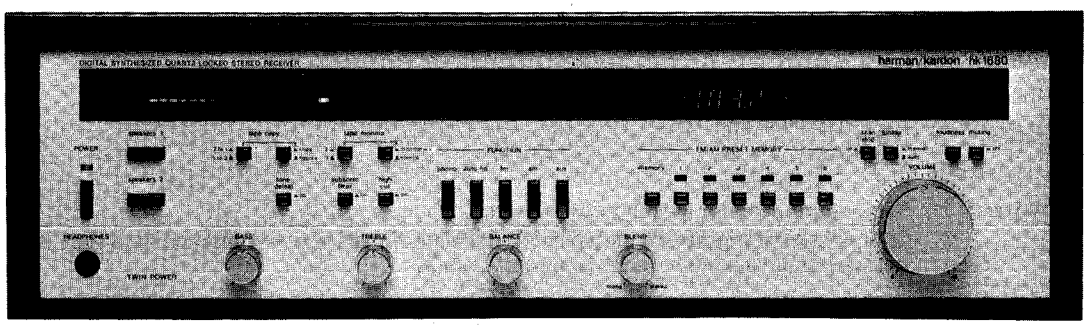
The Harman Kardon Model hk1680

Manual No. 53A

Digital Synthesized Quartz-Locked Stereo Receiver

Technical Manual



harman/kardon
240 CROSSWAYS PARK WEST, WOODBURY, N.Y. 11797
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PRECAUTIONS

1. Always disconnect the chassis from power line when soldering. Turning the power switch OFF is not enough. Power line leakage passing through the heating element may destroy the transistors.

2. Never attempt to do any work on the transistor amplifiers without first disconnecting the AC line cord and waiting until the power supply filter capacitors have discharged.

3. Replacement for output and driver transistors, if necessary, must be made from the same beta group as the original type.

4. If one output transistor burns out (open or short) always remove all the output transistors in that channel and check the bias adjustment, the control and other parts in the network with an ohmmeter before inserting a new transistor. All transistors in one channel will be destroyed if the base biasing circuit is open on the emitter end.

5. When mounting a replacement power transistor, be sure that the bottom of the flange, the mica insulators and the surface of the heat sink are free of foreign matter, for they may cause transistor failure.

6. Silicon grease must be applied between the transistor and the mica insulator, and between the mica insulator and the heat sink for better heat conduction.

7. Fuses must be replaced with size and type indicated. Use of other types can expose components to destructive current levels.

ALIGNMENT PROCEDURES

AM ALIGNMENT

Instruments: 1. AM Signal Generator modulated with 400Hz at 30%.
2. Oscilloscope
3. AC V.T.V.M.
4. DC Voltmeter

Notes: 1. Set function selector switch to AM position.
2. Connect signal source to a loop placed to radiate signals into AM antenna loop stick (L251).
3. Set odd/even selector switch to EVEN position.

Step	Signal Source	Connect Output Meter To	Station Display Setting	Adjust	Adjust For
1	450kHz	VTVM and oscilloscope to TP1 and ground	1610kHz	T251, T252	Maximum output on VTVM and at the same time clean wave form on oscilloscope
2	450kHz	VTVM and oscilloscope to TP2 and ground	1610kHz	T253	Same as above
3	——	DC voltmeter to TP3 and ground	530kHz	L252	1.62V on DC voltmeter
4	——	Same as above	1610kHz	TC252	22.5V on DC voltmeter
5	600kHz	VTVM to Tape 1 Out jack	600kHz	L251	Maximum output on VTVM
6	1400kHz	Same as above	1400kHz	TC251	Same as above
7	Repeat steps 5 and 6 for optimum sensitivity.				
8	1000kHz 40dB/m(100μV/m)	Oscilloscope to Tape 1 Out jack	1000kHz	VR251	Clean wave form on oscilloscope

ALIGNMENT PROCEDURES

FM ALIGNMENT

Instruments:
1. FM Signal Generator modulated with 1000Hz at 100% (75kHz).
2. Oscilloscope
3. Frequency Counter
4. Distortion Meter
5. AC V.T.V.M.
6. DC Voltmeter

Notes:
1. Set function selector switch to FM position.
2. Set muting switch to OFF (button in) position.
3. Connect signal source to FM antenna terminals.

Step	Signal Source	Connect Output Meter To	Station Display Setting	Adjust	Adjust For
1	——	DC voltmeter to TP4 and ground	88.1MHz	Lo	3V on DC voltmeter
2	——	Same as above	107.9MHz	TCo	21V on DC voltmeter
3	90.1MHz 65dBf (970μV)	VTVM to Tape 1 Out jack	90.1MHz	L_A, L_R1, L_R2	Maximum output on VTVM
4	106.1MHz 65dBf (970μV)	Same as above	106.1MHz	TC_A, TC_R1, TC_R2	Same as above
5	Repeat steps 3 and 4 for optimum sensitivity.				
6	——	Frequency counter to TP5 and ground	98.3MHz	TC801	109MHz on frequency counter
7	Set Muting switch to ON position.				
8	98MHz 65dBf (970μV)	Oscilloscope to Tape 1 Out jack	98.1MHz	T201(A)	Clean wave on oscilloscope
9	97.97MHz 65dBf (970μV)	Same as above	98.1MHz	T202(A)	Same as above
10	Repeat steps 8 and 9 for optimum sensitivity.				
11	98.1MHz 65dBf (970μV)	Distortion meter to Tape 1 Out jack	98.1MHz	T201(B)	Minimum reading on distortion meter
12	Repeat steps 8, 9 and 11 for optimum alignment point of T201(A) and (B).				

QUARTZ LOCK INDICATOR ADJUSTMENT

Instrument: FM Signal Generator modulated with 1000Hz at 100% (75kHz).

Notes:
1. Set function selector switch to FM position.
2. Set muting switch to OFF (button in) position.
3. Connect signal source to FM antenna terminals.
4. Turn the VR202 and VR352 to the center.

Signal Source	Station Display Setting	Adjust	Adjust For
98.1MHz 12dBf (2μV)	98.1MHz	VR201	Quartz indicator LED lights

ALIGNMENT PROCEDURES

MUTING SENSITIVITY AND SIGNAL STRENGTH DISPLAY ADJUSTMENT

Instruments: 1. FM Signal Generator modulated with 1000Hz at 100% (75kHz).
2. Oscilloscope
3. AC V.T.V.M.

Notes: 1. Set function selector switch to FM position.
2. Set muting switch to ON (button out) position.
3. Connect signal source to FM antenna terminals.

Step	Signal Source	Connect Output Meter To	Station Display Setting	Adjust	Adjust For
1	98.1MHz 12dBf (2μV)	VTVM and oscilloscope to Tape 1 Out jack	98.1MHz	VR352	Clean wave on oscilloscope and 1 of signal strength display LEDs lights
2	98.1MHz 65dBf (970μV)	——	98.1MHz	VR202	10 of signal strength display LEDs lights
3	Repeat steps 1 and 2 for optimum sensitivity.				

MPX ADJUSTMENT

Instruments: 1. FM Signal Generator modulated with 1000Hz at 100% (75kHz).
2. Frequency Counter

Notes: 1. Set function selector switch to AUTO FM position.
2. Connect signal source to FM antenna terminals.

Signal Source	Connect Output Meter To	Station Display Setting	Adjust	Adjust For
98.1MHz 65dBf (970μV)	Frequency Counter to TP6 and ground	98.1MHz	VR301	76kHz on frequency counter

STEREO FM INDICATOR ADJUSTMENT

Instrument: FM Stereo Signal Generator modulated with 1000Hz at 100% (75kHz).
(L+R=45% L−R=45% 19kHz=9%)

Notes: 1. Set function selector switch to AUTO FM position.
2. Connect signal source to FM antenna terminals.

Signal Source	Station Display Setting	Adjust	Adjust For
98.1MHz 36dBf (30μV)	98.1MHz	VR351	Stereo FM indicator LED lights

ALIGNMENT PROCEDURES

SEPARATION ADJUSTMENT

Instruments: 1. FM Stereo Signal Generator modulated with 1000Hz at 100% (75kHz).
(L+R=45% L−R=45% 19kHz=9%)
2. AC V.T.V.M.

Notes: 1. Set function selector switch to AUTO FM position.
2. Set blend control to STEREO position.
3. Connect signal source to FM antenna terminals.

Step	Signal Source	Connect Output Meter To	Station Display Setting	Adjust	Adjust For
1	Set Lch signal ON at FM stereo signal generator.				
2	98.1MHz 65dBf (970μV)	VTVM to Rch Tape 1 Out jack	98.1MHz	VR302, VR303	Minimum output on VTVM
3	Set Rch signal ON at FM stereo signal generator.				
4	98.1MHz 65dBf (970μV)	VTVM to Lch Tape 1 Out jack	98.1MHz	VR302, VR303	Minimum output on VTVM
5	Repeat steps 2 and 4 to obtain same level at left and right channels.				

IDLING CURRENT ADJUSTMENT

Instrument: DC Voltmeter
Notes: 1. Set function selector switch to AUX position.
2. Set volume control to minimum position.

Step	Connect Output Meter To	Adjust	Adjust For
1	DC voltmeter to TP7 (+) and TP8 (−)	VR403	10 mV on DC voltmeter
2	DC voltmeter to TP9 (+) and TP10 (−)	VR404	Same as above

DC VOLTAGE BALANCE ADJUSTMENT

Instrument: DC Voltmeter
Notes: 1. Set function selector switch to AUX position.
2. Set volume control to minimum position.
3. Press in speakers 1 push button to ON (button in) position.

