NIKKO TUNER

NT-950

AM/FM STEREO TUNER

SERVICE MANUAL

CONTENTS

SAFETY INSTRUCTIONS

PRECAUTIONS DURING SERVICING

1. Parts identified by the ⚠ symbol parts are critical for safety. Replace only with same parts number specified.

2. Other parts and assemblies are specified to conform with such regulations as those applying to spurious radiation.

   These must also be replaced only with specified replacements.

   Examples: RF converters, tuner units, RF cables, noise blocking capacitors, noise blocking filters, etc.

3. Use specified internal wiring
   a) Primary leads
   b) Wires covered with PVC tubing
   c) Double insulated wire

4. Use specified insulating materials for hazardous live parts.
   a) Insulation Tape
   b) Insulated Barriers (Spacers)
   c) PVC tubing
   d) Plastic screws for fixing microswitch (Especially in turntable)
   e) Terminal strips

5. When replacing the primary components (transformer, power supply cord switch, by-pass capacitor, etc.), wrap ends of wires securely about the terminals before soldering.

   Where hand soldering is involved, a minimum spacing below between terminals of uninsulated live parts of primary or supply circuitry through air or over surface is to be maintained.

   120V appliance : 3mm spacing min.
   220V and 240V appliance : 6mm spacing min.

6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal resistance, rectifiers, etc.)

7. Check that replaced wires do not contact sharp edges or pointed parts.

8. Do not leave electric conductive parts (screws, droplets, etc.) inside the appliance.

SAFETY RECHECK AFTER SERVICING

Confirm the specified insulation resistance between power plug prongs and externally exposed parts of the appliance is greater than 10Mohms, however, for equipment with external antenna terminals (tuner, receiver, etc.) specified insulation resistance should be more than 2.2Mohms (ground terminals, in-output jacks etc.).

SPECIFICATIONS

FM Tuner Section

Usable Sensitivity	11.2 dBf/2 µV	
50 dB Quieting Sensitivity		
STEREO	WIDE: 39.2 dBf	NARROW: 39.2 dBf
MONO	WIDE: 22.2 dBf	NARROW: 17.2 dBf
Signal-to-Noise Ratio		
STEREO	70 dB	
MONO	75 dB	
Total Harmonic Distortion		
STEREO	WIDE: 0.08%	NARROW: 0.2%
MONO	WIDE: 0.05%	NARROW: 0.1%
Stereo Separation		
1 kHz	WIDE: 50 dB	NARROW: 45 dB
100 Hz to 10 kHz	WIDE: 40 dB	NARROW: 35 dB
Frequency Response		
(50 Hz to 15 kHz)	+1.0 dB, −2.0 dB	
Capture Ratio	WIDE: 1.5 dB	NARROW: 2.0 dB
Alternate Channel Selectivity	50 dB	80 dB
Spurious Response Ratio	75 dB	75 dB
IF Rejection Ratio	90 dB	90 dB
AM Suppression Ratio	60 dB	60 dB
Sub-Carrier Suppression	67 dB	67 dB
Muting Threshold Level	WIDE: 35.2 dBf	NARROW: 35.2-
Antenna Impedance	75 ohms and 300 ohms	
Output Level	600 mV	

AM Tuner Section

Usable Sensitivity	350 µV/m
Selectivity	40 dB
Signal-to-Noise Ratio	50 dB
Image Rejection	40 dB
IF Rejection	40 dB
Total Harmonic Distortion	0.5%
Output Level	200 mV

General

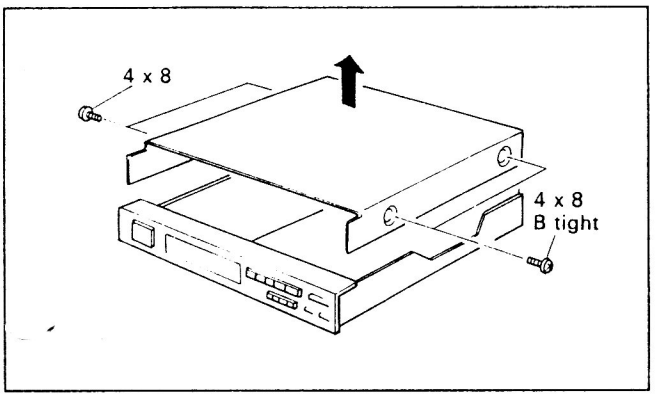
Power Requirement	
U.S.A. & Canada	AC 120 V, 60 Hz
Europe	AC 220 V, 50 Hz
Power Consumption	12W
Dimensions	440 (W) x 43.5 (H) x 265 (D) mm (17-1/4" x 1-3/4" x 10-2/5")
Weight, without package	3.2 kg (7 lbs)

• Specifications are subject to change without notice.

DISASSEMBLY

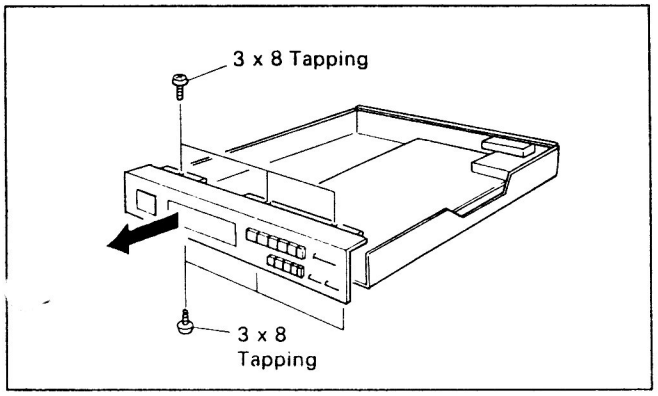
TOP COVER REMOVAL

1. Remove 4 screws from the cover (two from each side).
2. Lift the cover away from the unit.



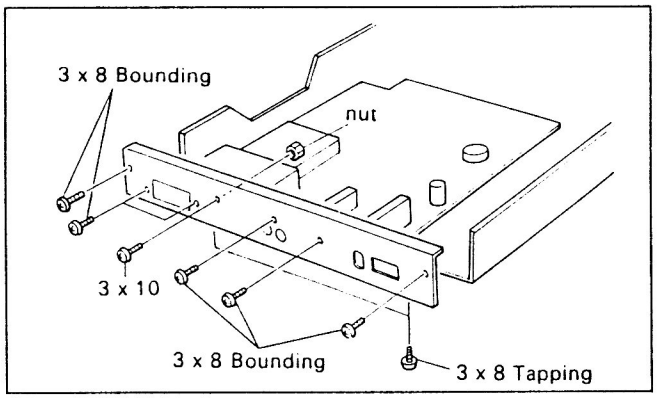
FRONT PANEL REMOVAL

1. Remove the top cover.
2. Remove 3 screws from the top of the panel.
3. Remove 3 screws from the bottom of the panel.
5. Detach the panel from the main unit by pulling it towards you.



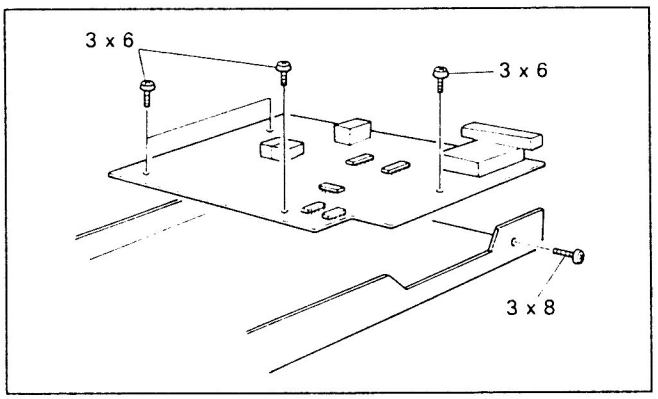
BACK PLATE REMOVAL

1. Remove the top cover.
2. Disconnect 2 leads running from the AC socket and 2 resistors.
3. Remove screws of the ground lead.
4. Remove 3 screws of the pin jack and antenna terminal.
5. Remove 3 screws from the back plate.
6. Remove 2 screws from the lower section of the back plate.
7. Remove the back plate by pulling it toward the front.

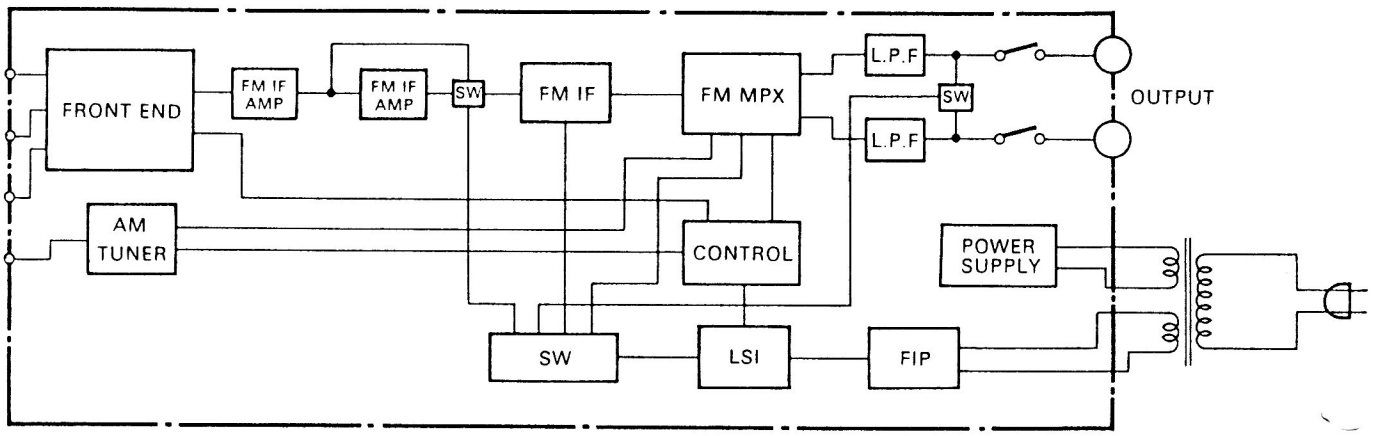


P.W. BOARD REMOVAL

1. Remove the top cover.
2. Remove the back plate.
3. Disconnect the leads from the TUNER PCB.
4. Remove the screw of the ground wire that is connected to the chassis.
5. Remove 4 screws that are holding the TUNER PCB.
6. Remove the TUNER PCB by lifting it away from the main unit.



