

**NAD SERVICE
MANUAL**

7240PE
STEREO RECEIVER

ALIGNMENT METHOD

AUDIO SECTION 7240PE

IMPORTANT

Speaker Impedance switch should be in 8 ohm position while adjusting center voltage and idling current.

INITIAL ADJUSTMENT (No load connected)

A. CENTER VOLTAGE

1. Connect DC millivoltmeter to L channel output terminals.
2. Turn on and adjust to 0 V \pm 30mV with VR401 (10KB). Connect DC millivoltmeter to R channel output terminals and adjust VR402 to 0 V \pm 30mV.

B. IDLING CURRENT

1. Remove solder short across R471 and R472.
2. Connect DC millivoltmeter across R471 (1 ohm) (output transistor's collector resistor) and adjust VR403 (1KB) for 26-30mV reading on meter.
Repeat adjust with VR404 (1KB), connecting meter across R472(1 ohm)
3. leave power on for minimum 5 minutes.

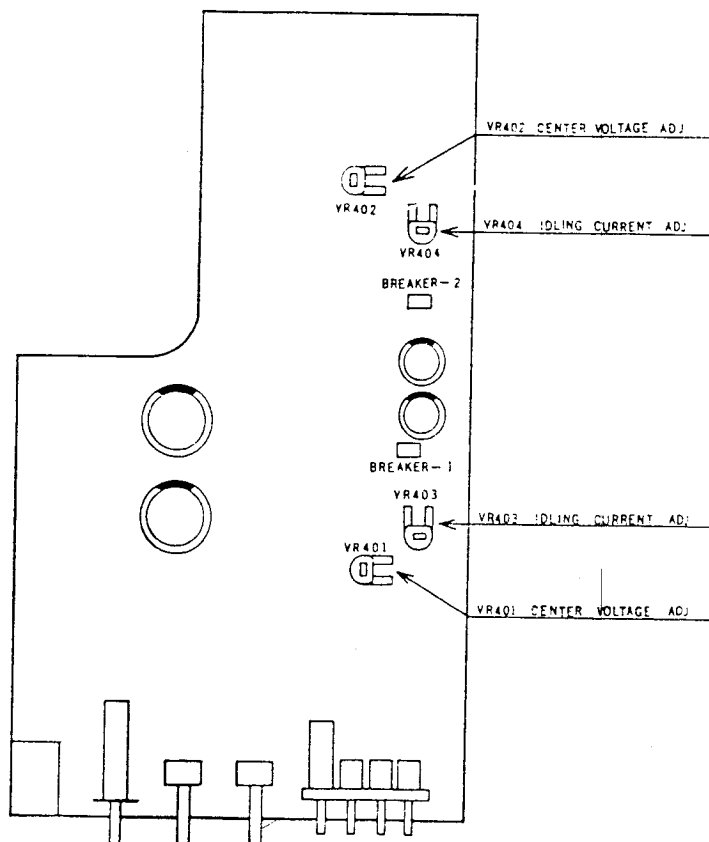
FINAL ADJUSTMENT

C. CENTER VOLTAGE

1. Repeat step A above.

D. IDLING CURRENT

1. Repeat step B and adjust with VR403, VR404 for 30mV reading on meter.
2. After the alignment is finished, 1 ohm resistor R471,R472 is shorted by solder short.



AMPLIFIER ADJUSTMENT POINTS

FM ALIGNMENTS

NECESSARY INSTRUMENTATION

FM GENERATOR (less than 0.05% THD)

STEREO GENERATOR (less than 0.05% THD, more than 50 dB separation at 1 KHz.)

AUDIO GENERATOR (not necessary if FM generator has built in sweep; i.e. SOUND TECHNOLOGY ST 1000A and ST 1020A)

2 AC VTVM's (or one with left/right channel switch)

THD ANALYZER (resolution better than 0.1%)

OSCILLOSCOPE (5mV or better sensitivity, X input capability)

FREQUENCY COUNTER

VOM or DHM (high impedance, must read in mV)

DIODE DETECTOR PROBE

COPPER/FERRITE INDUCTOR

IMPORTANT

While all FM generator output levels hereafter are referred to the 300 ohm input, 75 ohm input can be used, but be aware of possible equipment groundloops and divide the RF output level by 2.

Before alignments commence set input selector to tuner and release tape, mono and FM NR. defeat switches (out)

ALIGNMENT OF FRONTEND should only be necessary after repair to frontend or crystal oscillator circuits (pin 2 and 3 on IC7)

A. TUNING VOLTAGE (OSCILLATOR)

It is essential to check tuning voltage before aligning the rest of the frontend.

1. Connect DHM between shield and pin 6 on frontend.
2. Tune to 108 MHz and adjust L 707 if voltage is incorrect.
SPECIFICATION 20.5V \pm 0.5V
3. Tune to 87.5 MHz and read voltage, repeat step 2 and 3 if incorrect.
SPECIFICATION 3V \pm 0.5V

B. RF ADJUSTMENT (TRACKING)

1. Connect RF generator to antenna input and detectorprobe to pin 1, IC 2 (IF DETECTOR) with ground to detectorshield. Adjust sensitivity of oscilloscope to maximum (5mV or better) and modulate FM generator sweep \pm 300 KHz or more WITH modulating (sweep) signal connected to X-input of oscilloscope.
2. Set tuner to 90 MHz, enter into preset 1, and tune generator so that curve appears on oscilloscope. Turn down RF input level so that curve covers approximately 1/2 of oscilloscope display.
3. Check alignments of L 702 - L 704 - L 705 by inserting copper/ferrite inductor close to them while watching curve on oscilloscope. Curve should decrease in height with either ferrite (same as increasing inductance, i.e. more core) or with copper (same as decreasing inductance, i.e. extend size of coil). If curve increases in size more than 10% adjust only the coil which reacts incorrectly. Adjust coils by gently extend or contract the aircoil with a non-metallic and non-static tool (i.e. plastic knit-pin or a wooden stick). Be careful not to deform coil.
4. Set tuner to 105MHz, enter into preset 2, and tune generator so that curve appears on oscilloscope.
5. Check L 702 - L 704 - L 705 again with the ferrite/copper inductor. Curve should not increase more than 10% on any of the coils.
6. Repeat step 2 + 3 + 4 + 5 if curve height is outside of tolerances, if necessary distribute the error between 90 and 105 MHz. Check tuning voltage again if tolerances not possible to achieve.

C. IF ADJUSTMENT

1. Set tuner to approximately 98 MHz (the tuner must be tuned to an unoccupied frequency) enter into preset 3, and tune FM generator to display a curve on the oscilloscope.
2. Adjust L 709 (IFT tuner frontend) to maximum and symmetrical curve on th display, using as little input signal as possible.

D. DETECTOR COARSE ADJUSTMENT (OPTIONAL, NEEDED ONLY IF DETECTOR WAS REPAIRED).

1. Reduce sweep modulation level to +/- 75 kHz and set input level to 300 uv.
2. Adjust FM generator frequency so that both legs of the inverted U-shaped curve are equally high on the display. The curve should be almost perfectly symmetrical.
3. Disconnect detectorprobe from tuner and oscilloscope. Connect either of the tape rec. outputs to the oscilloscope.
4. Adjust IFT 1 primary (closest to the rear of unit) to maximum curveheight and IFT 1 secondary (closest to the front of unit) to minimum curveheight and straightest possible line. Go back and forth between primary and secondary till both are peaked.

NOTE:

Both the cores should be within 1.5 mm from the top of the form.

