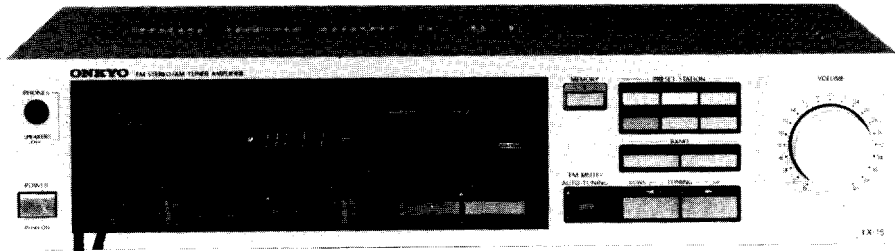


ONKYO SERVICE MANUAL

QUARTZ SYNTHESIZED TUNER AMPLIFIER MODEL TX-15/TX-100



Silver and black models

| | |
|--------------------------|-------------------------|
| UD, UDN, BUD, BUDN | 120V AC, 60Hz |
| UG, TX-100, BUG, TX-100B | 220V AC, 50Hz |
| UW, BUW | 120 or 220V AC, 50/60Hz |
| UQA | 240V AC, 50Hz |

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK Δ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PARTS NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

SPECIFICATIONS

AMPLIFIER SECTION

Power Output: 23 watts per channel, min. RMS, at 8 ohms, both channels driven, from 40Hz to 20kHz, with no more than 0.3% THD.

Music Power Output: 2 x 40 watts at 4 ohms, 1kHz (DIN)
2 x 35 watts at 8 ohms, 1kHz (DIN)

Continuous Power Output: 2 x 30 watts at 4 ohms, 1kHz (DIN)
2 x 25 watts at 8 ohms, 1kHz (DIN)

Total Harmonic Distortion: 0.1% at 20W
0.1% at 1 watt output

IM Distortion: 0.1% at 20W
0.1% at 1 watt output

Damping Factor: 35 at 8 ohms

Frequency Response: 20 – 30,000 Hz ± 1 dB

RIAA Deviation: 20 – 20,000 Hz ± 0.8 dB

Sensitivity and Impedance: Phono: 2.5mV/50 kohms
Tape Play: 150mV/50 kohms
Tape Rec: 150mV/3.5 kohms (phono)

Phono Overload: 150mV RMS at 1 kHz, 0.3% THD

Signal-to-Noise Ratio: Phono: 85dB (at 10mV input, A weighted)
75dB (IHF A-202)
Tape: 95dB (A weighted)
80dB (IHF A-202)

Tone Controls: Bass: ± 8 dB at 100Hz
Treble: ± 8 dB at 10kHz

Loudness (± 30 dB): +7dB at 70Hz, +5dB at 10kHz

ONKYO
AUDIO COMPONENTS

TUNER SECTION

| FM: | 120V model | 220/240V model |
|--------------------------------|---|---|
| Tuning Range: | 87.5 – 108.0 MHz (100 kHz steps) | 87.5 – 108.0 MHz (50 kHz steps) |
| Usable sensitivity: | Mono: 12.4 dBf, 2.3 μ V | Mono: 12.4 dBf, 2.3 μ V (IHF) 1.2 μ V, 75 Ω (DIN) |
| 50 dB Quieting Sensitivity: | Stereo: 19.2 dBf, 5.0 μ V Mono: 18.2 dBf, 4.5 μ V Stereo: 38.2 dBf, 4.5 μ V | Stereo: 2.5 μ V, 75 Ω Mono: 2.2 μ V, 75 Ω Stereo: 22 μ V, 75 Ω |
| Capture Ratio: | 1.5 dB | 1.5 dB |
| Image Rejection Ratio: | 40 dB | 85 dB |
| IF Rejection Ratio: | 90 dB | 90 dB |
| Signal-to Noise Ratio: | Mono: 70 dB Stereo: 65 dB | Mono: 70 dB Stereo: 65 dB |
| Alternate channel Attenuation: | 55 dB | 50 dB DIN (\pm 300 kHz 40 kHz dev.) |
| AM Suppression Ratio: | 50 dB | 50 dB |
| Harmonic Distortion: | Mono: 0.15% Stereo: 0.3% | Mono: 0.15% Stereo: 0.3% |
| Frequency Response: | 30 – 15,000 Hz \pm 1.5 dB | 30 – 15,000 Hz \pm 1.5 dB |
| Stereo Separation: | 40 dB at 1 kHz 30 dB at 100 – 10,000 Hz | 40 dB at 1 kHz 30 dB at 100 – 10,000 Hz |
| Tuning Level | 17.2 dBf, 4 μ V | 17.2 dBf, 2 μ V |
| Stereo Threshold: | 17.2 dBf, 4 μ V | 17.2 dBf, 2 μ V |

AM:

| | | |
|------------------------|--------------------------------|-------------------------------|
| Tuning Range: | 520 – 1,710 kHz (10 kHz steps) | 522 – 1,611 kHz (9 kHz steps) |
| Usable Sensitivity: | 30 μ V | 30 μ V |
| Image Rejection Ratio: | 40 dB | 40 dB |
| IF Rejection Ratio: | 30 dB | 30 dB |
| Signal-to-Noise Ratio: | 40 dB | 40 dB |
| Harmonic Distortion: | 0.8% | 0.8% |

GENERAL:

| | | |
|---------------------|---|---|
| Semiconductors: | EETs: 4 TR: 24 ICs: 9 Diodes: 49 | EETs: 4 TR: 28 ICs: 9 Diodes: 51 |
| Dimensions (WxHxD): | 418 x 99 x 319 mm (16 1/2" x 3 15/16" x 12 1/2") | 418 x 99 x 319 mm (16 1/2" x 3 15/16" x 12 1/2") |
| Weight: | 5.7 kg., 12.6 lbs. | 5.7 kg., 12.6 lbs. |

Specifications and features are subject to change without notice.

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3-4-85

TX-15

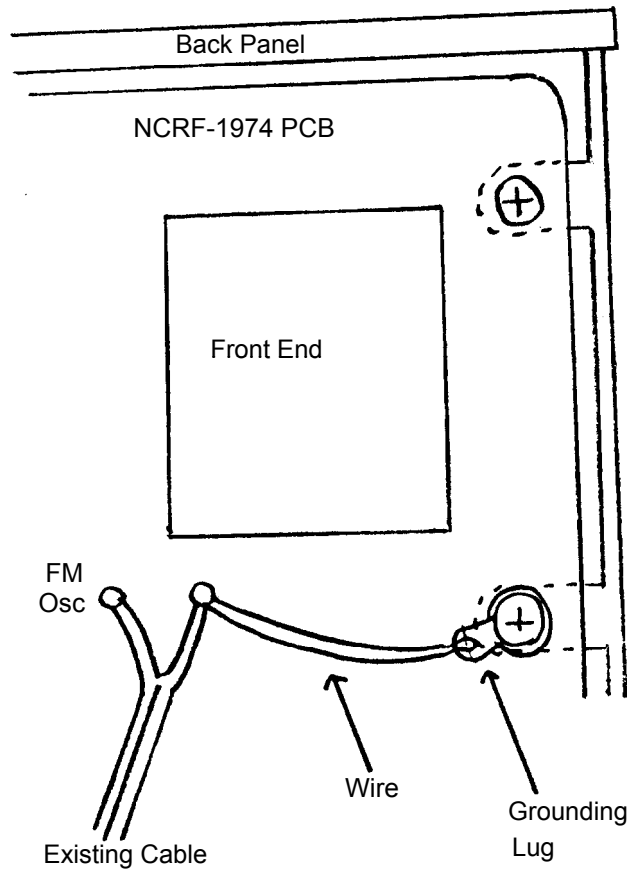
TX-15 Service Bulletin

(Please enclose this bulletin in your TX-15 Receiver service manual.)

Problem: A loud hum or buzzing noise when listening to AM or FM.

Cause: Loose grounding screws on main printed circuit board NCRF-1974.

Solution: Add an additional grounding wire with lug from the ground post for the FM OSC cable to the chassis ground screw nearest it. Please see the below sketch.



SERVICE PROCEDURES

TX-15

1. Replacing the fuses

For continued protection against fire hazard, replace only with same type and same rating fuse.

D (120V) model

| Circuit no. | Part no. | Description |
|-------------|----------|--------------------|
| F501, F601 | 252006 | 3A (SS-2), Speaker |
| F901 | 252048 | 3A (ST-6), Primary |

G (220V) and Q (240V) models

| Circuit no. | Part no. | Description |
|-------------|----------|-------------------------|
| F501, F601 | 252075 | 2.5A-SE-EAK, Speaker |
| F902 | 252073 | 1.6A-SE-EAK, Primary |
| F903, F904 | 252077 | 4A-SE-EAK, Secondary |
| F905, F906 | 252070 | 1A-SE-EAK, Secondary |
| F907 | 252088 | 250mA-SE-EAK, Secondary |

W (120 or 220V) model

| Circuit no. | Part no. | Description |
|-------------|----------|----------------------|
| F501, F601 | 252006 | 3A (SS-2), Speaker |
| F901 | 252048 | 3A (ST-6), Primary |
| F902 | 252073 | 1.6A-SE-EAK, Primary |

2. Safety-check out (D model)

After correcting the original service problem, perform the following safety check before releasing the set to the customer:

Connect the insulating-resistance tester between the plug of power supply cable and nickel screw.

Specifications: $3.3M\Omega \pm 0.3M\Omega$

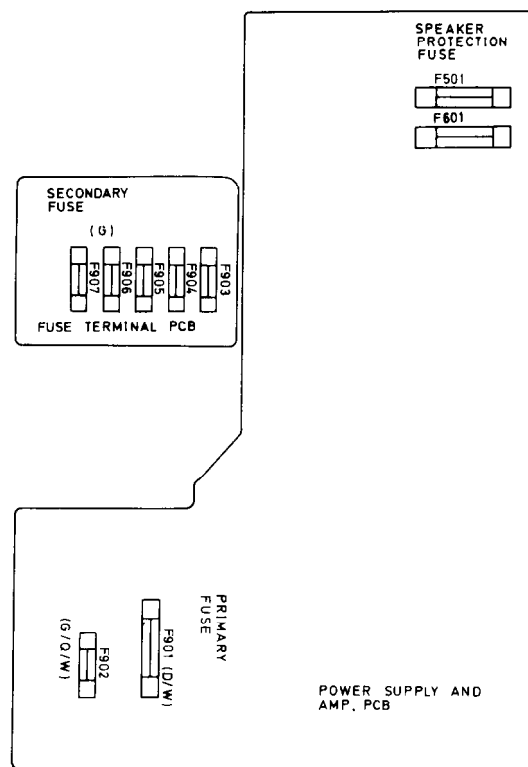
3. Check of pc boards

To allow the pc board to be checked from the underside of the chassis, the bottom board has two doors.