BLOCK DIAGRAM



ALIGNMENT

TEST EQUIPMENTS

FM Signal Generator (FM SG)
Oscilloscope
AC Voltmeter
Distortion Meter
MPX Signal Generator (MPX SG)
Frequency Counter
AM Sweep Generator (AM SG)
DC Voltmeter

GENERAL ALIGNMENT INSTRUCTIONS

1. Always observe response curve on oscilloscope during alignment procedure.
2. Do not apply signals from FM or AM broadcast stations. Apply signals from generators only.
3. Use of excessive signal from FM SG or AM SG can cause overloading of the tuner circuits. To properly align the receiver, adjust FM SG or AM SG output level control so that response curve on oscilloscope is not distorted.
4. Input signal levels shown in the tables are measured at the antenna terminals of the tuner.
5. Allow a minimum of 10 minutes warm-up for test equipments and the tuner to be tested.

FM SECTION

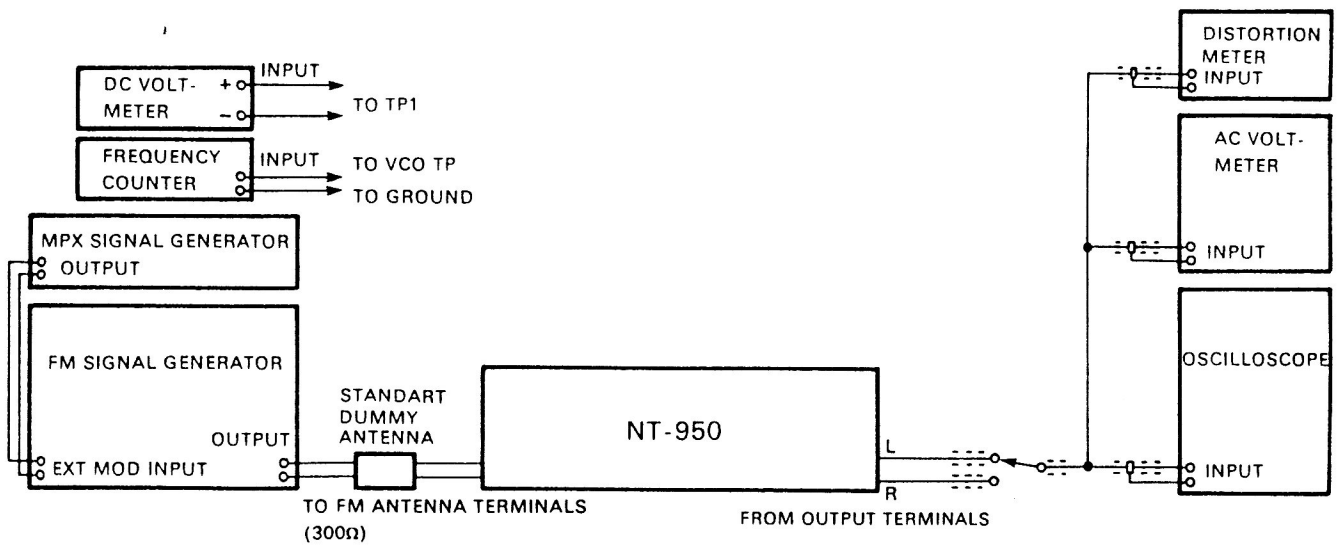
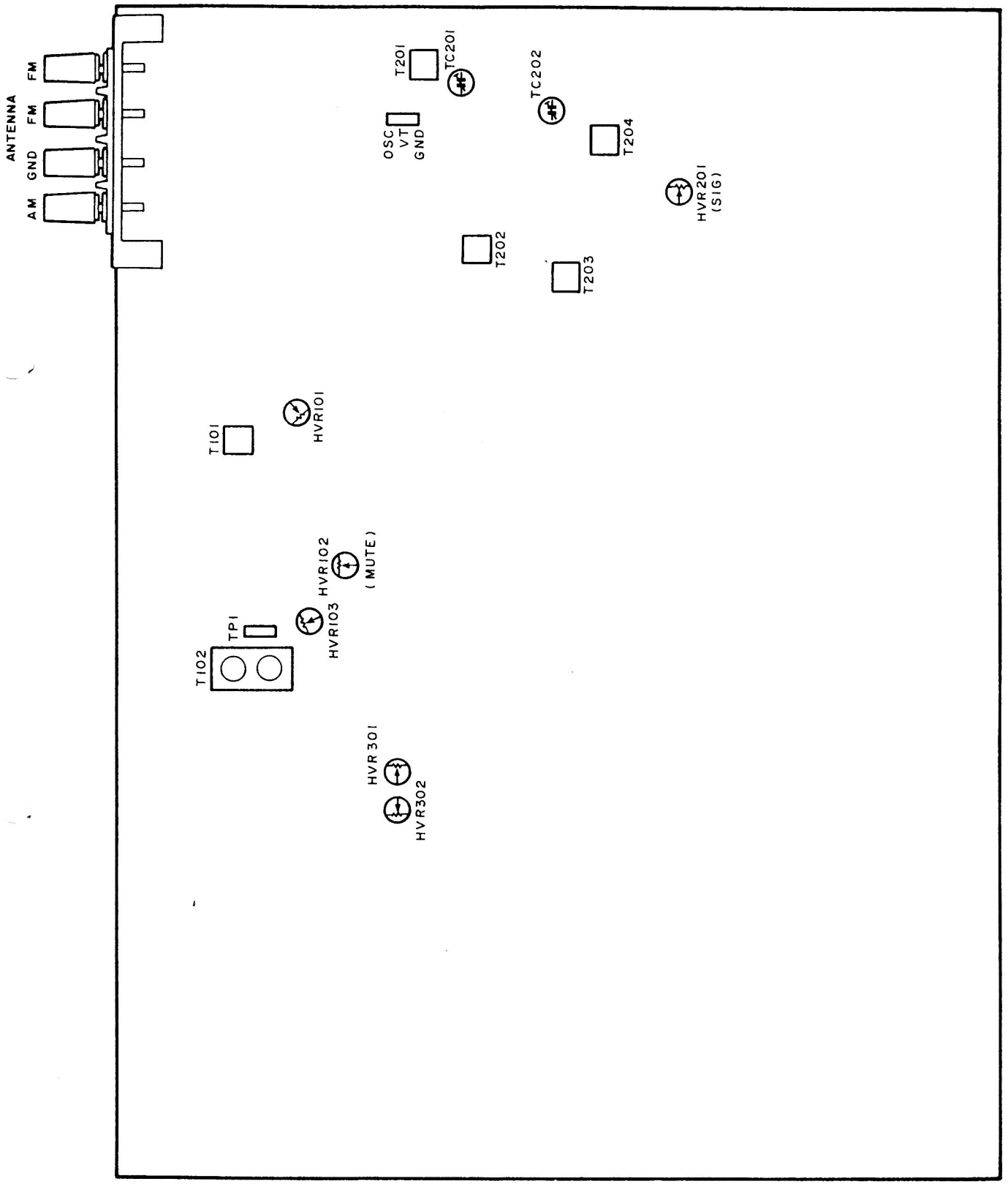


Figure 1 Test Equipment Hook-up

Adjustment Points



FM-IF Alignment

STEP	FM SG FREQUENCY/ CALIBRATION	MODULATING FREQUENCY/ DEVIATION	SWITCHES OF THE TUNER	FREQUENCY DISPLAY	TEST POINT	ADJUST-MENT POINT	PROCEDURE	REMARKS
1	98.1MHz/ 65 dBf (60 dBμ)	(No modulation)	A. POWER to "ON". B. BAND to "FM". C. MUTING to "OFF". D. HI-BLEND to "OFF". E. IF BAND to "WIDE".	Where no signal is tuned.	TP1	Primary core of T102.	Adjust until DC voltmeter indicates zero volt.	Repeat steps 1 and 2 until distortion can no longer be minimized.
2		400Hz/mono (±75kHz)		98.1MHz	Output terminal (L or R)	Secondary core of T102.	Adjust for mimum distortion.	

FM Signal IND Alignment

STEP	FM SG FREQUENCY/ CALIBRATION	MODULATING FREQUENCY/ DEVIATION	SWITCHES OF THE TUNER	FREQUENCY DISPLAY	TEST POINT	ADJUST-MENT POINT	PROCEDURE	REMARKS
1	98.1MHz 55 dBμ	400Hz/ mono	A. POWER to "ON". B. BAND to "FM". C. MUTING to "OFF". D. HI-BLEND to "OFF". E. IF BAND to "WIDE".	98.1MHz	LED display	HVR 103	Adjust until five signal strength display LED's light up.	
2			E. IF BAND to "NARROW"			HVR 101	Adjust until five signal strength display LED's light up.	