E. DETECTOR ALIGNMENTS (FINAL)

1. Disconnect detectorprobe and connect tape rec. outputs to VTVM's, oscilloscope and distortion analyzer.
2. Switch stereo generator to 1 kHz 100% (+/- 75kHz) mono modulation and oscilloscope to normal internal sweep 0.2 mS and 0.5 V/cm sensitivity.
3. Detector reference frequency
Reduce FM generator output level while monitoring THD from left channel. When THD increases to 3%, fine tune the FM generator frequency to minimum THD. Reduce FM generator output level and fine tune till no reduction in the 3% THD can be achieved by fine tuning. Use this frequency for all the following detector, MPX and FM NR adjustments.

NOTE:

The typical input level for this 3% THD should be 1.6 uv to 2.3 uv. This is done only to "lineup" the frequency from the generator to the tuner's frequency. If IHF usable sensitivity (-30 dB THD+N= 3.16% THD+ N) is to be verified, a proper IHF bandpassfilter must be used.

4. Connect DMM ACROSS TP 2 (negative) and TP 1 (positive). Set FM generator output level to 1000 uv.
5. Adjust IFT 1 primary (closest to the rear of unit) for 0 V on DMM.
TOLERANCE +/- 50 mV
6. Adjust IFT 1 secondary (closest to the front of unit) for lowest THD.
SPECIFICATION less than 0.1%.
7. Repeat steps 3 - 5 and 6 till no further improvements. Record the DMM's final reading for use later in the adjustment.

F. AUTOSEARCH LEVEL

1. Connect DMM between IC 2 pin 12 and ground.
2. Increase FM generator level upwards from 0 and adjust VR 1 so that DMM reading goes from 0 V to approximately 4.8 V at 10 uv.
TOLERANCE +/- 2 uv

G. STEREO DECODER, MPXFILTERS.

1. VCO Connect a frequency counter between IC 6 pin 11 and ground.
2. Set FM generator to 1000 uv output and no modulation.
3. Adjust VR 3 for a 19000 Hz reading on the counter.
TOLERANCE +/- 100Hz
4. Disconnect frequency counter and press FM NR defeat switch (in).
5. Stereo switch threshold.
Modulate FM generator 1 kHz 45% left only plus 19 kHz PILOT 8 - 10%.
6. Increase FM generator level upwards from 0 and adjust VR 2 so that stereo light turns on and audio outputs as watched on VTVM and oscilloscope, switches to one channel only at 10 uv input level.
TOLERANCE +5 V

NOTE:

When turning input level down the unit will switch into mono at a lower level, typically 5 - 7 uv.

7. Stereo separation
Set FM generator output to 1000 uv, modulate in mono only.
8. Adjust VR 4 for identical outputs in the two channels.
TOLERANCE +/- 20mV.
9. Modulate FM generator left channel only and adjust VR 5 for minimum on right channel VTVM.
10. Modulate FM generator right channel only and adjust VR 5 for minimum on left channel VTVM.
11. If the minimum in step 9 and 10 are different, adjust VR 5 so that the readings are the same in both channels.
SPECIFICATION better than 40dB separation
12. MPX filter
Turn off audio modulation, leaving pilot tone only. Disable IHF filter or external 19 kHz filter if used.
13. Adjust LPF 1 left channel and LPF 2 right channel for minimum output
SPECIFICATION more than 60 dB suppression
14. Release the FM NR DEFEAT switch (out).

H. FM NR ADJUSTMENTS.

1. Turn VR 6 fully clockwise.
2. FM NR separation effect
Observe output from left channel with FM generator output level 1000 uv and modulated 1 kHz left channel only. Reduce audio modulation only from stereo generator so that left channel output is reduced by 6 dB (50% stereo modulation).
The 19 KHz pilot signal MUST REMAIN modulated 8-10%
3. Set FM generator output to 150 uv and adjust VR 6 for - 30 dB separation left to right channel (or right to left)
TOLERANCE +/- 2 dB.

I. SYNTHESIZER FREQUENCY.

1. Tune to a known accurate frequency source, i.e. broadcasting station or synthesized / digital display FM generator, preferably in the midband (95 - 100 MHz).
2. Connect DMH across TP 2 (negative) and TP 1 (positive).
3. Adjust VC 2 so that DMH reads the same as recorded in E - 7.
TOLERANCE +/- 10 mV.

AM ALIGNMENTS

Unless repairs have been done to Oscillator Section, do not adjust AM OSC coil or Trimming Capacitor. If OSC Adjustment is needed, connect high impedance voltmeter (preferably DMN) between R35 and ground.

A. OSC ADJUSTMENT

1. Tune unit to show 1610KHz or 1620 KHz on display and adjust VC3 to read 7.5 on DMN.
2. Tune unit to show 520KHz or 522KHz on display and adjust L3 to read $1V \pm 0.5V$ on DMN.
3. Repeat step 1 and unit no further improvement.

B. IF ADJUSTMENT

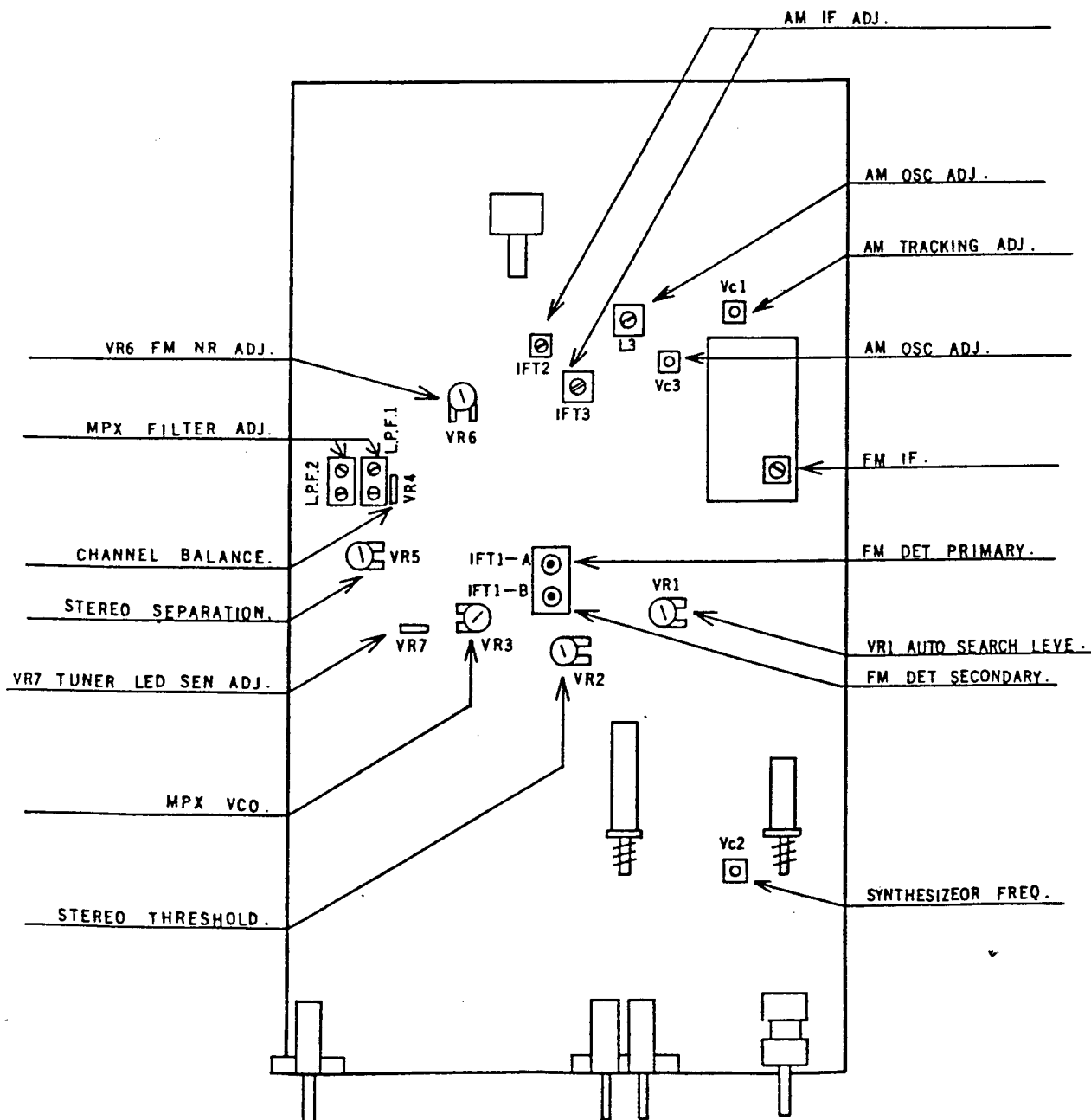
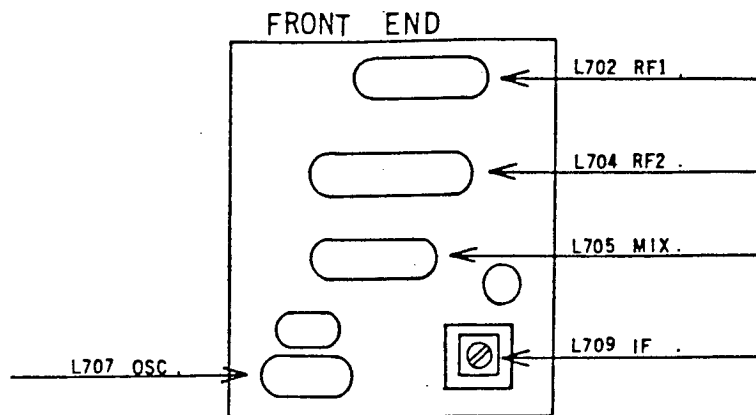
1. For IF adjustment and Tracing adjustment connect VTVM to loudspeaker output (or tape output), only one channel connection needed, and connect signal generator to antenna terminals. Adjust generator for 30% modulation and approx. 100 uv input.