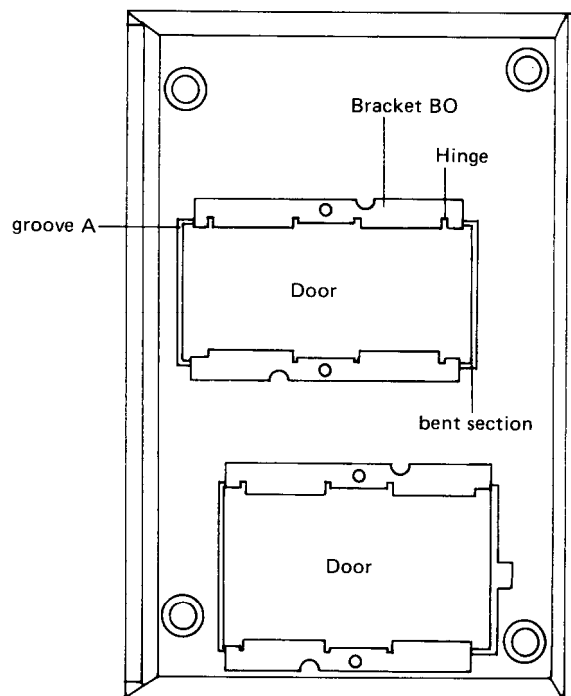
At each one, groove A and the bent section are held in place by bracket BO. Bracket BO serves as a backup part to attach the door to the chassis if the bent section hinge is broken off. When checking the pc board, remove the two BO brackets and bend them about 90° . Be careful because if they are bent too far, attach the door to the chassis using bracket BO.

4. Change of AM scan step (W model)

W models are equipped with a switch to change the AM scan step frequency from 9kHz to 10kHz. The switch is located on the back panel. This switch is set to 9kHz at the factory; change to 10kHz if gives better results in your locality.

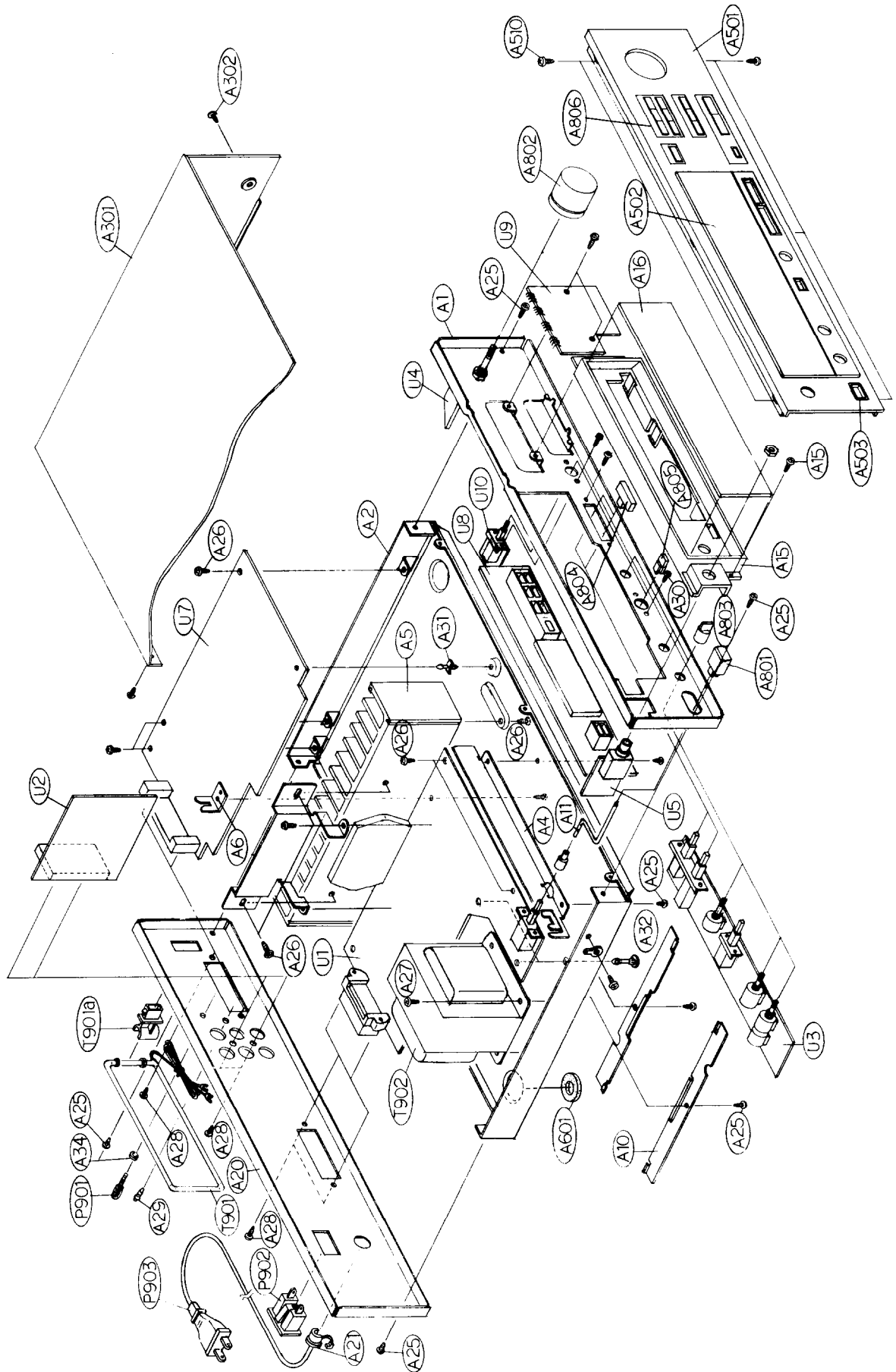


(fig. 1)



(fig. 2)

EXPLODED VIEW



PARTS LIST

| REF. NO. | PART NO. | DESCRIPTION | REF. NO. | PART NO. | DESCRIPTION | REF. NO. | PART NO. | DESCRIPTION |
|----------|-----------|------------------------------|----------|------------|--|----------|-----------|---|
| A1 | 27110217A | Front bracket | A501 | 18112121 | Front panel ass'y (TX-100B) | U1 | 18088568 | NAAF-1968, Power amplifier and rectifier circuit pc board ass'y (D) |
| A2 | 27100052 | Chassis | | 28191244 | Clear plate | | | |
| A4 | 27130350 | Bracket, pc board | | 27267215 | Guide, power | | | |
| A5 | 27160142 | Radiator | | 28321480 | Knob ass'y | U1 | 18094568A | NAAF-1968a, Power amplifier and rectifier circuit pc board ass'y (G/Q/TX-100) |
| A6 | 27140893 | Bracket, pc board | A510 | 834430068 | 3TTS+6B (BC), Tapping screw | U1 | 18090568B | NAAF-1968b, Power amplifier and rectifier circuit pc board ass'y (W) |
| A8 | 27140908 | Bracket BO | A601 | 27175011C | Leg | | | |
| A10 | 28320135 | Connector | A801 | 28320852 | Knob, power (S) | | | |
| A11 | 27260144 | Shaft | | 28321160 | Knob, power (B) | | | |
| A15 | 27190265 | Holder | A802 | 28320543-1 | Knob, volume (S) | U2 | 18088569 | NAEQ-1969, Equalizer amplifier pc board ass'y (D/W) |
| A16 | 28133096 | Back plate | | 28320892 | Knob, volume (B) | | | |
| A20 | 27120573A | Back panel (D) | A803 | 28321473 | Knob, tone (S) | | | |
| | 27120574 | Back panel (G) | | 28321474 | Knob, tone (B) | U2 | 18094569A | NAEQ-1969a, Equalizer amplifier pc board ass'y (G/Q/TX-100) |
| | 27120580 | Back panel (TX-100) | A804 | 28321475 | Knob, selector (S) | | | |
| | 27120575 | Back panel (W) | | 28321476 | Knob, selector (B) | | | |
| | 27120635 | Back panel (Q) | A805 | 28321477 | Knob, push (S) | U3 | 18088570 | NATC-1970, Tone control pc board ass'y |
| A21 | 270280 | SR-4K-4, Strainrelief | | 28321478 | Knob, push (B) | | | |
| A25 | 834430068 | 3TTS+6B (BC), Tapping screw | | 252006 | 3A (SS-2), Speaker protection fuse (D/W) | U4 | 18088571 | NAVR-1971, Volume control pc board ass'y |
| A26 | 831430088 | 3TTW+8B (BC), Tapping screw | | 252075 | 2. 5A-SE-EAK, Speaker protection fuse (G/Q/TX-100) | U5 | 18088572 | NAHP-1972, Headphone terminal pc board ass'y |
| A27 | 838440089 | 4TTB+8C (BC), Tapping screw | | 252048 | 3A (ST-6), Primary fuse (D/W) | | | |
| A28 | 834430108 | 3TTS+10B (BC), Tapping screw | A F901 | 252048 | 1. 6A-SE-EAK, Primary fuse (G/Q/TX-100/W) | U6 | 18094573 | NAFU-1973, Fuse terminal pc board ass'y (G/Q/TX-100) |
| A29 | 834230108 | 3TTS+10B (Ni), Nickel screw | A F902 | 252073 | 4A-SE-EAK, Secondary fuse (G/Q/TX-100) | U7 | 18088574 | NARF-1974, FM/AM tuner pc board ass'y (D) |
| A30 | 82143006 | 3P+6FN (BC), Pan head screw | | 252077 | 1A-SE-EAK, Secondary fuse (G/Q/TX-100) | | | |
| A31 | 27190062 | Holder | | 252088 | 250mA-SE-EAWK, Secondary fuse (G/Q/TX-100) | U7 | 18090574B | NARF-1974b, FM/AM tuner pc board ass'y (W) |
| A32 | 27190266 | Holder | | | Ground terminal | U8 | 18088575 | NADIS-1975, Indication pc board ass'y (D) |
| A33 | 27140889 | Bracket, fuse (G/TX-100) | | 25060044 | NSCT-2P15, AC outlet (D) | | | |
| A34 | 87613010 | W3x10F, Washer | | 25050046 | AS-UC-4#18, Power supply cable (D) | U8 | 18094575A | NADIS-1975a, Indication pc board ass'y (G/Q/TX-100/W) |
| A35 | 838430068 | 3TTB+6B (BC), Tapping screw | | 253112 | AS-CEE, Power supply cord (G/TX-100/W) | U9 | 18088576 | NASW-1976, Switch pc board ass'y |
| A301 | 28184144 | Top cover (S) | | 253083-1 | AS-SAA, Power supply cord (Q) | | | |
| | 28184228 | Top cover (B) | | 253118 | NPS-1258P, Voltage selector switch (W) | U10 | 18088577 | NASW-1977, Muting switch pc board ass'y |
| A302 | 834430068 | 3TTS+6B (BC), Tapping screw | | 25065123 | NMA-3052, AM loop antenna | | | |
| A501 | 18088121 | Front panel ass'y (S) | | 232119 | Antenna holder | | | |
| | 28191243 | Clear plate | | 27190105 | NPT-836D, Power transformer (D) <i>120V AC</i> | | | |
| | 27267215 | Guide, power | | 230784 | NPT-836G, Power transformer (G/TX-100) | | | |
| | 28321479 | Knob ass'y | | 230785A | NPT-836DG, Power transformer (W) | | | |
| A501 | 18108121 | Front panel ass'y (B) | | 230786 | NPT-836Q, Power transformer (Q) | | | |
| | 28191244 | Clear plate | | | | | | |
| | 27267215 | Guide, power | | | | | | |
| | 28321480 | Knob ass'y | | | | | | |
| A501 | 18092121 | Front panel ass'y (TX-100) | | | | | | |
| | 28191243 | Clear plate | | | | | | |
| | 27267215 | Guide, power | | | | | | |
| | 28321479 | Knob ass'y | | | | | | |

Note: (D): Only 120V model
 (G): Only 220V model
 (Q): Only 240V model
 (W): Only 120/220V model
 (S): Only silver model
 (B): Only black model

NOTE: THE COMPONENTS IDENTIFIED BY MARK  ARE CRITICAL FOR FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PARTS NUMBER SPECIFIED.