Narrow Band IF Alignment

STEP	FM SG FREQUENCY/ CALIBRATION	MODULATING FREQUENCY/ DEVIATION	SWITCHES OF THE TUNER	FREQUENCY DISPLAY	TEST POINT	ADJUST-MENT POINT	PROCEDURE	REMARKS
1	98.1 MHz	400Hz/ mono	A. POWER to "ON". B. BAND to "FM". C. MUTING to "OFF". D. HI-BLEND to "OFF". E. IF BAND to "WIDE".	98.1MHz	OUTPUT terminal (L or R)	SSG	Input until T.H.D 3% is reached.	The noise form should be observed, on the wave, symmetrically in respect to axis.
2			E. IF BAND to "NARROW"			T-101	The noise form should be observed, on the wave, symmetrically in respect to axis.	
3	98.1MHz 60 dBμ						The same level should be observed on the signal of the 5th point.	WIDE, NARROW

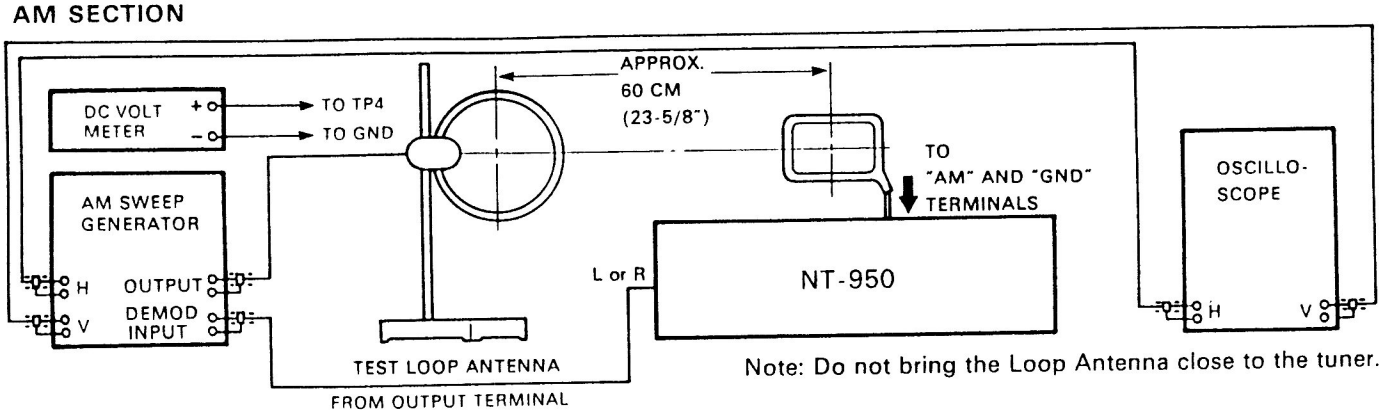
Muting Alignment

STEP	FM SG FREQUENCY/ CALIBRATION	MODULATING FREQUENCY/ DEVIATION	SWITCHES OF THE TUNER	FREQUENCY DISPLAY	TEST POINT	ADJUST-MENT POINT	PROCEDURE	REMARKS
1	98.1MHz 30 dBμ	400Hz/ mono	A. POWER to "ON". B. BAND to "FM". C. MUTING to "ON". D. HI-BLEND to "OFF". E. IF BAND to "WIDE".	98.1MHz	OUTPUT terminal (L or R)	HVR 102	Adjust to the point where the signal appears or disappears.	

FM MPX Alignment

STEP	FM SG FREQUENCY/ CALIBRATION	MODULATING FREQUENCY/ DEVIATION	SWITCHES OF THE TUNER	FREQUENCY DISPLAY	TEST POINT	ADJUST-MENT POINT	PROCEDURE	REMARKS
1	98.1MHz/ 60 dBμ	1kHz/stereo [main (L) & sub (−L): ±67.5kHz/pilot signal: ±7.5kHz]	A. POWER to "ON". B. BAND to "FM". C. MUTING to "ON". D. HI-BLEND to "OFF". E. IF BAND to "WIDE".	98.1MHz	Output terminals (L and R)	HVR 302	Adjust for maximum separation (minimum output of right channel)	Output of left and right channel should be equal.
2		1kHz/stereo [main (R) & sub (−R): ±67.5kHz/pilot signal: ±7.5kHz]					Adjust for maximum separation (minimum outdput of left channel)	
3			E. IF BAND to "RARROW".			HVR 301	Adjust for maximum separation (minimum output of left and right channel)	Do likewise as 1 and 2.

AM SECTION



Note: Do not bring the Loop Antenna close to the tuner.

Figure 2 Test Equipment Hook-up

AM Frequency Coverage Alignment

STEP	SWITCHES OF THE TUNER	FREQUENCY DISPLAY	TEST POINT	ADJUSTMENT POINT	PROCEDURE	REMARKS
1	A. POWER to "ON". B. BAND to "AM".	1620kHz (W-type) 1611kHz (other type)	TP3	TC202	Adjust until DC voltmeter indicates approx. 23 V.	Repeat steps 1 and 2 several times and finally adjust the voltages to 23 V ±100 mV at the highest frequency and 2.3 V ±50 mV at the lowest frequency.
2		530kHz (W-type) 522kHz (other type)		T204	Adjust until DC voltmeter indicates approx. 2.3 V.	

NOTE: Apply no signal AM SG.

AM Tracking Alignment

STEP	AM SG FREQUENCY/ CALIBRATION		MODULATING FREQUENCY/ MODULATION	SWITCHES ON THE TUNER	FREQUENCY DISPLAY	TEST POINT	ADJUSTMENT POINT FOR MAX. SCOPE INDICATION	REMARKS
1	600kHz, 50 dB/m (W-type) 603kHz, 50 dB/m (other type)	Set IF/RF switch of AM SG to "RF" position.	400Hz/30%	A. POWER to "ON". B. BAND to "AM". C. MUTING to "OFF".	600kHz (W-type) 603kHz (other type)	Output terminal (L or R)	T201	Repeat steps 1 and 2 several times.
2	1400kHz, 50 dB/m (W-type) 1404kHz, 50 dB/m (other type)				1400kHz (W-type) 1404kHz (other type)		TC201	

NOTE: To check tracking errors, use an apparatus made of ferrite rod and copper wire (Figure 4). Move it toward the AM loop antenna gradually, while checking for the response curve on oscilloscope becoming smaller. If the response curve becomes larger, repeat steps 1 and 2 (See Figure 5).

AM-IF Alignment

STEP	AM SG FREQUENCY/ CALIBRATION	MODULATING FREQUENCY/ MODULATION	SWITCHES OF THE TUNER	FREQUENCY DISPLAY	TEST POINT	ADJUST-MENT POINT	REMARKS
1	Set IF/RF switch of AM SG to "IF" position. 450kHz, 50 dB/m	(Unmodulated carrier)	A. POWER to "ON". B. BAND to "AM".	1620kHz (W-type) 1611kHz (other type)	Output terminal (L or R)	T202 T203	Adjust for maximum waveform on oscilloscope.

Signal-strength Display Circuit Adjustment

STEP	AM SG FREQUENCY/ CALIBRATION	MODULATING FREQUENCY/ MODULATION	SWITCHES OF THE TUNER	FREQUENCY DISPLAY	TEST POINT	ADJUST-MENT POINT	RROCEDURE
1	1000kHz, 70 dB/m (W-type) 999kHz, 70 dB/m (other type)	400Hz/30%	A. POWER to "ON". B. BAND to "AM".	1000kHz (W-type) 999kHz (other type)	LED display	HVR 201	Adjust until five signal strength display LED's light up.
2	(No signal)						Check that any signal strength LED no longer lights up.

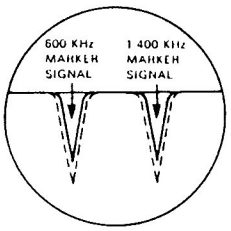


Figure 3 AM Tracking

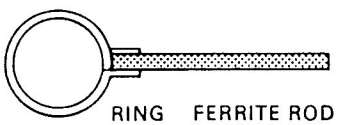


Figure 4 Apparatus

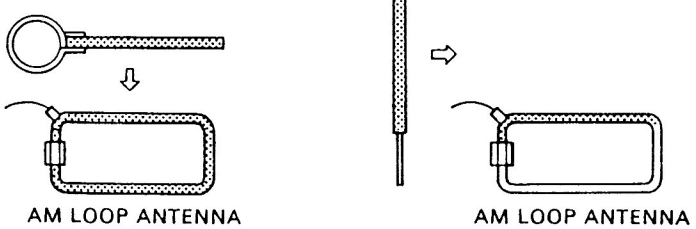


Figure 5 Tracking Errors

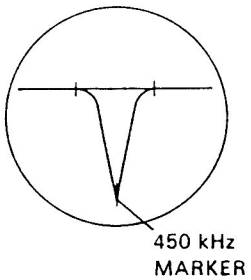


Figure 6 AM IF

CIRCUITS DATA

LSI TC9303AN-001

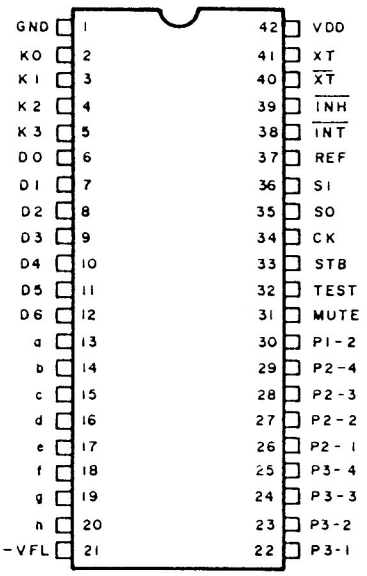
FUNCTION/MANUFACTURER
■ TUNING CONTROLLER/Toshiba
PIN DESCRIPTION

PIN #	SYMBOL	NAME AND FUNCTION
1	GND	0 V Power Supply
2	K_0	Key Return Signal Inputs
3	K_1	
4	K_2	
5	K_3	
6	D_0	Digit Outputs
7	D_1	
8	D_2	
9	D_3	
10	D_4	
11	D_5	
12	D_6	
13	a	Segment Outputs
14	b	
15	c	
16	d	
17	e	
18	f	
19	g	
20	h	
21	$-V_{FL}$	— Power Supply
22	P3-1	I/O Port
23	P3-2	
24	P3-3	
25	P3-4	
26	P2-1	
27	P2-2	
28	P2-3	
29	P2-4	
30	P1-2	
31	MUTE	Muting Output
32	TEST	Test Mode Input
33	STB	Serial Interface
34	CK	
35	SO	
36	SI	
37	REF	Criteria Frequency Signal Output
38	$\overline{INT}$	Initialize Input
39	$\overline{INH}$	In-bit Input
40	$\overline{X_T}$	Crystal Oscillator Inputs
41	X_T	
42	V_{DD}	Power Supply