Step	Connect Output Meter To	Adjust	Adjust For
1	DC voltmeter to Lch terminal of Speaker System 1	VR401	0V±50mV on DC voltmeter
2	DC voltmeter to Rch terminal of Speaker System 1	VR402	Same as above

ALIGNMENT PROCEDURES

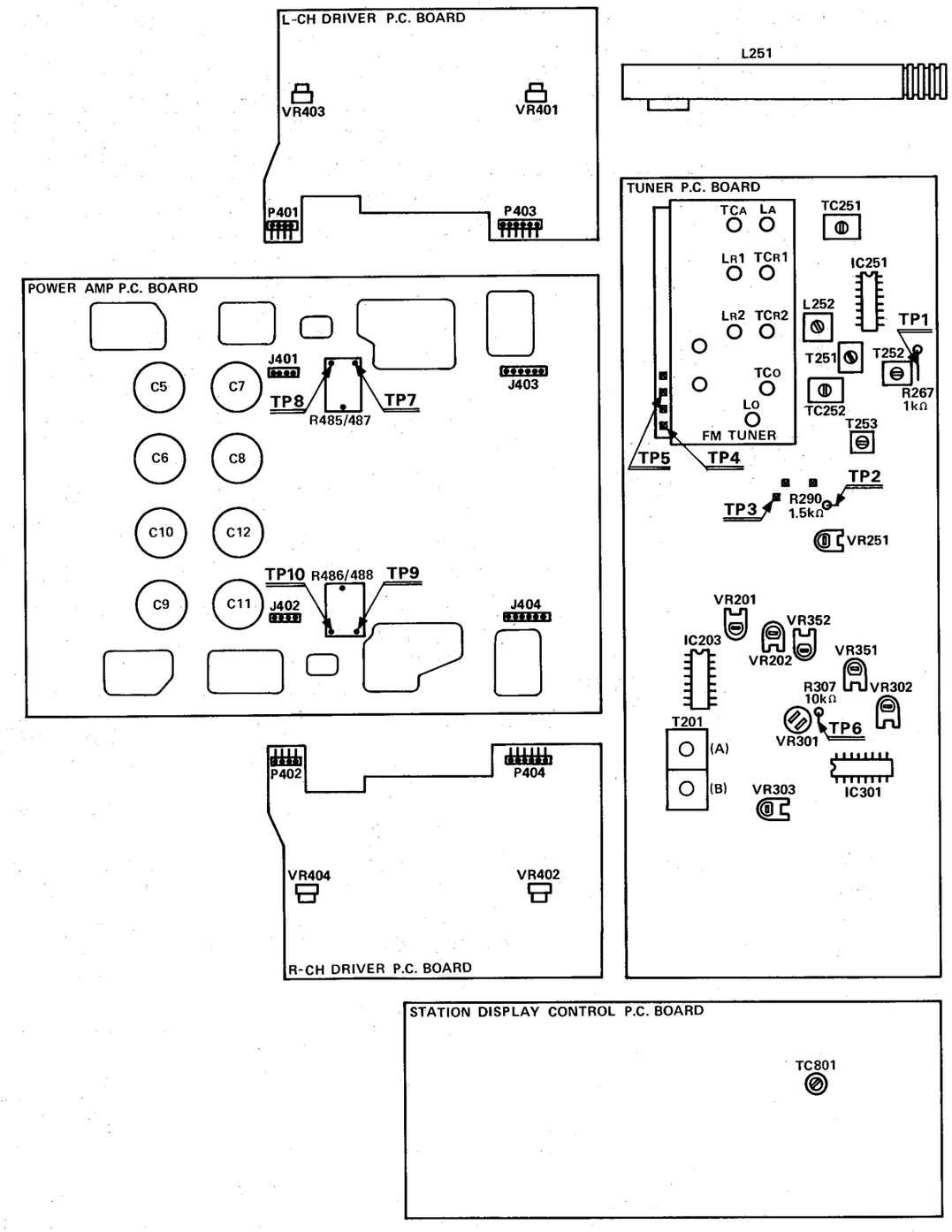


Fig. 1—Alignment Points Location

ALIGNMENT PROCEDURES

SEPARATION ADJUSTMENT

Instruments: 1. FM Stereo Signal Generator modulated with 1000Hz at 100% (75kHz).
(L+R=45% L−R=45% 19kHz=9%)
2. AC V.T.V.M.

Notes: 1. Set function selector switch to AUTO FM position.
2. Set blend control to STEREO position.
3. Connect signal source to FM antenna terminals.

Step	Signal Source	Connect Output Meter To	Station Display Setting	Adjust	Adjust For
1	Set Lch signal ON at FM stereo signal generator.				
2	98.1MHz 65dBf (970μV)	VTVM to Rch Tape 1 Out jack	98.1MHz	VR302, VR303	Minimum output on VTVM
3	Set Rch signal ON at FM stereo signal generator.				
4	98.1MHz 65dBf (970μV)	VTVM to Lch Tape 1 Out jack	98.1MHz	VR302, VR303	Minimum output on VTVM
5	Repeat steps 2 and 4 to obtain same level at left and right channels.				

IDLING CURRENT ADJUSTMENT

Instrument: DC Voltmeter

Notes: 1. Set function selector switch to AUX position.
2. Set volume control to minimum position.

Step	Connect Output Meter To	Adjust	Adjust For
1	DC voltmeter to TP7 (+) and TP8 (−)	VR403	10 mV on DC voltmeter
2	DC voltmeter to TP9 (+) and TP10 (−)	VR404	Same as above

DC VOLTAGE BALANCE ADJUSTMENT

Instrument: DC Voltmeter

Notes: 1. Set function selector switch to AUX position.
2. Set volume control to minimum position.
3. Press in speakers 1 push button to ON (button in) position.

Step	Connect Output Meter To	Adjust	Adjust For
1	DC voltmeter to Lch terminal of Speaker System 1	VR401	OV±50mV on DC voltmeter
2	DC voltmeter to Rch terminal of Speaker System 1	VR402	Same as above