CIRCUIT DESCRIPTIONS

1. Synthesizer and controller operation

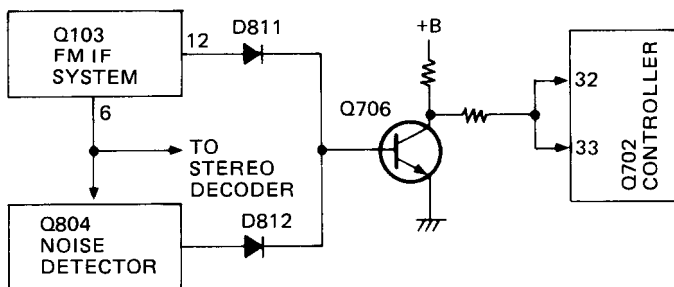
| Pin No. | Symbol | Terminal | Description |
|---------|--------|---|--|
| 1 | GND | Ground | |
| 2 | XT | X'tal | Connected to the 7.2MHz crystal oscillator for the reference frequency. |
| 3 | XT | | |
| 4 | FM | FM band specification input | Mutual reset type, performs switching of each band, FM/MW/LW. |
| 5 | MW | MW band specification input | |
| 6 | LW | LW band specification input | |
| 7 | MANUAL | Manual tuning mode specification input | Mutual reset type, performs auto search and manual operation mode switching during UP/DOWN tuning. |
| 8 | AUTO | Auto search tuning mode specification input | |
| 9 | UP | UP tuning key input | Connect the push key and perform UP/DOWN tuning. |
| 10 | DOWN | DOWN tuning key input | |
| 11 | STO | Memory store command input | The preset memory is set to the write mode when the key is pressed. |
| 12-19 | M1-M8 | Preset memory channel specification input | Controls the write and read out of the internal 16-station preset memory along with the MC1 and MC2 input. |
| 20 | MC-1 | Memory control input | Set the 16-station preset memory to the 8 FM/8 AM station mode or the FM/MW/LW 3-band 16-station random mode. The 8 FM/8 AM mode is used in this unit. |
| 21 | MC-2 | | |
| 22 | OSC2 | AM oscillator terminal | CR connection terminal for the oscillator that determines the scan speed during the AM search mode. |
| 23 | OSC1 | FM oscillator terminal | CR connection terminal for the oscillator that determines the scan speed during the FM search mode. |
| 24 | 0/5 | FM 50 kHz output | Output that represents the 50kHz FM band tuning step for European models. Goes to the high level for the 50 kHz setting. |
| 25 | CK2 | Tuned frequency data output | Outputs the serial data and timing clock to the tuned frequency display driver. |
| 26 | CK1 | | |
| 27 | DATA | | |
| 28 | MUTE | Muting signal output | Goes to the high level during muting output. |
| 29 | E2 | Regin specification input | See table 1. |
| 30 | E1 | | |
| 31 | STOP 3 | AM IF signal input | During AM reception, this counts the IF signal and stops auto search. |
| 32 | STOP 2 | Auto search stop signal input | When the stop 1 input (pin 33) is at the high level and this terminal goes to the high level, auto search is stopped. |
| 33 | STOP 1 | Scan speed slow input | When the high level is input at this terminal, the auto search speed is cut in half. |

| Pin No. | Symbol | Terminal | Description |
|---------|-------------------------|----------------------------------|--|
| 34 | DO1 | Error output | Charge pump output of the phase detector which constitutes the PLL. High level is output when the divided oscillation frequency is high than the reference frequency. In the opposite case, low level is output. Floating occurs when the frequencies match. The output is applied to the variable capacitor diode in the front end through low pass filter Q703 and Q704. The output from both terminals is the same, but only DO1 is used. |
| 35 | DO2 | | |
| 36 | TEST | Test terminal | Test mode at the high level. |
| 37 | FM IN | FM programmable counter input | Connect to the prescaler output (Pin3 of Q701) |
| 38 | PSC | Pulse swallow control output | Output to the control the division ratio of the prescaler. |
| 39 | AM IN | AM local oscillator signal input | Terminal for input of AM broadcast signal. |
| 40 | $\overline{\text{INH}}$ | Inhibit input | Operates normally at the high level. Inhibit status at the low level. |
| 41 | $\overline{\text{INT}}$ | Initialize input | Operates normally at the high level. At the low level, the internal status is initialized. |
| 42 | V _{DD} | Power supply | Device power terminal; supplies 5V during the normal operation and 2.5V from the super capacitor (C715) for memory preservation. |

table 1.

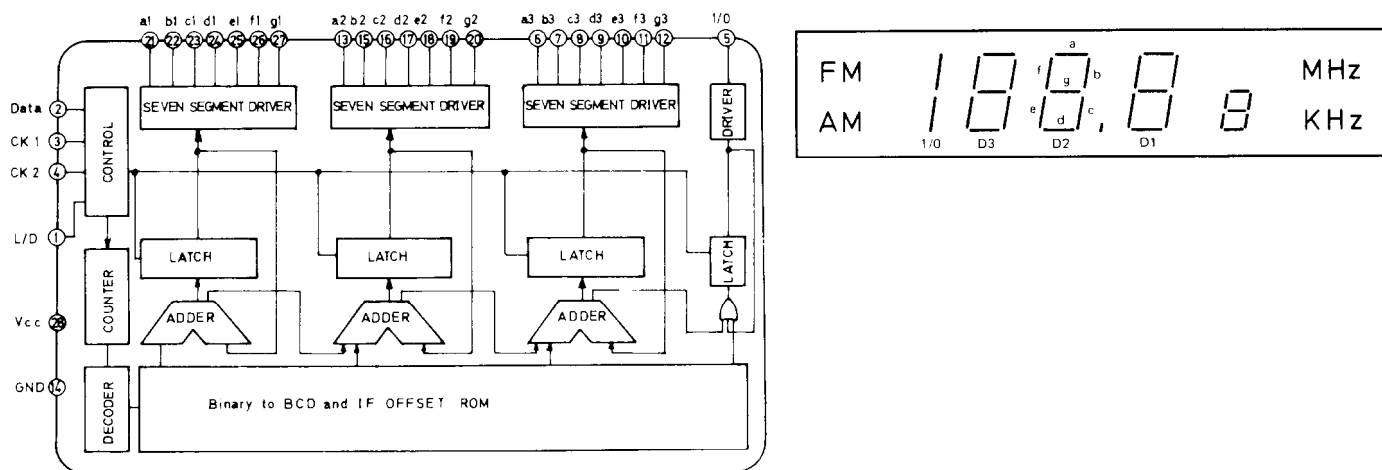
| E1 (Pin 30) | E2 (Pin 29) | Regin | Band | Frequency range | Intermediate frequency | Scan step | Reference frequency |
|-------------|-------------|--------|------|--------------------|------------------------|-----------|---------------------|
| 0 | 1 | U.S.A | FM | 87.5 ~ 108.0 MHz | +10.7 MHz | 100 kHz | 25 kHz |
| | | | AM1 | 520 ~ 1 710 kHz | +450 kHz | 10kHz | 10 kHz |
| 1 | 1 | Europe | AM2 | 522 ~ 1710 kHz | +450 kHz | 9kHz | 9kHz |
| 1 | 0 | | FM | 87.50 ~ 108.00 MHz | +10.7 MHz | 50 kHz | 25 kHz |
| | | | MW | 522 ~ 1611 kHz | +450 kHz | 9 kHz | 9 kHz |
| 0 | 0 | Japan | LM | 153 ~ 360 kHz | +450 kHz | 1 kHz | 1 kHz |
| | | | FM | 76.0 ~ 90.0 MHz | - 10.7 MHz | 100 kHz | 25 kHz |
| | | | AM | 522 ~ 1611 kHz | +450 kHz | 9 kHz | 9 kHz |

2. Auto-search tuning circuit



During FM reception, this is operated by the IF level detection and zero point detection circuits included in the FM IF system IC of Q103 and by the noise component detection circuit of Q804. When a station is tuned, the output of all outputs go to the low level so Q706 goes from on to off, causing pins 32 and 33 of the controller IC to go to the high level to complete auto search tuning.

4. Frequency indicator circuit



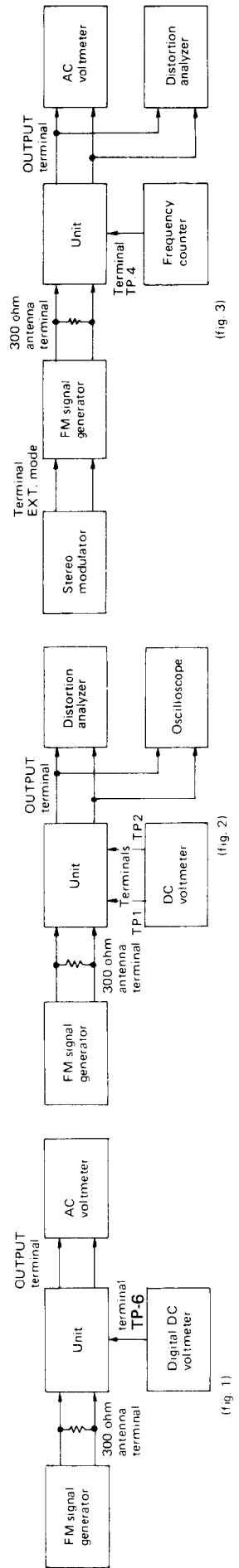
TD6301AP block diagram

| Pin No. | Terminal | Description |
|-----------|-----------------|--|
| 1 | L/D | Output indication switching input terminal: Fluorescent display at the low level, and LED display at the high level. |
| 2 | Data | Tuned frequency data input terminal: Input from the system controller LSI to the serial. |
| 3,4 | CK1, CK2 | Tuned frequency data input control timing input terminal: Transferred simultaneously with data from the system controller LSI. |
| 5 | 1/0 | Segment drive output terminal: Sets the number of display digit for FM (100MHz) and AM (1.000kHz) reception. |
| 6-12 | a3-g3 | Seven segment drive output terminals: Sets the number of display digit for FM (10MHz) and AM (100kHz) reception. |
| 13, 15-20 | a2-g2 | Seven segment drive output terminals: Sets the number of display digit for FM (1MHz) and AM (10kHz) reception |
| 21-27 | a1-g1 | Seven segment drive output terminals; set the number of display digit for FM (100kHz) and AM (1kHz) reception |
| 14 | V _{CC} | Power source terminal |
| 28 | Gnd | Ground |