TC9303AN-001

Maximum Ratings (Ta=25°C)

Item	Simbol	Rating	Units
Supply Voltage	V_{DD}	−0.3~6.0	V
Input Voltage	V_{IN}	−0.3~V_{DD}+0.3	V
Power Consumption	F_D	800	mW
Operating Temperature	T_{opr}	−30~75	°C
Storage Temperature	T_{stg}	−55~125	°C
Open Drain Output Proof	V_{BDS}	35 (Voltage between drain and source)	V
Key Input Voltage	V_{INK}	−V_{FL}−0.3~V_{DD}+0.3	V

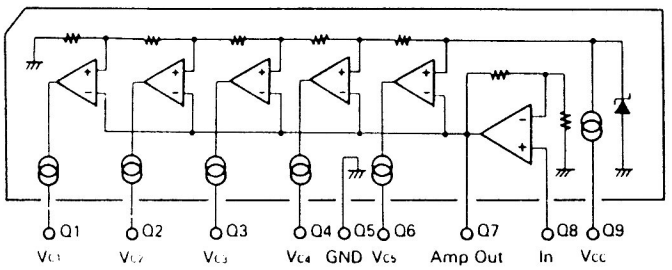


PIN CONFIGURATION (TOP VIEW)

INTEGRATED CIRCUIT LB1423N

FUNCTION/MANUFACTURER

■ LEVEL METER DRIVE/Sanyo



Absolute Maximum Ratings (Ta=25°C)

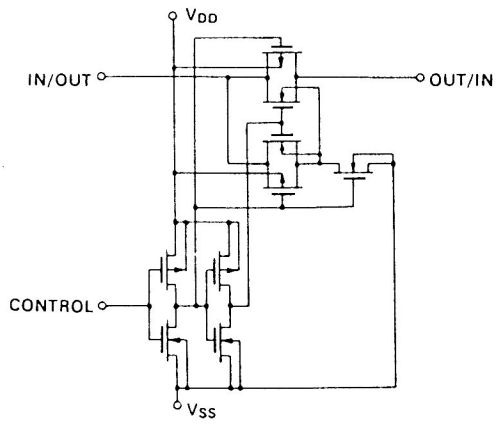
Vcc max	18	V
Pd max	1100	mV
Topg	−25~+75	°C
Tstg	−55~+125	°C

INTEGRATED CIRCUIT TC4066BP

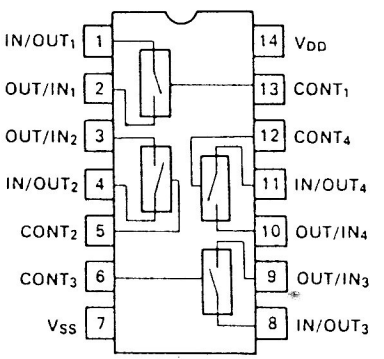
FUNCTION/MANUFACTURER

■ Quad Analog Switch/Toshiba

EQUIVALENT CIRCUIT

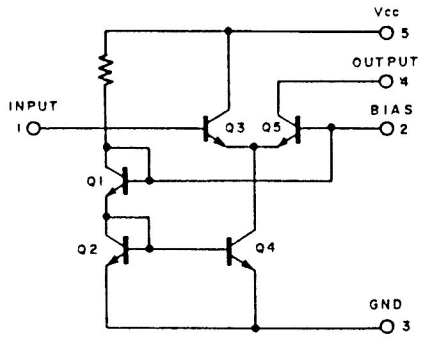


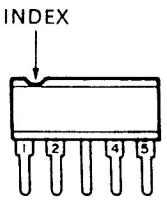
BLOCK DIAGRAM (TOP VIEW)



INTEGRATED CIRCUIT BA401

FUNCTION/MANUFACTURER
■ FM-IF Amplifier/Rohm
EQUIVALENT CIRCUIT AND CONNECTION INFORMATION

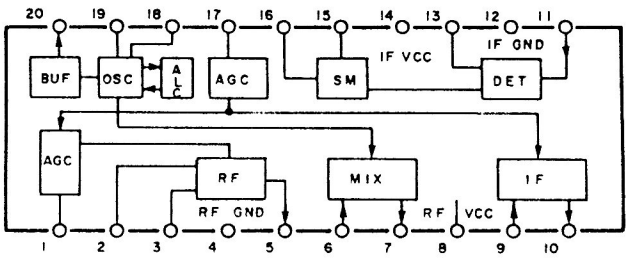


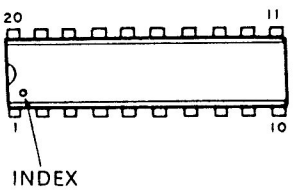


(SIDE VIEW)

INTEGRATED CIRCUIT LA1247

FUNCTION/MANUFACTURER
■ AM TUNER System/Sanyo
BLOCK DIAGRAM & CONNECTION INFORMATION

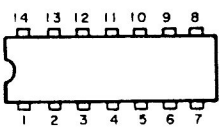




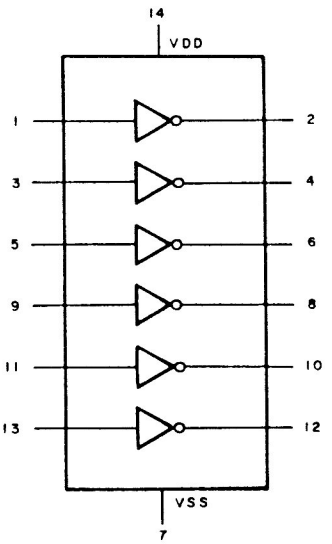
(TOP VIEW)

INTEGRATED CIRCUIT LC4069BP

FUNCTION/MANUFACTURER
■ HEX INVERTER/Sanyo
BLOCK DIAGRAM & CONNECTION INFORMATION

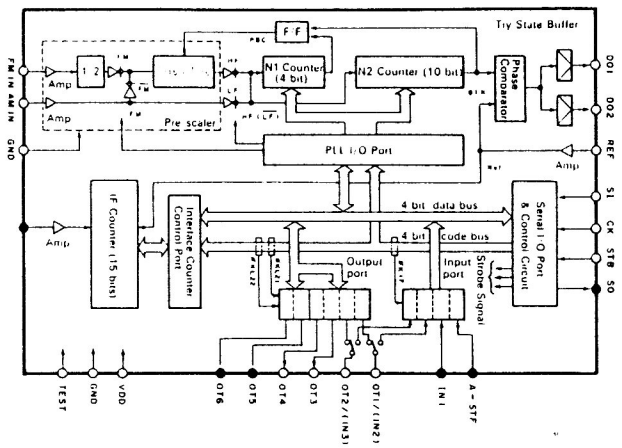


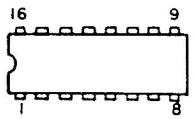
(TOP VIEW)



INTEGRATED CIRCUIT TC9172P

FUNCTION/MANUFACTURER
■ PLL-LSI System/Toshiba
BLOCK DIAGRAM AND CONNECTION INFORMATION

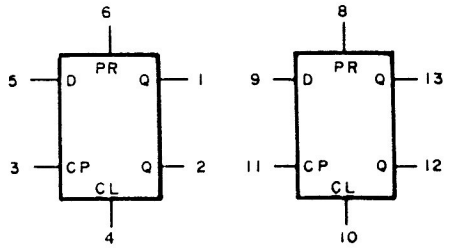




(TOP VIEW)

INTEGRATED CIRCUIT TC4013BP

FUNCTION/MANUFACTURER
■ DUAL D-TYPE FLIP FLOP/Toshiba
BLOCK DIAGRAM & CONNECTION INFORMATION



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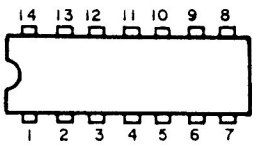
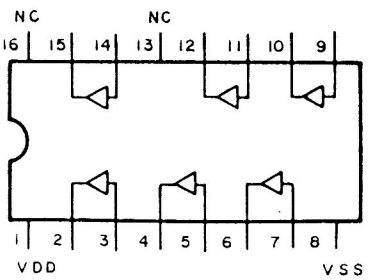
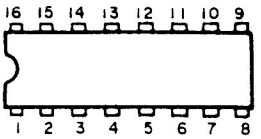


(TOP VIEW)

'NTEGRATED CIRCUIT TC4050BP

FUNCTION/MANUFACTURER
■ HEX BUFFER/CONVERTER NON-INVERTER/Toshiba
BLOCK DIAGRAM & CONNECTION INFORMATION

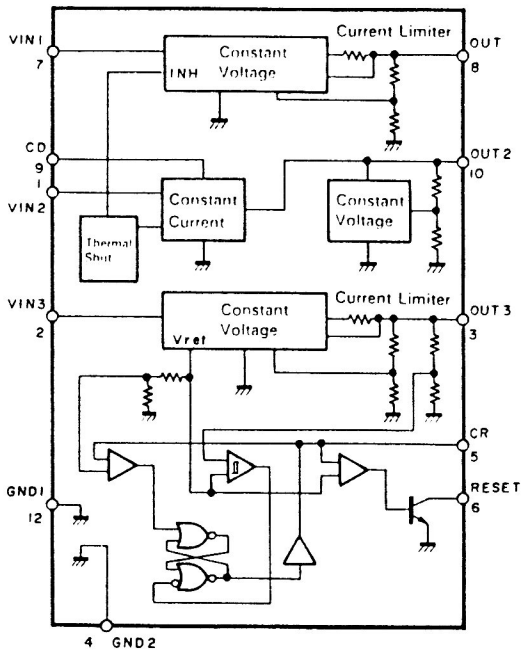


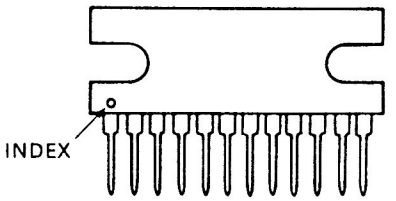


(TOP VIEW)