Tune both generator and receiver to approx. 1000KHz, and adjust generator frequency for maximum reading on VTVM. Then adjust IFT2, and IFT3 for maximum reading on meter.

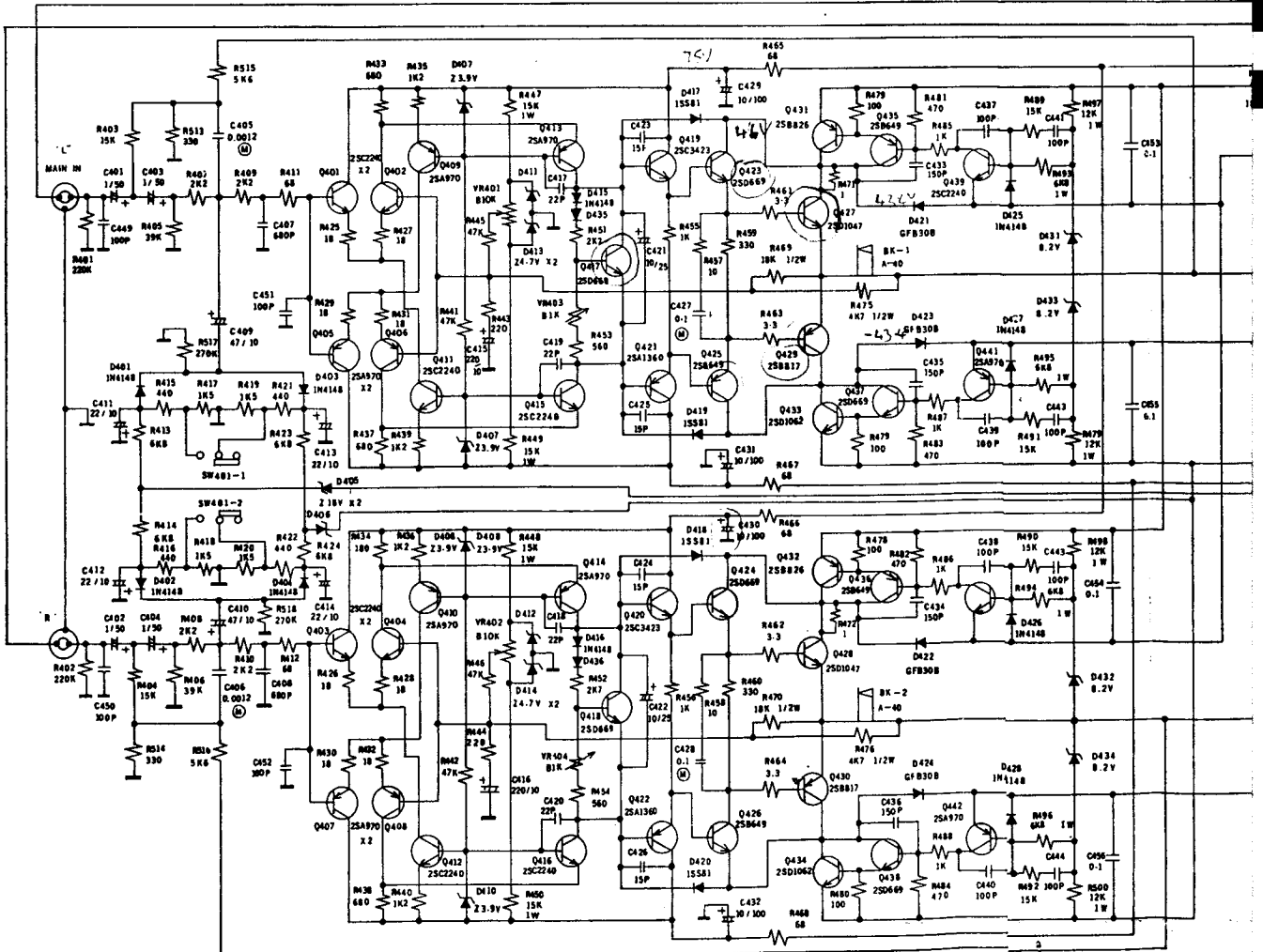
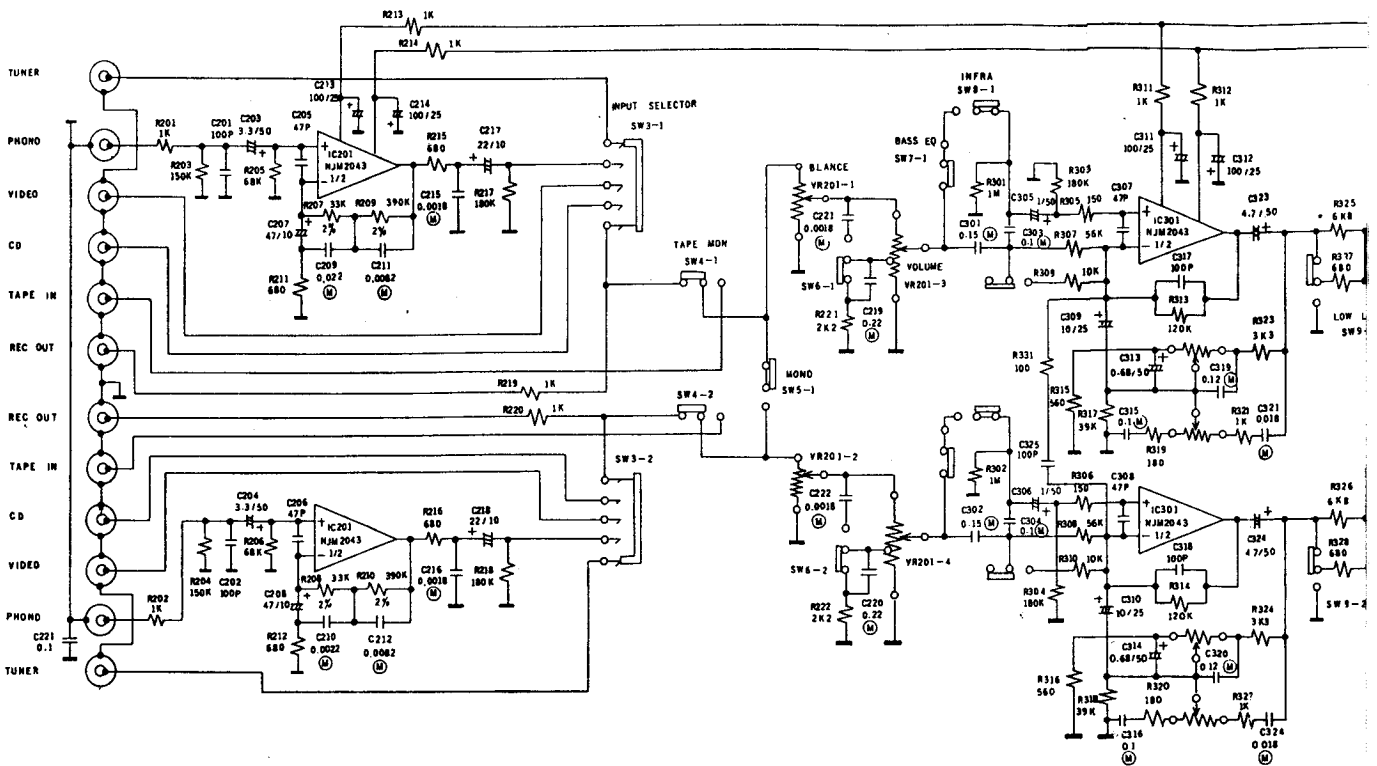
C. TRACKING ADJUSTMENT