ADJUSTMENT PROCEDURES

FM section

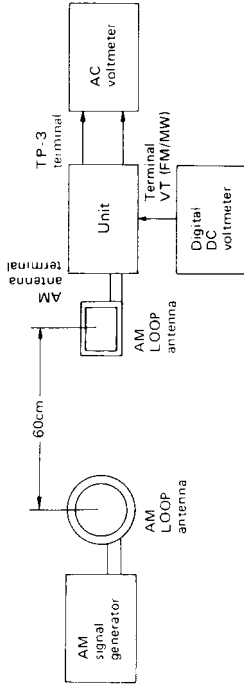
| Item | Step | Connection of instrument | FM SG output | Stereo modulator output | Turning dial setting | Output indicator | Adjustment | Adjust for | Remarks |
|--------------|------|--------------------------|---|-------------------------|----------------------|----------------------|---------------|----------------|---|
| FM RF | 1 | Fig. 1 | - | - | 87.50 MHz | Digital DC voltmeter | LO | 1.5V ± 0.3V | (G/Q models) |
| | 2 | Fig. 1 | 107.9 MHz 1 kHz, 75 kHz devi. | - | 107.90 MHz | AC voltmeter | TC1, TC2 | Maximum output | |
| FM RF | 1 | Fig. 1 | - | - | 87.5 MHz | Digital DC voltmeter | LO | 1.5V ± 0.3V | (D/W models) |
| | 2 | Fig. 1 | 107.9 MHz 1 kHz, 75 kHz devi. | - | 107.9 MHz | AC voltmeter | TC1 | Maximum output | |
| FM IF | 1 | Fig. 2 | 98.1 MHz 1 kHz, 75 kHz devi. 65 dBf (60 dB) | - | 98.1 MHz | DC voltmeter | L101 1st coil | 0V | Repeat the steps 1 and 2 until no further adjustment is necessary |
| | 2 | Fig. 2 | 98.1 MHz 1 kHz, 75 kHz devi. 65 dBf (60 dB) | - | 98.1 MHz | Frequency counter | L101 2nd coil | Minimum | |
| VCO | | Fig. 3 | 98.1 MHz 1 kHz, 75 kHz devi. 65 dBf (60 dB) | - | 98.1 MHz | Distortion analyzer | R213 | 19 kHz ± 19 Hz | Remove the frequency counter after adjustment |
| Distortion | | Fig. 3 | 98.1 MHz 65 dBf (60 dB) Ext. modulation | L+R 1 kHz | 98.1 MHz | Distortion analyzer | T2 | Minimum | |
| Muting level | 1 | Fig. 2 | 98.1 MHz 17.2 dBf (12 dB) 1 kHz, 75 kHz devi. | - | 98.1 MHz | Oscilloscope | R120 | Signal output | Muting switch to on. |
| | 2 | | 98.1 MHz 16.2 dBf (11 dB) 1 kHz, 75 kHz devi. | - | | | | No output | |



AM section

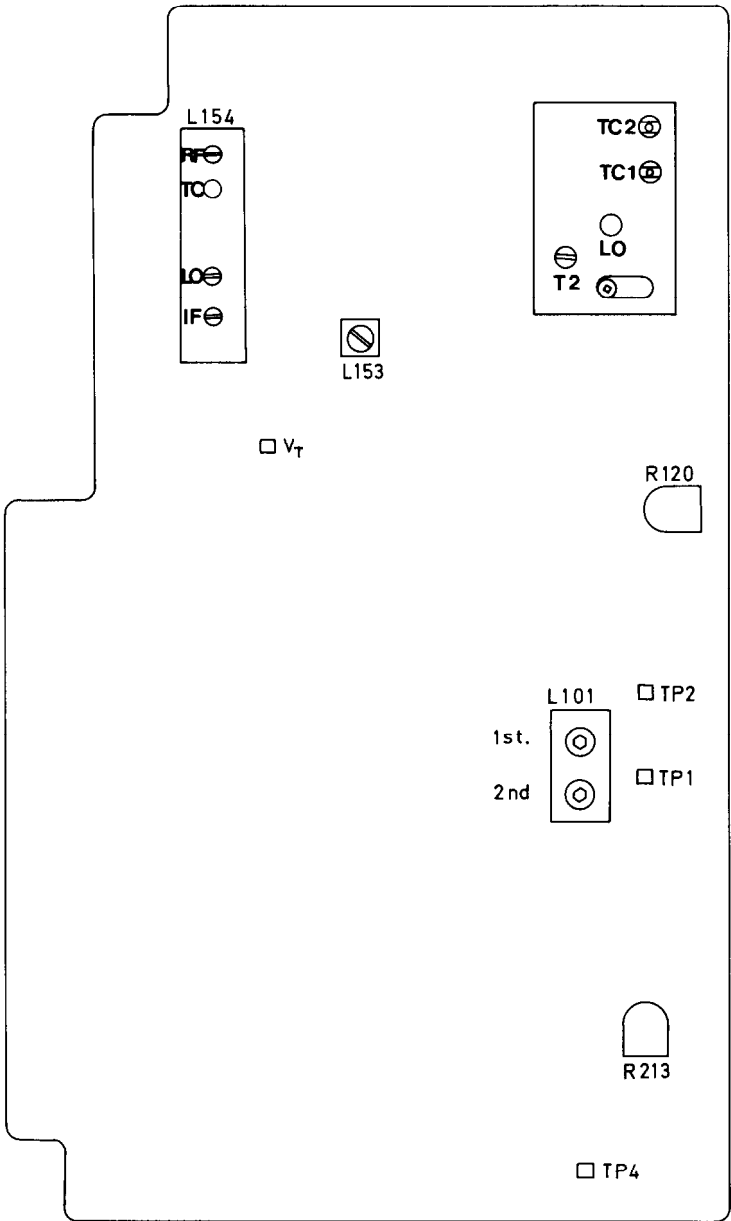
120V model

| Step | AM SG output | Tuned frequency | Output indicator | Adjustment point | Adjust for | Remarks |
|------|---------------------------|-----------------|----------------------|------------------|-------------|--|
| 1 | 1000kHz 400Hz 30% mod. | 1000kHz | AC voltmeter | IF L153 | Maximum | |
| 2 | | 520kHz | Digital DC voltmeter | LO | 1.2V ± 0.2V | |
| 3 | 600kHz 400Hz 30% mod. | 600kHz | AC voltmeter | RF | Maximum | Repeat the steps 3 and 4 until no further adjustment is necessary. |
| 4 | 1400kHz 400Hz 30% mod. | 1400kHz | AC voltmeter | TC | Maximum | |



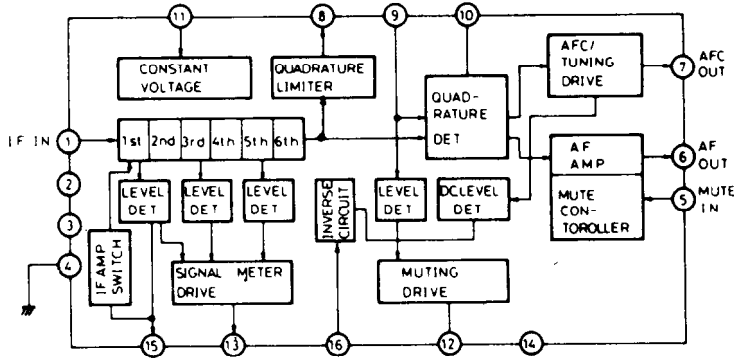
Other models

| Step | AM SG output | Tuned frequency | Output indicator | Adjustment point | Adjust for | Remarks |
|------|---------------------------|-----------------|----------------------|------------------|-------------|--|
| 1 | 999kHz 400Hz 30% mod. | 999kHz | AC voltmeter | IF L153 | Maximum | |
| 2 | | 522kHz | Digital DC voltmeter | LO | 1.2V ± 0.2V | |
| 3 | 603kHz 400Hz 30% mod. | 603kHz | AC voltmeter | RF | Maximum | Repeat the steps 3 and 4 until no further adjustment is necessary. |
| 4 | 1404kHz 400Hz 30% mod. | 1404kHz | AC voltmeter | TC | Maximum | |



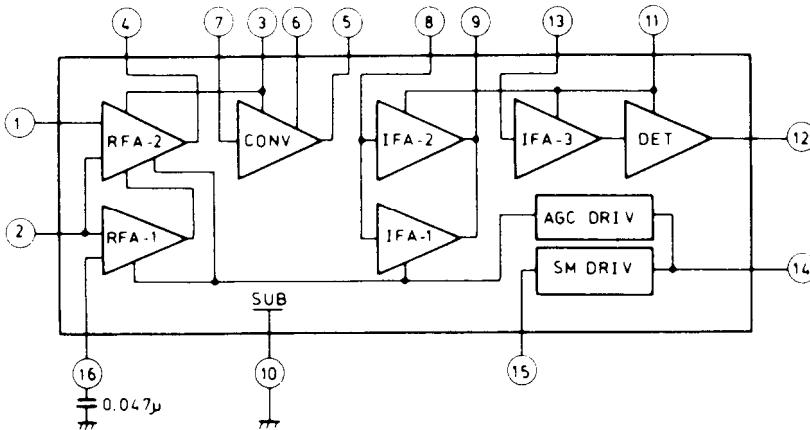
BLOCK DIAGRAM OF ICS

μPC1267C (FM IF system)

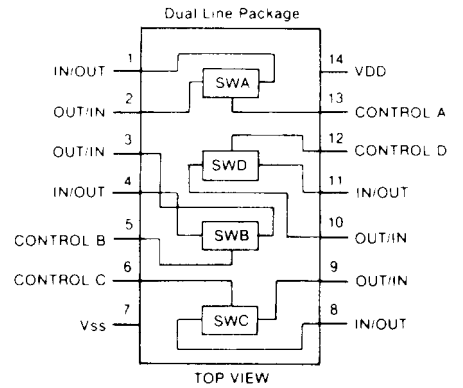


1. IF signal input
2. IF amplifier switch input
H level: Off
3. Muting switch input
4. Composite signal output
5. AFC output
6. AFC output
7. IF amplifier output
8. 10.7MHz input
9. Reference voltage
10. Power supply
11. Muting output
Tuned: L level
12. Signal strength output
13. AGC output
14. Muting level

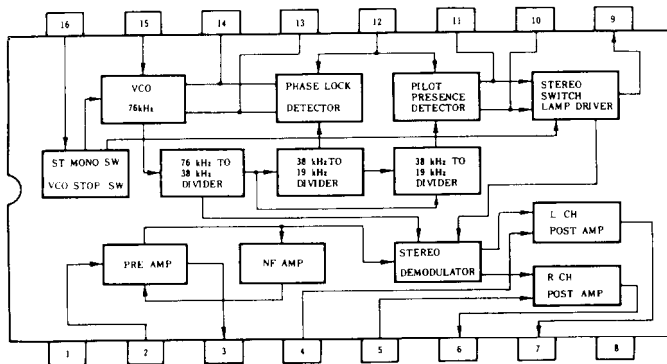
μPC1243C (AM radio system)



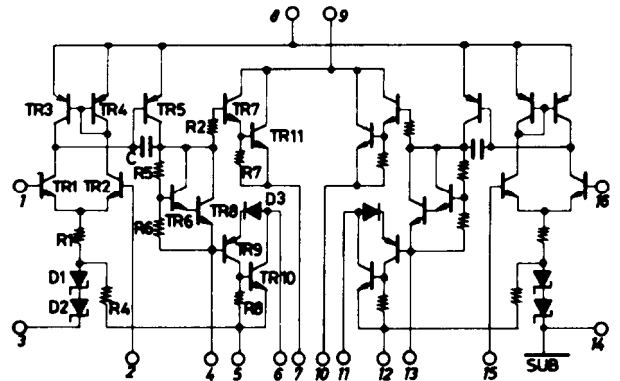
TC4066BP (Analogue switch)



μPC1161C3 (Stereo decoder)



