capacitor-MS or LR	MS04C50V1μF or LR04E50V1μF	2	392680107 or 392680101 or	
C373, C473	Capacitor-Elect.	CE04W50V1μF	2	352780101	
C391, C393 C394, C396	Capacitor-Elect.	CE04W25V330μF	4	352753311	
R356, R456	Resistor-Variable	N24RGP250KBT30-41C	1	5172042	VOLUME
R369, R469 R372, R472	Resistor-Variable	N24RGP100KB30-21C	2	5172044	BASS, TREBLE
R389, R489	Resistor-Variable	N24RGP100KMN30-C	1	5172043	BALANCE
S807-S810	Switch-Push	NPS-122X4LA	1	25035033	
((NADA-341))					
Q501, Q502 Q601, Q602	Transistor	2SC1681(O-1) or (O-2)	4	2210670 or 2210671 or	
Q503, Q603	Transistor	2SA706(42)	2	2200033	
Q504, Q604	Transistor	2SC945(L)(P)	2	2210743	
Q505, Q605	Transistor	2SC1625(O) or (Y)	2	2200373 or 2200394 or	
Q506, Q606	Transistor	2SA815(O) or (Y)	2	2200403 or 2200404 or	
D501, D502, D503 D601, D602, D603	Diode-Silicon	1S1555	6	223105	
D503	Diode-Zener	WZ-210 or RD-20E(C)	1	223921 or 223974 or	
C503, C603	Capacitor-Elect.	CE04W10V47μF	2	352734701	
C508, C608	Capacitor-Elect.	CE04W6.3V47μF	2	352724711	
C510, C610	Capacitor-Elect.	CE04W100V100μF	2	352791011	

PARTS NO.	DESCRIPTION	SPECIFICATIONS	Q'TY	STOCK NO.	REMARKS
C513, C613	Capacitor-Elect.	CE04W6.3V220μF	2	352722211	
C516, C616	Capacitor-DE	DE93M50V154M	2	374121547	
C519, C619	Capacitor-DE	DE93M50V104K	2	374121045	
C501, C601	Capacitor-MS Capacitor-LR	MS04C25V4.7μF or LR04E25V4.7μF	2	392050497 or 392650471	
R504, R604	Resistor-Semi Fixed	R-HK4.7KB3S	2	5221008	
R518, R618	Resistor-Semi Fixed	R-HK1KB3S	2	5221017	
R537, R637	Resistor-Semi Fixed	R-HK2.2KB3S	2	5221007	
R513	Resistor-Metal Oxide Film	RS1WBJ3.3K	2	441623324	
R514	Resistor-Metal Oxide Film	RS1WBJ820	2	441628214	
R515	Resistor-Metal Oxide Film	RS1WBJ1.8K	2	441621824	
R517	Termistor	D22A	2	4000003	
R522	Resistor-Metal Film	RNU1WCJ10	2	451631004	
R529	Resistor-Metal Film	RNU2WCJ10	2	451731004	
R530, R533 R630, R633	Resistor-Metal Film	RNU1WCJ2.7	4	451630274	
R532	Resistor-Metal Film	RNU1WCJ6.8	2	451630684	
R526, R540 R626, R640	Resistor-Cement	RSS5WK0.47	4	48114795	
	Radiator	RAD-O1	6	270187-1	
L501, L601	Coil-S	S-1.3B	2	231001	
((NAPS-342))					
Q701, Q702 Q703	Transistor	2SA841(GR) or (BL)	3	2210665 or 2210666 or	
Q704, Q705	Transistor	2SC1681(O-1) or (O-2)	2	2210670 or 2210671 or	
Q706	Transistor	2SC1625(Y)	1	2200394	
Q901	Transistor	2SD235(Y)	1	2200014	
Q902, Q904	Transistor	2SD234(O) or (Y)	2	2200113 or 2200020 or	
Q903	Transistor	2SA510(O-1) or 2SA722(S)	1	2210073, 2210074, 2210915	
Q905	Transistor	2SC945(L)(P)	1	2210743	
D701-D703 D706, D707	Diode-Silicon	1S1554	5	223106	
D708	Diode-Zener	WZ-061 or RD5.6E(C)	1	223928 or 223948 or	
D709	Diode-Zener	WZ-240	1	223916	
D901, D902	Diode-Silicon	1S1885 or 10D1	2	223802 or 223801 or	
D905, D906 D903, D904	Diode-Silicon	SR3AM-6B	4	223815	
D907, D908	Diode-Silicon	10D2	2	223805	
D909	Diode-Zener	WZ-130	1	223924	
D910	Diode-Zener	WZ-240 or RD24E(B)	1	223916 or 223977 or	
D911, D912	Diode-Silicon	1S1555	2	223105	
D913	Diode-Zener	WZ-120 or RD12E(B)	1	223910 or 223963 or	
C701, C702	Capacitor-Elect.	CE04W50V330μF	2	352783311	
C706	Capacitor-Elect.	CE04W16V330μF	1	352743311	
C903	Capacitor-Elect.	CE04W25V470μF	1	352754711	
C904	Capacitor-Elect.	CE04W25V220μF	1	352752211	
C905, C923	Capacitor-Elect.	CE04W16V470μF	2	352744711	
C906	Capacitor-Elect.	CE04W16V220μF	1	352742211	
C907, C918	Capacitor-Elect.	CE04W35V100μF	2	352761011	
C910	Capacitor-Elect.	CE04W50V100μF	1	352781011	
C917, C922 C919	Capacitor-Elect.	CE04W35V220μF	3	352762211	
R717	Resistor-Metal Oxide Film	RS1WBJ180	1	441621814	
R718	Resistor-Metal Oxide Film	RS1WBJ150	1	441621514	
R902	Resistor-Metal Oxide Film	RS1WBJ100	1	441621014	
R903	Resistor-Metal Oxide Film	RS1WBJ120	1	441621214	
R904	Resistor-Metal Oxide Film	RS1WBJ680	1	441626814	
R901	Resistor-Metal Film	RNU1WCJ8.2	1	451630824	
R919	Resistor-Metal Oxide Film	RS2WBJ1.8K	1	441721824	
R920	Resistor-Metal Oxide Film	RS1WBJ1K	1	441621024	
R921	Resistor-Metal Oxide Film	RS1WBJ820	1	441628214	
F902	Fuse	5A-T	1	252020	
F902a	Fuse Holder	SN5051	2	250113	
RL701	Relay	NRL2P5ADC24	1	25065015	
	Radiator	RAD-O1	4	270187-1	
((NAPL-343))					
PL801-PL804	Pilot Lamp	6.3V0.25A	4	210026	Fuse type
PL808-PL814	Pilot Lamp	6.3V0.05A	7	210027	
	Fuse Holder	SN505			

**FM TUNING METER, STRENGTH METER AND MUTING ADJUSTMENT**

Set SELECTOR switch to FM.



Connect FM Signal Generator to 300-ohm ANTENNA Terminals.

Set TUNING dial pointer and FM Signal Generator Frequency (no mod.) to 98MHz.  
Confirm LOCKED LAMP should light up.

Adjustment	FM Signal Generator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks
TUNING METER	98MHz 60dB no mod.		R254(width) R257(center)	TUNING METER	fig-17	TX-4500
STRENGTH METER	98MHz 400Hz 100% mod. 70dB	98MHz	R114 (TX-4500) R118 (TX-2500)	STRENGTH METER	fig-18	
MUTING	1 98MHz 400Hz 100% mod. 12dB	98MHz	R151 (TX-4500) R154 (TX-2500)	Oscilloscope or AC VTVM	signal	Repeat step 1 & 2.
	2 11dB			no signal and noise		