ALIGNMENT PROCEDURES

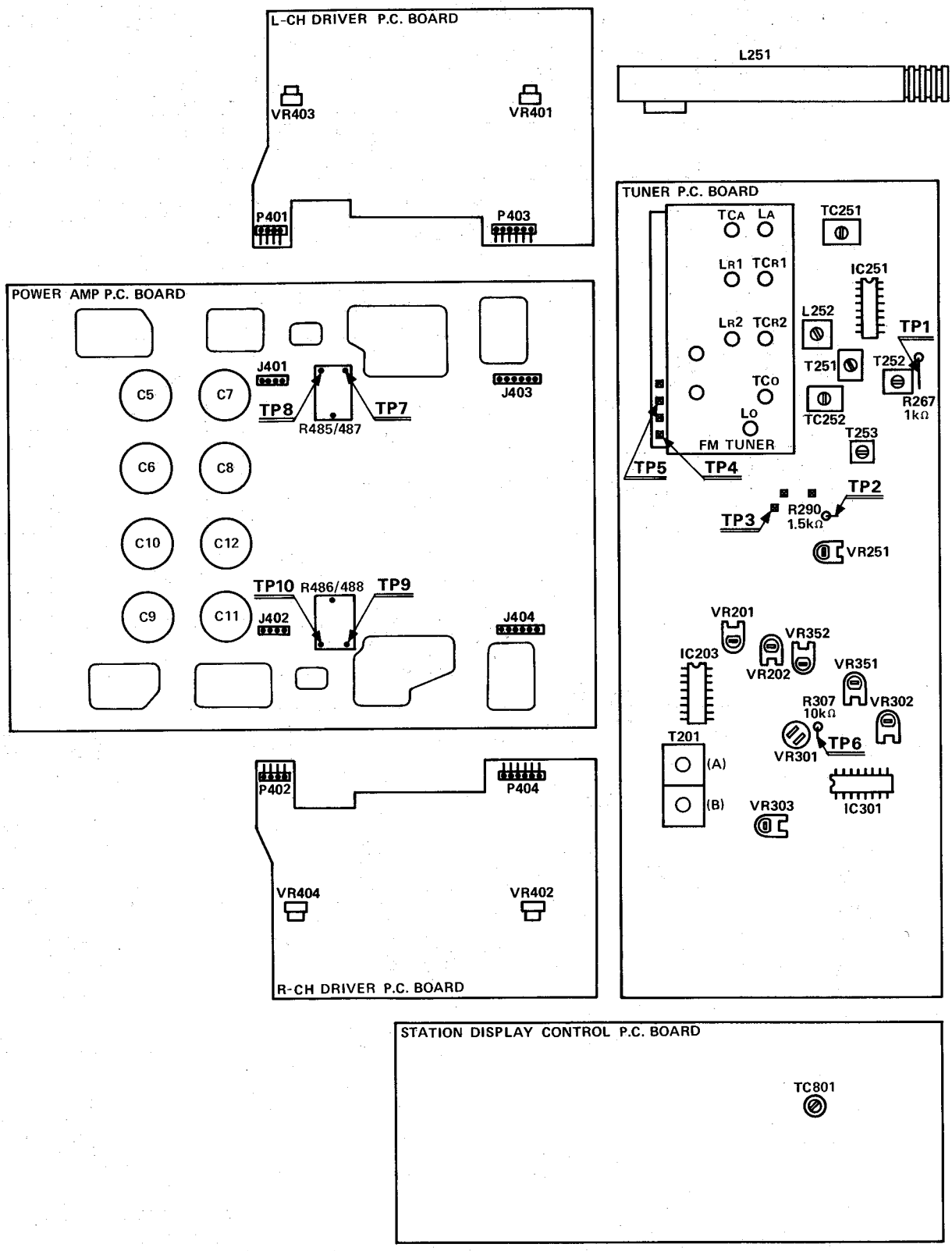
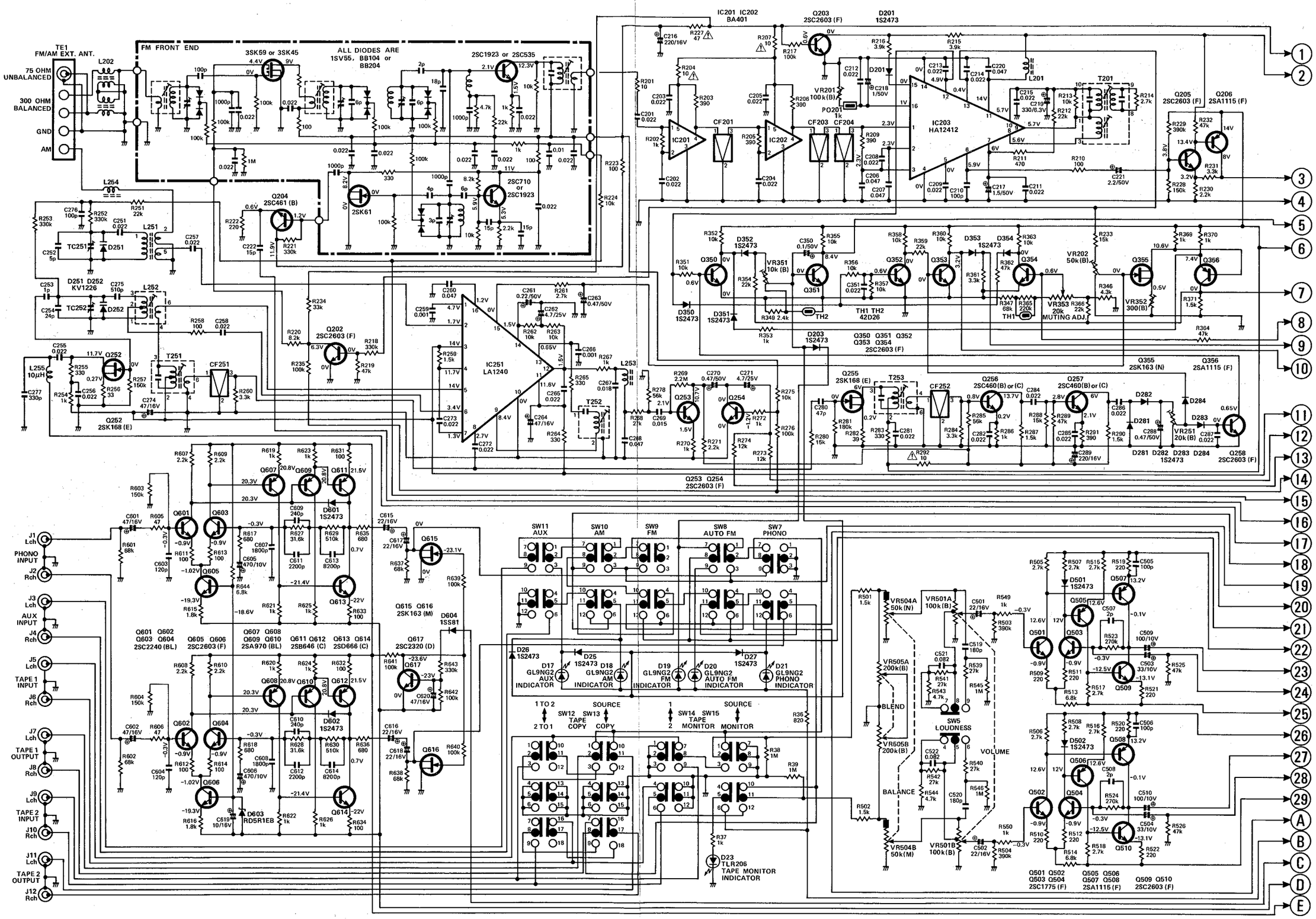
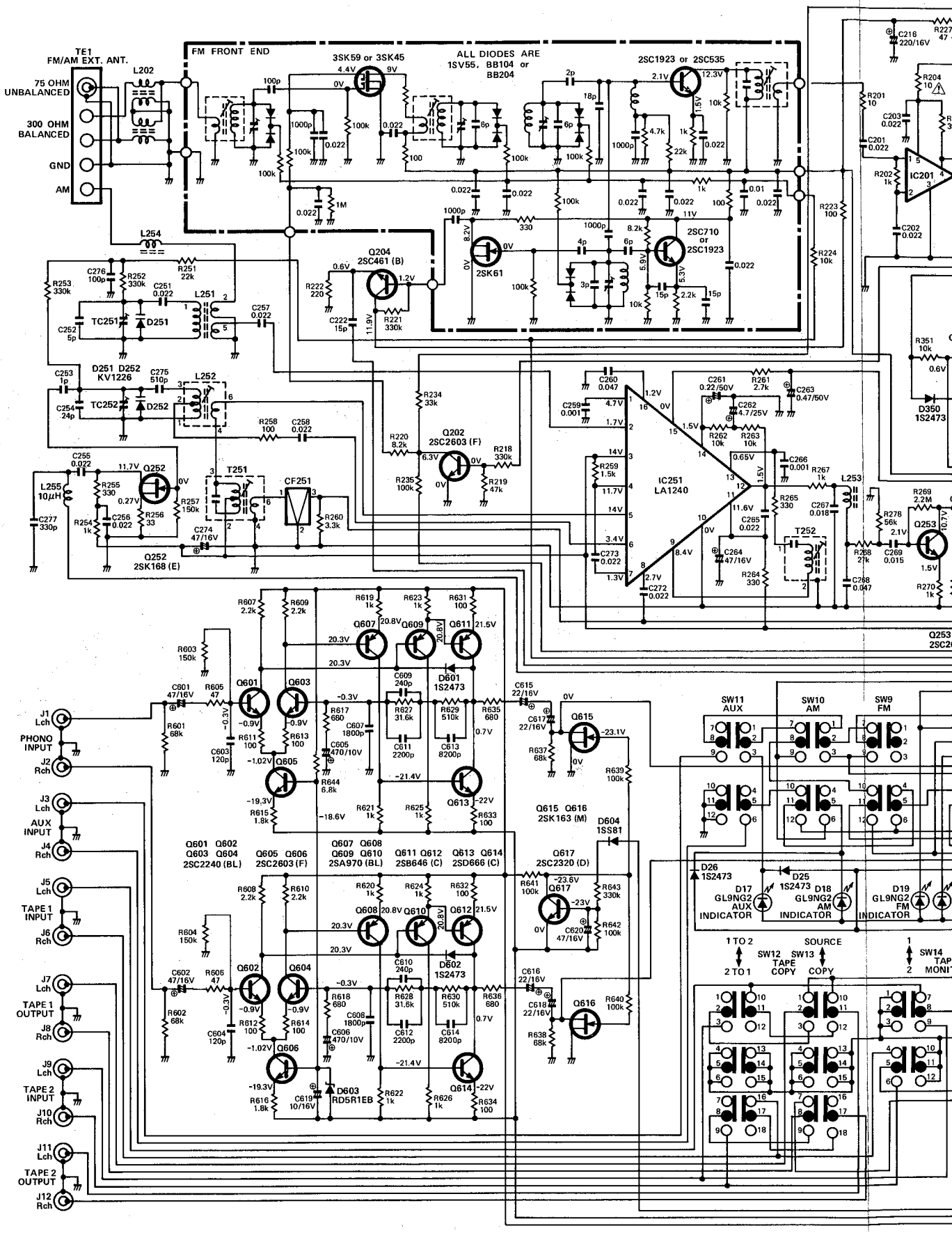