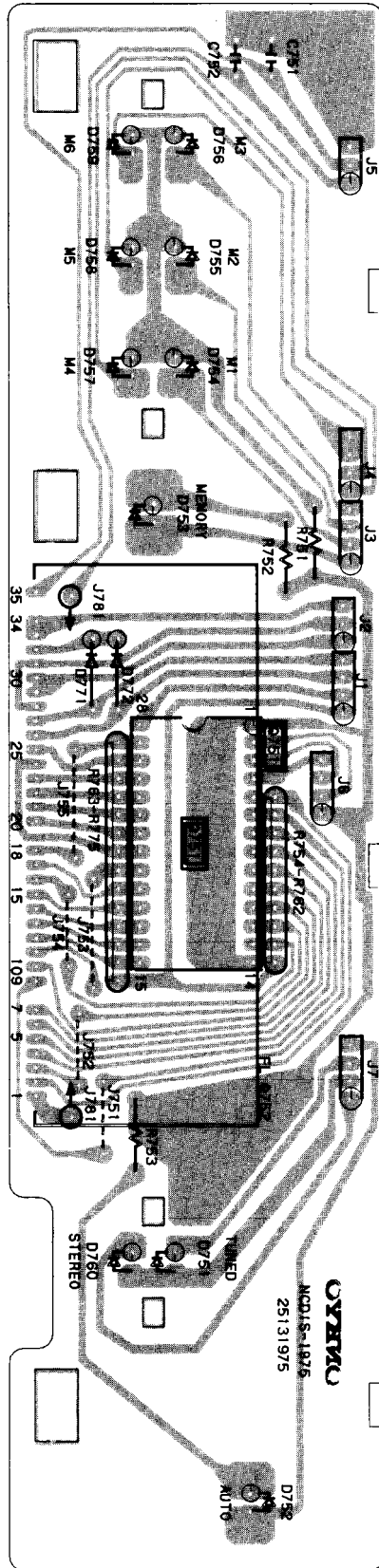
STK-459 (Power amplifier)



PRINTED CIRCUIT BOARD-PARTS LIST

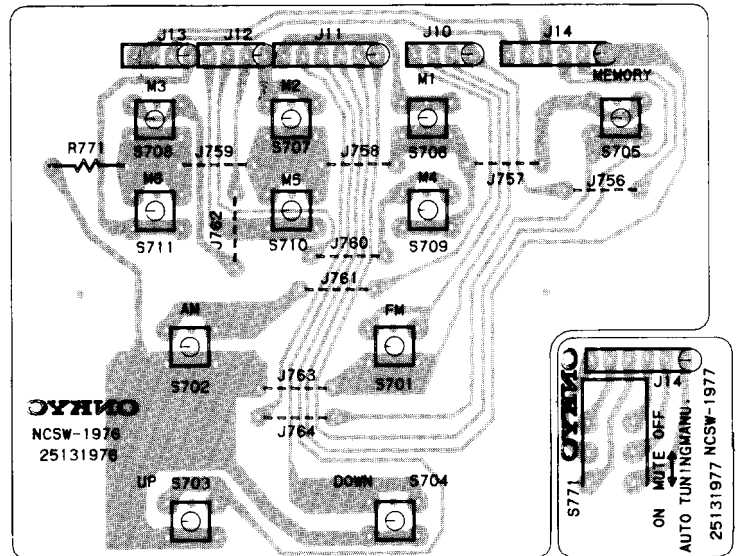
TX-15

INDICATION CIRCUIT (NADIS-1975/a)



(D): Only 120V model
 (G): Only 220V or 240V models
 (W): Only 120/220V model

SWITCH (NASW-1976) MUTING SWITCH (NASW-1977)



INDICATION PC BOARD (NADIS-1975)

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|-------------|----------------------------|------------------------|
| | IC | |
| Q751 | 222673 | TD6301AP |
| | Fluorescent indicator tube | |
| Q752 | 212016 | FIP7B8CS |
| | Diodes | |
| D771, D772 | 223145 | 1S2076TD (G/W) |
| | LEDs | |
| D751 | 225137 | SEL2413E |
| D752 | 225060 | SEL1310E |
| D753 | 225126 | GL3PR1 |
| D754-D759 | 225137 | SEL2413E |
| D760 | 225142 | SEL2913K |
| | Resistors | |
| R754-R762 | 49121333509 | 33kΩx9, 1/8W, Network |
| R763-R775 | 49121333513 | 33kΩx13, 1/8W, Network |
| | Holders | |
| | 27190268 | LED-2 |
| | 27190267 | LED-7 |
| | Spacer | |
| | 27270071 | |
| | Cushion | |
| | 28140538 | t3.5x10x40 |

SWITCH PC BOARDS (NASW-1976/77)

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|-------------|-------------------------|--|
| S701-S711 | 25035275 or 25035389 | NPS-111-S239 or NPS-111-S353, Push switch |
| S771 | 25035372 | NPS-122-L336, Push switch |

BAND SELECTOR SWITCH PC BOARD (NASW-1978) (Only W model)

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|-------------|----------|-------------|
| S751 | 25065147 | NSS-4266 |

TX-15

PRINTED CIRCUIT BOARD PARTS LIST/VIEW FROM BOTTOM SIDE

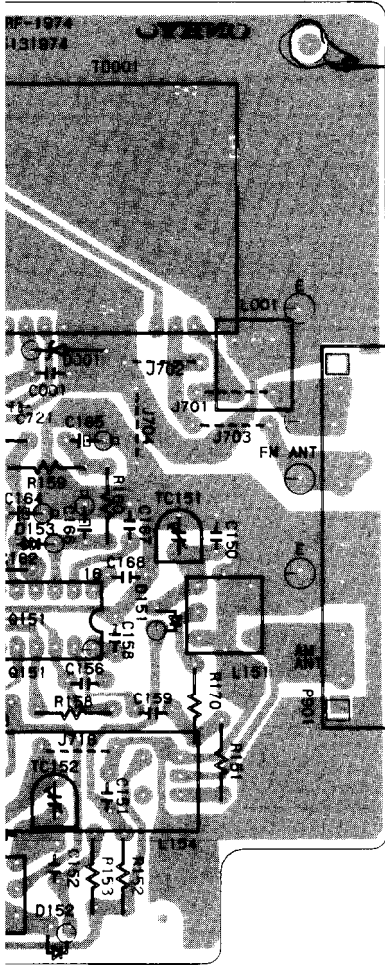
FM/AM TUNER (NARF-1974/a/b)

FM/AM TUNER PC BOARD (NARF-1974/a/b)

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|-------------|--------------------|------------------|
| | Front end | |
| TU001 | 240061 | FE349U14 (D/W) |
| | 240059 | FE416U33 (G) |
| | ICs | |
| Q103 | 222803 | μ PC1267C |
| Q151 | 222804 or | μ PC1168C or |
| | 222629 | μ PC1243C |
| Q201 | 222678 | μ PC1161C3 |
| Q701 | 222675 | TD6104P |
| Q702 | 222674 | TC9147P |
| | Transistors | |
| Q101 | 2211723 | 2SC1923 (O) |
| Q102 | 2211723 | 2SC1923 (O) (G) |
| Q152 | 2211945 or | 2SK246 (GR) or |
| | 2212304 | 2SK381 (D) |
| Q153 | 2211255 or | 2SC1815 (GR) or |
| | 2210746 | 2SC945A (P) |

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|-------------|-----------------------------------|---|
| Q154, Q155 | 2212485, 2211255 or 2210746 | JC501Q, 2SC1815 (GR) or 2SC945A (P) |
| Q202, Q203 | 2211706 or 2211705 | 2SD655 (F) or 2SD655 (E) |
| Q703 | 2211293 or 2212294 | 2SK68 (M) or 2SK108 (D) |
| Q704 | 2211255 | 2SC1815 (GR) |
| Q705-Q710 | 2212485, | JC501Q, |
| Q801-Q803 | 2211255 or 2210746 | 2SC1815 (GR) or 2SC945A (P) |
| Q711 | 2212495 or 2211455 | JA101Q or 2SA1015 (GR) |
| Q712, Q713 | 2212485, 2211255 or 2210746 | JC501Q, 2SC1815 (GR) or 2SC945A (P) (G/W) |
| Q714 | 2212495 or 2211455 | JA101Q or 2SA1015 (GR) (G/W) |
| Q804 | 2211255 | 2SC1815 (GR) |
| Q951, Q952 | 2211255 | 2SC1815 (GR) |

(D): Only 120V model
 (G): Only 220V or 240V models
 (W): Only 120/220V model



| CIRCUIT NO. | PART NO. | DESCRIPTION |
|-------------|-----------------------------------|--|
| | Diodes | |
| D001 | 2243192, 2242865 or 2239552 | MTZ8.2B, EQA02-08B or RD8.2EB2 (G/W) |
| D101 | 223150, 223133 or 223145 | US1040, DS442X or 1S2076TD |
| D153 | 4000068 | VD1222 |
| D701-D706 | 233150, | US1040, |
| D708 | 233133 or 223145 | DS442X or 1S2076TD |
| D707 | 2243292, 2242991 or 2239752 | MTZ22B, EQA02-22A or RD22EB2 |
| D709, D953 | 2243133, 2242834 or 2239433 | MTZ4.7C EQA02-05A or RD4.7EB3 |
| D801-D805 | 233150, | US1040, |
| D808-D812 | 233133 or 223145 | DS442X or 1S2076TD |