**CHASSIS LAYOUT**

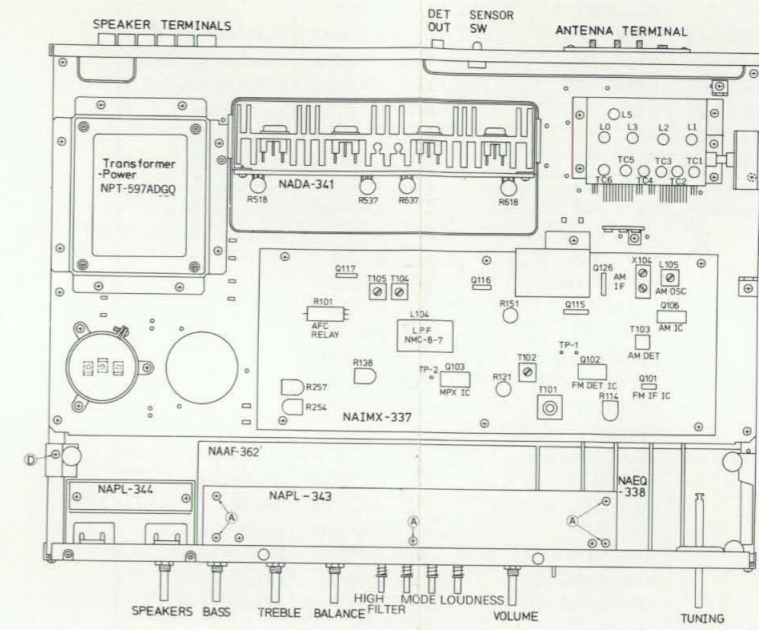


fig-20  
TX-4500  
TOP VIEW

**CHASSIS LAYOUT**

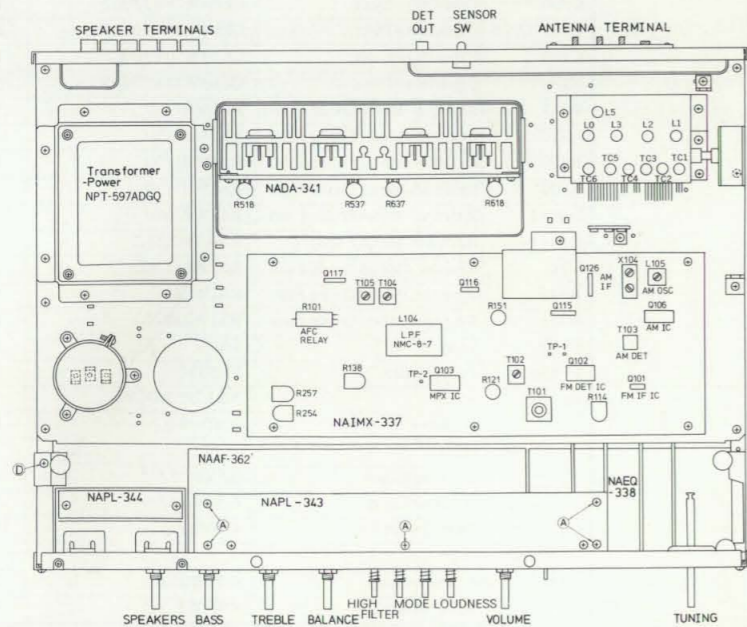


fig-19  
TX-2500  
TOP VIEW

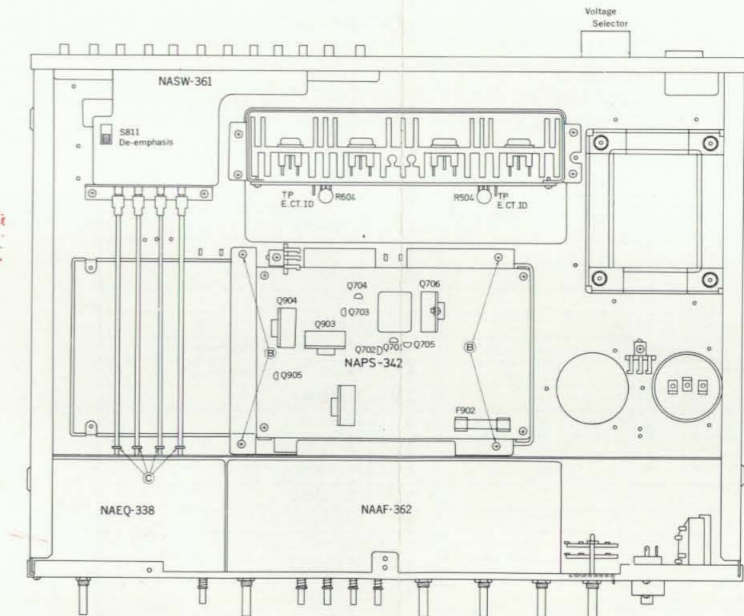
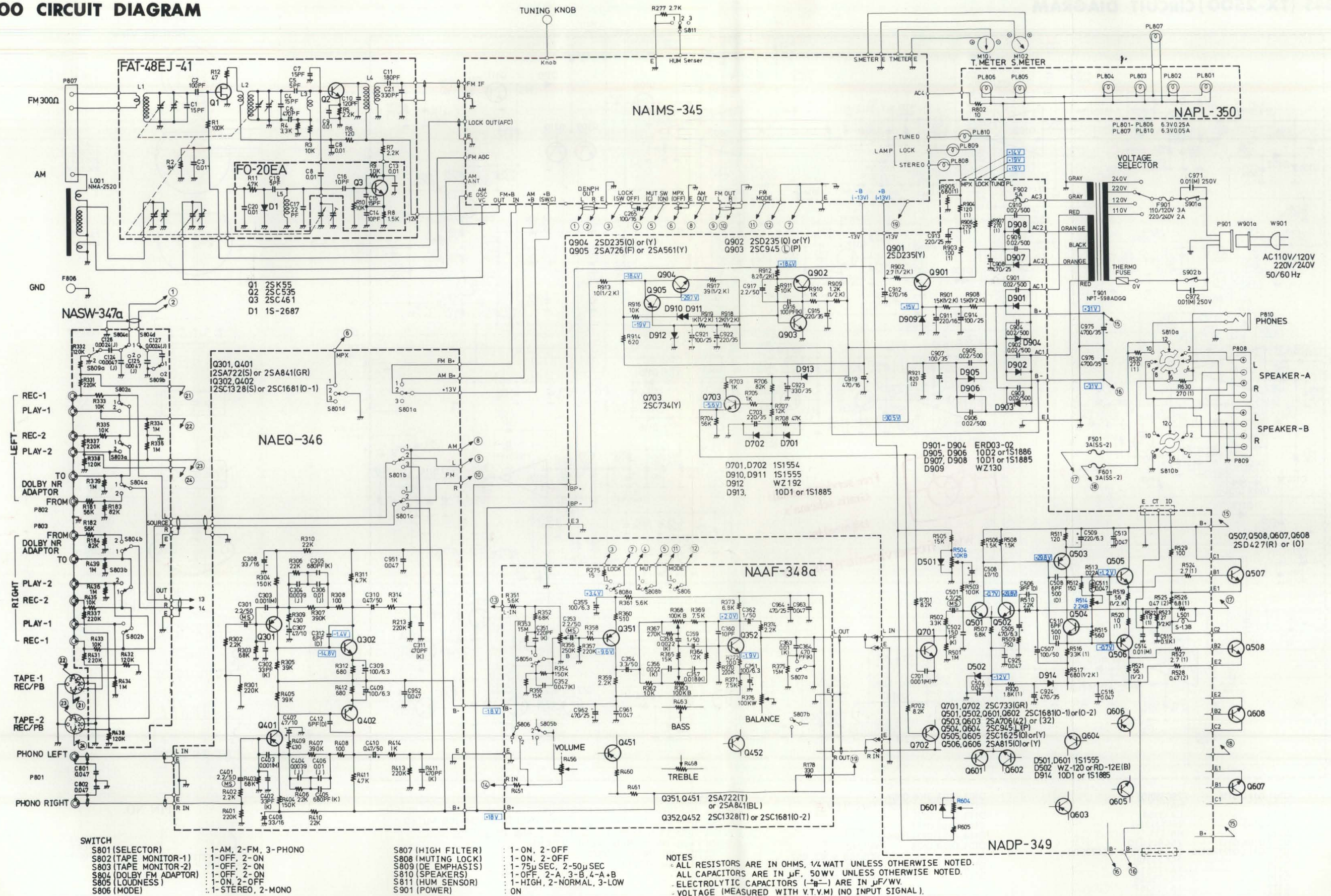


fig-21  
TX-4500  
BOTTOM VIEW

Free service manuals  
Gratis schema's  
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www.freeservicemanuals.info