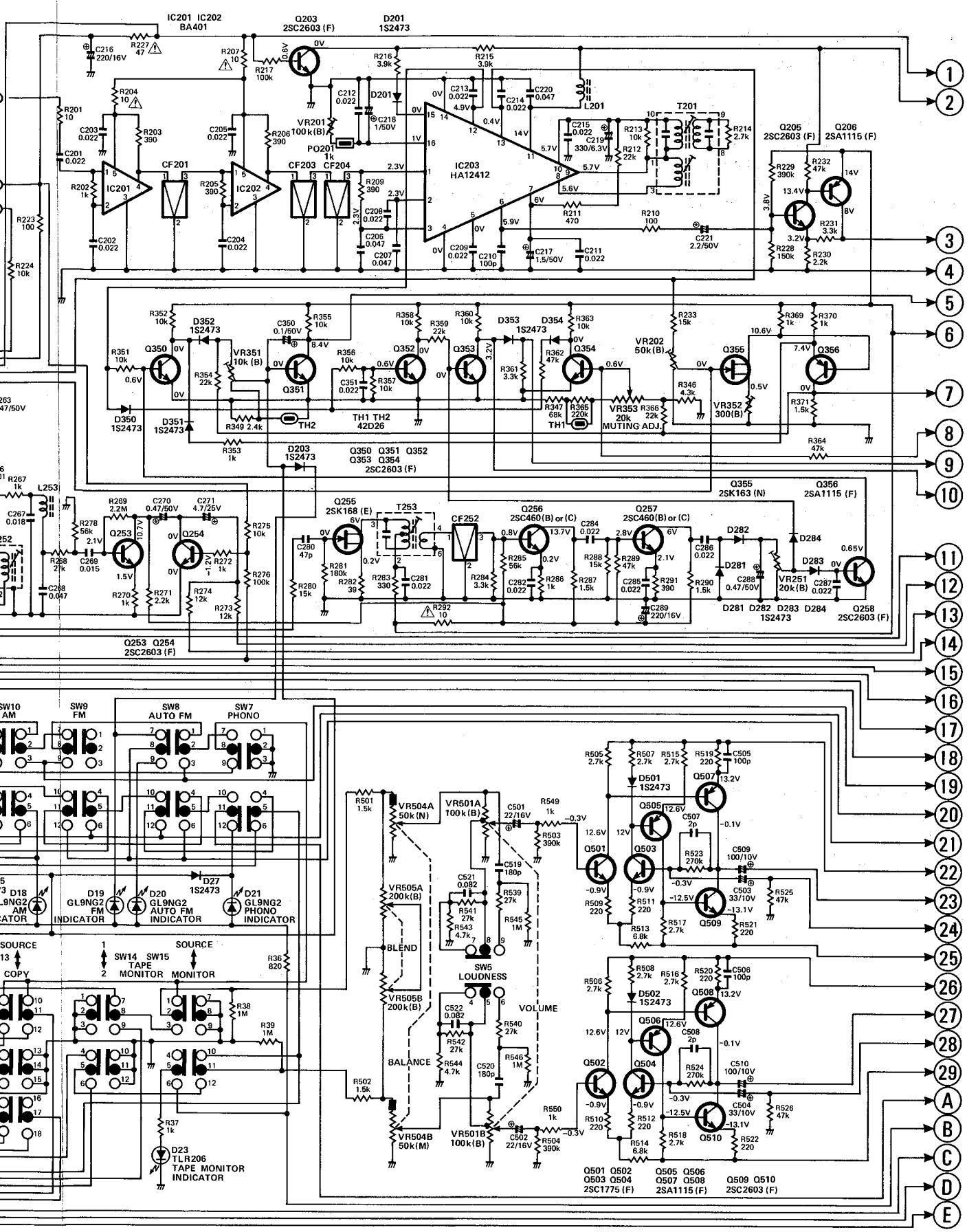
Fig. 1—Alignment Points Location

SCHEMATIC DIAGRAM

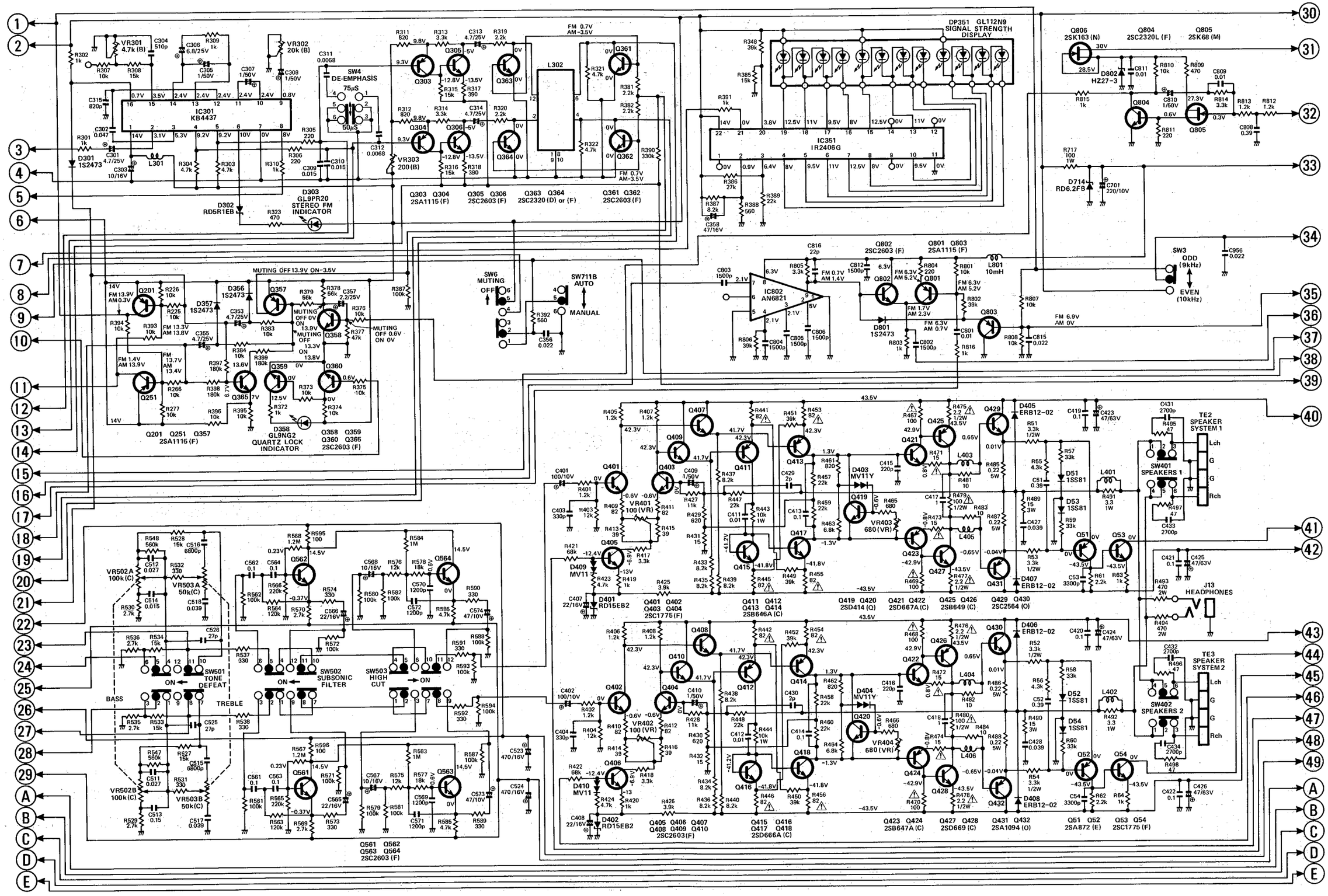


SCHEMATIC DIAGRAM




IC201 IC202 BA401
Q203 2SC2603 (F)
D201 1S2473
IC203 HA12412
T201
L201
CF201
CF203 CF204
VR201 100k(B)
PO201 1k
Q205 2SC2603 (F)
Q206 2SA1115 (F)
D352 1S2473
VR351 10k (B)
Q350
Q351
Q352
Q353
Q354
D353 D354 1S2473
VR202 50k(B)
Q355
Q356
D350 1S2473
D351 1S2473
TH2
TH1 TH2 42D26
TH1
VR353 20k MUTING ADJ.
VR352 300(B)
D203 1S2473
Q350 Q351 Q352 Q353 Q354 2SC2603 (F)
Q355 2SK163 (N)
Q356 2SA1115 (F)
Q255 2SK168 (E)
T253
CF252
Q256 2SC460(B) or (C)
Q257 2SC460(B) or (C)
D282
D284
D281
D283
VR251 20k(B)
D281 D282 D283 D284 1S2473
Q258 2SC2603 (F)
Q253 Q254 2SC2603 (F)
SW10 AM
SW9 FM
SW8 AUTO FM
SW7 PHONO
D18 GL9NG2 AM INDICATOR
D19 GL9NG2 FM INDICATOR
D20 GL9NG2 AUTO FM INDICATOR
D21 GL9NG2 PHONO INDICATOR
D27 1S2473
SOURCE
COPY
SW14 SW15 TAPE MONITOR
SOURCE
D23 TLR206 TAPE MONITOR INDICATOR
VR504A 50k (N)
VR501A 100k (B)
VR505A 200k(B)
BLEND
VR505B 200k(B)
VR504B 50k(M)
VR501B 100k(B)
SW5 LOUDNESS
VOLUME
BALANCE
D501 1S2473
D502 1S2473
Q501 Q502 Q503 Q504 2SC1775 (F)
Q505 Q506 Q507 Q508 2SA1115 (F)
Q509 Q510 2SC2603 (F)

SCHEMATIC DIAGRAM



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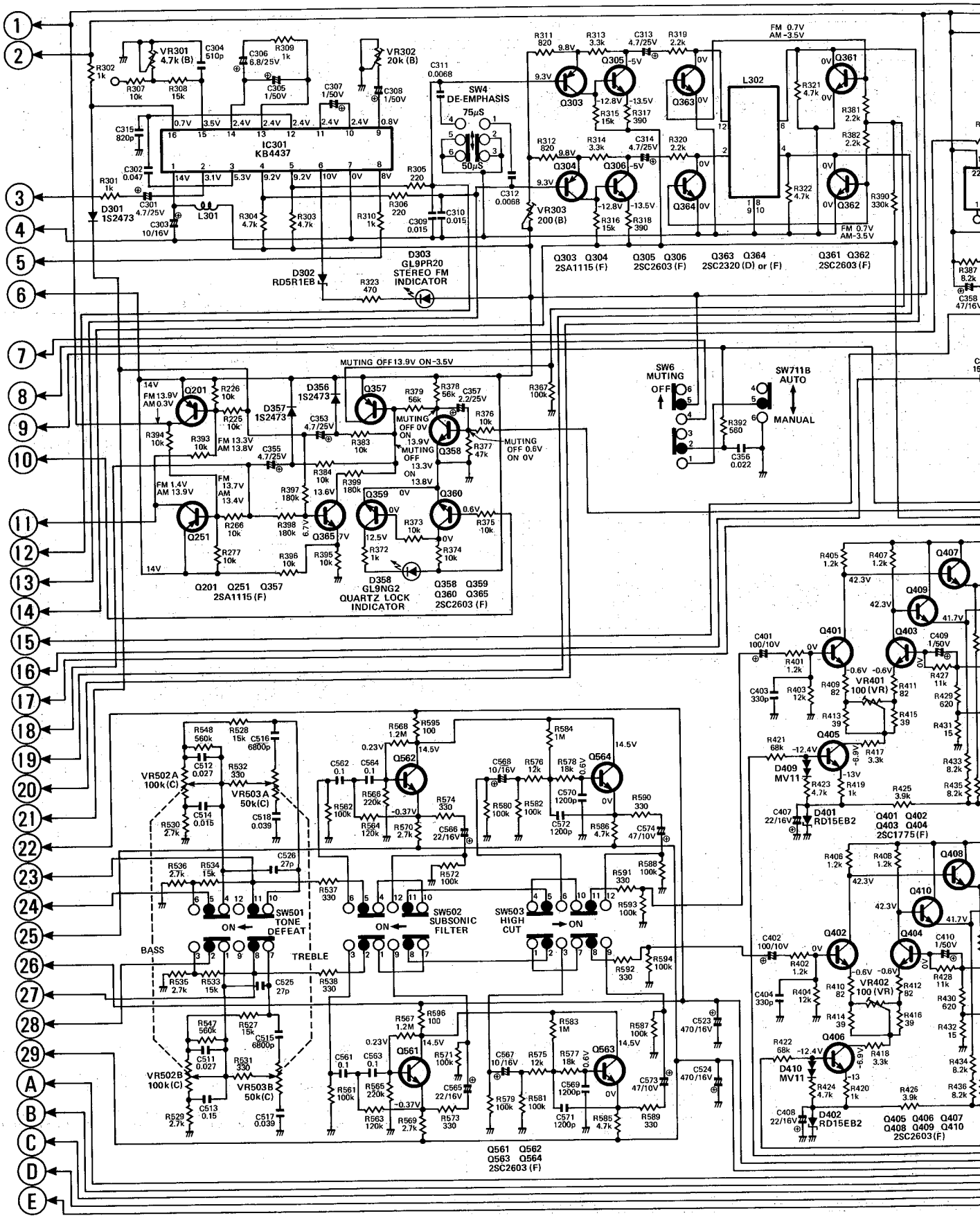