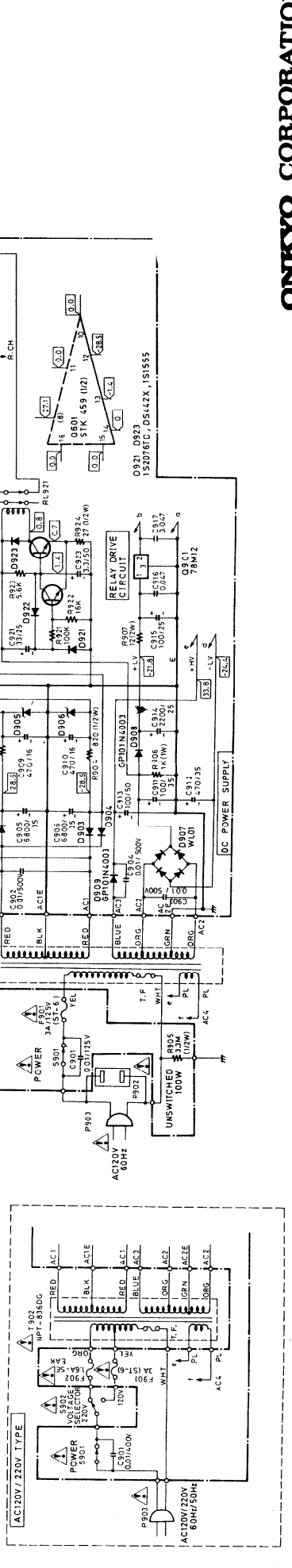
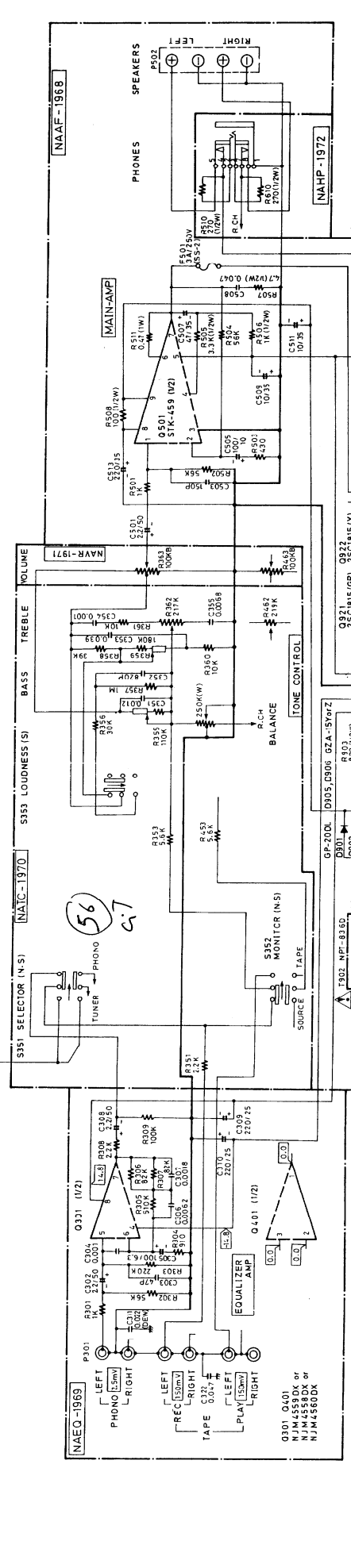
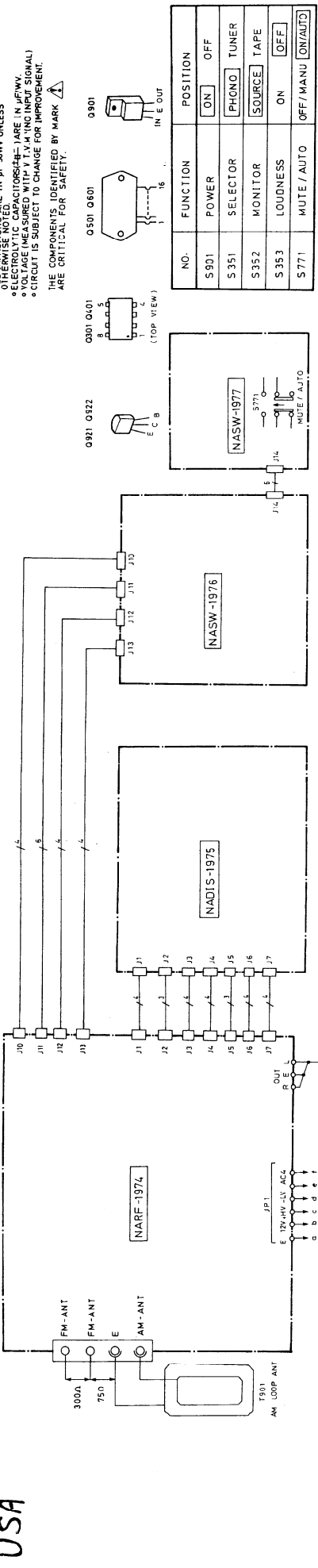
| CIRCUIT NO. | PART NO. | DESCRIPTION |
|-------------|-----------------------------------|--------------------------------------|
| D806, D807 | 223133 or 223145 | DS442X or 1S2076TD |
| D951 | 2243021 or 2239792 | EQA02-28A or RD27E-B3 |
| D952 | 2243163, 2242848 or 2239493 | MTZ6.2C, EQA02-06E or RD6.2EB3 |
| | Transformers | |
| L101 | 233270 | NFIF-6040 |
| L153 | 232095 | NMIF-6025 |
| | Coils | |
| L001 | 233312 | NFA-3051 (G) |
| L102 | 233105 or 233024 | NCH-1005 or NCCH-1501 |
| L201 | 233236 | NMC-6027 (G) |
| L202, L203 | 233291 | NMC-5039 (G) |
| L801 | 233031 | NMC-9-1 |
| | RF. block | |
| L154 | 233311 | NMRF-7036 |
| | Filters | |
| X101, X102 | 3010071 | SFE10.7MA5 (D/W) |
| X101 | 3010043 | SFE10.7MM (G) |
| X102 | 3010070 | SFE10.7MS3GY-A (G) |
| | X'tal | |
| X701 | 3010073 | XTL-7.2M |
| | Capacitors | |
| C107, C109 | 352780109 | 1 μ F, 50V, Elect. |
| C110 | 352741009 | 10 μ F, 16V, Elect. |
| C116 | 352784799 | 0.47 μ F, 50V, Elect. |
| C157 | 352741019 | 100 μ F, 16V, Elect. |
| C164 | 352741009 | 10 μ F, 16V, Elect. |
| C165 | 352750479 | 4.7 μ F, 25V, Elect. |
| C166 | 352741009 | 10 μ F, 16V, Elect. |
| C170 | 352782299 | 0.22 μ F, 50V, Elect. |
| C171 | 352780109 | 1 μ F, 50V, Elect. |
| C172 | 352721019 | 100 μ F, 6.3V, Elect. |
| C202 | 352744719 | 470 μ F, 16V, Elect. |
| C203 | 352750479 | 4.7 μ F, 25V, Elect. |
| C207, C208 | 352741009 | 10 μ F, 16V, Elect. |
| C210 | 352782299 | 0.22 μ F, 50V, Elect. |
| C211 | 352780339 | 3.3 μ F, 50V, Elect. |
| C212 | 352780109 | 1 μ F, 50V, Elect. |
| C213 | 370134714 | 470pF \pm 5%, 100V, APS |
| C215, C216 | 352780229 | 2.2 μ F, 50V, Elect. |
| C705 | 352734709 | 47 μ F, 10V, Elect. |
| C707 | 395160107 | 1 μ F, 35V, Tantalum |
| C710 | 352780109 | 1 μ F, 50V, Elect. |
| C711 | 352780229 | 2.2 μ F, 50V, Elect. |
| C713 | 3020018 | 0.047F, 5V, Super |
| C714 | 352784799 | 0.47 μ F, 50V, Elect. |
| C715 | 352780339 | 3.3 μ F, 50V, Elect. |
| C719 | 352741009 | 10 μ F, 16V, Elect. |
| C804, C806 | 352784799 | 0.47 μ F, 50V, Elect. |
| C807 | 352782299 | 0.22 μ F, 50V, Elect. |
| C951, C952 | 352780109 | 1 μ F, 50V, Elect. |
| C954 | 352724719 | 470 μ F, 6.3V, Elect. |
| | Resistors | |
| R120 | 5215003 | N08HR20KBC, Semi-fixed |
| R213 | 5215044 | N08HR5KBC, Semifixed |
| R953 | 441523904F | 39 Ω , 1/2W, Metal oxide film |
| | Terminal | |
| P901 | 25060085 | NTM-4PDMN29, Antenna (D/W) |
| | 25060087 | NTM-2PDMN31 (G) |

A B C D E F G

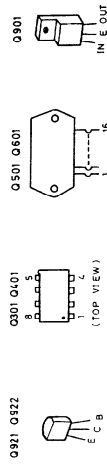
SCHEMATIC DIAGRAM

AMPLIFIER SECTION
- D/W models -
USA

NOTES:
 * ALL RESISTORS ARE IN OHMS UNLESS OTHERWISE NOTED.
 * ALL CAPACITORS ARE IN μF UNLESS OTHERWISE NOTED.
 * ELECTROLYTIC CAPACITORS ARE IN μF UNLESS OTHERWISE NOTED.
 * VOLTAGE IS MEASURED WITH A 1.5 M Ω INPUT RESISTANCE.
 * CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.
 * THE COMPONENTS IDENTIFIED BY MARK Δ ARE CRITICAL FOR SAFETY.



| NO. | FUNCTION | POSITION |
|------|-------------|--------------------|
| S901 | POWER | ON OFF |
| S351 | SELECTOR | PHONO TUNER |
| S352 | MONITOR | SOURCE TAPE |
| S353 | LOUDNESS | ON OFF |
| S771 | MUTE / AUTO | OFF/MANU [ON/AUTO] |



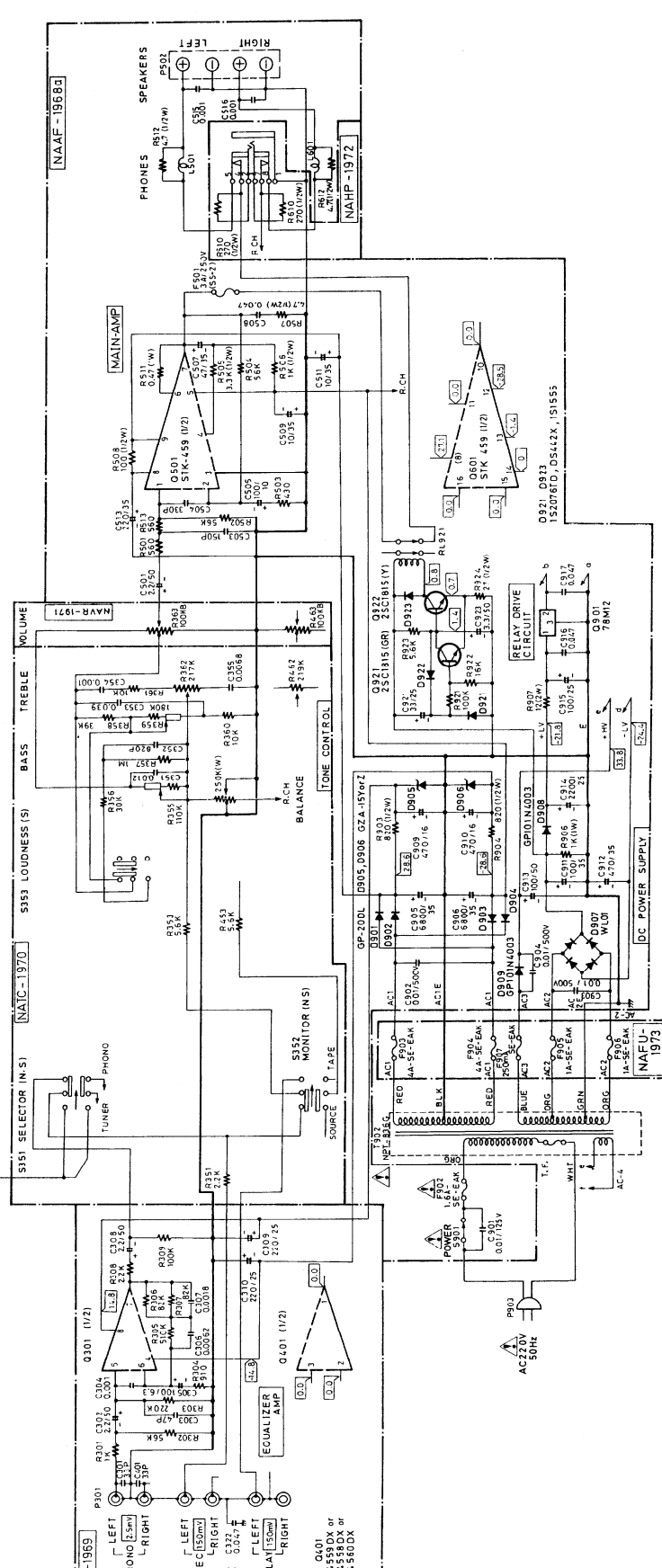
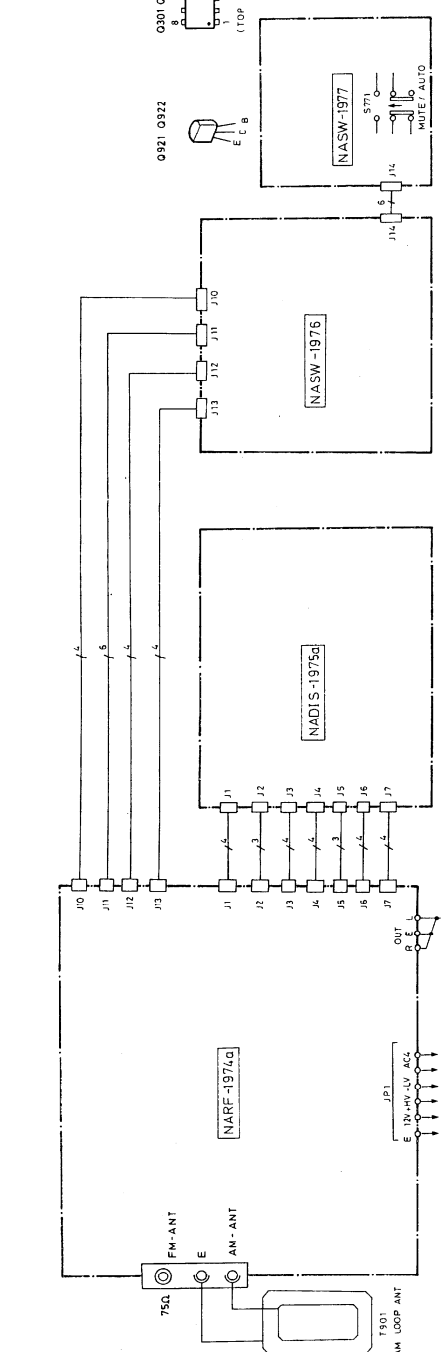
A B C D E F G