# TX-2500 CIRCUIT DIAGRAM



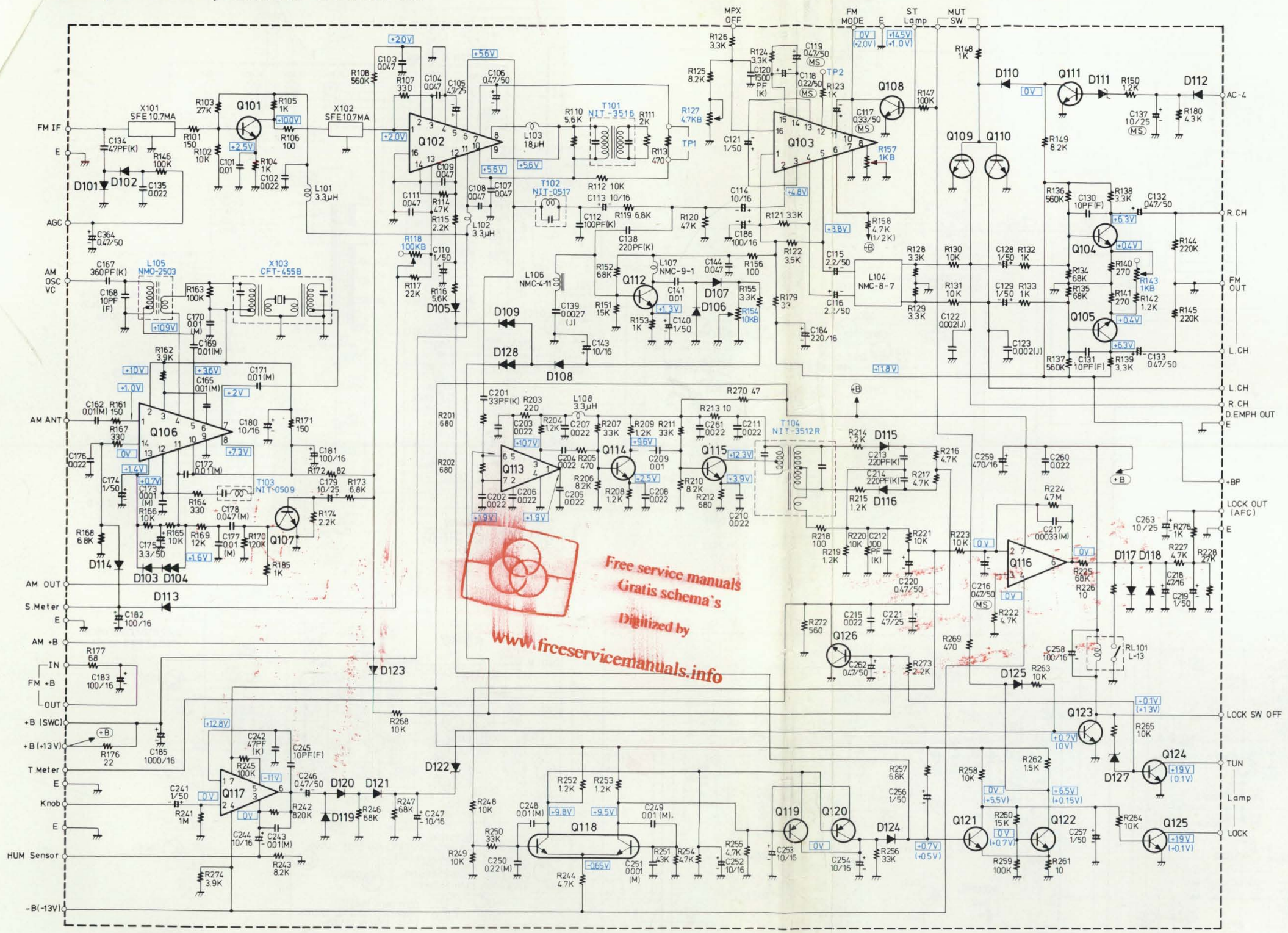
- SWITCH**
- S801 (SELECTOR) : 1-AM, 2-FM, 3-PHONO
  - S802 (TAPE MONITOR-1) : 1-OFF, 2-ON
  - S803 (TAPE MONITOR-2) : 1-OFF, 2-ON
  - S804 (DOLBY NR ADAPTOR) : 1-OFF, 2-ON
  - S805 (LOUDNESS) : 1-ON, 2-OFF
  - S806 (MODE) : 1-STEREO, 2-MONO

- S807 (HIGH FILTER) : 1-ON, 2-OFF
- S808 (MUTING LOCK) : 1-ON, 2-OFF
- S809 (DE EMPHASIS) : 1-75μ SEC, 2-50μ SEC
- S810 (SPEAKERS) : 1-OFF, 2-A, 3-B, 4-A+B
- S811 (HUM SENSOR) : 1-HIGH, 2-NORMAL, 3-LOW
- S901 (POWER) : ON

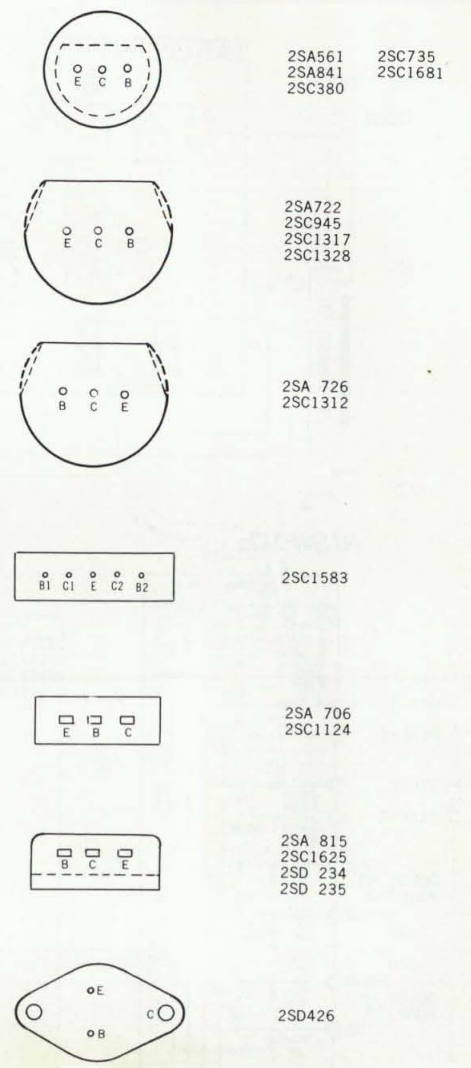
**NOTES**

- ALL RESISTORS ARE IN OHMS, 1/4 WATT UNLESS OTHERWISE NOTED.
- ALL CAPACITORS ARE IN μF, 50 WV UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS (—|—) ARE IN μF/WV.
- VOLTAGE (MEASURED WITH V.T.V.M.) (NO INPUT SIGNAL).

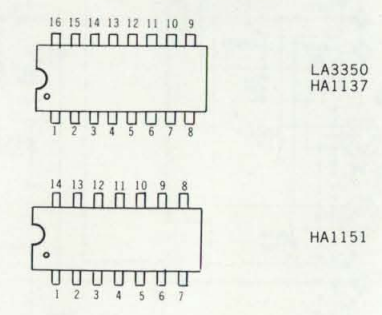
# .345 (TX-2500) CIRCUIT DIAGRAM



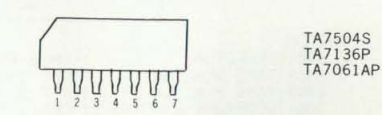
## Semiconductors Bottom View



## IC PIN NO. TOP VIEW



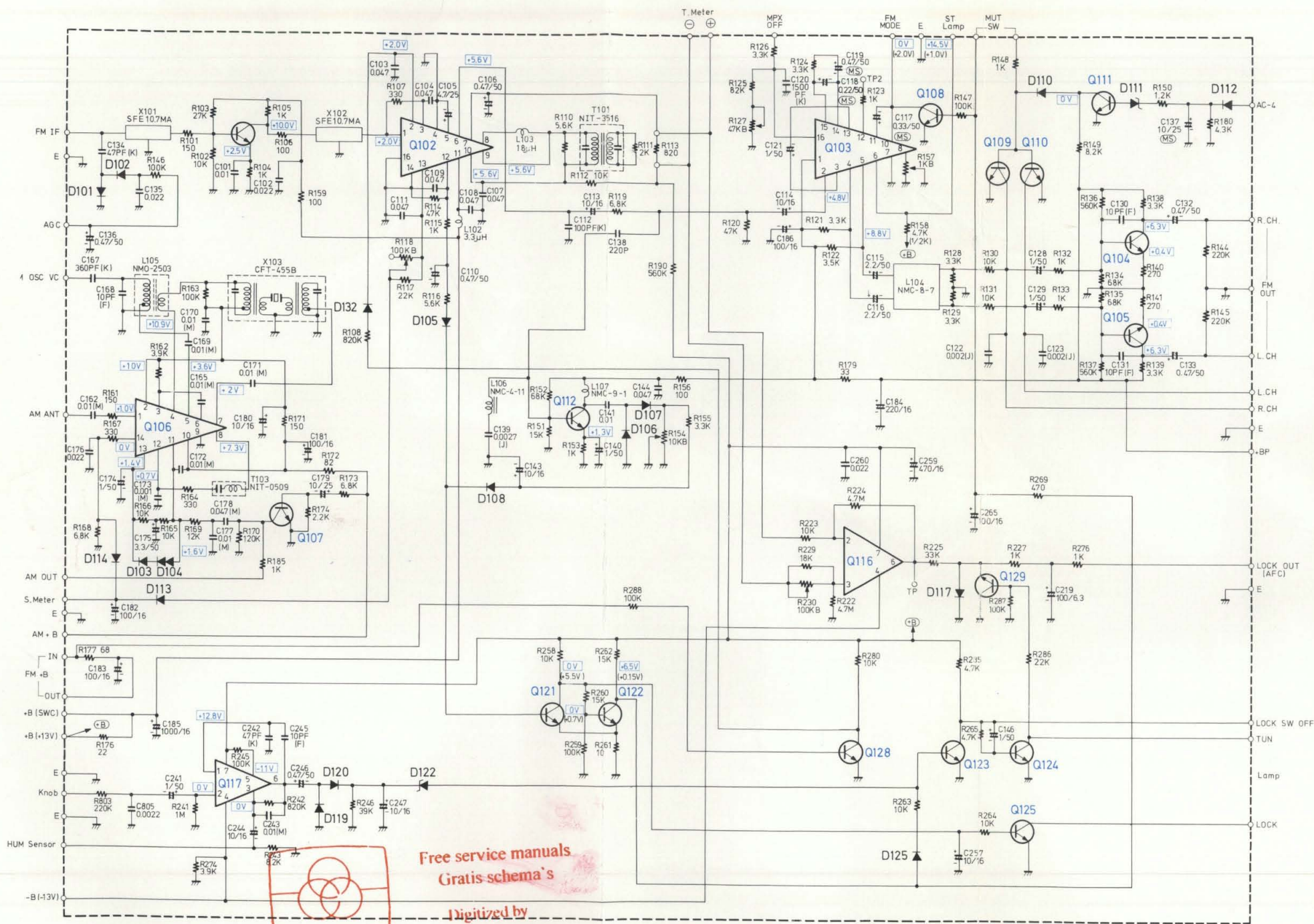
## PIN NO.