INTEGRATED CIRCUIT LA5658

FUNCTION/MANUFACTURER
■ Multi-Function Power Supply/Sanyo
BLOCK DIAGRAM & CONNECTION INFORMATION

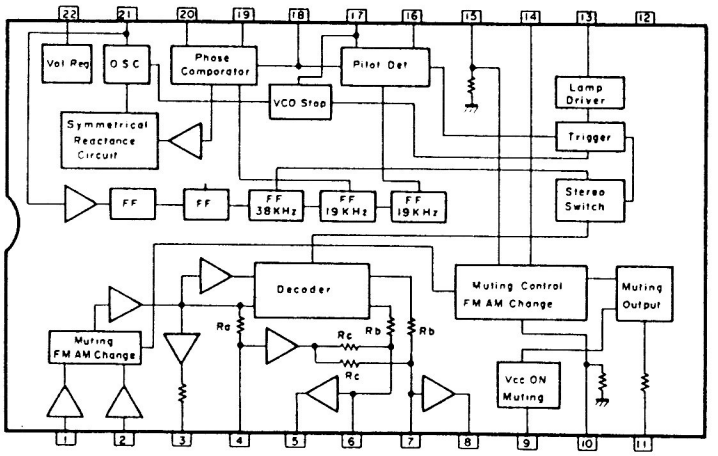


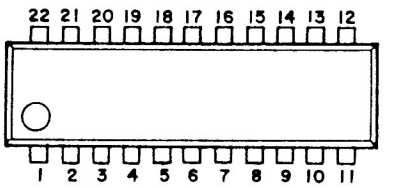


(SIDE VIEW)

INTEGRATED CIRCUIT LA3401

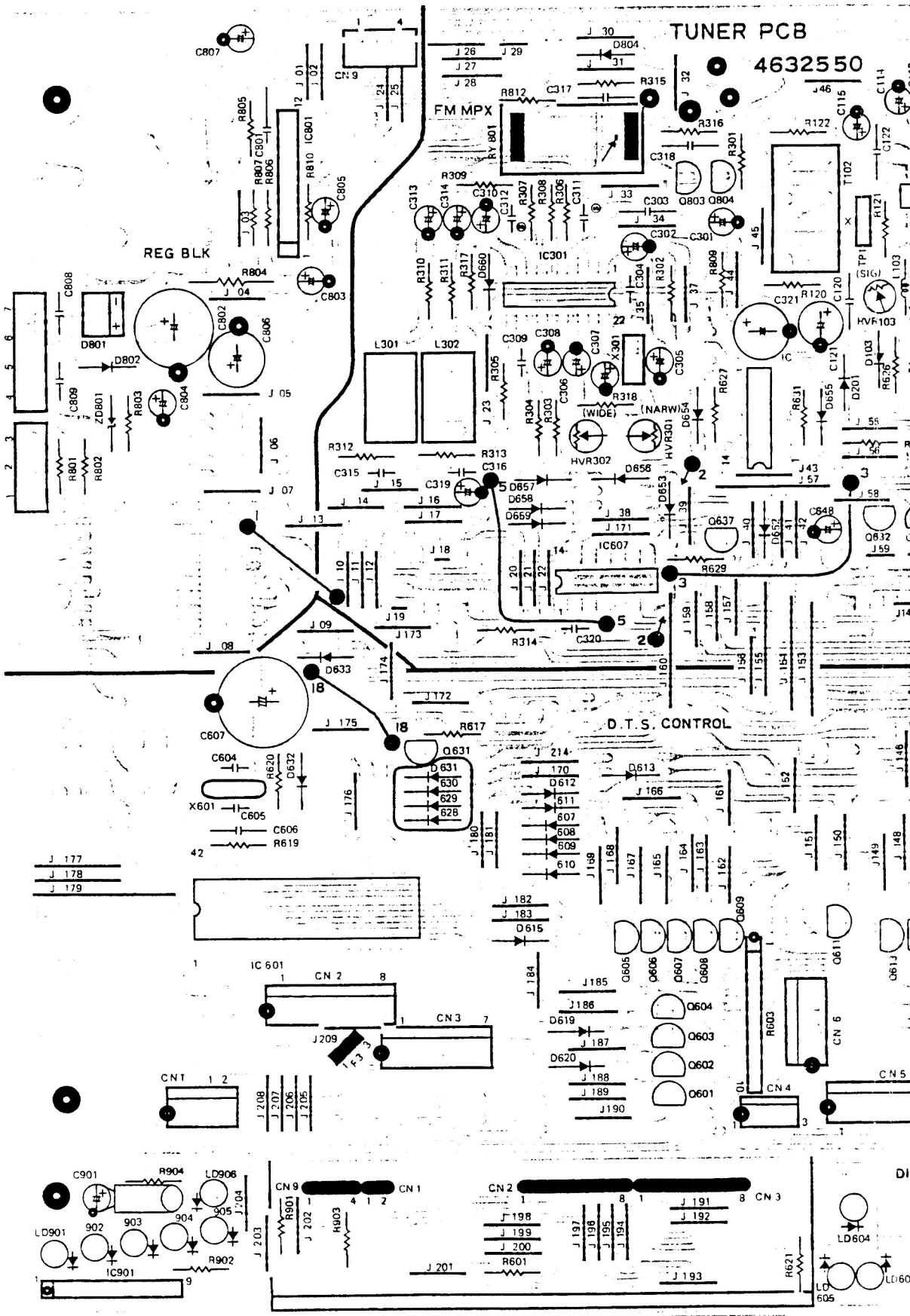
FUNCTION/MANUFACTURER
■ FM MPX Demodulator/Sanyo
BLOCK DIAGRAM & CONNECTION INFORMATION