SCHEMATIC DIAGRAM

AMPLIFIER SECTION - G/Q models -

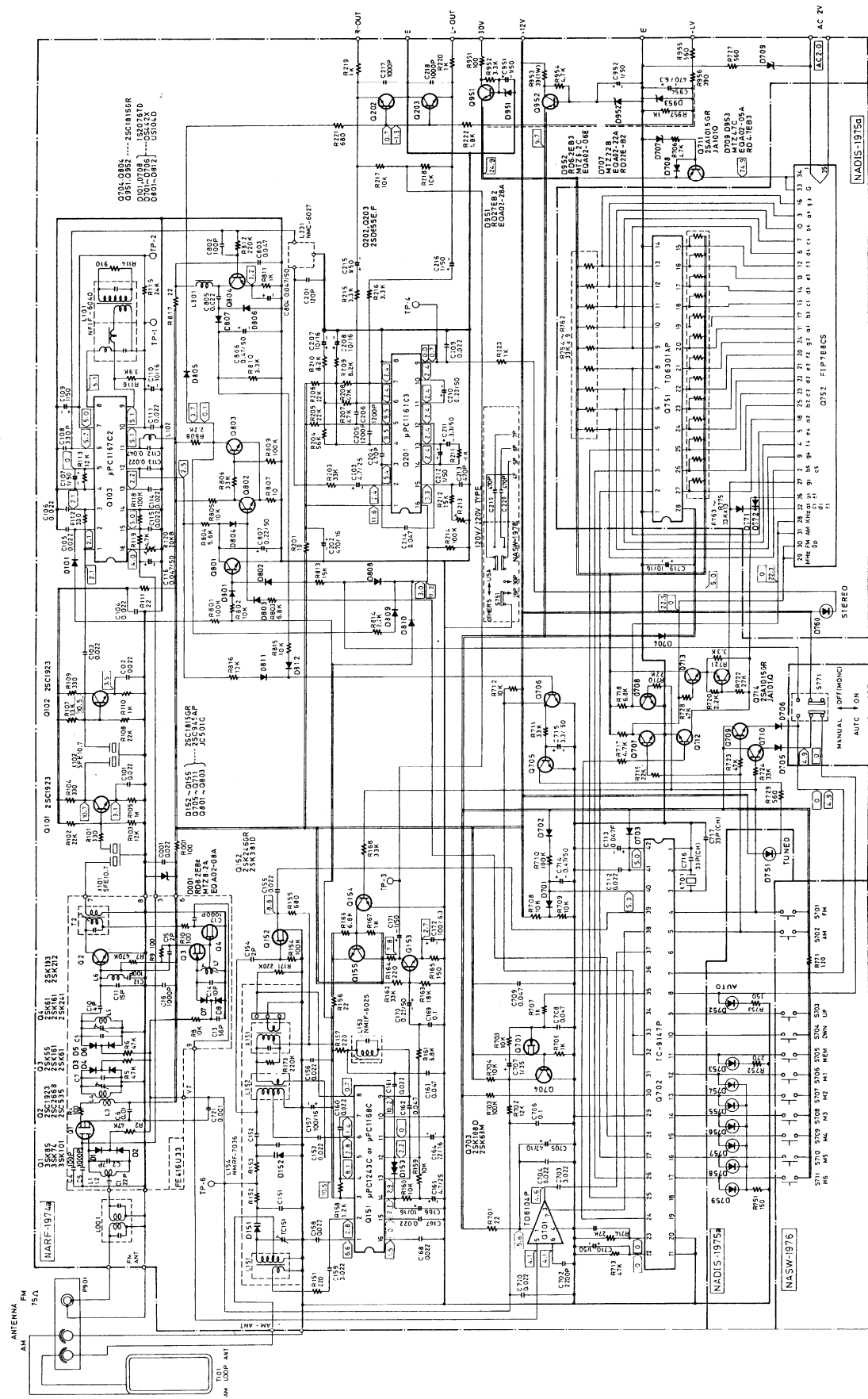
- NOTES:
 * ALL RESISTORS ARE IN OHMS UNLESS OTHERWISE NOTED.
 * ALL CAPACITORS ARE IN μ F UNLESS OTHERWISE NOTED.
 * ELECTROLYTIC CAPACITORS ARE IN μ F IN μ F/WV.
 * VOLTAGE MEASURED WITH V.T.V. (NO INPUT SIGNAL).
 * CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.
 * THE COMPONENTS IDENTIFIED BY MARK Δ ARE CRITICAL FOR SAFETY.

| NO. | FUNCTION | POSITION |
|------|-------------|------------------|
| S901 | POWER | ON OFF |
| S351 | SELECTOR | PHONC TUNER |
| S352 | MONITOR | SOURCE TAPE |
| S353 | LOUDNESS | ON OFF |
| S771 | MUTE / AUTO | OFF/MANU ON/AUTO |



SCHEMATIC DIAGRAM

TUNER SECTION - G/W/Q models -



- NOTES:
 * TRANSISTORS ARE IN OHMS (WATT) UNLESS OTHERWISE NOTED.
 * CAPACITORS ARE IN P.F. UNLESS OTHERWISE NOTED.
 * ELECTROLYTIC CAPACITORS ARE IN MICROFARADS (MF) UNLESS OTHERWISE NOTED.
 * CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

- 5 C D 15K68
- 5 C B 25K118
- 5 C B 25K131
- 5 C B 25K133
- 5 C B 25K135
- 5 C B 25K137
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- 5 C B 25K633
- 5 C B 25K635
- 5 C B 25K637
- 5 C B 2

PRINTED CIRCUIT BOARD PARTS LIST/VIEW FROM BOTTOM SIDE

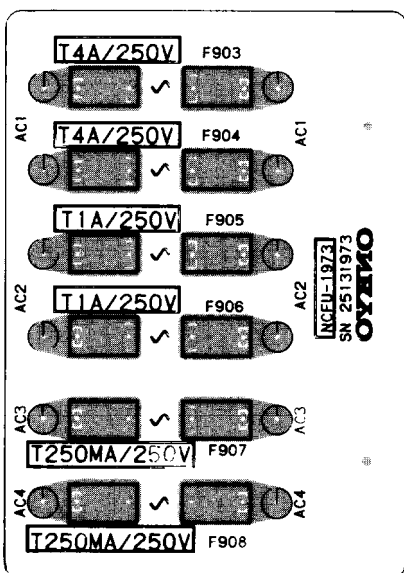
TONE CONTROL (NATC-1970)

(D): Only 120V model
 (G): Only 220V or 240V models
 (W): Only 120/220V model

TONE CONTROL PC BOARD (NATC-1970)

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|------------------|-----------|---|
| Resistors | | |
| R354 | 5146026 | N16RLC250KW15, Balance control variable |
| R355, R455 | 5104114-1 | N16RQM110K180K15, Bass control variable |
| R362, R462 | 5148059-1 | N16RGM219K15, Treble control variable |
| Switches | | |
| S351, S352 | 25035314 | NPS-222-L278, Selector/Tape |
| S353 | 25035421 | NPS-122-L385, Loudness |

FUSE TERMINAL PC BOARD (NAFU-1973)



FUSE TERMINAL PC BOARD (NAFU-1973)

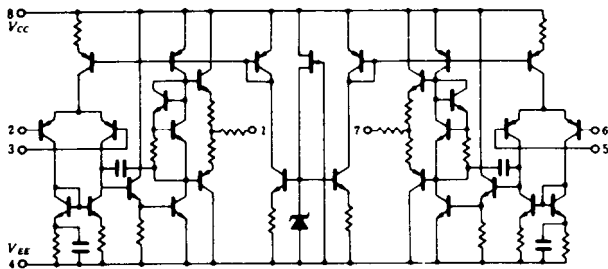
(Only G model)

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|--------------|----------|-------------------------------|
| △ F903, F904 | 252077 | 4A-SE-EAK, Secondary fuse |
| △ F905, F906 | 252070 | 1A-SE-EAK, Secondary fuse |
| △ F907 | 252088 | 250mA-SE-EAWK, Secondary fuse |
| △ | 25050065 | YSH403T, Fuseholder |

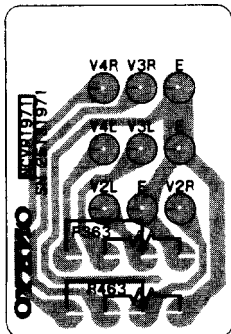
NOTE: THE COMPONENTS IDENTIFIED BY MARK △ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PARTS NUMBER SPECIFIED.