- |                       |                               |                        |                         |
|-----------------------|-------------------------------|------------------------|-------------------------|
| Q101, Q114, Q115      | ----- 2SC380(O)               | D101, D102, D106, D107 | ----- 1N60 (FM)         |
| Q102                  | ----- HA1137                  | D110, D112-D116, D108  | ----- 1N60 (FM)         |
| Q103                  | ----- LA-3350                 | D119, D120, D123       | ----- 1S1555            |
| Q104, Q105            | ----- 2SC1312(F)              | D118, D121, D124, D125 | ----- VD1212            |
| Q106                  | ----- HA1151                  | D104, D109, D128       | ----- VD1212            |
| Q107, Q108, Q111      | ----- 2SC945 (Q)              | D111                   | ----- RD5.1EB or WZ-052 |
| Q109, Q110, Q121-Q126 | ----- 2SC1317(R) or 2SC735(Y) | D122                   | ----- RD4.7EB or YZ-047 |
| Q112                  | ----- 2SC733(BL)              | D127                   | ----- RD5.6EC or WZ-061 |
| Q113                  | ----- TA-7061AP               |                        |                         |
| Q116                  | ----- TA-7504S                |                        |                         |
| Q117                  | ----- TA-7136P                |                        |                         |
| Q118                  | ----- 2SC1583(G)              |                        |                         |
| Q119, Q120            | ----- 2SA726(F)               |                        |                         |

- NOTES:
- ALL RESISTORS ARE IN OHMS, 1/4WATT UNLESS OTHERWISE NOTED.
  - ALL CAPACITORS ARE IN  $\mu$ F, 50V UNLESS OTHERWISE NOTED.
  - ELECTROLYTIC CAPACITORS (  $\frac{\square}{\square}$  ) ARE IN  $\mu$ F/WV.
  - VOLTAGE (MEASURED WITH V.T.V.M)
  - (  $\square$  ) NO INPUT SIGNAL
  - (  $\square$  ) FM STEREO

# TX-2500 FM/AM SCHEMATIC DIAGRAM(Change Parts) NAIMX-345



**NOTES**  
 ALL RESISTORS ARE IN OHMS, 1/4WATT UNLESS OTHERWISE NOTED.  
 ALL CAPACITORS ARE IN  $\mu$ F, 500WV UNLESS OTHERWISE NOTED.  
 ELECTROLYTIC CAPACITORS (  ) ARE IN  $\mu$ F/WV.  
 VOLTAGE (MEASURED WITH V.T.V.M)  
 (  ) DC VOLTAGE (NO INPUT SIGNAL).  
 (  ) DC VOLTAGE (FM STEREO)  
 PUT "K" MARK AT THE BACK OF SERIAL NUMBER AFTER A CHANGE.

### SERVO LOCKED CIRCUIT ALIGNMENT

1. Set MUTING switch to off.
2. Set the radio dial to center needle deflection on tuning meter when the FM program source is received.
3. Set MUTING switch to on.
4. Adjust R230 to center needle deflection on tuning meter.

### FM/AM PC BOARD(NAIMX-345)-PARTS LIST

CIRCUIT NO.	STOCK NO.	DESCRIPTION
<b>TRANSISTORS</b>		
Q101	2210123	2SC380 (O), FM IF Amp.
Q104, Q105	2210136	2SC1312 (F), Audio Amp.
Q107, Q111	2210046-1 or 2210045	2SC732 (BL) or Transient Killer 2SC732 (GR)
Q108	Same as above	Same as above Mono-ST. Switch
Q109, Q110	2210244 or 2210943	2SC735 (Y) or Muting 2SC1317 (R)
Q112	2210086	2SC733 (BL), Noise Amp.
Q121, Q122	2210244 or 2210943	2SC735 (Y) or Schmitt Trigger 2SC1317 (R)
Q123		Gate Circuit
Q124	Same as above	Same as above Tuned Lamp Switch
Q125		Locked Lamp Switch
Q128	2210085	2SC733 (GR),
Q129	2210085	2SC733 (GR), AFC Switch
<b>ICs</b>		
Q102	222421	HA-1137 Quadrature Det.
Q103	222449	LA-3350 MPX
Q106	222418	HA-1151 AM
Q116	222424	TA-7504S OP Amp.
Q117	222423	TA-7136P Hum Sensor Amp.
<b>DIODES</b>		
D101, D106, D102		1(N)60(N)FM
D107, D108, D110,	2231031	IS1555
D103, D105, D117, D125,	223105	
D132		
D104	4000022	VD-1212, Varistor
D111	223945 or 224012	RD5.1EB or
D122	223943 or 224011	RD4.7EB or YZ-047
<b>COILS</b>		
L102	223105 or 233024	NCH1005 or NCCH-1501
L103	233074	NCCH-1506
L104	233032 or 233104	NMC-8-7 or NMC-5001
L105	232013	NMO-2503
L106	233018	NMC-4-11
L107	233031	NMC-9-1
<b>TRANSFORMERS</b>		
T101	233101 or 233083	NFIF-6003 or NIT-3516
T103	232041	NIT-0509
<b>CERAMIC FILTERS</b>		
X101, X102	3010007, 3010006 or 3010008	SFE10.7MA (Blue) SFE10.7MA (Red) SFE10.7MA (Orange)
X103	3010012	CFZ-455B
<b>VARIABLE RESISTOR</b>		
R118	5225013	R-HK100KB3P
R127	5225019	R-H4.7KB3M
R154	5225017	R-HK10KB3P
R157	5225024	N10HR1KBD
R230	5225013	R-HK100KB3P