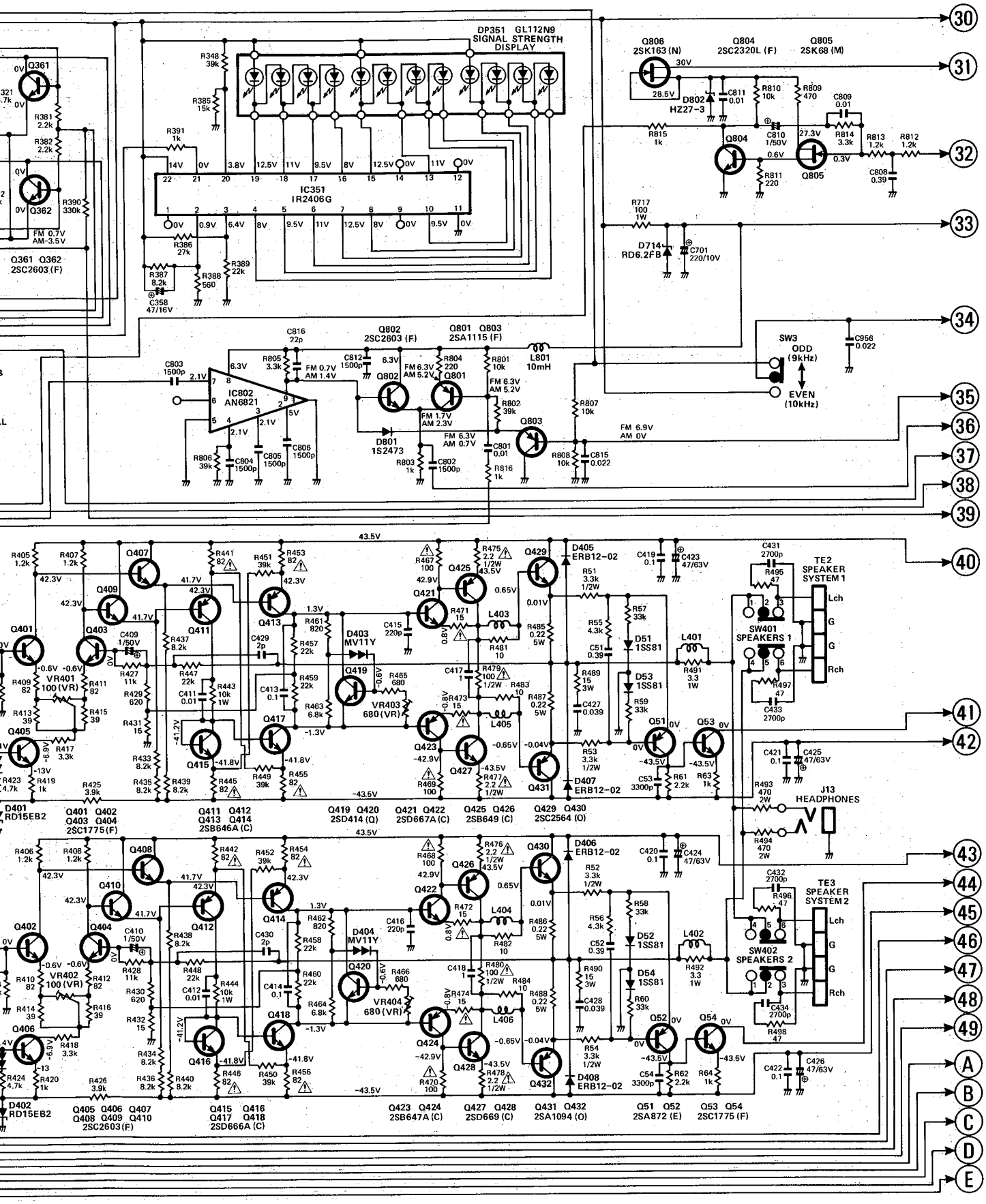
DP351 GL112N9
SIGNAL STRENGTH
DISPLAY
IC351
IR2406G
IC802
AN6821
Q361 Q362
2SC2603 (F)
Q802
2SC2603 (F)
Q801 Q803
2SA1115 (F)
Q806
2SK163 (N)
Q804
2SC2320L (F)
Q805
2SK68 (M)
D802
HZ27-3
D714
RD6.2FB
D801
1S2473
SW3
ODD
(9kHz)
EVEN
(10kHz)
SW401
SPEAKERS 1
SW402
SPEAKERS 2
TE2
SPEAKER
SYSTEM 1
TE3
SPEAKER
SYSTEM 2
J13
HEADPHONES
VR401
100 (VR)
VR402
100 (VR)
VR403
680 (VR)
VR404
680 (VR)
D401
RD15EB2
D402
RD15EB2
D405
ERB12-02
D406
ERB12-02
D407
ERB12-02
D408
ERB12-02
D403
MV11Y
D404
MV11Y
Q401 Q402
Q403 Q404
2SC1775 (F)
Q405 Q406 Q407
Q408 Q409 Q410
2SC2603 (F)
Q411 Q412
Q413 Q414
2SB646A (C)
Q415 Q416
Q417 Q418
2SD666A (C)
Q419 Q420
2SD414 (Q)
Q421 Q422
2SD667A (C)
Q423 Q424
2SB647A (C)
Q425 Q426
2SB649 (C)
Q427 Q428
2SD669 (C)
Q429 Q430
2SC2564 (O)
Q431 Q432
2SA1094 (O)
Q51 Q52
2SA872 (E)
Q53 Q54
2SC1775 (F)
L401
L402
L403
L404
L405
L406
L801
10mH
Lch
G
G
Rch
30
31
32
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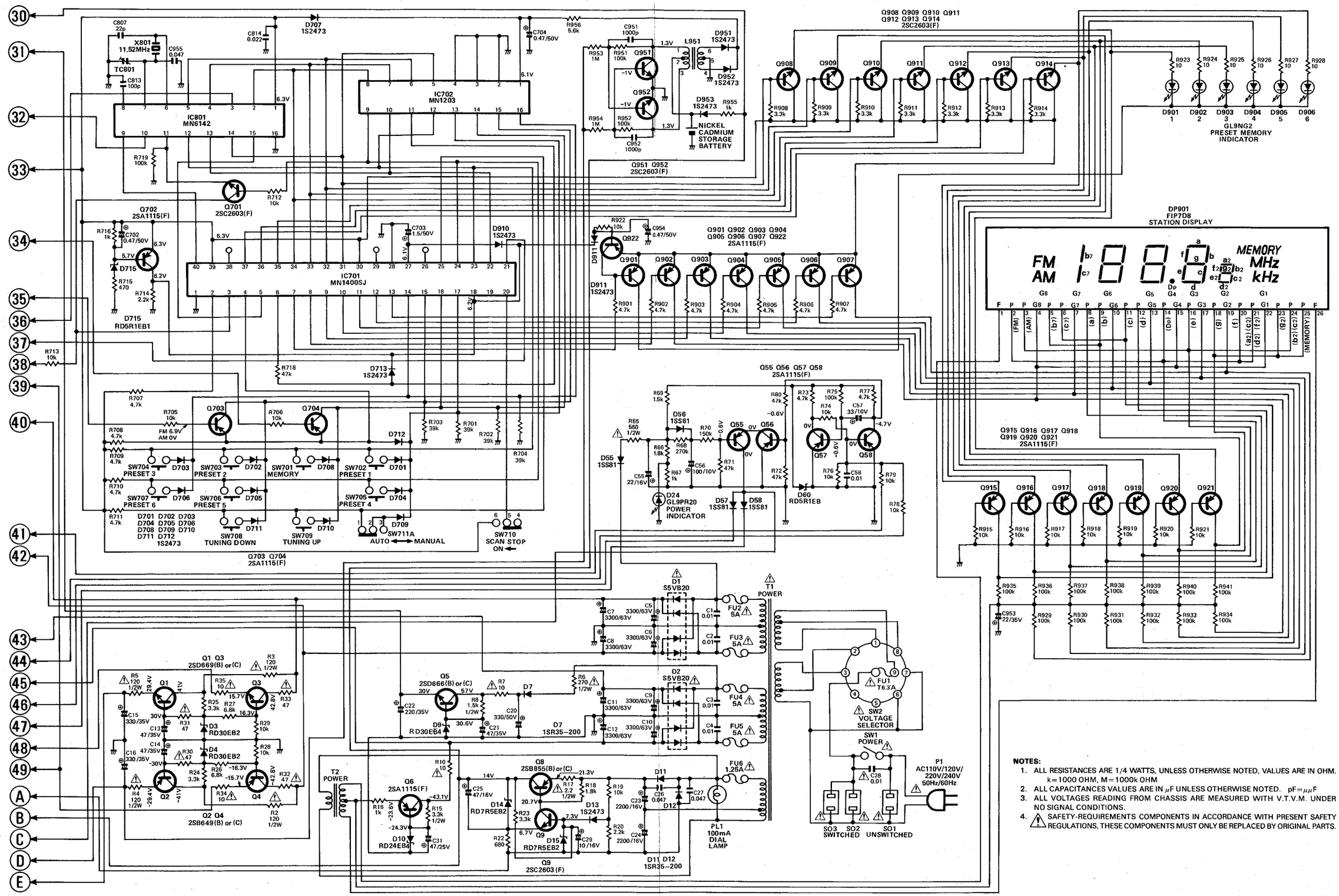
A
B
C
D
E