EQUALIZER AMPLIFIER (NAEQ-1969/a)

NJM-4559DX (Equalizer amplifier)



VOLUME CONTROL (NAVR-1971)



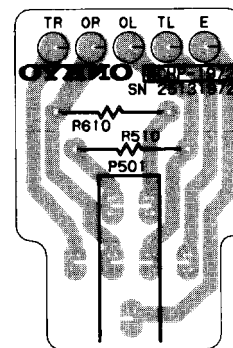
VOLUME CONTROL PC BOARD (NAVR-1971)

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|-------------|----------|--------------------------------------|
| R363, R463 | 5148093 | N16RGM100KBTP35 Variable resistor |

EQUALIZER AMPLIFIER PC BOARD (NAEQ-1969/a)

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|-------------------|-----------|-------------------------------|
| Q301, Q401 | 222534 | NJM4559DX |
| | 222502 or | NJM4558DX or |
| | 222570 | NJM4560DX |
| Capacitors | | |
| C302, C402 | 352780229 | 2.2 μ F, 50V, Elect. |
| C305, C405 | 352721019 | 100 μ F, 6.3V, Elect. |
| C308, C408 | 352780229 | 2.2 μ F, 50V, Elect. |
| C309, C310 | 352742219 | 220 μ F, 16V, Elect. |
| C311 | 379122237 | 0.022 μ F, 50V, DEW (D/W) |
| Terminal | | |
| P301 | 25045143 | NPJ-6PDBL56, Phono and tape |


HEADPHONE TERMINAL (NAHP-1972)



HEADPHONE TERMINAL PC BOARD (NAHP-1972)

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|-------------|-----------|---------------------------------------|
| P501 | 25045109 | HLJ4308-01-040, Headphone terminal |
| R510, R610 | 441522714 | 270 Ω , 1/2W, Metal oxide film |

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|-------------|--------------------------------|----------------------------------|
| | ICs | |
| Q501, Q601 | 222016 | STK459 |
| Q901 | 222780122 | 78M12 |
| | Transistors | |
| Q921 | 2211255 | 2SC1815 (GR) |
| Q922 | 2211254 | 2SC1815 (Y) |
| | Diodes | |
| D901-D904 | 223845 | GP20DL |
| D905, D906 | 2241152 or 2241153 | GZA15Y or GZA15Z |
| D907 | 223862 | WL01 |
| D908, D909 | 223880 | GP101N4003 |
| D921-D923 | 223105, 223145 or 223133 | 1S1555, 1S2076TD or DS442X |

NOTE: THE COMPONENTS IDENTIFIED BY MARK  ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PARTS NUMBER SPECIFIED.

| CIRCUIT NO. | PART NO. | DESCRIPTION | CIRCUIT NO. | PART NO. | DESCRIPTION |
|---------------|-------------------|---------------------------------------|------------------------|---------------------|---|
| | Coils | | | Resistors | |
| L501, L601 | 231001 | S-1. 3B (G) | R505, R605 | 441523324 | 3.3k Ω , 1/2W, Metal oxide film |
| | Capacitors | | R506, R606 | 441521024 | 1k Ω , 1/2W, Metal oxide film |
| C501, C601 | 352780229 | 2.2 μ F, 50V, Elect. | R507, R607 | 441520474F | 4.7 Ω , 1/2W, Metal oxide film |
| C505, C605 | 352731019 | 100 μ F, 10V, Elect. | R508 | 441521014F | 100 Ω , 1/2W, Metal oxide film |
| C507, C607 | 352764709 | 47 μ F, 35V, Elect. | R511, R611 | 441624794F | 0.47 Ω , 1W, Metal oxide film |
| C509, C609 | 352761009 | 10 μ F, 35V, Elect. | R512, R612 | 441520474F | 4.7 Ω , 1/2W, Metal oxide film (G) |
| C511 | 352761009 | 10 μ F, 35V, Elect. | R903, R904 | 441528214F | 820 Ω , 1/2W, Metal oxide film |
| C513 | 352762219 | 220 μ F, 35V, Elect. | Δ R905 | 531523355 | 3.3M Ω , 1/2W, Solid (D) |
| Δ C901 | 3500065A | 0.01 μ F, AC400/125V Capacitor IS | R906 | 441621024 | 1k Ω , 1W, Metal oxide film |
| C905, C906 | 3504166 | 6,800 μ F, 35V, Elect. | R907 | 441721204F | 12 Ω , 2W, Metal oxide film |
| C909, C910 | 352744719 | 470 μ F, 16V, Elect. | R924 | 441522704F | 27 Ω , 1/2W, Metal oxide film |
| C911 | 352761019 | 100 μ F, 35V, Elect. | | Relay | |
| C912 | 352764719 | 470 μ F, 35V, Elect. | RL921 | 25065108 | NRL-2P3ADC24-05 |
| C913 | 352781019 | 100 μ F, 50V, Elect. | | Switch | |
| C914 | 352752229 | 2,200 μ F, 25V, Elect. | Δ S901 | 25035398 | NPS-111-L362P |
| C915 | 352751019 | 100 μ F, 25V, Elect. | | Terminal | |
| C921 | 352753309 | 33 μ F, 25V, Elect. | P502 | 25060086 | NTM-4PDML30, Speaker |
| C923 | 352780339 | 3.3 μ F, 50V, Elect. | | Fuse holders | |
| | | | Δ F501a, F601a, | 250113 | SN5051 (D/W) |
| | | | Δ F901a | | |
| | | | Δ F501a, F601a, | 25050065 | YSH403T (G) |
| | | | Δ F902a | | |
| | | | Δ F902a | 25050065 | YSH403T (W) |
| | | | | Fuses | |
| | | | Δ F501, F601 | 252006 | 3A (SS-2) (D/W) |
| | | | Δ F501, F601 | 252075 | 2.5A-SE-EAK (G) |
| | | | Δ F901 | 252075 | 3A (ST-6) (D/W) |
| | | | Δ F902 | 252073 | 1.6A-SE-EAK (G/W) |
| | | | | Bracket | |
| | | | | 27140887 | IC |
| | | | | Cover | |
| | | | | 27300601 | Capacitor |
| | | | | Radiator | |
| | | | | 27160011A | RAD-05 |
| | | | | Screws | |
| | | | | 82143010 | 3P+10F (BC), Pan head |
| | | | | 834430108 | 3TTS+10B (BC), Tapping |
| | | | | 834430068 | 3TTS+6B (BC), Tapping |
| | | | | Nut | |
| | | | | 863430 | N-3F-N (BC) |
| | | | | Rating label | |
| | | | | 29360405 | Fuse (G) |
| | | | | 29360684 | Fuse (W) |

| |
|-------------------------------|
| (D): Only 120V model |
| (G): Only 220V or 240V models |
| (W): Only 120/220V model |

DAIGAE
TX-15 UD

日付：85/04/17 ページ： 1

| 発行日 | 回路番号 | 部品名 | <i>sub</i> 代替部品 | <i>REG</i> 正規部品 | <i>between SN</i> 適用台数 |
|--------|------------------|------------|--------------------|--------------------|---------------------------|
| 590709 | Q704,804,951,952 | TRANSISTOR | 2SC1815LGR | 2SC1815GR | 14041-15040 |
| 590709 | Q703 | FET | 2SK68AM | 2SK68M/2SK108D | 14041-15040 |
| 590523 | D907 | DIODE | WL04/2W02 | WL01 | 9541-11840 |
| 590521 | D952 | DIODE | RD6.2EB3 | GZA6.2Y | 9041-11840 |
| 591017 | Q101 | TRANSISTOR | 2SC1923R | 2SC19230 | 17441-20540 |
| 591106 | D751,754-759 | LED | SEL2413E | SEL2310G | 20541-21040 |

MODEL TX-100

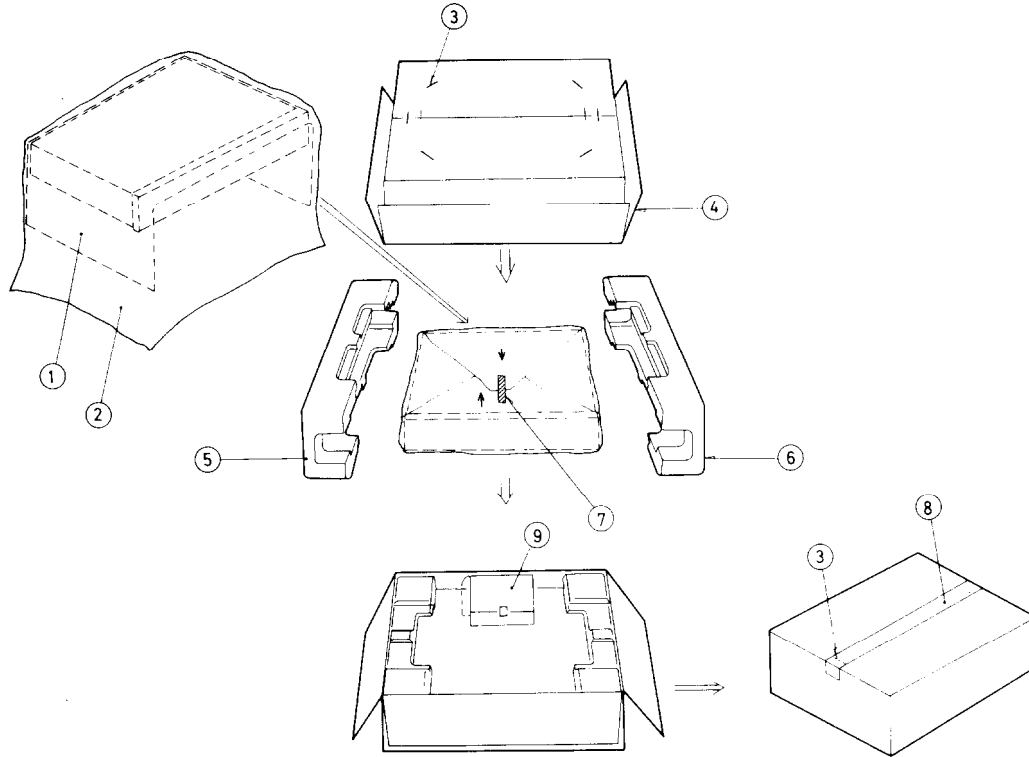
SUBSTITUTIVE PARTS LIST

NOTE:USE THE REGULAR PARTS WHEN REPLACEMENT

| TYPE | CIRCUIT NO. | DESCRIPTION | REGULAR PARTS | SUBSTITUTIVE PARTS | APPLICATION |
|------|-------------|-------------|---------------|--------------------|-------------|
| | D907 | DIODE | WL01 | WL04 | 1007-2007 |

PACKING VIEW

TX-15



| REF. NO. | PARTS NO. | DESCRIPTION | |
|----------|---------------------|----------------------------------|------------------------------------|
| 1 | 29095012-1 | 500×800mm, Protection sheet | 220V model |
| 2 | 29100063 | 750×500mm, Poly-vinyl bag | 292092 FM antenna |
| 3 | 282301 | Sealing hook | 29340759 Instruction manual |
| 4 | 29050911 | Master carton box (silver model) | 29100006 350×250mm, Poly-vinyl bag |
| | 29050912 | Master carton box (black model) | TX-100 |
| | 29050924 | Master carton box (TX-100) | 292092 FM antenna |
| | 29050925 | Master carton box (TX-100B) | 29340761 Instruction manual |
| 5 | 29090690A | Pad R | 29365016 Warranty card |
| 6 | 29090691 | Pad L | 29100006 350×250mm, Poly-vinyl bag |
| 7 | 29110032 | W = 15mm, Adhesive tape | 120/220V model |
| 8 | 260012 | W = 50mm, Damplon tape | 292064A FM antenna |
| 9 | Accessory bag ass'y | | 29340759 Instruction manual |
| | U.S.A. model | | 25055040 Conversion plug |
| | 292064A | FM antenna | 29100006 350×250mm, Poly-vinyl bag |
| | 29340758 | Instruction manual | 240V model |
| | 29365006-5 | Warranty card | 292092 FM antenna |
| | 29358002A | Service station list | 29340759 Instruction manual |
| | 29100006 | 350×250mm, Poly-vinyl bag | 25060088 FM antenna adaptor |
| | 120V model | | 29100006 350×250mm, Poly-vinyl bag |
| | 292064A | FM antenna | |
| | 29340758 | Instruction manual | |
| | 29100006 | 350×250mm, Poly-vinyl bag | |

ONKYO CORPORATION

International Division: No. 24 Mori Bldg., 23-5, 3-chome, Nishi-Shinbashi, Minato-ku, Tokyo, Japan
 Telex: 2423551 ONKYO J. Phone: 03-432-6981

ONKYO U.S.A. CORPORATION

200 Williams Drive, Ramsey, N.J. 07446 Tel. 201-825-7950

ONKYO DEUTSCHLAND GMBH, ELECTRONICS

8034 München-Germering, Industriestrasse 18, West Germany. Telex: 521 726 Telefon: (089)-84-3071