# TX-2500 PARTS LIST

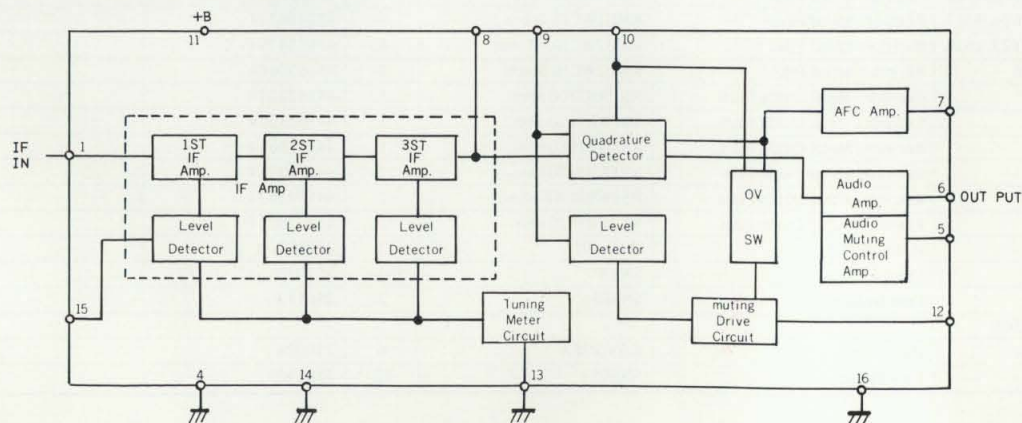
PARTS NO.	DESCRIPTION	SPECIFICATIONS	Q'TY	STOCK NO.	REMARKS
	FM Front End	FAT-48EJ-41	1	240036	
	Printed Circuit Board Ass'y	NAIMS-345	1	13809545	Tuner Ass'y
	Printed Circuit Board Ass'y	NAEQ-346	1	13809546	Equalizer Ass'y
	Printed Circuit Board Ass'y	NASW-347a	1	13810547A	Switch Ass'y
	Printed Circuit Board Ass'y	NAAF-348a	1	13810548A	Tone Ass'y
	Printed Circuit Board Ass'y	NADP-349	1	13809549	Driver Ass'y
	Printed Circuit Board Ass'y	NAPL-350	1	13809550	Pilot Lamp Ass'y
Q507, Q508, Q607, Q608	Transistor	2SD427(R) or 2SD427(O)	4	2200372 or 2200373	Use same hfe rank.
PL807-PL810	Pilot Lamp	6.3V0.05AW3	4	210015	Dial illumination
T901	Transformer-Power	NPT-598ADGQ	1	230157	
L001	Coil-Antenna	NMA-2520	1	232054	AM BAR ANTENNA
C971	Capacitor-IS	PME271Y510CEE	2	3500052	
C975, C976	Capacitor-Elect.	CE62W35V4700μF	2	3504081	
C265	Capacitor-Elect.	CE04W16V100μF	1	352741011	
R530, R630	Resistor-Metal Oxide Film	RS1WBJ270ohm	2	441622714	
S901	Switch-Push	NPS-121LN3	1	25035026	Power Source
S810	Switch-Rotary	NRS-244-30Y	1	25030059	SPEAKERS
S811	Switch-Slide	NSS-2327	1	25065016	HUM SENSOR
P801	Pin Jack	NTM-2WPBL-E1	1	250170	Phono
P807	Terminal	NTM-3WPUN1	1	25060020	Antenna
P808, P809	Terminal-Speaker	NTM-4WPUN1	2	25060001A	
P810	Jack-Stereo Headphone	LJ-100-H	1	25045018	
P804, P806	Socket-DIN	S-1823	2	250008	
W901	Power Supply Cord	AS-CEE	1	253083	
F901	Fuse	2A-T	1	252002	Power Source
F901a	Socket-VS	S-17205-7	1	250186	
F501, F601	Fuse	SS-2 3A	2	252006	Speaker
F601a	Fuse Holder		1	25050004	with COVER
M101	Tuning Indicator	NIND-0250S52	1	243053	Strength
M102	Tuning Indicator	NIND-0500S55	1	243056	
Q507a, Q607a, Q508a, Q608a	Socket-Transistor	M1614	4	250249	
	Binder	SKB-1	20	260208	
A001	Chassis		1	27100016	
A003	Dial Drum		1	27200019	
A004	Spring-Drum	SP-14A	1	273803	
A005	Dial Cord			273903	
A007	Shaft-Push Switch		3	27260006	
A009	Joint		3	28320135	Push Switch
A032	Bracket-Dial Pulley (R)		1	27140084	
A033	Bracket-Dial Pulley (L)		2	27140083	
A034	Dial Pulley	DP-16N	4	27185002	
A040	Bracket-Front		1	27110024B	
A041	Drive Shaft		1	27205005	
A073	Back Panel		1	27120041	
A074	Bracket-Antenna		1	27140091	
A075	Holder-Antenna		1	27190015A	
A078	Heat Sink		1	27160016A	
A301	Amp. Box Ass'y		1	28110096A	
A302	Screw	4MS+1SBS-Ni	4	82374015	
A303	Washer	4X12BS-Ni	4	870040	
((NAEQ-346))					
Q301, Q401	Transistor	2SA722(S) or 2SA841(GR)	2	2210915 or 2210665	
Q302, Q402	Transistor	2SC1328(S) or 2SC1681(O-1)	2	2210925 or 2210670	
C301, C401			2		
C307, C407	Capacitor-Elect.	CE04W10V47μF	2	352734701	
C308, C408	Capacitor-Elect.	CE04W16V33μF	2	352743301	
C309, C409	Capacitor-Elect.	CE04W6.3V100μF	2	352721011	
C310, C410	Capacitor-Elect.	CE04W50V0.47μF	2	352784791	
S801	Switch-Rotary	NRS-163-30K	1	25030060	SELECTOR
((NASW-347a))					
P802, P803	Pin Jack	NTM-6PBL-E1	2	25045019	
S802-S804	Switch-Push	NPS-122X2-142LA	1	25035031	T. MONI & DOLBY
((NAAF-348a))					
Q351, Q451	Transistor	2SA841(GR) 2SA841(BL) 2SA722(S) 2SA722(T) or	2	2210665 2210666 2210915 2210916 or	
Q352, Q452	Transistor	2SC1681(O-2) 2SC1328(T) or	2	2210671 2210926 or	

PARTS NO.	DESCRIPTION	SPECIFICATIONS	Q'TY	STOCK NO.	REMARKS
C352, C452	Capacitor-DE	DE93M50V0.047μF	2	374124735	
C353, C453	Capacitor-LR Capacitor-MS	LR04B50V2.2μF MS04C50V2.2μF	2	392680221 392080227	
C354, C454	Capacitor-Elect.	CE04W50V3.3μF	2	352780331	
C355, C455	Capacitor-Elect.	CE04W10V47μF	2	352734701	
C361, C461, C359, C369	Capacitor-Elect.	CE04W50V1μF	4	352780101	
C962, C964	Capacitor-Elect.	CE04W25V470μF	2	352754711	
R356, R456	Resistor-Variable	N24RGP250KBT30.41C	1	5172042	VOLUME
R363, R463, R368, R468	Resistor-Variable	N16RGM100KB30.11C	2	5104036	tone
R376, R476	Resistor-Variable	N16RL100KW30C	1	5104035	BALANCE
S805-S807	Switch-Push	NPS-122X3LA	1	25035032	LOW & HI FILTER, DOLBY
S808	Switch-Push	NPS-122LA7	1	25035029	MUTING
((NADP-349))					
Q501, Q502, Q601, Q602	Transistor	2SC1681(O-1) 2SC1681(O-2) or	4	2210670 or 2210671	Using same hfe rank
Q503, Q603	Transistor	2SA706(42) or (32)	2	2200033 or 2200034	
Q504, Q604, Q903	Transistor	2SC945 L (P)	3	2210743	
Q505, Q605	Transistor	2SC1625(O) or 2SC1625(Y)	2	2200393 or 2200394	Using same hfe rank
Q506, Q606	Transistor	2SA815(O) or 2SA815(Y)	2	2200403 or 2200404	Using same hfe rank
Q701, Q702	Transistor	2SC733(GR)	2	2210085	
Q703	Transistor	2SC734(Y)	1	2210064	
Q901	Transistor	2SD235(Y)	1	2200014	
Q902, Q904	Transistor	2SD235(O) or (Y)	2	2200013 or 2200014	
Q905	Transistor	2SA726(F) or 2SA561(Y)	1	2210416 or 2210074	
D501, D601, D910, D911	Diode-Silicon	1S1555	4	223105	
D502	Diode-Zener	WZ-120 or RD12E(B)	1	223910 or 223963	
D901-D904	Diode-Silicon	ERD03-02	4	223832	
D905, D906	Diode-Silicon	10D2	2	223805	
D907, D908, D913, D914	Diode-Silicon	10D1 or 1S1885	4	223801 or 223802	
D909	Diode-Zener	WZ-130	1	223924	
D912	Diode-Zener	WZ-192	1	223927	
D701, D702	Diode-Silicon	1S1554	2	223106	
L501, L601	Coil-S	S-1.3B	2	231001	
C501, C601	Capacitor MS or LR	MS04C25V4.7μF or LR04B25V4.7μF	2	392650471 392050477 or	
C503, C603	Capacitor-Elect.	CE04W10V47μF	2	352734701	
C505, C605	Capacitor-Elect.	CE04W6.3V470μF	2	352724711	
C507, C607	Capacitor-Elect.	CE04W50V100μF	2	352781011	
C509, C609	Capacitor-Elect.	CE04W6.3V220μF	2	352722211	
C515, C615	Capacitor-DE	DE93M50V0.1μF	2	374121045	
C703, C915, C923	Capacitor-Elect.	CE04W35V220μF	3	352762211	
C907	Capacitor-Elect.	CE04W35V100μF	1	352761011	
C908	Capacitor-Elect.	CE04W25V470μF	1	352754711	
C911	Capacitor-Elect.	CE04W16V220μF	1	352742211	
C912, C919	Capacitor-Elect.	CE04W16V470μF	2	352744711	
C913	Capacitor-Elect.	CE04W25V220μF	1	352752211	
C914, C921	Capacitor-Elect.	CE04W25V100μF	2	352751011	
C917	Capacitor-Elect.	CE04W50V2.2μF	1	352780221	
C924	Capacitor-Elect.	CE04W35V470μF	1	352764711	
R504, R604	Resistor-Semi Fixed	R-HK4.7KB3M	2	5225019	Center Voltage
R513, R613	Thermistor	D-22A	2	4000003	
R514, R614	Resistor-Semi Fixed	R-HK2.2KB3M	2	5225005	Idling Current
R516, R616	Resistor-Metal Oxide Film	RS1WBJ3.3Kohm	2	441623324	
R520, R522, R620, R622	Resistor-Metal Film	RNU1WCJ10ohm	4	451631004	
R524, R527, R624, R627	Resistor-Metal Film	RNU1WCJ2.7ohm	4	451630274	
R525, R528, R625, R628	Resistor-Metal Film	RNU2WCJ0.47ohm	4	451734794	
RQ526, RQ626	Resistor-Metal Film	RNU1WCJ6.8ohm	2	451630684	
R903	Resistor-Metal Oxide Film	RS1WBJ100ohm	1	441621014	
R904	Resistor-Metal Oxide Film	RS1WBJ120ohm	1	441621214	
R905	Resistor-Metal Oxide Film	RS1WBJ680ohm	1	441626814	
R906, R907	Resistor-Metal Oxide Film	RS1WBJ270ohm	2	441622714	
R920	Resistor-Metal Oxide Film	RS1WBJ1.8Kohm	1	441621824	
R921	Resistor-Metal Oxide Film	RS2WBJ820ohm	1	441728214	
	Radiator	RAD-01	7	270187-1	
F902	Fuse	5A-T	1	252020	
F902a	Fuse Holder	SN5051	2	250113	
((NAPL-350))					
PL801-PL806	Pilot Lamp	6.3V0.25A	6	210026	
	Fuse Holder	SN5051	12	250113	