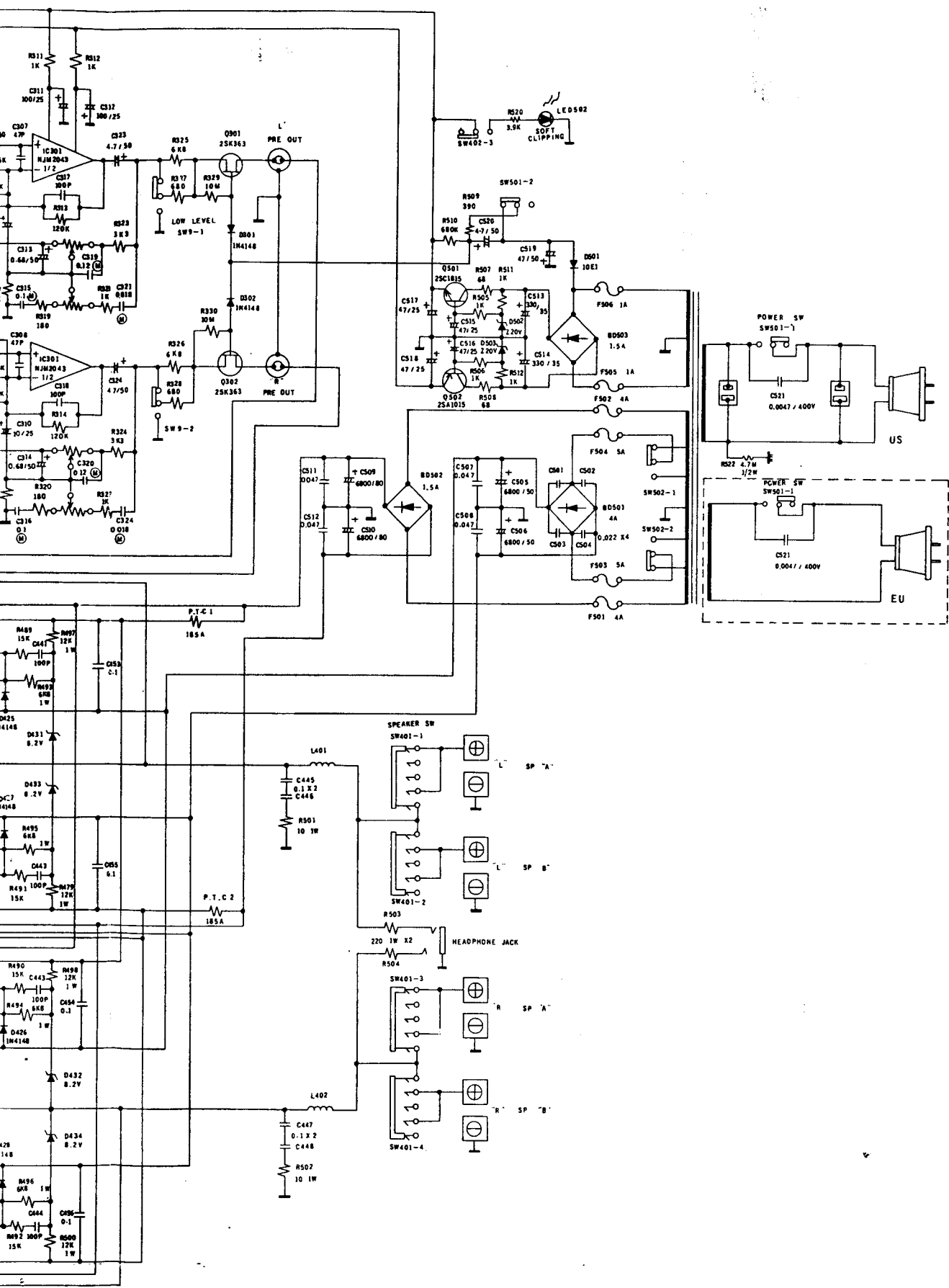
1. Tune unit and generator to show approx. 600KHz and adjust L2 to maximum reading on VTVM.
2. Tune unit and generator to show approx. 1400KHz and adjust VCI (Trimming Capacitor) for maximum reading on VTVM.
3. Repeat step 1 and 2 unit no further improvement is obtained.