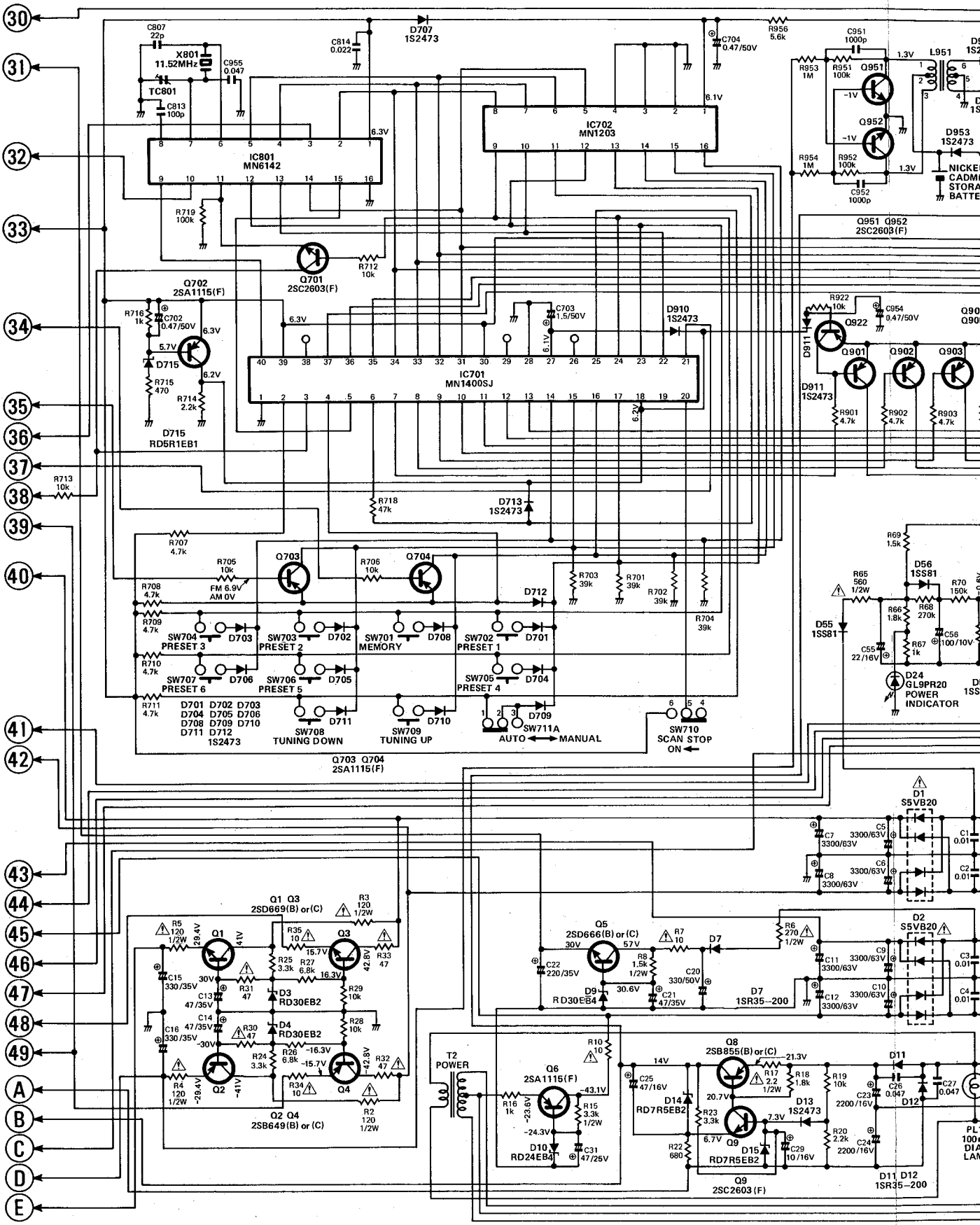
SCHEMATIC DIAGRAM

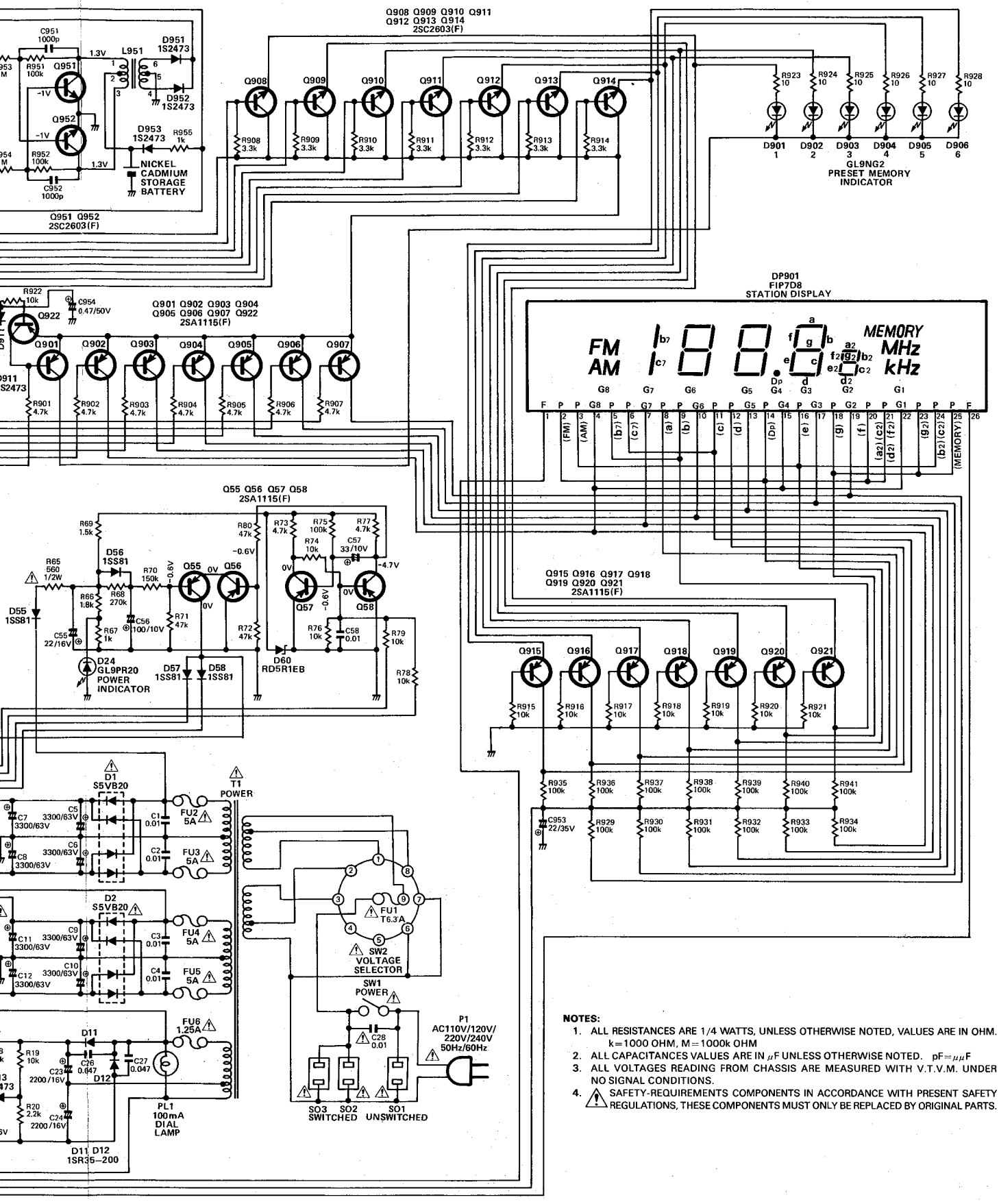


NOTES:

1. ALL RESISTANCES ARE 1/4 WATTS, UNLESS OTHERWISE NOTED, VALUES ARE IN OHM. k=1000 OHM, M=1000k OHM
2. ALL CAPACITANCES VALUES ARE IN μF UNLESS OTHERWISE NOTED. pF=$\mu\mu$F
3. ALL VOLTAGES READING FROM CHASSIS ARE MEASURED WITH V.T.V.M. UNDER NO SIGNAL CONDITIONS.
4. ⚠ SAFETY-REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS, THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.