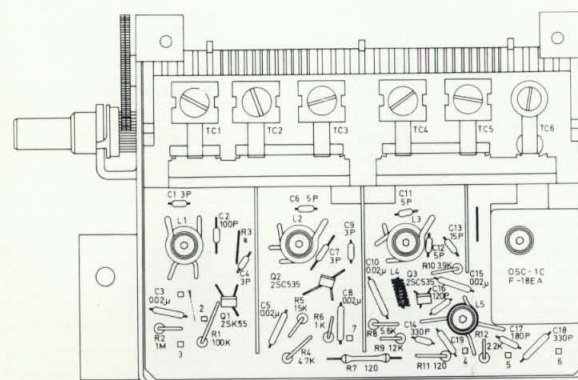
### NAIMX-337 PARTS LIST

PARTS NO.	DESCRIPTION	SPECIFICATIONS	Q'TY	STOCK NO.	REMARKS
Q101, Q116	IC	TA-7060P	2	222407	FM IF Amp
Q102	IC	HA-1137W	1	222421	FM DET
Q103	IC	HA-1156	1	222419	FM MPX
Q106	IC	HA-1151	1	222418	AM
Q115	IC	TA-7061AP	1	222402	FM IF Amp
Q117	IC	TA-7504S	1	222424	OP Amp
Q126	IC	TA-7136P	1	222423	Sensor Amp
Q104, Q105	Transistor	2SC1312(F)	2	2210136	
Q108, Q111, Q114	Transistor	2SC945 (L) Q1	3	2210745	
Q109, Q110, Q112, Q121-Q123, Q124, Q125, Q127	Transistor	2SC735(Y) or 2SC1317(R)	14	2210244 or 2210943	
Q112, Q113, Q128, Q129	Transistor	2SC733(BL)	4	2210086	
Q119, Q120	Transistor	2SC380(O)	2	2210123	
Q127	Transistor	2SC1583(G)	1	2210707	
Q131, Q132	Transistor	2SA726(F)	2	2210416	
D101, D105, D118, D121, D124, D125, D128	Diode-Silicon	1S1555	8	223105	
D102	Varistor	VD1212	1	4000022	
D103, D104, D106, D109, D112-D117, D119, D120, D123, D126, D129	Diode-Germanium	1N60 (N) FM	16	2231031	
D111	Diode-Silicon	RD5.1EB or WZ-052	1	223945 or 224012	
D122	Diode-Silicon	RD4.7EB or YZ047	1	223943 or 224011	
D127	Diode-Silicon	RD5.6EC or WZ-061	1	223948 or 223928	
L101, L102, L107, L108, L110	Choke Coil	NCCB-1501	5	233204	3.3μH
L103	Choke Coil	NCCB-1506	1	233074	
L104	Coil-MPX	NMC-8-7	1	233032	Low Pass Filter
L105	Coil-OSC	NMO-2504	1	232042	AM OSC
L106	Coil-MPX	NMC-9-1	1	233031	2.2μH
L109	Coil-MPX	NMC-4-11	1	233018	
T101	Transformer-IF	NIT-3516	1	233083	Quadrature Detector
T102	Transformer-IF	NIT-0517	1	233084	10.7MHz Trap
T103	Transformer-IF	NIT-0509	1	232041	AM DET
T104	Transformer-IF	NIT-0515P	1	233078	FM DET
T105	Transformer-IF	NIT-0515S	1	233079	FM DET
X101	Ceramic Filter	SFJ10.7MA	1	3010018	(RED)
X103	Ceramic Filter	SFE10.7MA	1	3010006	(RED)
X104	Ceramic Filter	CFT-455B	1	3010012	
X105	Crystal Oscillator	XTL-10.7M	1	3010015	
C105	Capacitor-Elect.	CE04W25V4.7S	1	352750471	
C106, C132, C133, C135, C246	Capacitor-Elect.	CE04W50V0.47S	5	352784791	
C174, C177, C241, C110, C128, C129, C139, C134, C255	Capacitor-Elect.	CE04W50V1S	9	352780101	
C113, C114, C141, C180, C244, C247, C253	Capacitor-Elect.	CE04W16V10S	7	352741001	
C115, C116	Capacitor-Elect.	CE04W50V2.2S	2	352780221	
C175, C250	Capacitor-Elect.	CE04W50V3.3S	2	352780331	
C179, C251, C252	Capacitor-Elect.	CE04W25V10S	3	352751001	
C181, C182, C183, C186, C256	Capacitor-Elect.	CE04W16V100S	5	352741011	
C184	Capacitor-Elect.	CE04W16V220S	1	352742211	
C185	Capacitor-Elect.	CE04W16V1000S	1	352741021	
C187, C216	Capacitor-Elect.	CE04W16V47S	2	352744701	
C257	Capacitor-Elect.	CE04W16V470S	1	352744711	
C117, C118	Capacitor-MS	MS04C50V0.47M	2	392084797	
C119	Capacitor-MS	MS04C50V1M	1	392080107	
C136	Capacitor-MS	MS04C16V10M	1	3920410007	
C121, C178	Capacitor-DE	DE93M50V473M	2	374124737	
C213, C214	Capacitor-MS or Capacitor-LR	MS04C50V0.47M or LR04B50V0.47S	2	392084797 or 392684791	
R114	Resistor-Semi Fixed	R-HK100KB3P	1	5225013	
R138, R257	Resistor-Semi Fixed	R-HK1KB3P	2	5225018	
R142	Resistor-Semi Fixed	R-HK4.7KB3P	1	5225019	
R151	Resistor-Semi Fixed	R-HK100KB3M	1	5225016	
R254	Resistor-Semi Fixed	R-HK10KB3P	1	5225017	
R274, R275	Resistor-Metal Oxide Film	RS1WBJ270	2	441622714	
RL101	Relay	L-13	1	25065026	AFC