TUNER ADJUSTMENT POINTS

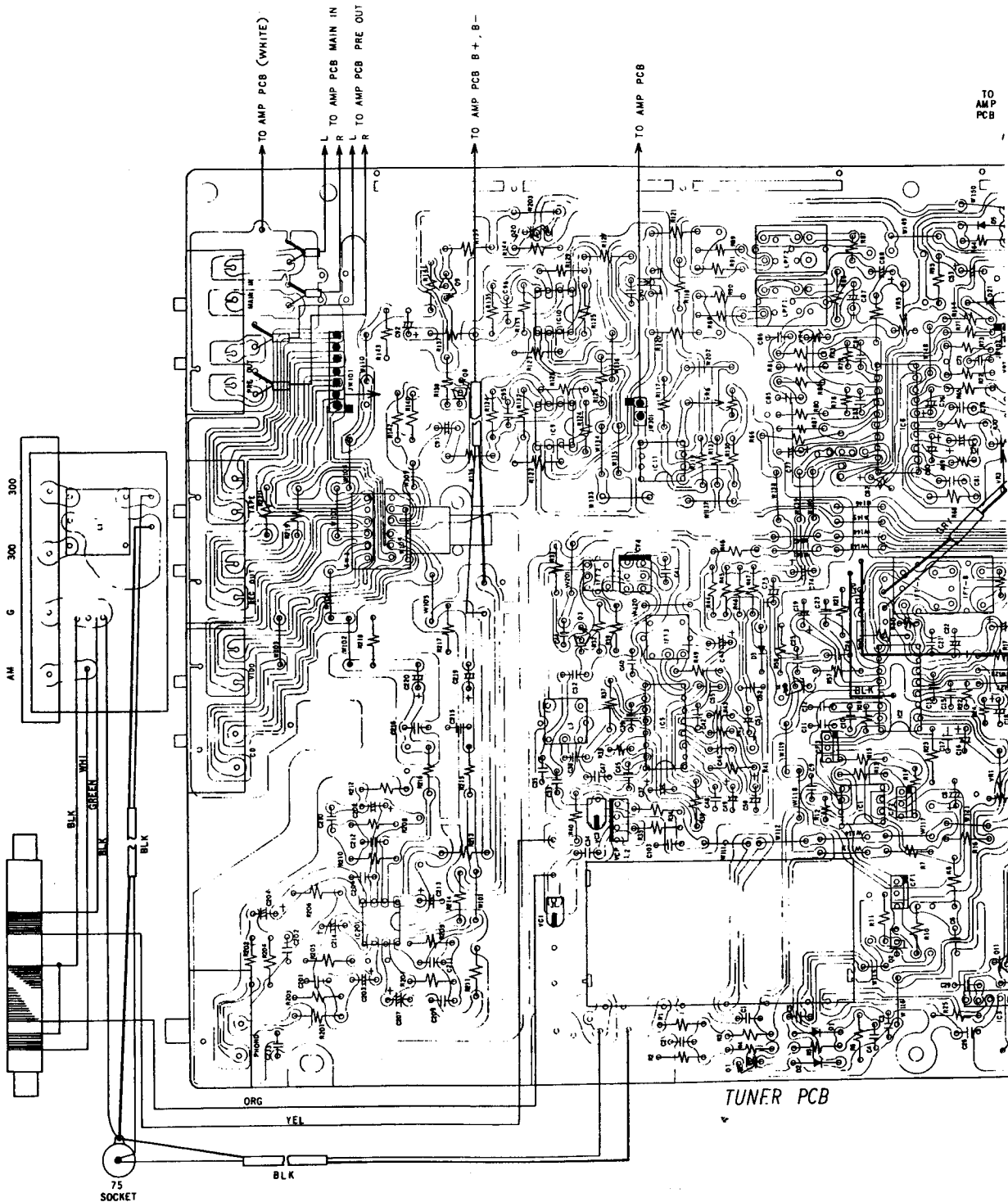


SCHEMATIC DIAGRAM NAD7240PE AMPLIFIER

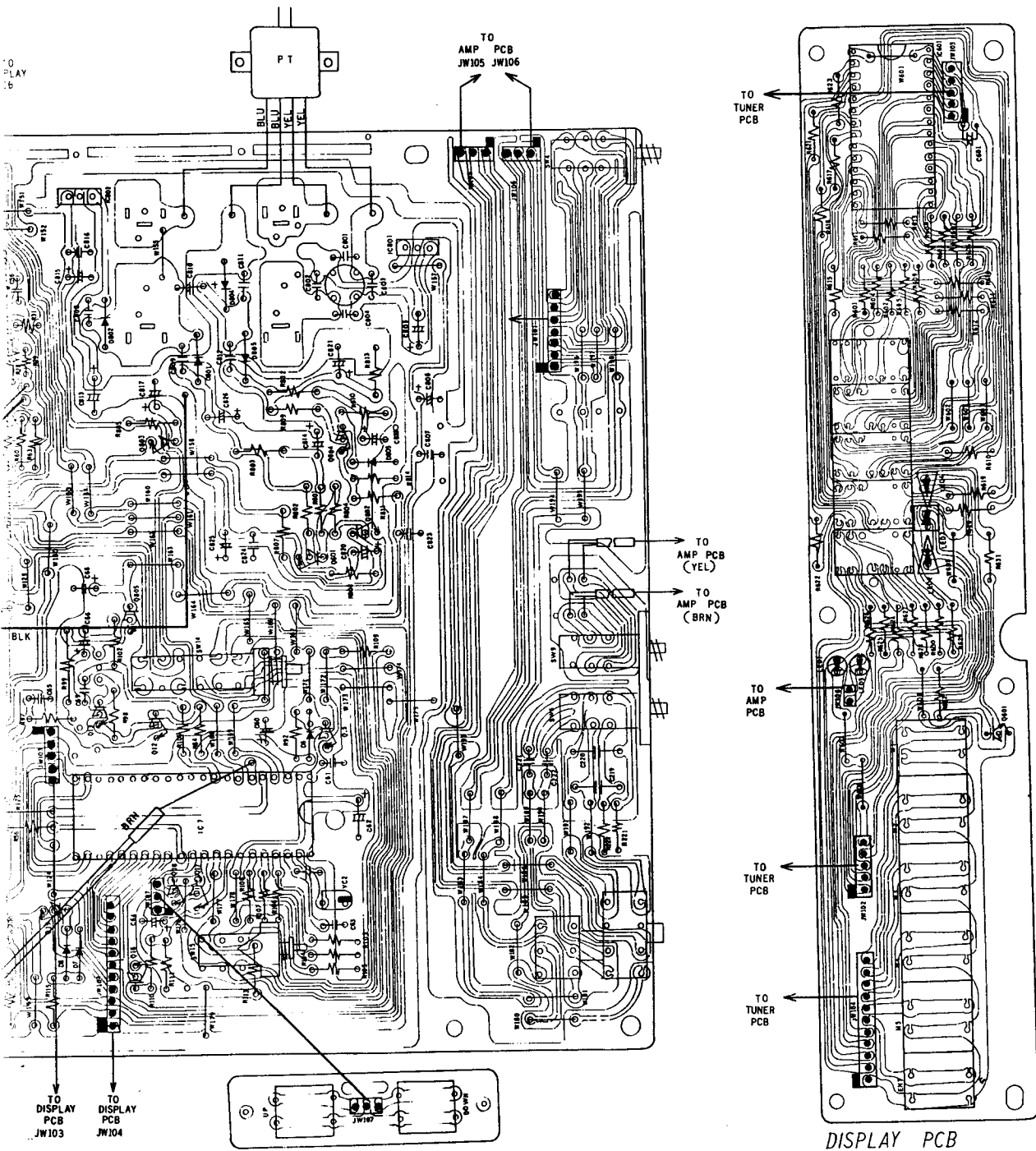