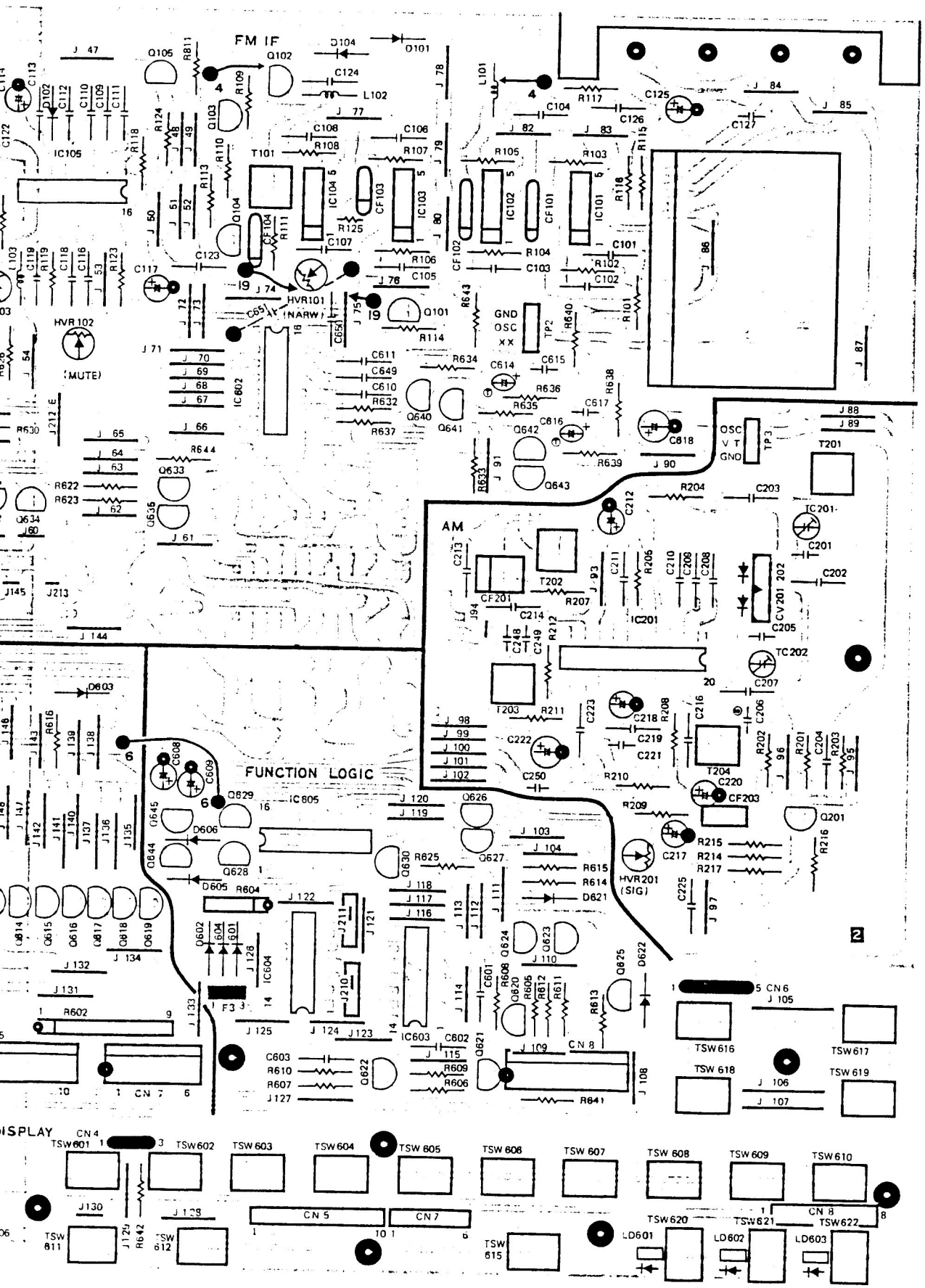




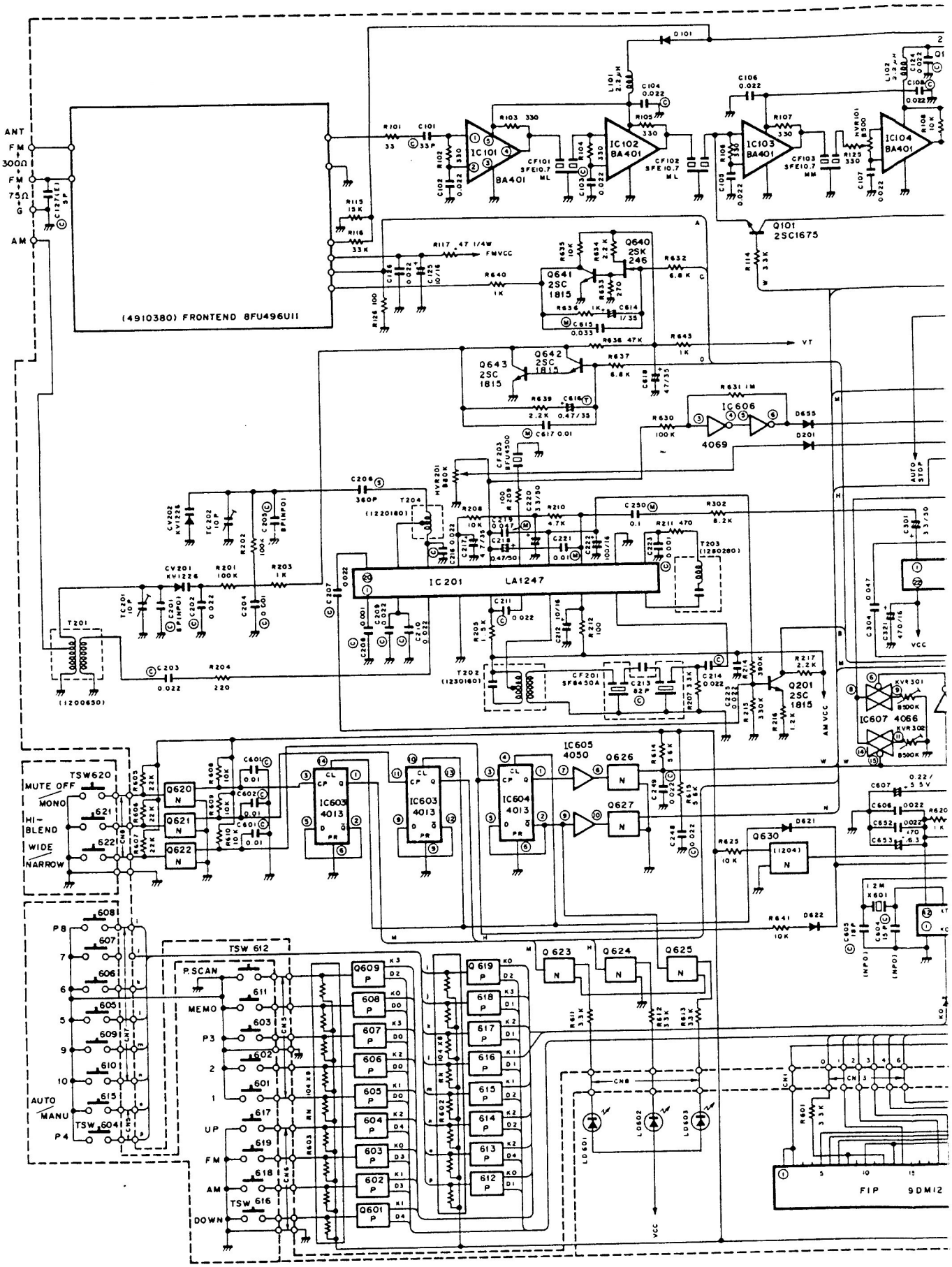
(TOP VIEW)

P.W. BOARD

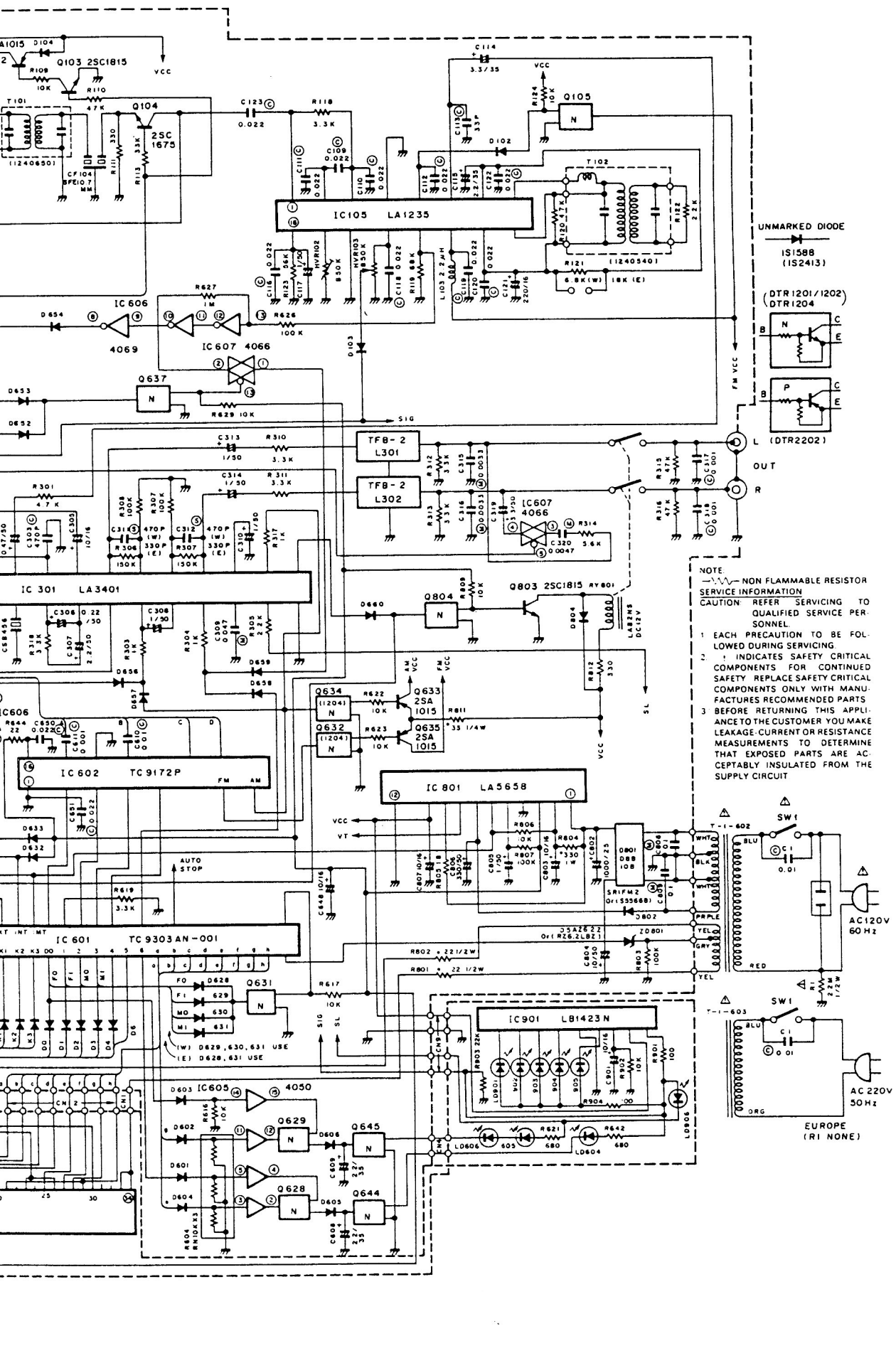

TUNER PCB
4632550
FM MPX
REG BLK
D.T.S. CONTROL
IC301
IC607
IC601
IC901
L301
L302
T102
CN 1
CN 2
CN 3
CN 4
CN 5
CN 6
CN 9
(WIDE)
(NARW)
(SIG)


FM IF
AM
FUNCTION LOGIC
DISPLAY
(MUTE)
(NARW)
(SIG)
GND
OSC
VT
IC105
IC602
IC605
IC603
IC604
IC201
T101
T201
T202
T203
T204
HVR101
HVR102
HVR201
Q101
Q102
Q103
Q104
Q105
Q201
Q626
Q627
Q628
Q629
Q633
Q634
Q635
Q640
Q641
Q642
Q643
Q644
Q645
TP2
TP3
CF101
CF102
CF103
CF104
CF201
CF203
CV201
TC202
L101
L102
D101
D102
D104
D603
D605
D606
D621
TSW601
TSW602
TSW603
TSW604
TSW605
TSW606
TSW607
TSW608
TSW609
TSW610
TSW611
TSW612
TSW615
TSW616
TSW617
TSW618
TSW619
TSW620
TSW621
TSW622
LD601
LD602
LD603
CN4
CN5
CN6
CN7
CN8

SCHEMATIC DIAGRAM



NT-950



NOTE:
—∿∿— NON FLAMMABLE RESISTOR

SERVICE INFORMATION

CAUTION: REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

1. EACH PRECAUTION TO BE FOLLOWED DURING SERVICING.
2. ⚠ INDICATES SAFETY CRITICAL COMPONENTS FOR CONTINUED SAFETY. REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURES RECOMMENDED PARTS.
3. BEFORE RETURNING THIS APPLIANCE TO THE CUSTOMER YOU MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT

PARTS LIST

NOTES:

1. * Numberals in file indicate the quantity of parts used in one type.
   W : U.S.A. & Canada model, AC 120V
   E : European model, AC 220V
2. ** TR: Transistor
   FET: Field effect transistor
   VR: Volume control (Variable resistor)
   MO-RES: Metal oxide film fixed resistor
   FP: Flame proof
   C-CAP: Ceramic capacitor
   E-CAP: Aluminum electrolytic capacitor
   M-CAP: Polyester film capacitor
   S-CAP: Polystyrene film capacitor
   T-CAP: Tantalum electrolytic capacitor
3. Assemblies and parts are subject to change without notice.
4. Parts ordering procedure.
   A. DO NOT USE THE "REFERENCE" number and "SYMBOL" number. (these are control * for the factory only)
   B. Include in any order
      a. Part number. b. Part description. c. Model number.
      (any of the above lacking from an order may delay shipment of that order.)