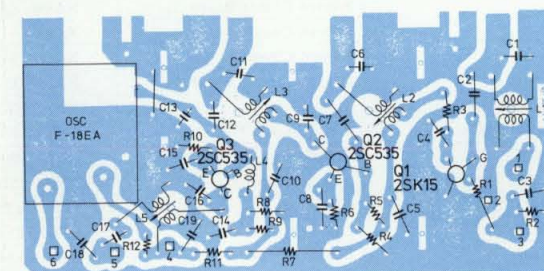
### HA-1137W BLOCK DIAGRAM



### FM FRONT END BOARD VIEW FAT-42EJ-41(TX-4500) TOP VIEW



### BOTTOM VIEW

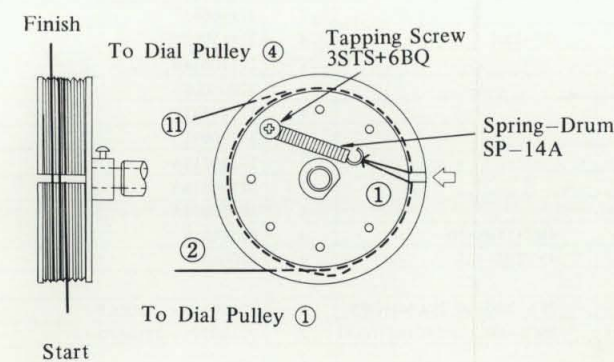


#### Terminals

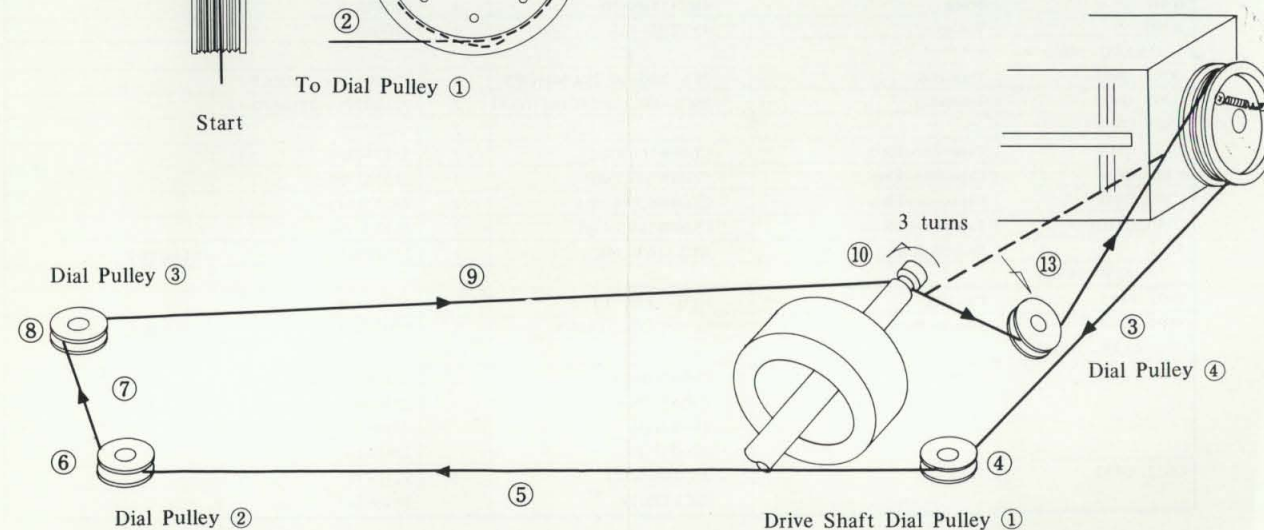
- |                 |            |
|-----------------|------------|
| 1. ANT (75-ohm) | 6. AFC     |
| 2. ANT (E)      | 7. E       |
| 3. AGC          | 8. AM. RF  |
| 4. +B (12V)     | 9. AM. OSC |
| 5. IF OUT       |            |

PARTS NO.	DESCRIPTION	SPECIFICATIONS	Q'TY	STOCK NO.	REMARKS
Q1	Transistor (FET)	2SK55(D)	1	2210954	RF Amp.
Q2	Transistor	2SC535(B)	1	2210882	RF Amp.
Q3	Transistor	2SC535(B)	1	2210882	Mixer
	OSC Block	F-18EA	1	222009	

### DIAL CORD ARRANGEMENT



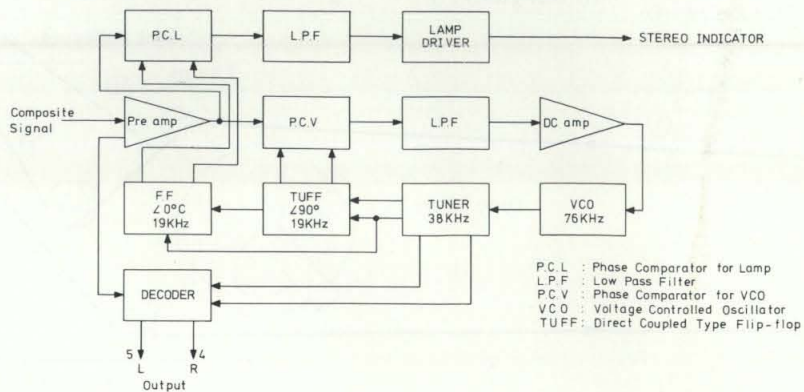
1. Close the variable capacitor complete and tie dial cord to the spring of the drum.
2. Thread dial cord in the direction of arrow from ① to ⑨ and wind dial cord three turns around the tuning shaft clockwise.
3. Thread dial cord in the direction of arrow from ⑩ to ⑫.
4. Thread dial cord to the dial pulley ④.



# NAIMS-345 PARTS LIST

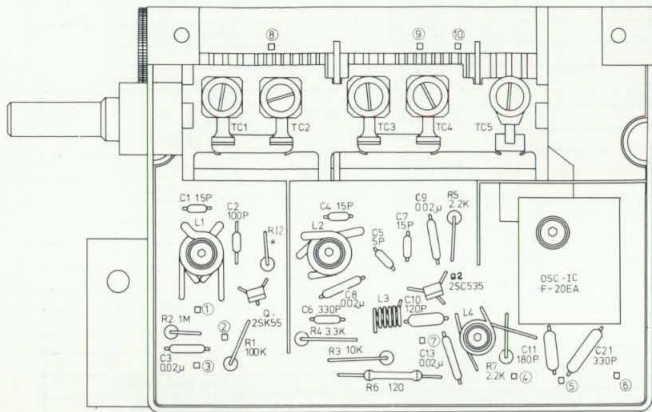
PARTS NO.	DESCRIPTION	SPECIFICATIONS	QTY	STOCK NO.	REMARKS
Q101, Q114, Q115	Transistor	2SC380(O)	3	2210123	
Q104, Q105	Transistor	2SC1312(F)	2	2210136	
Q107, Q108, Q111	Transistor	2SC945(L)Q	3	2210745	
Q109, Q110, Q121-Q126	Transistor	2SC1317(R) or 2SC735(Y)	8	2210943 or 2210244	
Q112	Transistor	2SC733(BL)	1	2210086	
Q118	Transistor	2SC1583(G)	1	2210707	Twin transistor
Q119, Q120	Transistor	2SA726(F)	2	2210416	
Q102	IC	HA-1137	1	222421	Quadrature Detector
Q103	IC	LA-3350	1	222449	MPX IC
Q106	IC	HA-1151	1	222418	AM IC
Q113	IC	TA-7061AP	1	222402	FM IF IC
Q116	IC	TA-7504S	1	222424	OP Amp
Q117	IC	TA-7136P	1	222423	Sensor Amp
D101, D102, D110, D106-D108 D112-D116, D119, D120, D123	Diode-Germanium	1N60(N) FM	14	2231031	
D103, D105, D117, D118, D121 D124, D125	Diode-Silicon	1S1555	7	223105	
D104, D109, D128	Varistor	VD1212	3	4000022	
D111	Diode-Zener	RD5.1EB or WZ-052	1	223945 or 224012	
D122	Diode-Zener	RD4.7EB or YZ-047	1	223943 or 224011	
D127	Diode-Zener	RD5.6EC or WZ-061	1	223948 or 223928	
L101, L102, L108	Choke Coil	NCCH-1501 (3.3μH)	3	233024	
L103	Choke Coil	NCCH-1506 (18μH)	1	233074	
L104	MPX Coil	NMC-8-7	1	233032	Low Pass Filter
L105	OSC Coil	NMO-2503	1	232013	AM OSC Coil
L106	MPX Coil	NMC-4-11	1	233018	
L107	MPX Coil	NMC-9-1	1	233031	
T101	Transformer-IF	NIT-3516	1	233083	FM DET
T102	Transformer-IF	NIT-0517	1	233084	10.7MHz Trap
T103	Transformer-IF	NIT-0509	1	232041	AM DET
T104	Transformer-IF	NIT-3512R	1	233075	FM DET
X101, X102	Ceramic Filter	SFE10.7MA(BLUE, RED or ORANGE)	2	3010007, 3010006 or 3010008	FM IF Filter
X103	Ceramic Filter	CFT-455B	1	3010012	AM IF Filter
C105	Capacitor-Elect.	CE04W25V4.7μF	1	352750471	
C106, C132, C133, C136, C220, C246	Capacitor-Elect.	CE04W50V0.47μF	6	352784791	
C110, C121, C219, C257, C128 C139, C201, C180, C158, C256	Capacitor-Elect.	CE04W50V1μF	10	352780101	
C113, C114, C247, C253, C143 C244, C242, C254	Capacitor-Elect.	CE04W16V10μF	8	352741001	
C115, C116	Capacitor-Elect.	CE04W50V2.2μF	2	352780221	
C175	Capacitor-Elect.	CE04W50V3.3μF	1	352780331	
C179, C263	Capacitor-Elect.	CE04W25V10μF	2	352751001	
C180	Capacitor-Elect.	CE04W16V10μF	1	352741001	
C181, C182, C258, C183, C186	Capacitor-Elect.	CE04W16V100μF	5	352741011	
C184	Capacitor-Elect.	CE04W16V220μF	1	352742211	
C185	Capacitor-Elect.	CE04W16V1000μF	1	352741021	
C218	Capacitor-Elect.	CE04W16V47μF	1	352744701	
C221	Capacitor-Elect.	CE04W25V47μF	1	352754701	
C259	Capacitor-Elect.	CE04W16V470μF	1	352744711	
C117	Capacitor-MS	MS04C50V0.33μF	1	392083397	
C118	Capacitor-MS	MS04C50V0.22μF	1	392082297	
C137	Capacitor-MS	MS04C25V10μF	1	392051007	
C119, C216	Capacitor-MS or LR	MS04C50V0.47μF or LR04B50V0.47μF	2	392084797 or 392684791	
C178	Capacitor-DE	DE93M50V47000μF	1	374124737	
C250	Capacitor-DE	DE93M50V220000μF	1	374122247	
R118	Resistor-Semi Fixed	R-HK100KB3P	1	5225013	STRENGTH METER
R127	Resistor-Semi Fixed	R-H4.7KB3M	1	5225019	19KHz
R154	Resistor-Semi Fixed	R-HK10KB3P	1	5225017	MUTING LEVEL
R157	Resistor-Semi Fixed	N10HR1KBD	1	5225024	SEPARATION
PL101	Relay	L-13	1	25065026	AFC