TUNER PCB LAYOUT AND WIRING DIAGRAM

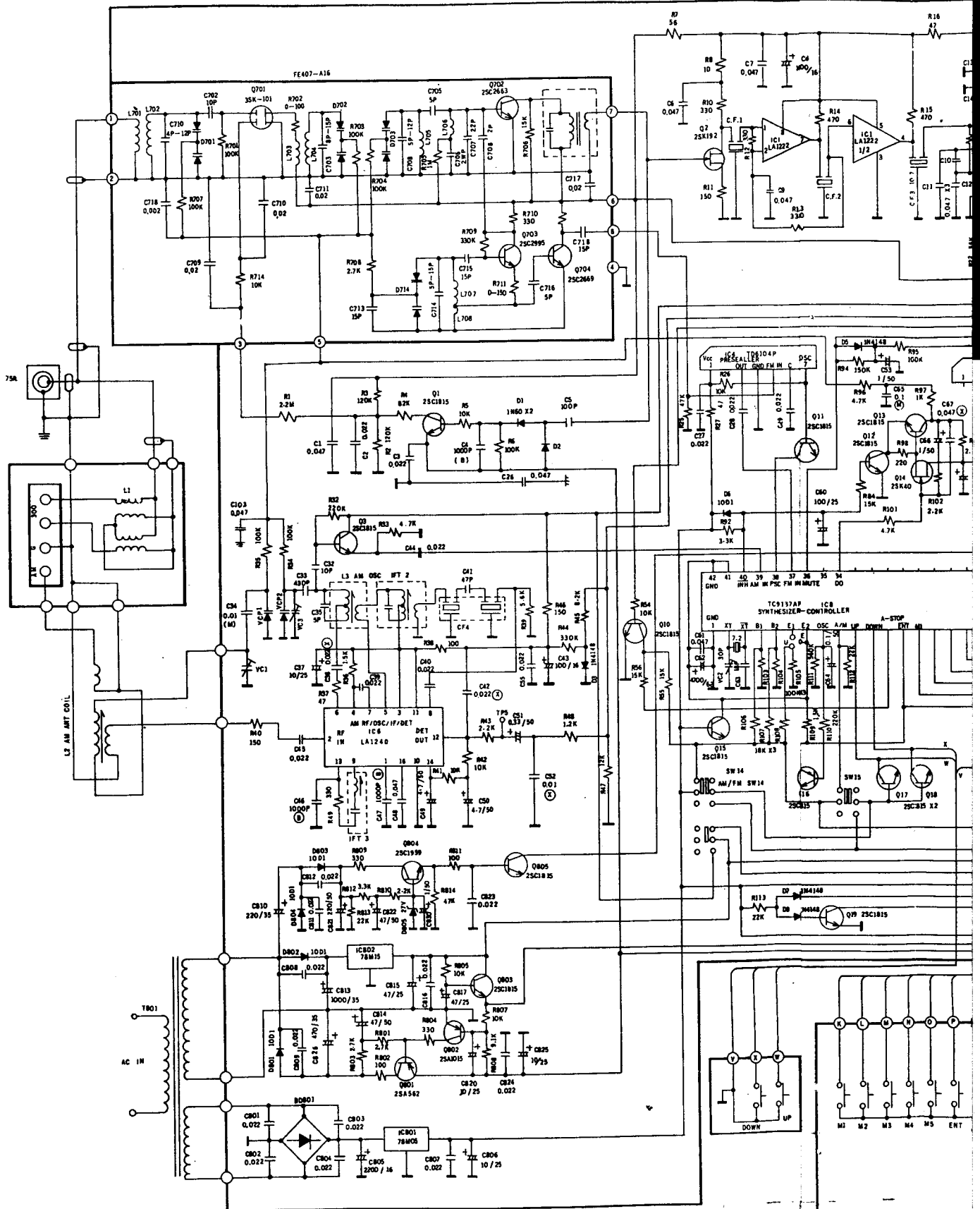


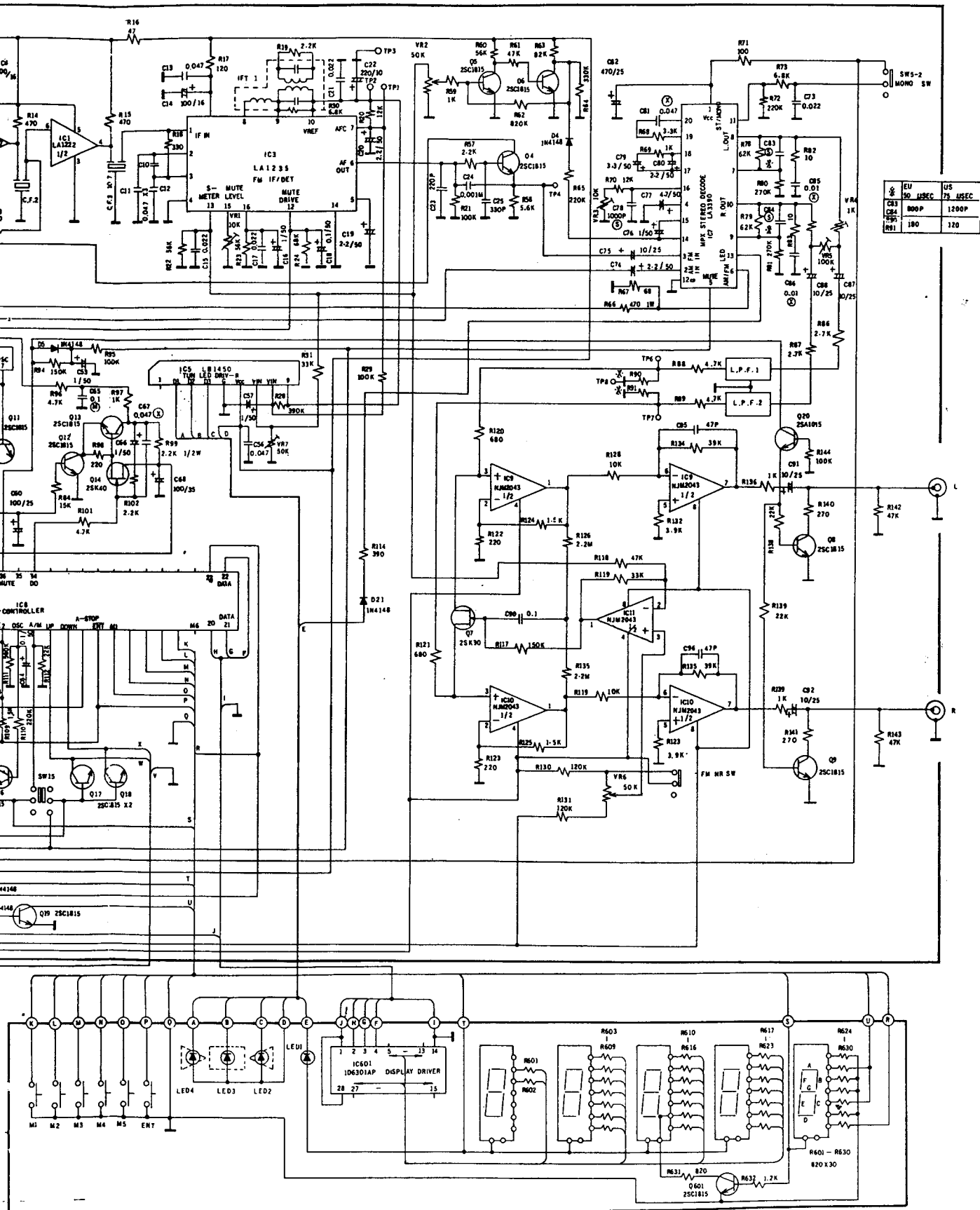
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DISPLAY PCB