WARNING

⚠ INDICATES SAFETY CRITICAL COMPONENTS.
FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

KEY NO.	SYMBOL NO.	TYPE* W	TYPE* E	DESCRIPTION	PART NO.
	PACKING MATERIALS AND ACCESSARIES				
001		1	1	CARTON BOX NT-950	9827410
002		1	1	STYROL PAD NPSIR (SET)	9841400
[illegible]		1	1	POLY SACK A1	9640720
		1	1	POLY SACK NO.13	9640320
		1	1	OWNERS MANUAL NT-950 W E	960483H
006		1	1	Q-MATCH ANT (EX)	4581360
007		1	1	LOOP ANT LA-100	1200640
008		1	1	PIN PLUG CARD 2T	962026A
009		1	-	WARRANTY CARD ASI-3 (CANADA ONLY)	967049A
010		1	-	WARRANTY CARD (U.S.A. ONLY)	967056A
011		1	-	SERVICE STATION LIST (U.S.A. ONLY)	9690360
	CABINET AND CHASSIS ASSY				
101		1	1	COVER BLK	7821880
102		4	4	POLY FOOT 7114 20x10	7403520
103		1	1	FRONT PANEL NT-950 BK	7887430
104		1	1	PNL WINDOW NT-950 BK	7803780
105		1	1	BUTTON GUIDE 1420 BK	7404290
106		1	1	BUTTON GUIDE 950 BK	7406470
107		1	1	BUTTON 950 BK	7871650
108		3	3	IND GLB EQ	7406180
109		1	1	BUTTON P1420 BL	7852870
110		1	1	RELAY SHAFT 16.5-2	7405030
111		1	1	SCREEN 950	7803810
112		1	1	BLIND 950	7003820
113		1	1	FRONT PLATE	7329630
114		1	1	CHASS BOTTOM	7329450
115		1	1	DISPLAY HOLDER 950	7406480
⚠ 116		1	-	POWER TRANSFORMER T-1-602	1106030
⚠ 117		-	1	POWER TRANSFORMER T-1-603	1106020
118		1	-	BACK PLATE NT-950 (W)	7329580
119		-	1	BACK PLATE NT-950 (E)	7329590
120		1	1	SHIELD PLT	7036170
⚠ 121		1	-	AC SKT AC-T03	4500320
⚠ 122		1	-	PLUG CORD SPT-1	606013A
⚠ 123		1	-	CORD STP SR-3P-4	7400620
⚠ 124		1	1	C-CAP 0.01 μF	239103B
⚠ 125		-	1	CEE 2T PLUG CORD	600510A
⚠ 126		-	1	CORD STP SR-4N-4	7400690
[illegible]		-	1	C-CAP COVER	7400960
⚠		1	1	POWER SW TV-3 SDDLD1	4043180
[illegible]		1	1	SW HOLD 18MM	7228400
130		1	-	TUNER PCB ASS(W)	
131		-	1	TUNER PCB ASS(E)	
⚠	R1	1	-	RES RD50S 2.2M OHM 1/4W 5%	329225J
	TUNER PCB ASSEMBLY				
201		1	1	TUNER PCB	4632550
	FM-SECTION				
211		1	1	FRONT END BFE496U11	4910380
	C101,113	2	2	C CAP 33 μF 5%	236330J
	C102~112,113, 118,119,120,122, 123,124,126	19	19	C CAP EP 0.0022μF	236223N
	C114	1	1	E-CAP 3.3 μF 35V	211413S
	C115	1	1	E-CAP 2.2 μF 35V	211412S
	C117	1	1	E-CAP 1 μF 50V	211510S
	C121	1	1	E-CAP 220 μF 16V	211232X
	C125	1	1	E CAP 10 μF 16V	211220S
	C127		1	C CAP 5 μF	232509D
	CF101,102	2	2	C-FIL SFE10 TMM-A	1281110
	CF103,104	2	2	C-FIL SFE10 TMM-A	1280410
	D101,102,103,104	4	4	D 1S1588	501030S
	HVR101	1	1	HVR V16EK-PV(1S)B500K	4302030
	HVR102,103	2	2	HVR V16EK-PV(1S)B 50K	4302090
	IC101,102,103,104	4	4	IC BA401	518271S
	IC105	1	1	IC LA1235	518209S
	L101,102,103	3	3	INDUCTOR 2R2M(MICRO)	121114S
	Q101,104	2	2	TR 2SC1675	515082S
	Q102	1	1	TR 2SA1015	510102S

KEY NO.	SYMBOL NO.	TYPE* W	TYPE* E	DESCRIPTION	PART NO.
	Q103	1	1	TR 2SC1815	512107S
	Q105	1	1	DTR RN1201	512159S
	R101	1	1	RES 33 OHM 1/4W 5%	328330J
	R102,103,104,105, 106,107,111	7	7	RES 330 OHM 1/4W 5%	328331J
	R108,109,124	3	3	RES 10K OHM 1/4W 5%	328103J
	R110	1	1	RES 41K OHM 1/4W 5%	328473J
	R113,R114,116	3	3	RES 33K OHM 1/4W 5%	328333J
	R115	1	1	RES 15K OHM 1/4W 5%	328153J
	R117	1	1	FP-RES 47 OHM 1/4W	328470L
	R118	1	1	RES 3.3K OHM 1/4W 5%	328332J
	R119	1	1	RES 68K OHM 1/4W 5%	328683J
	R120	1	1	RES 4.7K OHM 1/4W 5%	328472J
	R121	1	-	RES 6.8K OHM 1/4W 5%	328682J
	R121	-	1	RES 18K OHM 1/4W 5%	328183J
	R122	1	1	RES 2.2K OHM 1/4W 5%	328222J
	R123	1	1	RES 56K OHM 1/4W 5%	328563J
	R125	1	1	RES 330 OHM 1/4W	328331V
	R126	1	1	RES 100 OHM 1/4W 5%	328101V
	R811	1	1	RES 33 OHM 1/4W	328330L
	T101	1	1	FM IFT COIL	1240650
	T102	1	1	FM DET COIL	1240540
	T201	1	1	AM ANT COIL	1200650
	T202	1	1	AM IFT COIL	1230160
	T203	1	1	AM UET COIL	1230280
	T204	1	1	AM OSC COIL	1220180
	TC201,202	2	2	TRM VCT56C115A	4241110
	FM MPX SECTION				
	C301,319	2	2	E-CAP 3.3 μF 50V	211513S
	C302	1	1	E-CAP 0.47 μF 50V	211505S
	C303	1	1	C-CAP UP 470 μF 10%	236471K
	C304,309	2	2	M-CAP 0.047 μF 5%	222473J
	C305	1	1	E-CAP 10 μF 6V	211220S
	C306	1	1	E-CAP 0.22 μF 50V	211502L
	C307	1	1	E-CAP 2.2 μF 50V	211512L
	C308,310,313,314	4	4	E-CAP 1 μF 50V	211510S
	C311,312	-	2	S-CAP 330 PF	223331V
	C311,312	2	-	S-CAP 470 PF	223471V
	C315,316	2	2	M-CAP 0.0033μF 5%	222332J
	C317,318	2	2	C-CAP AP 0.001 μF 10%	236102K
	C320	1	1	M-CAP 0.0047μF 5%	222472J
	C321	1	1	E-CAP 470 μF 16V	211430X
	HVR301,302	2	2	HVR V6EK-PV(1S) B500K	4302120
	IC301	1	1	IC LA3401	518322S
	L301,302	2	2	LPF TFB-2	1281030
	R301	1	-	RES 4.7K OHM 1/4W 5%	328472J
	R301	-	1	RES 10K OHM 1/4W 5%	328103J
	R302	1	1	RES 8.2K OHM 1/4W 5%	328822J
	R303,304,317	3	3	RES 1K OHM 1/4W 5%	328102J
	R305	1	1	RES 2.2K OHM 1/4W 5%	328222J
	R306,307	2	2	RES 150K OHM 1/4W 5%	328154J
	R308,309	2	2	RES 100K OHM 1/4W 5%	328104J
	R310,311,312, R313, 318	5	5	RES 3.3K OHM 1/4W 5%	328332J
	R314	1	1	RES 5.6K OHM 1/4W 5%	328562J
	R315,316	2	2	RES 4.7K OHM 1/4W 5%	328473J
	X301	1	1	CF CSB456F11	1281020
	AM SECTION				
	C201,205	2	2	C-CAP 8FP NP0	232809C
	C202,203,207,209, C210,211,214,216,225	9	9	C-CAP EP 0.002 μF	236223N
	C204,208,223	3	3	C-CAP AP 0.001 μF 10%	236102K
	C206	1	1	S-CAP 360 μF	223361V
	C212	1	1	E-CAP 10 μF 16V	211220S
	C213	1	1	C-CAP UP82 μF 5%	236820J
	C217	1	1	E-CAP 4.7 μF 35V	211415S
	C218	1	1	E-CAP 0.47 μF 50V	211505S
	C219	1	1	M-CAP 0.047 μF 5%	222473J
	C220	1	1	E-CAP 3.3 μF 50V	211513S
	C221	1	1	M-CAP 0.01 μF 5%	222103J
	C222	1	1	E-CAP 100 μF 16V	2112300
	C248,249	2	2	M-CAP 0.022 μF 5%	222223J

PARTS ORDERING PROCEDURE ..... DO NOT USE THE "REFERENCE" number and "SYMBOL" number. (these are control # for the factory only.) Include in any order:
a. Part number, b. Part despcription, c. Model number. (any of the above lacking from an order may delay shipment of the order.)