SCHEMATIC DIAGRAM

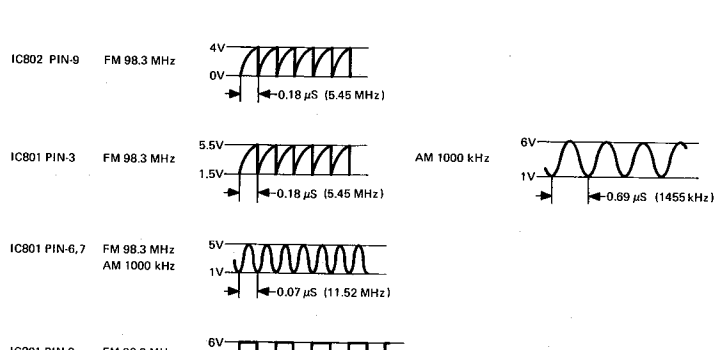




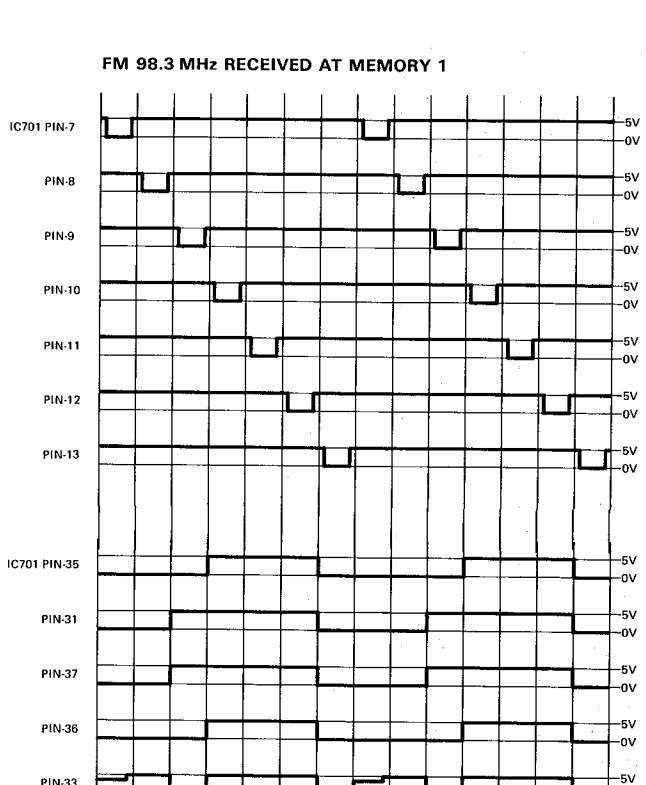
NOTES:

1. ALL RESISTANCES ARE 1/4 WATTS, UNLESS OTHERWISE NOTED, VALUES ARE IN OHM. k=1000 OHM, M=1000k OHM
2. ALL CAPACITANCES VALUES ARE IN μF UNLESS OTHERWISE NOTED. pF=$\mu\mu$F
3. ALL VOLTAGES READING FROM CHASSIS ARE MEASURED WITH V.T.V.M. UNDER NO SIGNAL CONDITIONS.
4. ⚠ SAFETY-REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS, THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.

TIME/SEQUENCE CHART

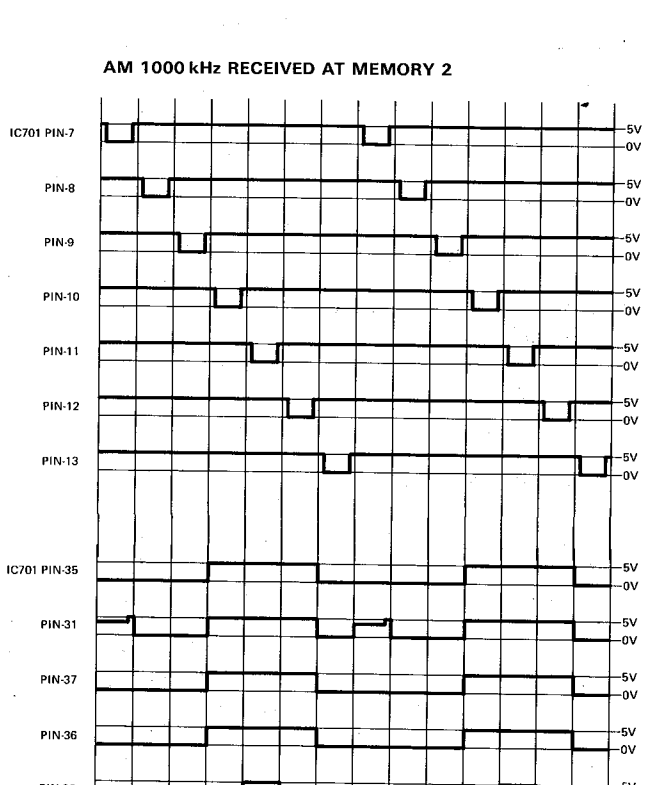


FM 98.3 MHz RECEIVED AT MEMORY 1



NOTE : The output signal from terminal number 7 in IC701 is applied to the oscillator trigger input.

AM 1000 kHz RECEIVED AT MEMORY 2



NOTE : The output signal from terminal number 7 in IC701 is applied to the oscillator trigger input.

PARTS LIST

Ref. No.	Part No.	Description
	GENERAL UNIT	
	A423-HK1680	Cabinet Bottom Assembly
	A443-HK1680	Front Panel Assembly
	A634-HK1680A	Knob Assembly, Volume
	A634-HK1680B	Knob Assembly, Bass, Treble, Balance, Blend
	A662-HK1680A	Push Button Assembly, Power
	A662-HK1680B	Push Button Assembly, Speakers 1, Speakers 2, Phono, Auto FM, FM, AM, AUX
	A662-HK1680C	Push Button Assembly, Memory, FM/AM Preset Memory, Scan Stop, Tuning
	A662-HK1680D	Push Button Assembly, Tape Copy, Tape Monitor, Tone Defeat, Subsonic Filter, High Cut, Loudness, Muting
	1319-0153	Foot, Cabinet Bottom
	1424-04303	Cabinet Back
	1415-02601	Cabinet Top
	1425-06201	Cabinet Bottom
	1514-05001	Flate, Front Panel
	1721-01001	Indication Plate, Clear Panel
	2310-7015	Special Screw, Ground Terminal
	2410-7005	Special Washer, Ground Terminal
	2440-7011	Special Nut, Ground Terminal
	RESISTORS	
R2,3	5102-1215114	120 ohm ±5% 1/2W Fuse
R4,5	5102-1215710	120 ohm ±5% 1/2W Fuse
R6	5102-2715114	270 ohm ±5% 1/2W Fuse
R7,10,34,35	5102-1004713	10 ohm ±2% 1/4W Fuse
R17	5102-2R25710	2.2 ohm ±5% 1/2W Fuse
R30,31,32,33	5102-4704713	47 ohm ±2% 1/4W Fuse
R65	5102-5615710	560 ohm ±2% 1/2W Fuse
R204,207,292	5102-1004713	10 ohm ±2% 1/4W Fuse
R227	5102-4704713	47 ohm ±2% 1/4W Fuse
R441,442,445,446,453, 454,455,456	5102-8204713	82 ohm ±2% 1/4W Fuse
R467,468,469,470	5102-1014713	100 ohm ±2% 1/4W Fuse
R471,472,473,474	5102-1504713	15 ohm ±2% 1/4W Fuse
R475,476,477,478	5102-2R25710	2.2 ohm ±5% 1/2W Fuse
R479,480	5102-1015710	100 ohm ±5% 1/2W Fuse
R485/487,486/488	5275-R22671	0.22 ohm ±10% 5W×2 Cement (Special Dual)
VR201	5101-10471913	Variable Resistor, 100 k ohm
VR202	5101-50371913	Variable Resistor, 50 k ohm
VR251	5101-2037187	Variable Resistor, 20 k ohm
VR301	5101-4727173	Variable Resistor, 4.7 k ohm
VR302	5101-20371913	Variable Resistor, 20 k ohm
VR303	5101-2017187	Variable Resistor, 200 ohm
VR351	5101-10371913	Variable Resistor, 10 k ohm
VR352	5101-30171913	Variable Resistor, 300 ohm
VR353	5113-2037131	Variable Resistor, 20 k ohm Muting Adj.
VR401,402	5101-1017375	Variable Resistor, 100 ohm
VR403,404	5101-6817775	Variable Resistor, 680 ohm
VR501	5116-1047343	Variable Resistor, 100 k ohm Volume Control
VR502	5113-1048177	Variable Resistor, 100 k ohm Bass Control
VR503	5113-5038277	Variable Resistor, 50 k ohm Treble Control
VR504	5113-50376100	Variable Resistor, 50 k ohm Balance Control
VR505	5113-20475122	Variable Resistor, 200 k ohm Blend Control
	CAPACITORS	
TC251,252	5371-64	Trimmer Capacitor
TC801	5371-59	Trimmer Capacitor
C5,6,7,8,9,10,11,12	5341-338G0955	3300μF ±20% 63V Electrolytic