## LA-3350 BLOCK DIAGRAM

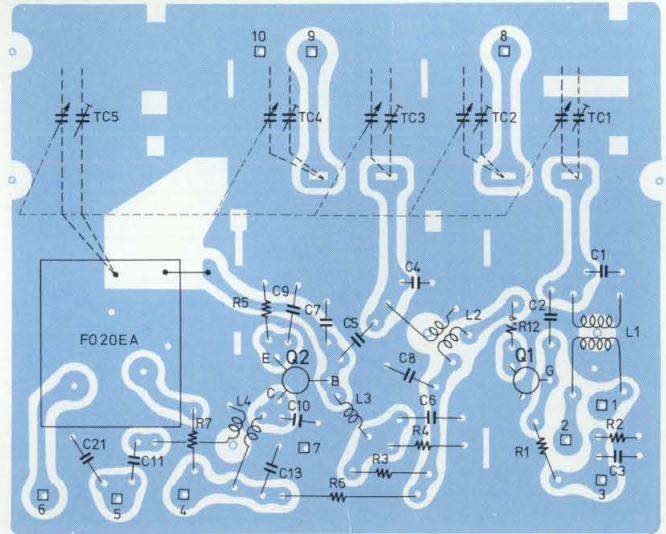




### FRONT END BOARD VIEW FAT-48EJ-41(TX-2500) TOP VIEW



### BOTTOM VIEW



PARTS NO.	DESCRIPTION	SPECIFICATIONS	STOCK NO.	REMARKS
Q1	Transistor (FET)	2SK55(D)	2210954	RF Amp.
Q2	Transistor	2SC535(B)	2210882	Mixer
	OSC Block	FO-20EA		

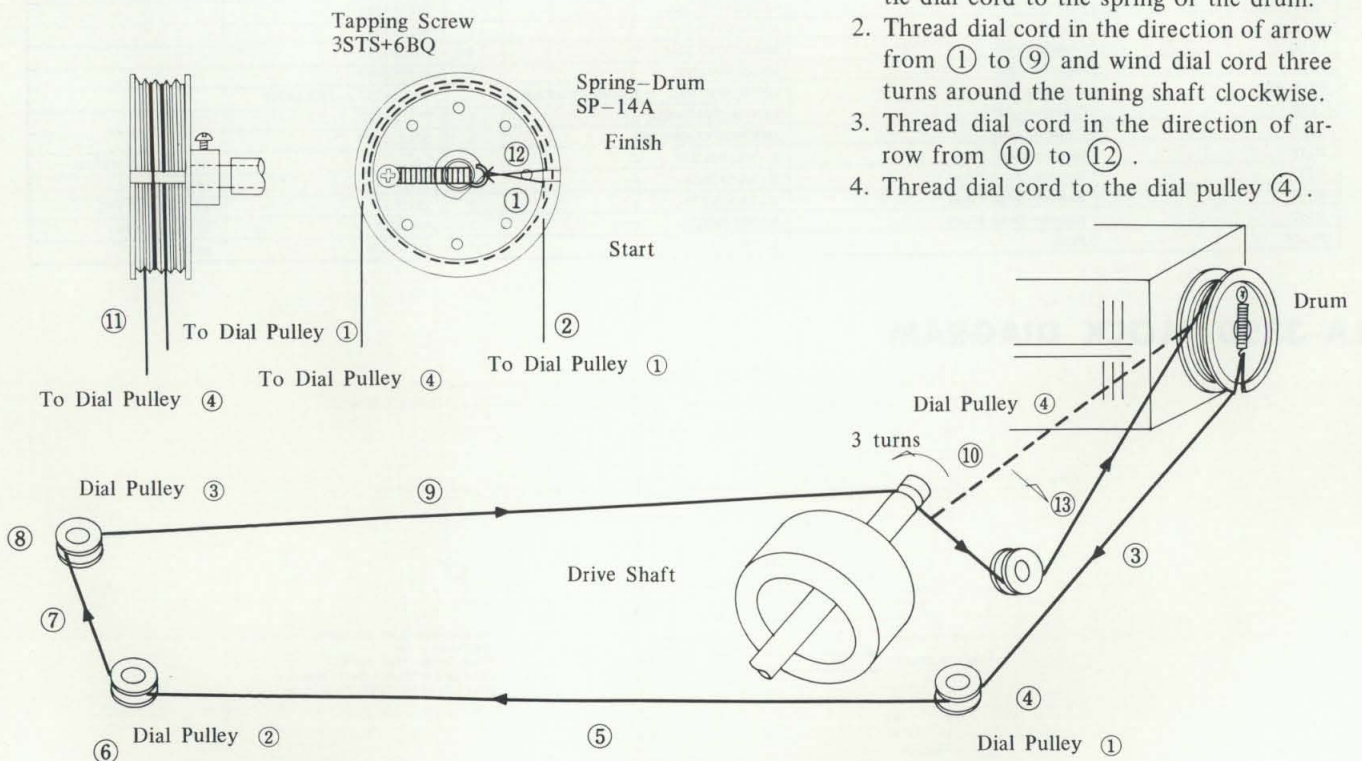
#### Terminals

- 1. ANT (300-ohm)
- 2. ANT (300-ohm)
- 3. AGC
- 4. +B
- 5. IF OUT (600-ohm)
- 6. AFC
- 7. FM. E
- 8. AM. RF
- 9. AM. OSC
- 10. AM. E

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### DIAL CORD ARRANGEMENT

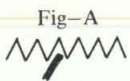
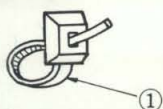
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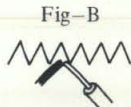
1. Close the variable capacitor complete and tie dial cord to the spring of the drum.
2. Thread dial cord in the direction of arrow from ① to ⑨ and wind dial cord three turns around the tuning shaft clockwise.
3. Thread dial cord in the direction of arrow from ⑩ to ⑫.
4. Thread dial cord to the dial pulley ④.

## SERVICE PROCEDURE

### RELEASING BINDER



the state in which it stays



a small driver or a fine pin

fig-29

A little space opens up in between the teeth as the part (1) is pressed slightly in the same direction as in tightening, as shown in fig-29, the binder can come off with the driver or pin having the pointed end being pushed up in the direction as shown by the arrow.

### USEING SENSOR SWITCH

While the sensor SW is ordinarily set to LOW position when the unit is delivered, there may be occasions when the sensitivity of the inductive ham detection device is lessened as one of the coaxial cables is earthed with the aerial in joint use. Only in this or similar case is the sensor SW allowed to be brought to HIGH position.

### REMOVING TUNING KNOB

Being fixed in position on the shaft with the 4 mm enamel screw, the tuning knob should be taken off by the use of a hexagonal driver.

### DEEMPHASIS SELECTOR (on bottom of unit)

This switch, located on the bottom of the unit, changes the deemphasis constant for receiving FM broadcasts. The switch is factory-set at 50  $\mu$ sec and should not normally be reset, a change in deemphasis will be required if you move to or from the U.S.A., where the deemphasis standard is different from that used in the rest of the world.

Europe	50 $\mu$ sec	U.S.A.	75 $\mu$ sec
--------	--------------	--------	--------------

### FUSE REPLACEMENT

#### LINE VOLTAGE AND FUSE

The model TX-2500 and TX-4500 operate on each one of the four line voltages, 110V, 120V, 220V, and 240V. Set the unit to the proper line voltage by the following procedure described below.

#### CHANGE LINE VOLTAGE SETTING AND FUSE

To remove the fuse, turn the fuse cap located on the line voltage selector counter-clockwise.

Then remove the fuse plug from the unit. Put the fuse plug back so that the proper line voltage marking can be seen through the cut in the edge of the plug.

Whenever the position of the selector is changed, check the rating of the fuse.

A 3.0A fuse is for 220V or 240V operation and a 5.0A fuse is for 110V or 120V operation.

(Model TX-4500)

A 2.0A fuse is for 220V or 240V operation and a 3.0A fuse is for 110V or 120V operation.

(Model TX-2500)

If the rating of the fuse is correct, replace the cap.

#### FUSE REPLACEMENT

When the fuse has blown, remove the fuse cap and replace the fuse with a new one. See fig. 30.

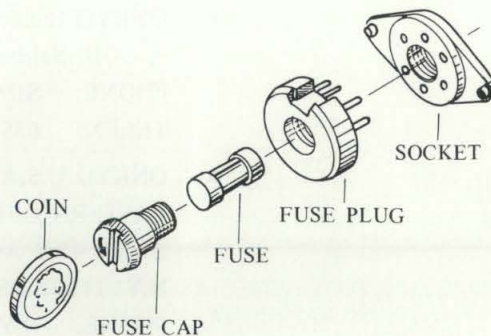
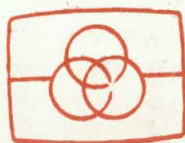


fig-30



Free service manuals

Gratis schema's

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