KEY NO	SYMBOL NO	TYPE + W	E	DESCRIPTION	PART NO
	C250	1	1	M-CAP 0.1 μF	222104J
	CF201	1	1	C-FIL SFZ450A	1280730
	CF203	1	1	C-FIL BFU45004N	1280800
	CV201,202	1	1	D KV1226	504005S
	D201	1	1	D 1S1588	501030S
	HVR201	1	1	HVR V6FK-PV(1S) B 50K	4302090
	IC201	1	1	IC LA1247	518323S
	Q201	1	1	TR 2SC1815	512107S
	R201,202	2	2	RES 100K OHM 1/4W 5%	328104J
	R203	1	1	RES 1K OHM 1/4W 5%	328102J
	R204	1	1	RES 220 OHM 1/4W 5%	328221J
	R205	1	1	RES 1.5K OHM 1/4W 5%	328152J
	R207	1	1	RES 3.3K OHM 1/4W 5%	328332J
	R208	1	1	RES 10K OHM 1/4W 5%	328103J
	R209,212	2	2	RES 100 OHM 1/4W 5%	328101J
	R210	1	1	RES 4.7K OHM 1/4W 5%	328472J
	R211	1	1	RES 470 OHM 1/4W 5%	328471J
	R214	1	1	RES 390K OHM 1/4W 5%	328394J
	R215	1	1	RES 330K OHM 1/4W 5%	328334J
	R216	1	1	RES 1.2K OHM 1/4W 5%	328122J
	R217	1	1	RES 2.2K OHM 1/4W 5%	328222J
	CONTROL SECTION				
	R601,611,612,613, R619	5	5	RES 3.3K OHM 1/4W 5%	328332J
	R602	1	1	R-NET 104Jx8 5%	519014J
	R603	1	1	R-NET 104Jx9 5%	519015J
	R604	1	1	R-NET 103Jx3 5%	519013J
	R605,606,607	3	3	RES 22K OHM 1/4W 5%	328223J
	R608~610,616,617, R622,R623,625,622	11	11	RES 10K OHM 1/4W 5%	328103J
	R635,641				
	R614,615	2	2	RES 5.6K OHM 1/4W 5%	328562J
	R620,636,640,643	4	4	RES 1K OHM 1/4W 5%	328102J
	R621	1	1	RES 680 OHM 1/4W 5%	328681J
	R626,630	2	2	RES 100K OHM 1/4W 5%	328104J
	R627,631	2	2	RES 1M OHM 1/4W 5%	328105J
	R632,637	2	2	RES 6.8K OHM 1/4W 5%	328682J
	R633	1	1	RES 270 OHM 1/4W 5%	328271J
	R634,639	2	2	RES 2.2K OHM 1/4W 5%	328222J
	R638	1	1	RES 47K OHM 1/4W 5%	328473J
	57,153,154,155, 60,179	7	7	JUMPER 20MM	4581740
	C601,602,603,610	4	4	C-CAP TP 0.01 μF	236103N
	C604	1	1	C-CAP 15 μF	232150C
	C605	1	1	C-CAP 18 μF	232180C
	C606,650,651,652	4	4	C-CAP EP 0.022 μF	236223N
	C607	1	1	E-CAP 0.22 μF 5.5V	2100340
	C608,609	2	2	E-CAP 2.2 μF 35V	211412S
	C611	1	1	C-CAP AP 0.001 μF 10%	236102K
	C614	1	1	T-CAP 1 μF 35V	252410M
	C615	1	1	M-CAP 0.033 μF 5%	222333J
	C616	1	1	T-CAP 0.47 μF 35V	252405M
	C617	1	1	M-CAP 0.01 μF 5%	222103J
	C618	1	1	E-CAP 47 μF 35V	211425X
	C648	1	1	E-CAP 10 μF 16V	211220S
	C653	1	1	E-CAP 470 μF 6.3V	211035L
	D601~613,615, D619~622,628~633, D652~660	32	31	D 1S1588	501030S
	IC601	1	1	IC TC9303AN-001	518292S
	IC602	1	1	IC TC9172P	518289S
	IC603,604	2	2	IC TC4013BP	518080S
	IC605	1	1	IC TC4050BP	518263S
	IC606	1	1	IC LC4069UBP	518282S
	IC607	1	1	IC TC4066BP	518163S
	J177,178	2	2	JUMPER JPOWO2-FC08	4583390
	J18,19,94,145, 210,211	7	7	JUMPER JPW01-H1	4583410
	J29,59,60	3	3	JUMPER 5MM	4583190

KEY NO	SYMBOL NO	TYPE + W	E	DESCRIPTION	PART NO
	Q601~611, Q613~619	18	18	DTR RN2202	510144S
	Q620~629,631,637, Q644,645	14	14	DTR RN1201	512159S
	Q630,632,634	3	3	DTR RN1204	512162S
	Q633,635	2	2	TR 2SA1015	510102S
	Q640	1	1	FET 2SK246	516043S
	Q641,642,643	3	3	TR 2SC1815	512107S
	R644	1	1	RES 22 OHM 1/4W 5%	328220J
	X601	1	1	X TAL 7.200MHZ	1281010
	DISPLAY SECTION				
221		1	1	FIP 9DM12	5890050
	C901	1	1	E-CAP 10 μF 16V	211220S
	J105~107	3	3	JUMPER JPOWO2-FC08	4583390
	J130	1	1	JUMPER 5MM	4583190
	LD601~603	3	3	LED LN260RCPP	5061190
	LD604,605,606,906	4	4	LED SLP-981C-50	5061110
	LD901~905	5	5	LED SLP-281F-50U	5061180
	R647	2	2	RES 680 OHM 1/4W 5%	328681J
	R901,904	2	2	RES 100 OHM 1/4W 5%	328101J
	R902	1	1	RES 10K OHM 1/4W 5%	328103J
	R903	1	1	RES 22K OHM 1/4W 5%	328223J
	TSW601~612, TSW615~622	20	20	TACT SW	406013U
	REG SECTION				
231		1	1	H-SINK 950	7082620
232		1	1	IC HOLD 950	7050650
233		4	4	GLASS TUBE x10mm (for R801,802)	TUBL0008
	C802	1	1	E-CAP 1000 μF 25V	211340X
	C803	1	1	E-CAP 10 μF 16V	211220S
	C804	1	1	E-CAP 10 μF 50V	211520S
	C805	1	1	E-CAP 1 μF 50V	211510S
	C806	1	1	E-CAP 330 μF 50V	211533X
	C807	1	1	E-CAP 10 μF 16V	211220S
	C808,809	2	2	M-CAP 0.1 μF 10%	226104K
⚠	D801	1	1	D DBB108	560081S
⚠	D802	1	1	D SR1FM-2	560086S
	D804	1	1	D 1S1588	501030S
⚠	IC801	1	1	IC LA5658	518324S
	Q803	1	1	TR 2SC1815	512107S
	Q804	1	1	DTR RN1201	512159S
	R801,802	2	2	FP-RES 22 OHM 1/2W	329220L
	R803,807	2	2	RES 100K OHM 1/4W 5%	328104J
	R804	1	1	FP-MO-RES 330 OHM 1W	361331L
	R805	1	1	RES 1.8K OHM 1/4W 5%	328188J
	R806,809	2	2	RES 10K OHM 1/4W 5%	328103J
	R812	1	1	RES 330 OHM 1/4W 5%	328331J
	RY801	1	1	REED RELAY LAB2L	1700610
⚠	ZD801	1	1	ZD 05AZ6.2Z	502146S
	TERMINAL SECTION				
241		1	1	PINTER 2PT5882	4442130
242		1	1	WP-TER WD-3 1,2,3 (Transformer,Secondary)	4581760
243		1	1	WP-TER WD-4 4,5,6,7 (Transformer,Secondary)	4581770
	(Transformer,Secondary)				
	ANT TER	1	1	SCW TER 4PM13	4450650
	CN1	1	1	MINI CONCT W-D0604	4570430
	CN2,8	2	2	MINI CONCT W-D0608	457047[illegible]
	CN3	1	1	MINI CONCT W-D0607	457046[illegible]
	CN4	1	1	MINI CONCT W-D0603	4570420
	CN5	1	1	MINI CONCT W-D0610	4570490
	CN6	1	1	MINI CONCT W-D0605	4570440
	CN7	1	1	MINI CONCT W-D0606	4570450
	CN9	1	1	BASE POST B4B-XH-A	4572040
	TP1~3	3	3	BASE POST 3022-03A	4572000
	IC901	1	1	IC LB1423N	518256S

CORRECTION SHEET

NT-950 SERVICE MANUAL

This is to notify of the recent changes. Please implement them as follows:

PARTS LIST (page 18)

	KEY NO.	SYMBOL NO.	TYPE + W	E	DESCRIPTION	PART NO.
Incorrect	116		1	-	POWER TRANSFORMER T-1-602	1106030
	117		-	1	POWER TRANSFORMER T-1-603	1106020
		R1	1	-	RES RD50S 2.2M OHM ¼W 5%	329225J
		C222	1	1	E-CAP 100μF 16V	2112300

Correct	116		1	-	POWER TRANSFORMER T-1-602	1106020
	117		-	1	POWER TRANSFORMER T-1-603	1106030
		R1	1	-	RES RD50S 2.2M OHM ½W 5%	329225J
		C222	1	1	E-CAP 100μF 16V	211230S