Ref. No.	Part No.	Description
C20	5345-337-50	330μF +50% −10% 50V Electrolytic
C23,24	5345-228-16	2200μF +50% −10% 16V Electrolytic
C28	5352-1030961	0.01μF ±20% AC250V Metalized Polyester
	INTEGRATED CIRCUITS	
IC201,202	5652-BA401	BA401 FM IF Amp.
IC203	5652-HA12412	HA12412 FM IF Amp./FM Det.
IC251	5652-LA1240	LA1240 AM Converter/AM IF Amp.
IC301	5652-KB4437	KB4437 FM Multiplex
IC351	5652-IR2406G	IR2406G Signal Strenght Display Driver
IC701	5654-MN1400SJ	MN1400SJ Synthesizer Controller
IC702	5654-MN1203	MN1203 Memory
IC801	5654-MN6142	MN6142 PLL
IC802	5654-AN6821	AN6821 Pre-Scaler
	TRANSISTORS	
Q1,3	5614-669(B)	2SD669(B)or(C) }
Q2,4	5612-649(B)	2SB649(B)or(C) } Voltage Regulator
Q5	5614-666(B)	2SD666(B)or(C) }
Q6,55,56,57,58	5611-1115(F)	2AS1115(F) Voltage Regulator, Audio Muting, Overload Protector
Q8	5612-855(B)	2SB855(B)or(C) } Voltage Regulator
Q9	5613-2603(F)	2SC2603(F) }
Q51,52	5611-872(E)	2SA872(E) } Overload Protector
Q53,54	5613-1775(F)	2SC1775(F) }
Q201,206,251	5611-1115(F)	2SA1115(F) FM Voltage Supply, FM Demodulati on Signal Amp., AM Voltage Supply
Q202,203,205,253,254, 258	5613-2603(F)	2SC2603(F) FM AGC, FM/AM Switching, FM Demodulation Signal Amp., AM AF Amp., AM Muting, Switching
Q204	5613-461(B)	2SC461(B) FM Osc., Buffer
Q252,255	5616-2SK168(E	F.E.T., 2SK168(E) AM Osc., Buffer, Auto Scan Stop Control Amp.
Q256,257	5613-460(B)	2SC460(B)or(C) Auto Scan Stop Control Amp.
Q303,304,356,357	5611-1115(F)	2SA1115(F) MPX Output Amp., Signal Strength Display Level Amp., Muting
Q305,306,350,351,352, 353,354,358,359,360, 361,362,365	5613-2603(F)	2SC2603(F) MPX Output Amp., Synthesizer/Quartz Lock Switching, Mono/Stereo Switching, Muting, Synthesizer/Quartz Lock Lever Sensor, Quartz Lock Indicator Driver, FM Muting, Muting
Q355	5616-2SK163(N	F.E.T., 2SK163(N) Signal Strength Display Level Amp.
Q363,364	5613-2320(D)	2SC2320(D)or(F) FM Muting
Q401,402,403,404	5613-1775(F)	2SC1775(F) }
Q405,406,407,408,409, 410	5613-2603(F)	2SC2603(F) }
Q411,412,413,414	5612-646A(C)	2SB646A(C) }
Q415,416,417,418	5614-666A(C)	2SD666A(C) }
Q419,420	5614-414(Q)	2SD414(Q) }
Q421,422	5614-667A(C)	2SD667A(C) } Power Amp.
Q423,424	5612-647A(C)	2SB647A(C) }
Q425,426	5612-649(C)	2SB649(C) }
Q427,428	5614-669(C)	2SD669(C) }
Q429,430	5613-2564(O)	2SC2564(O) }
Q431,432	5611-1094(O)	2SA1094(O) }
Q501,502,503,504	5613-1775(F)	2SC1775(F) } Flat/Tone Control Amp.
Q505,506,507,508	5611-1115(F)	2SA1115(F) }
Q509,510,561,562,563, 564	5613-2603(F)	2SC2603(F) Flat/Tone Control Amp., Subsonic Filter, High-Cut Filter
Q601,602,603,604	5613-2240(BL)	2SC2240(BL) Equalizer Amp.

Ref. No.	Part No.	Description
Q605,606	5613-2603(F)	2SC2603(F)
Q607,608,609,610	5611-970(BL)	2SA970(BL)
Q611,612	5612-646(C)	2SB646(C) } Equalizer Amp.
Q613,614	5614-666(C)	2SD666(C)
Q615,616	5616-2SK163(M	F.E.T., 2SK163(M) Muting
Q617	5613-2320(D)	2SC2320(D) Muting
Q701	5613-2603(F)	2SC2603(F) Switching
Q702,703,704	5611-1115(F)	2SA1115(F) Switching, AM Osc. Amp.
Q801,802,803	5611-1115(F)	2SA1115(F) Pre-Scaler Buffer, Switching
Q804	5613-2320L(F)	2SC2320L(F)
Q805	5616-2SK68(M)	F.E.T., 2SK68(M) } Low Pass Filter
Q806	5616-2SK163(N	F.E.T., 2SK163(N) Current Regulator
Q901,902,903,904,905, 906,907,915,916,917, 918,919,920,921,922	5611-1115(F)	2SA1115(F) Station Display/Preset Memory Indicator Driver
Q908,909,910,911,912, 913,914,951,952	5613-2603(F)	2SC2603(F) Station Dispaly/Preset Memory Indicator Driver, Memory IC Back Up Osc.
	DIODES	
D1,2	5685-S5VB20	Bridge Silicon, S5VB20
D3,4	5635-RD30EB2	Zener, RD30EB2
D7,11,12	5632-1SR35-20	1SR35-200
D9	5635-RD30EB4	Zener, RD30EB4
D10	5635-RD24EB2	Zener, RD24EB2
D13,25,26,27	5631-1S2473	1S2473
D14,15	5635-RD7R5EB2	Zener, RD7.5EB2
D17,18,19,20,21	5637-GL9NG2	Light Emitting Diode, GL9NG2 AUX, AM, FM, Auto FM, Phono Indicator
D23	5637-TLR206	Light Emitting Diode, TLR206 Tape Monitor Indicator
D24	5637-GL9PR20	Light Emitting Diode, GL9PR20 Power Indicator
D51,52,53,54,55,56,57,58	5636-1SS81	1SS81
D60	5635-RD5R1EB	Zener, RD5.1EB
D201,203,281,282,283, 284	5631-1S2473	1S2473
D251/252	5633-KV1226	KV1226
D301,350,351,352,353, 354,356,357	5631-1S2473	1S2473
D302	5635-RD5R1EB	Zener, RD5.1EB
D303	5637-GL9PR20	Light Emitting Diode, GL9PR20 Stereo FM Indicator
D358	5637-GL9NG2	Light Emitting Diode, GL9NG2 Quartz Lock Indicator
D401,402	5635-RD15EB2	Zener, RD15EB2
D403,404	5641-MV11Y	Varistor, MV11Y
D405,406,407,408	5632-ERB12-02	ERB12-02
D409,410	5641-MV11	Varistor, MV11
D501,502	5631-1S2473	1S2473
D601,602	5631-1S2473	1S2473
D603	5635-RD5R1EB	Zener, RD5.1EB
D604	5636-1SS81	1SS81
D701,702,703,704,705, 706,707,708,709,710, 711,712,713	5631-1S2473	Diode, 1S2473
D714	5635-RD6R2FB	Zener, RD6.2FB
D715	5635-RD5R1EB1	Zener, RD5.1EB1
D801	5631-1S2473	1S2473
D802	5635-HZ27-3	Zener, HZ27-3
D901,902,903,904,905,906	5637-GL9NG2	Light Emitting Diode, GL9NG2 Preset Memory Indicator
D910,911,951,952,953	5631-1S2473	1S2473
DP351	5623-GL112N9	LED Display Assembly, GL112N9 Signal Strenght Display

Ref. No.	Part No.	Description
DP901	5722-9	Tube Display Assembly, FIP7D8 Station Display
	COILS	
L201,301	5995-100325	Coil, RF Choke
L202	5995-703027	Coil, FM RF Balun
L251	5911-208	AM Ferrite Loopstick Antenna
L252	5923-71220	Coil, AM Osc.
L253	5995-563250	Coil, Filter
L254	5995-470325	Coil, Choke
L255	5995-100325	Coil, Choke
L401,402	5991-7135	Coil, RF Choke
L801	5995-100325	Coil, Choke
L951	5933-70215	Coil, Back Up Osc.
	TRANSFORMERS	
T1	5584-702355	Transformer, Power
T2	5584-701345	Transformer, Station Display Filament
T201	5574-7043	Transformer, Quadrature Det.
T251,253	5552-7027	Transformer, AM IF, Filter
T252	5932-7023	Transformer, AM IF
	MISCELLANEOUS	
	6114-7119	FM Tuner Assembly
	4196-NR-AA	Nickel Cadmium Storage Battery
	1397-6	Dipole Antenna
CF201	5671-7120A	Ceramic Filter, FM IF
CF203,204	5671-7119A	Ceramic Filter, FM IF
CF251	5671-7128A	Ceramic Filter, AM IF
CF252	5671-7129A	Ceramic Filter, Filter
FH1	4472-7122	Fuse Holder, FU1
FU1	5732-632030	Fuse, 6.3A 250V
FU2,3,4,5	5732-502030	Fuse, 5A 250V
FU6	5732-122030	Fuse, 1.25A 250V
J1,2,3,4,5,6,7,8,9,10, 11,12	4486-6	6-Pin Jack, Phono, AUX, Tape 1, Tape 2
J13	4451-00108	Jack, Headphones
L302	5214-8	LC Components, Low Pass Filter
L403,404,405,406	5597-45502	Ferrite Bead
P1	4161-71120	AC Line Cord
PL1	5731-1507245	Lamp, 15V 100 mA Dial Illuminator
PO201	5192-102723	PTC Thermistor, 1 k ohm
TE1	4214-113	FM/AM External Antenna Terminal
TE2,3	4214-7034	Speaker Terminal, Speaker System 1, 2
TH1,2	5191-42D26	Thermistor, 42D26
SO1,2,3	4474-151	External AC Socket, Unswitched, Switched
SW1	4431-01017658	Push Switch, Power
SW2	4467-5	Power Source Voltage Selector
SW3	4421-0227131	Slide Switch, Frequency Interval Selector
SW4	4421-022110	Slide Switch, De-Emphasis
SW5,6	4431-02087160	Push Switch, Loundness, Muting
SW7,8,9,10,11	4431-05207149	Push Switch, Function Selector
SW12,13	4431-02127359	Push Switch, Tape Copy
SW14,15	4431-02087159	Push Switch, Tape Monitor
SW401,402	4431-02047451	Push Switch, Speakers 1, Speakers 2
SW501	4431-01047994	Push Switch, Tone Defeat
SW502,503	4431-02087259	Push Switch, Subsonic Filter, High Cut
SW701,702,703,704,705, 706,707,708,709	4431-01010170	Push Switch, FM/AM Preset Memory, Tuning Down, Tuning Up
SW710,711	4431-02047459	Push Switch, Scan Stop, Auto/Manual Tuning
X801	5691-01152019	Crystal Osc., 11.52 MHz