SCHEMATIC DIAGRAM NAD7240PE TUNER

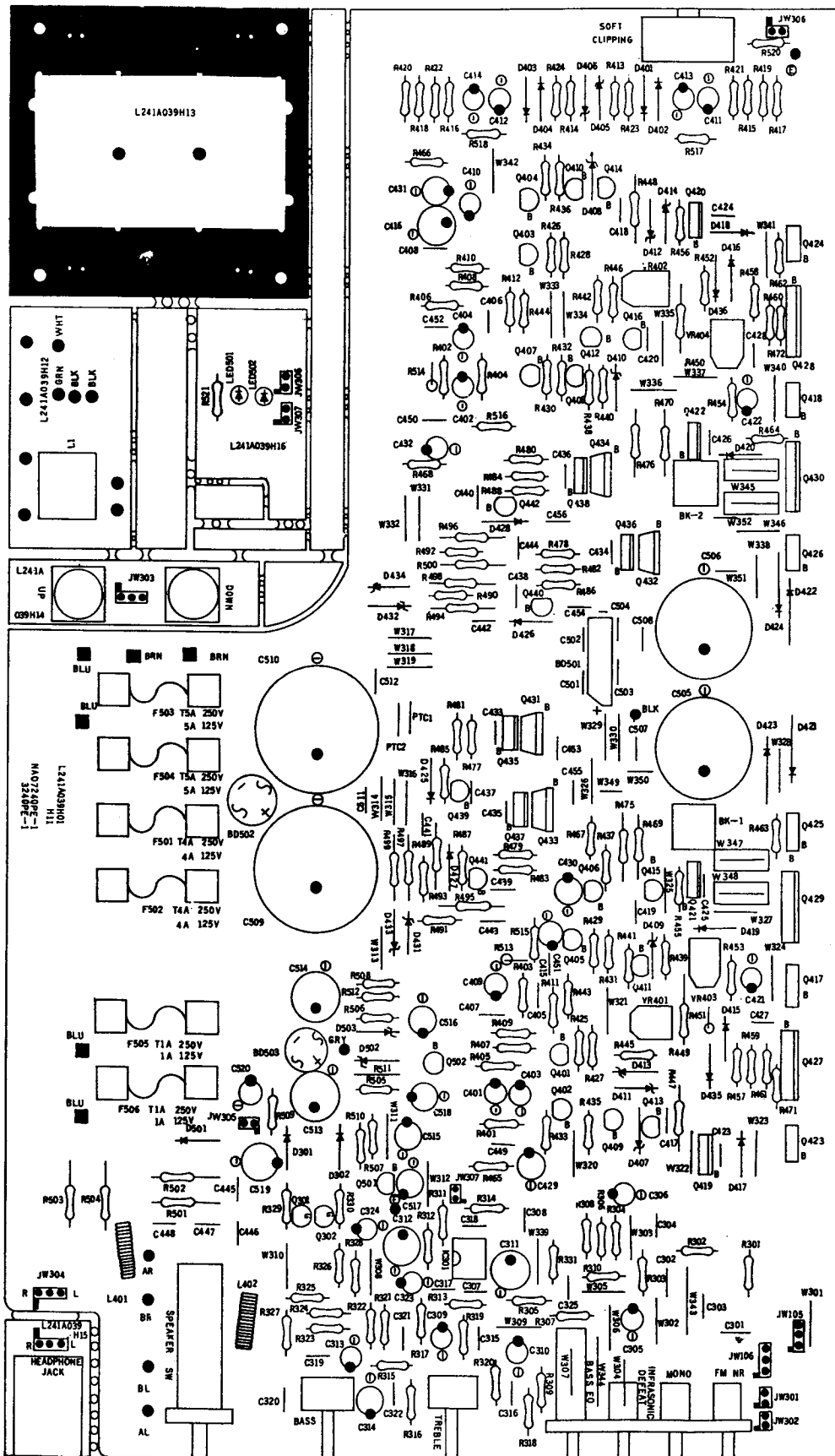




	EU	US
C33	50 USEC	75 USEC
C34	800P	1200P
R91	180	220

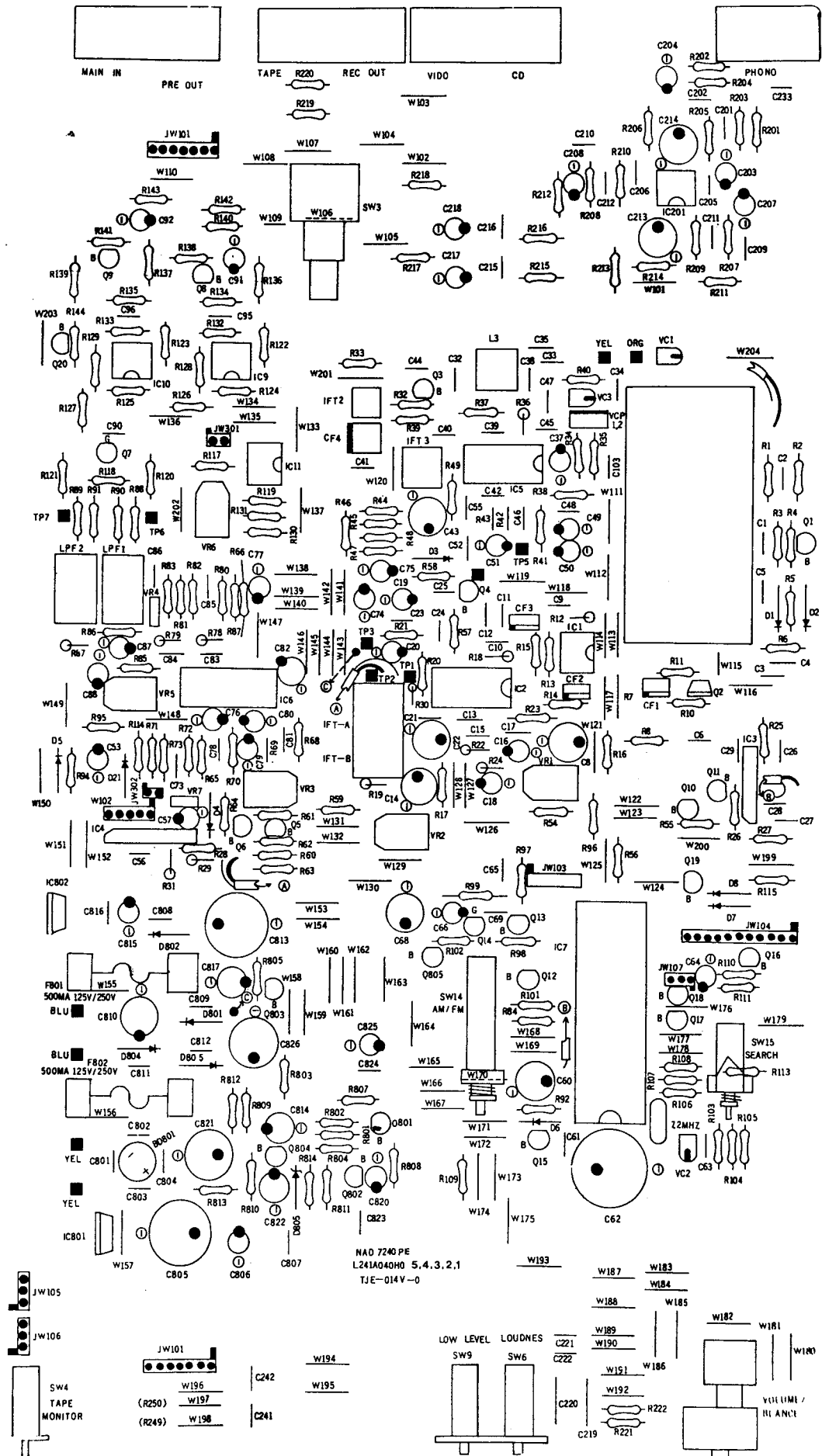
AMPLIFIER, TUNER, DISPLAY PCB COMPONENT LOCATION

AMPLIFIER PCB



AMPLIFIER, TUNER, DISPLAY PCB COMPONENT LOCATION

TUNER PCB



7240FE PARTS LIST

SYMBOL NO.	PART NO.	DESCRIPTION	REF	QTY	UNIT	RES.	QTY	UNIT	RES.
R1, 125, 127	L103Y214H57	Res, Carb, 2.2K	1/4W	1	22K	L103Y214H35	1/4W	1	22K
R2, 3, 120, 131, 313, 314	L103Y214H44	Res, Carb, 120K	1/4W	1	390	L103Y214H14	1/4W	1	390
R4, 63	L103Y214H42	Res, Carb, 82K	1/4W	1	150K	L103Y214H45	1/4W	1	150K
R5, 26, 41, 54, 128, 123, 309, 310, 805, 807	L103Y214H31	Res, Carb, 10K	1/4W	1	33K	L103Y214H37	1/4W	1	33K
R6, 21, 34, 35, 35, 104, 105, 144	L103Y214H43	Res, Carb, 100K	1/4W	1	680K	L103Y214H17	1/4W	1	680K
R7	L103Y214H69	Res, Carb, 56	1/4W	1	3.9K	L103Y214H17	1/4W	1	3.9K
R8, 82, 83, 457, 458	L103Y214H01	Res, Carb, 10	1/4W	1	39K	L103Y214H38	1/4W	1	39K
R10, 13, 49, 459, 460, 884, 809	L103Y214H13	Res, Carb, 330	1/4W	1	270	L103Y214H12	1/4W	1	270
R11, 40, 46, 305, 306	L103Y214H09	Res, Carb, 150	1/4W	1	68K	L103Y214H41	1/4W	1	68K
R12, 18	L103Y214H13	Res, Carb, 330	1/4W	1	330K	L103Y024H37	1/4W	1	330K
R14, 15, 481, 482, 483, 484	L103Y214H15	Res, Carb, 470	1/4W	1	180K	L103Y214H46	1/4W	1	180K
R16, 27, 37	L103Y214H05	Res, Carb, 47	1/4W	1	1M	L103Y214H18	1/4W	1	820
R17	L103Y214H08	Res, Carb, 120	1/4W	1	58K	L103Y214H55	1/4W	1	58K
R19	L103Y214H23	Res, Carb, 2.2K	1/4W	1	560	L103Y214H40	1/4W	1	560
R20, 47, 70	L103Y214H32	Res, Carb, 12K	1/4W	1	180	L103Y214H10	1/4W	1	180
R22	L103Y214H40	Res, Carb, 56K	1/4W	1	10M	L103Y214H59	1/4W	1	10M
R23, 60	L103Y214H40	Res, Carb, 56K	1/4W	1	440	L103Y022H66	1/4W	1	440
R24	L1035017H41	Res, Carb, 68K	1/4W	1	15K	L103Y022H66	1/4W	1	15K
R25, 42, 51, 18, 143, 441, 442, 445, 446, 814	L103Y214H39	Res, Carb, 47K	1/4W	1	3.3	L103Y022H66	1/4W	1	3.3
R28, 44, 64	L103Y214H49	Res, Carb, 47K	1/4W	1	18K	L1035007H39	1/4W	1	18K
R29	L1035017H43	Res, Carb, 100K	1/4W	1	1	L1035024H44	1/4W	1	1
R30	L1035017H29	Res, Carb, 6.8K	1/4W	1	4.7K	L103Y214H52	1/4W	1	4.7K
R31	L1035017H37	Res, Carb, 33K	1/4W	1	1K	L1035024H27	1/4W	1	1K
R32, 65, 72, 10, 401, 402	L103Y214H47	Res, Carb, 220K	1/4W	1	6.8K	L1035007H38	1/4W	1	6.8K
R33, 88, 99, 96, 101	L103Y214H27	Res, Carb, 4.7K	1/4W	1	12K	L1035007H38	1/4W	1	12K
R36	L1035017H21	Res, Carb, 1.5K	1/4W	1	1	L1035007H01	1/4W	1	1
R38, 71, 331, 477, 478, 479, 480, 802, 811	L103Y214H07	Res, Carb, 100	1/4W	1	220	L103Y214H17	1/4W	1	220
R39, 55, 515, 516	L103Y214H28	Res, Carb, 5.8K	1/4W	1	390	L103Y214H14	1/4W	1	390
R42	L1035017H31	Res, Carb, 10K	1/4W	1	660K	L103Y214H53	1/4W	1	660K
R45	L103Y214H30	Res, Carb, 8.2K	1/4W	1	330	L103Y214H26	1/4W	1	330
R48, 435, 436, 433, 440, 632	L103Y214H20	Res, Carb, 1.2K	1/4W	1	3.9K	L103Y214H26	1/4W	1	3.9K
R55, 56, 84, 403, 404, 489, 490, 491, 492	L103Y214H33	Res, Carb, 15K	1/4W	1	0.043UF	L140Y306H45	Cap, Cer	0.043UF	80-20K 50WV
R57, 192, 221, 222, 407, 408, 409, 410, 810	L103Y214H23	Res, Carb, 2.2K	1/4W	1	0.022UF	L140Y306H39	Cap, Cer	0.022UF	80-20K 50WV
R53, 97, 136, 137, 201, 213, 214, 219, 220, 302, 311	L103Y214H19	Res, Carb, 1K	1/4W	1	0.022UF	L140Y306H39	Cap, Cer	0.022UF	80-20K 50WV
R312, 213, 322, 455, 456, 505, 506, 511, 512	L103Y214H54	Res, Carb, 820K	1/4W	1	0.022UF	U140S020H43	Cap, Cer	0.022UF	10X 25WV
R62	L1035005H21	Res, Metal, 470	1W	1	0.001UF	L140Y306H12	Cap, Cer	0.001UF	10X 50WV
R66	L103Y214H25	Res, Carb, 68	1/4W	1	100UF	L140Y203H35	Cap, Cer	100UF	5X 50WV
R67, 411, 412, 465, 466, 467, 468, 507, 508	L103Y214H25	Res, Carb, 3.3K	1/4W	1	100UF	L140Y203H35	Cap, Cer	100UF	5X 50WV
R68, 92, 323, 324, 812	L103Y214H25	Res, Carb, 3.3K	1/4W	1	100UF	L140Y203H35	Cap, Cer	100UF	5X 50WV
R69	L103Y214H19	Res, Carb, 1K	1/4W	1	100UF	L140Y203H35	Cap, Cer	100UF	5X 50WV
R72, 325, 326, 413, 414, 423, 424	L103Y214H29	Res, Carb, 6.8K	1/4W	1	100UF	L182Y322H26	Cap, EL	100UF	450-10X 18V
R16, 79	L1035037H40	Res, Carb, 82K	1/4W	1	0.043UF	U140S005H31	Cap, Cer	0.043UF	80-20K 50WV
R80, 81, 517, 518	L103Y214H48	Res, Carb, 270K	1/4W	1	1UF	L182Y322H60	Cap, EL	1UF	75-10X 50V
R85	L104Y214H16	Res, Carb, 15K	1/4W	1	0.022UF	U140S005H29	Cap, Cer	0.022UF	80-20K 50WV
R85, 452, 801, 803	L103Y214H24	Res, Carb, 2.7K	1/4W	1	0.1UF	L182Y322H55	Cap, EL	0.1UF	75-10X 50V
R87	L1035017H37	Res, Carb, 2.7K	1/4W	1	2.2UF	L182Y322H51	Cap, EL	2.2UF	75-10X 50V
R90, 91	L103Y022H08	Res, Carb, 120	1/4W	1	220UF	L182Y322H15	Cap, EL	220UF	450-10X 10V
R90, 31	L103Y022H10	Res, Carb, 120	1/4W	1	220UF	L150Y308H43	Cap, Cer	220UF	5X 50WV
R94	L103Y214H45	Res, Carb, 150K	1/4W	1	0.031UF	L150Y308H01	Cap, Poly	0.031UF	5X 50WV
R96, 122, 123, 443, 444	L103Y214H11	Res, Carb, 220	1/4W	1	330UF	L150Y308H47	Cap, Cer	330UF	5X 50WV
R99	L1035024H23	Res, Carb, 2.2K	1/2W	1	10P	L140Y203H11	Cap, Cer	10P	10X 50WV
R105	L103Y022H43	Res, Carb, 100K	1/4W	1	430UF	U1735006H16	Cap, Styrol	430UF	10X 50WV
R105, 107	L103Y214H34	Res, Carb, 18K	1/4W	1	0.31UF	L172Y305H13	Cap, Poly	0.31UF	10X 50WV
R102	L103Y022H34	Res, Carb, 18K	1/4W	1	19F	L140Y203H06	Cap, Cer	19F	10X 50WV
R103, 124, 125, 417, 418, 419, 420	L103Y214H21	Res, Carb, 1.5K	1/4W	1	10UF	L182Y322H34	Cap, EL	10UF	450-10X 25V
R111	L103Y214H52	Res, Carb, 560K	1/4W	1	435UF	L140Y203H17	Cap, Cer	435UF	10X 55WV

EXPLODED VIEW

